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- CHAPTER 2:** **SET THEORY** — Sets and their Representations; Types of Sets; Subsets; Venn Diagrams; Operations on Sets.
- CHAPTER 3:** **FUNCTIONS** — Relations; Types of Relations; Functions; Domain, Co-domain and Range; Inverse Trigonometric Functions; Real Valued Functions; Arithmetic Combinations of Functions; Different types of Functions; Composition of Functions.
- CHAPTER 4:** **AVERAGE, RATIO & PROPORTION** — Average; Mixture Problems; Unitary Ratio; Comparison of Two or More Ratios; Composition of Ratios; Ratios Applications; Direct and Inverse Variation Alligation; Partnership.
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- CHAPTER 9:** **MENSURATION** — Polygon; Circle; Surface Areas Volumes and Areas of Solids; Cube and Cuboid; Cylinder; Sphere; Pyramid; Conversion of Solid from One Shape to Another.
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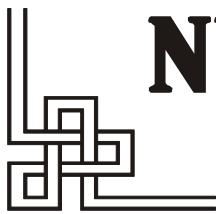
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- CHAPTER 24:** **READING COMPREHENSION Based on HUMANITIES** — Passages based on Literature, Criticism Art, Philosophy etc.

# UNIT - I : QUANTITATIVE APTITUDE

# 1

## CHAPTER



# NUMBER SYSTEM



1. What is the smallest number which when increased by 5 is completely divisible by 8, 11 and 24? (1994)  
 (a) 264 (b) 259 (c) 269 (d) None of these

2. Which is the least number that must be subtracted from 1856, so that the remainder when divided by 7, 12 and 16 will leave the same remainder 4 (1994)  
 (a) 137 (b) 1361 (c) 140 (d) 172

3. Two positive integers differ by 4 and sum of their reciprocals is  $10/21$ . Then one of the number is (1995)  
 (a) 3 (b) 1 (c) 5 (d) 21

4. Three bells chime at an interval of 18, 24 and 32 minutes respectively. At a certain time they begin to chime together. What length of time will elapse before they chime together again? (1995)  
 (a) 2 hours 24 minutes (b) 4 hours 8 minutes (c) 1 hour 36 minutes (d) 5 hours

5. For the product  $n(n+1)(2n+1)$ ,  $n \in \mathbb{N}$ , which one of the following is not necessarily true? (1995)  
 (a) It is always even.  
 (b) Divisible by 3.  
 (c) Always divisible by the sum of the square of first  $n$  natural numbers  
 (d) Never divisible by 237.

6. The remainder obtained when a prime number greater than 6 is divided by 6 is (1995)  
 (a) 1 or 3 (b) 1 or 5 (c) 3 or 5 (d) 4 or 5

7. Cost of 72 hens is Rs .....96.7..... Then, what will be the cost of hen, where two digits in place of “.....” are not visible or are written in illegible hand-writing? (1995)  
 (a) Rs. 3.23 (b) Rs. 5.11 (c) Rs. 5.51 (d) Rs. 7.22

8. Three consecutive positive even numbers are such that thrice the first number exceeds double the third number by 2 then the third number is (1995)  
 (a) 10 (b) 14 (c) 16 (d) 12

9.  $5^6 - 1$  is divisible by (1995)  
 (a) 13 (b) 31 (c) 5 (d) None of these

10. If a number 774958A96B is to be divisible by 8 and 9, the values of A and B, respectively, will be (1996)  
 (a) 7, 8 (b) 8, 0 (c) 5, 8 (d) None of these

11. If  $n$  is any odd number greater than 1, then  $n(n^2 - 1)$  is (1996)  
 (a) divisible by 48 always (b) divisible by 24 always (c) divisible by 6 always (d) None of these

12. Find the value of 
$$\frac{1}{1 - \frac{1}{3 - \frac{4}{2 - \frac{1}{3 - \frac{1}{2}}}}} - \frac{3}{3 - \frac{1}{2 - \frac{1}{2}}}$$
 (1996)  
 (a) 13/7 (b) 15/7 (c) 11/21 (d) 17/28

**Directions for questions 13 & 14 :** Read the information given below and answer the questions that follow :

A salesman enters the quantity sold and the price into the computer. Both the numbers are two-digit numbers. Once, by mistake, both the numbers were entered with their digits interchanged. The total sales value remained the same, i.e. Rs 1148, but the inventory reduced by 54.

13. What is the actual price per piece ? (1996)  
(a) 82 (b) 41 (c) 56 (d) 28

14. What is the actual quantity sold ? (1996)  
(a) 28 (b) 14 (c) 82 (d) 41

15. If  $n$  is an integer, how many values of  $n$  will give an integral value of  $(16n^2 + 7n + 6) / n$ ? (1997)  
 (a) 2 (b) 3 (c) 4 (d) None of these
16. A student, instead of finding the value of  $7/8$ th of a number, found the value of  $7/18$ th of the number. If his answer differed from the actual one by 770, find the number. (1997)  
 (a) 1584 (b) 2520 (c) 1728 (d) 1656
17. If  $m$  and  $n$  are integers divisible by 5, which of the following is not necessarily true? (1997)  
 (a)  $m - n$  is divisible by 5 (b)  $m^2 - n^2$  is divisible by 25  
 (c)  $m + n$  is divisible by 10 (d) None of these
18. Which of the following is true? (1997)  
 (a)  $7^{3^2} (7^3)^2$  (b)  $7^{3^2} (7^3)^2$  (c)  $7^{3^2} (7^3)^2$  (d) None of these
19. P, Q and R are three consecutive odd numbers in ascending order. If the value of three times P is three less than two times R, find the value of R. (1997)  
 (a) 5 (b) 7 (c) 9 (d) 11
20. A, B and C are defined as follows : (1997)  
 A  $(2.000004) \div [(2.000004)^2 - (4.000008)]$   
 B  $(3.000003) \div [(3.000003)^2 - (9.000009)]$   
 C  $(4.000002) \div [(4.000002)^2 - (8.000004)]$   
 Which of the following is true about the value of the above three expressions?  
 (a) All of them lie between 0.18 and 0.20 (b) A is twice of C  
 (c) C is the smallest (d) B is the smallest
21. P and Q are two integers such that  $(PQ) = 64$ . Which of the following cannot be the value of  $P + Q$ ? (1997)  
 (a) 20 (b) 65 (c) 16 (d) 35
22. Five digit numbers are formed using only 0,1,2,3,4 exactly once. What is the difference between the maximum and minimum number that can be formed? (1998)  
 (a) 19800 (b) 41976 (c) 32976 (d) None of these
23.  $n^3$  is odd. Which of the following statements is/are true? (1998)  
 I.  $n$  is odd II.  $n^2$  is odd III.  $n^2$  is even  
 (a) I only (b) II only (c) I and II only (d) I and III only
24.  $(BE)^2 = MPB$ , where B, E, M and P are distinct integers, then M = ? (1998)  
 (a) 2 (b) 3 (c) 9 (d) None of these
25. Three wheels can complete respectively 60,36,24 revolutions per minute. There is a red spot on each wheel that touches the ground at time zero. After how much time, all these spots will simultaneously touch the ground again? (1998)  
 (a)  $5/2$  seconds (b)  $5/3$  seconds (c) 5 seconds (d) 7.5 seconds
26. A certain number when divided by 899 leaves the remainder 63. Find the remainder when the same number is divided by 29. (1998)  
 (a) 5 (b) 4 (c) 1 (d) Cannot be determined
27. A is the set of positive integers such that when divided by 2,3,4,5 and 6 leaves the remainders 1,2,3,4 and 5 respectively. How many integer(s) between 0 and 100 belongs to set A? (1998)  
 (a) 0 (b) 1 (c) 2 (d) None of these
28. Number of students who have opted the subjects A, B, C are 60, 84, 108 respectively. The examination is to be conducted for these students such that only the students of the same subject are allowed in one room. Also the number of students in each room must be same. What is the minimum number of rooms that should be arranged to meet all these conditions? (1998)  
 (a) 28 (b) 60 (c) 12 (d) 21
29. What is the digit in the unit place of  $25^1$ ? (1998)  
 (a) 2 (b) 8 (c) 1 (d) 4
30. A hundred digit number is formed by writing first 54 natural numbers in front of each other as 12345678910111213.....5354. Find the remainder when this number is divided by 8 (1998)  
 (a) 4 (b) 7 (c) 2 (d) 0
31. If  $n = 1 + x$ , where 'x' is the product of four consecutive positive integers, then which of the following statements is/are true? (1999)  
 I. 'n' is odd II. 'n' is prime III. 'n' is perfect square  
 (a) I only (b) II only (c) III only (d) I & III only

32.  $n^2 = 12345678987654321$ , then,  $n = ?$  (1999)  
 (a) 1246789 (b) 12345321 (c) 1111111 (d) 11111111
33. When  $7^{84}$  is divided by 342, what is the remainder? (1999)  
 (a) 0 (b) 1 (c) 49 (d) 341
34. A, B, C are three distinct digits. AB is a two digit number and CCB is a three digit number such that  $(AB)^2 = CCB$  where  $CCB > 320$ . What is the possible value of the digit B? (1999)  
 (a) 1 (b) 0 (c) 3 (d) 9
35. For the given pair (x, y) of positive integers, such that  $4x - 17y = 1$  and  $x \leq 1000$ , how many integer values of y satisfy the given conditions (1999)  
 (a) 55 (b) 56 (c) 57 (d) 58
36. Convert 1982 in base 10 to base 12 (2000)  
 (a) 1129 (b) 1292 (c) 1192 (d) 1832
37. Let D be a recurring decimal of the form  $D = 0.a_1 a_2 a_1 a_2 a_1 a_2 \dots$  where  $a_1$  and  $a_2$  lie between 0 and 9. Further at most one of them is zero. Which of the following numbers necessarily produces an integer when multiplied by D? (2000)  
 (a) 18 (b) 198 (c) 100 (d) 288
38. P is the product of all the prime numbers between 1 to 100. Then the number of zeroes at the end of P are (2000)  
 (a) 1 (b) 24 (c) 0 (d) none of these
39.  $N = 1421 \times 1423 \times 1425$  what is the remainder when N is divided by 12? (2000)  
 (a) 0 (b) 1 (c) 3 (d) 9
40.  $x_n$  is either -1 or 1 &  $n \geq 4$ ; If  $x_1 x_2 x_3 x_4 x_2 x_3 x_4 x_5 x_3 x_4 x_5 x_6 \dots x_n x_1 x_2 x_3 \dots 0$  then n can be (2000)  
 (a) odd (b) even (c) prime (d) can't be determined
41. There are two integers 34041 and 32506, when divided by a three-digit integer n, leave the same remainder. What is the value of n? (2000)  
 (a) 298 (b) 307 (c) 461 (d) can't be determined
42. If x, y and z are odd integers then which of the following is necessarily false? (2000)  
 (a) xyz is odd (b) (x - y)z is even (c) (x - y)(z + y)x is even (d) (x - y - z)(x + z) is odd
43.  $55^3 - 72^3$  is divisible by (2000)  
 (a) both 3 and 13 (b) both 7 and 17 (c) both 3 and 17 (d) both 7 and 13
44. Out of 128 boxes of oranges, each box contains at least 120 and at most 144 oranges. The number of boxes containing the same number of oranges is at least (2001)  
 (a) 5 (b) 103 (c) 6 (d) Cannot be determined
45. In a 4 - digit number, the sum of the first two digits is equal to that of the last two digits. The sum of the first and last digits is equal to the third digit. Finally, the sum of the second and fourth digits is twice the sum of the other two digits. What is the third digit of the number? (2001)  
 (a) 5 (b) 8 (c) 1 (d) 4
46. Anita had to do a multiplication. Instead of taking 35 as one of the multipliers, she took 53. As a result, the product went up by 540. What is the new product? (2001)  
 (a) 1050 (b) 540 (c) 1440 (d) 1590
47. In a number system the product of 44 and 11 is 3414. The number 3111 of this system, when converted to the decimal number system, becomes (2001)  
 (a) 406 (b) 1086 (c) 213 (d) 691
48. Every ten years the Indian government counts all the people living in the country. Suppose that the director of the census has reported the following data on two neighbouring villages Chota Hazri and Mota Hazri (2001)  
 Chota Hazri has 4,522 fewer males than Mota Hazri. Mota Hazri has 4,020 more females than males.  
 Chota Hazri has twice as many females as males. Chota Hazri has 2,910 fewer females than Mota Hazri.  
 What is the total number of males in Chota Hazri?  
 (a) 11264 (b) 14174 (c) 5632 (d) 10154
49. Let x, y and z be distinct integers. x and y are odd positive, and z is even positive. Which one of the following statements can not be true? (2001)  
 (a)  $(x - z)^2 y$  is even (b)  $(x - z)y^2$  is odd (c)  $(x - z)y$  is odd (d)  $(x - y)^2 z$  is even
50. Number S is obtained by squaring the sum of digits of a two digit number D. If difference between S and D is 27, then the two digit number D is (2002)  
 (a) 24 (b) 54 (c) 34 (d) 45

51. When  $2^{256}$  is divided by 17 the remainder would be (2002)  
 (a) 1 (b) 16 (c) 14 (d) None of these
52. At a book store, "MODERN BOOK STORE" is flashed using neon lights. The words are individually flashed at intervals of  $2\frac{1}{2}$ ,  $4\frac{1}{4}$ ,  $5\frac{1}{8}$  seconds respectively, and each word is put off after a second. The least time after which the full name of the bookstore can be read again is (2002)  
 (a) 49.5 seconds (b) 73.5 seconds (c) 1742.5 seconds (d) 855 seconds
53. After the division of a number successively by 3, 4 and 7, the remainders obtained are 2, 1 and 4 respectively. What will be the remainder if 84 divides the same number? (2002)  
 (a) 80 (b) 76 (c) 41 (d) 53
54. If  $u$ ,  $v$ ,  $w$  and  $m$  are natural numbers such that  $u^m + v^m = w^m$ , then one of the following is true (2002)  
 (a)  $m \geq \min(u, v, w)$  (b)  $m \geq \max(u, v, w)$  (c)  $m = \min(u, v, w)$  (d) None of these
55.  $7^{6n} - 6^{6n}$ , where  $n$  is an integer  $> 0$ , is divisible by (2002)  
 (a) 13 (b) 127 (c) 559 (d) All of these
56. A positive whole number  $M$  less than 100 is represented in base 2 notation, base 3 notation, and base 5 notation. It is found that in all three cases the last digit is 1, while in exactly two out of the three cases the leading digit is 1. Then  $M$  equals (2003C)  
 (a) 31 (b) 63 (c) 75 (d) 91
57. How many even integers  $n$ , where  $100 \leq n \leq 200$ , are divisible neither by seven nor by nine? (2003C)  
 (a) 40 (b) 37 (c) 39 (d) 38
58. The number of positive integers  $n$  in the range  $12 \leq n \leq 40$  such that the product  $(n-1)(n-2)\dots(3.2.1)$  is not divisible by  $n$  is (2003C)  
 (a) 5 (b) 7 (c) 13 (d) 14
59. What is the remainder when  $4^{96}$  is divided by 6? (2003)  
 (a) 0 (b) 2 (c) 3 (d) 4

**Directions for Questions 60 to 62 : Answer the questions on the basis of the information given below.**

The seven basic symbols in a certain numeral system and their respective values are as follow :

I = 1, V = 5, X = 10, L = 50, C = 100, D = 500, and M = 1000

In general, the symbols in the numeral system are read from left to right, starting with the symbol representing the largest value; the same symbol cannot occur continuously more than three times; the value of the numeral is the sum of the values of the symbols. For example,  $XXVII = 10 + 10 + 5 + 1 + 1 = 27$ . An exception to the left to right reading occurs when a symbol is followed immediately by a symbol of greater value; then, the smaller value is subtracted from the larger.

For example,  $XLVI = (50 - 10) + 5 + 1 = 46$ .

60. The value of the numeral MDCCCLXXXVII is (2003)  
 (a) 1687 (b) 1787 (c) 1887 (d) 1987
61. The value of the numeral MCMXCIX is (2003)  
 (a) 1999 (b) 1899 (c) 1989 (d) 1889
62. Which of the following can represent the numeral for 1995? (2003)  
 I. MCMLXXV II. MCMXCV III. MVD IV. MVM  
 (a) only I and II (b) only III and IV (c) only II and IV (d) only IV
63. What is the sum of all two-digit numbers that give a remainder of 3 when they are divided by 7? (2004)  
 (a) 666 (b) 676 (c) 683 (d) 777
64. Let  $x$  and  $y$  be positive integers such that  $x$  is prime and  $y$  is composite. Then (2004)  
 (a)  $y - x$  cannot be an even integer (b)  $xy$  cannot be an even integer.  
 (c)  $(x + y)/x$  cannot be an even integer (d) None of the above statements is true.
65. Let  $n (> 1)$  be a composite integer such that  $\sqrt{n}$  is not an integer. Consider the following statements (2004)  
 I:  $n$  has a perfect integer-valued divisor which is greater than 1 and less than  $\sqrt{n}$ .  
 II:  $n$  has a perfect integer-valued divisor which is greater than  $\sqrt{n}$  but less than  $n$   
 Then,  
 (a) Both I and II are false (b) I is true but II is false (c) I is false but II is true (d) Both I and II are true

66. Let  $a, b, c, d$  and  $e$  be integers such that  $a = 6b = 12c$ , and  $2b = 9d = 12e$ . Then which of the following pairs contains a number that is not an integer? (2004)
- (a)  $\left(\frac{a}{27}, \frac{b}{e}\right)$  (b)  $\left(\frac{a}{36}, \frac{c}{e}\right)$  (c)  $\left(\frac{a}{12}, \frac{bd}{18}\right)$  (d)  $\left(\frac{a}{6}, \frac{c}{d}\right)$
67. If  $a, a+2$  and  $a+4$  are prime numbers, then the number of possible solutions for  $a$  is (2004)
- (a) one (b) two (c) three (d) more than three
68. The remainder, when  $(15^{23} + 23^{23})$  is divided by 19, is (2004 - 2 marks)
- (a) 4 (b) 15 (c) 0 (d) 18
69. If  $x = (16^3 + 17^3 + 18^3 + 19^3)$ , then  $x$  divided by 70 leaves a remainder of (2005)
- (a) 0 (b) 1 (c) 69 (d) 35
70. The digits of a three-digit number  $A$  are written in the reverse order to form another three-digit number  $B$ . If  $B > A$  and  $B - A$  is perfectly divisible by 7, then which of the following is necessarily true? (2005 - 2 marks)
- (a)  $100 < A < 299$  (b)  $106 < A < 305$  (c)  $112 < A < 311$  (d)  $118 < A < 317$
71. The rightmost non-zero digit of the number  $30^{2720}$  is (2005 - 2 marks)
- (a) 1 (b) 3 (c) 7 (d) 9
72. If  $R = \frac{30^{65} - 29^{65}}{30^{64} - 29^{64}}$ , then (2005)
- (a)  $0 \leq R \leq 0.1$  (b)  $0.1 \leq R \leq 0.5$  (c)  $0.5 \leq R \leq 1.0$  (d)  $R > 1.0$
73. For a positive integer  $n$ , let  $p_n$  denote the product of the digits of  $n$ , and  $s_n$  denote the sum of the digits of  $n$ . The number of integers between 10 and 1000 for which  $p_n + s_n = n$  is (2005)
- (a) 81 (b) 16 (c) 18 (d) 9
74. If  $x = -0.5$ , then which of the following has the smallest value? (2006)
- (a)  $2^{\frac{1}{x}}$  (b)  $\frac{1}{x}$  (c)  $\frac{1}{x^2}$  (d)  $2^x$  (e)  $\frac{1}{\sqrt{-x}}$
75. Which one among  $2^{1/2}, 3^{1/3}, 4^{1/4}, 6^{1/6}$  and  $12^{1/12}$  is the largest? (2006)
- (a)  $2^{1/2}$  (b)  $3^{1/3}$  (c)  $4^{1/4}$  (d)  $6^{1/6}$  (e)  $12^{1/12}$
76. Consider four digit numbers for which the first two digits are equal and the last two digits are also equal. How many such numbers are perfect squares? (2007)
- (a) 1 (b) 3 (c) 2 (d) 4 (e) 0
77. How many pairs of positive integers  $m, n$  satisfy (2007)
- $\frac{1}{m} + \frac{4}{n} = \frac{1}{12}$  where  $n$  is an odd integer less than 60?
- (a) 3 (b) 6 (c) 4 (d) 7 (e) 5
78. The integers 1, 2, ..., 40 are written on a blackboard. The following operation is then repeated 39 times; In each repetition, any two numbers, say  $a$  and  $b$ , currently on the blackboard are erased and a new number  $a + b - 1$  is written. What will be the number left on the board at the end? (2008)
- (a) 820 (b) 821 (c) 781 (d) 819 (e) 780
79. How many integers, greater than 999 but not greater than 4000, can be formed with the digits 0, 1, 2, 3 and 4, if repetition of digits is allowed? (2008)
- (a) 499 (b) 500 (c) 375 (d) 376 (e) 501
80. What are the last two digits of  $7^{2008}$ ? (2008)
- (a) 21 (b) 61 (c) 01 (d) 41 (e) 81

## ANSWERS WITH SOLUTIONS

1. (b) Required no. = LCM of (8, 11, 24) - 5 = 264 - 5 = 259  
 2. (d) Suppose least no. be x  
 $1856 - x \equiv n(\text{LCM of } 7, 12, 16) \equiv 4$   
 or  $1856 - x \equiv n(336) + 4$   
 we should take n = 5 so that n(336) is nearest to 1856  
 and  $n(336) < 1856$   
 $1856 - x = 1680 + 4 = 1684$   
 $x = 1856 - 1684 = 172$
3. (a) Let two positive integers be x and y.  
 $\therefore x - y = 4$  .....(i)
- and  $\frac{1}{x} - \frac{1}{y} = \frac{10}{21}$  or  $\frac{x-y}{xy} = \frac{10}{21}$  .....(ii)
- It is clear from second equation that x and y will be 3 and 7.
4. (b) L.C.M of 18, 24 and 32 = 288  
 Hence they would chime together after every 288 min. or 4 hrs. 8 min.
5. (d) It is clear that for n = 237 the expression  $n(n + 1)$  ( $2n + 1$ ) is divisible by 237.  
 Hence option (d) is not necessarily true.
6. (b) It is clearly 1 or 5  
*Example* : 7 divided by 6 leaves remainder 1  
 11 divided by 6 leaves remainder 5  
 13 divided by 6 leaves remainder 1.
7. (c) Multiply each option by 72 and find out the result which matches the visible digits.  
 Clearly we see  $72 \times 5.51 = 396.72$
8. (b) Let x - 2, x, x + 2 be the 3 consecutive numbers then,  $3(x-2) = 2(x+2) + 2$  (according to the question)  
 or  $3x - 6 = 2x + 6 \Rightarrow x = 12$   
 Hence, the 3rd no. is 14.
9. (b)  $5^6 - 1 = (5^3)^2 - 1 = 125^2 - 1 = (125 - 1)(125 + 1)$   
 $= 124 \times 126 = 15624$   
 which is divisible by 31
10. (b) According to the question, the number is divisible by 8 and 9. For the number to be divisible by 8, its last three digits have to be divisible by 8.  
 This 96Q and 968 can be the possibilities. For the number to be divisible by 9, the sum of the digits of the number should be divisible by 9.  
 Hence, it can be possible if B = 8 and A = 9 and if B = 0 and A = 8.  
 Hence, (8, 0) is the possible values of A and B.
11. (b) n is an odd no. > 1  
 $\therefore$  The minimum possible value of n = 3  
 $n(n^2 - 1) = 3 \times 8 = 24$   
 Hence,  $n(n^2 - 1)$  is divisible by 24 always

12. (b) 
$$\frac{1}{1 - \frac{1}{3 - \frac{4}{2 - \frac{1}{3 - \frac{1}{2}}}}} \quad \frac{3}{3 - \frac{4}{3 - \frac{1}{2 - \frac{1}{2}}}}$$

$$\begin{array}{cccc} \frac{1}{1 - \frac{1}{3 - \frac{4}{2 - \frac{1}{5}}}} & \frac{3}{3 - \frac{4}{3 - \frac{2}{3}}}& \frac{1}{1 - \frac{1}{3 - \frac{20}{12}}}& \frac{3}{3 - \frac{12}{11}} \\ \frac{1}{1 - \frac{1}{3 - \frac{2}{5}}}& \frac{3}{3 - \frac{2}{3}}& \frac{1}{1 - \frac{1}{3 - \frac{20}{12}}}& \frac{3}{3 - \frac{12}{11}} \\ \frac{1}{1 - \frac{1}{3 - \frac{2}{5}}}& \frac{33}{3 - \frac{2}{3}}& \frac{1}{1 - \frac{1}{3 - \frac{20}{12}}}& \frac{45}{3 - \frac{12}{11}} \\ \frac{1}{1 - \frac{12}{16}}& \frac{33}{21}& \frac{1}{1 - \frac{3}{4}}& \frac{45}{21} \\ \frac{1}{1 - \frac{12}{16}}& \frac{33}{21}& \frac{4}{7}& \frac{33}{21} \\ \frac{1}{1 - \frac{12}{16}}& \frac{33}{21}& \frac{4}{7}& \frac{45}{21} \\ \frac{1}{1 - \frac{12}{16}}& \frac{33}{21}& \frac{15}{7}& \frac{15}{7} \end{array}$$

### For Qs. 13-14.

Let quantity sold = q ; price = p and p',

q' be the wrong price and quantity respectively and

$$q' = q + 54$$

$$pq = \text{sales} = \text{Rs } 1148 = p'q'$$

$$\Rightarrow q = \frac{1148}{p} \quad \frac{1148}{p'} = 54 \quad \dots \dots \text{(i)}$$

13. (b) As q is an integer, both p and p' must divide 1148. Now checking the options :

- (a) 1148 is divisible by 82 and 28 but does not satisfy (i)  
 (b) 1148 is divisible by 41 and also by 14. It gives q = 28 and satisfies (i)  
 (c) 1148 is divisible by 56 and not by 65.  
 (d) 1148 is also divisible by 28 and 82 but does not satisfy (i).

14. (a) From option (b) of previous question, 28 is the quantity sold and the price is Rs 41.

**Alternatively :**  $q' = q + 54$ , which is only possible in case of 28 and 82 as given in options.

$$\Rightarrow q = 28 \text{ and } q' = 82. \text{ Therefore } p = \frac{1148}{28} = 41.$$

15. (c)  $\frac{16n^2 - 7n - 6}{n}$ ; (n is an integer)

$$\underbrace{\frac{16n}{7}}_{\text{Integer}} - \frac{6}{n}$$

Hence, to become the entire expression an integer

$\left(\frac{6}{n}\right)$  should be an integer and  $\left(\frac{6}{n}\right)$  can be an integer

for n = 1, n = 2, n = 3 and n = 6

Hence, n will have only four values.

16. (a) Let the number be x

$$\therefore \frac{7x}{8} - \frac{7x}{18} = 770 \Rightarrow \frac{x}{2} \left[ \frac{1}{4} - \frac{1}{9} \right] = 110$$

$$\Rightarrow \frac{x}{2} \times \frac{5}{36} = 110 \Rightarrow x = \frac{110}{5} \times 36 \times 2$$

$$\therefore x = 1584$$

17. (c) If  $m$  &  $n$  are integers divisible by 5.  
Then,  $(m+n)$  might be or might not be divisible by 10.  
For example: If  $m=5$  and  $n=10$  then  $m+n=15$  which is not divisible by 10.  
But if  $m=5, n=25$  then  $m+n=30$  which is divisible by 10.
18. (b)  $7^{3^2} (7)^{3^2} 7^9$  while  $(7^3)^2 7^6 7^9$   
Hence,  $7^{3^2} (7^3)^2$
19. (c) Let  $P, Q$  and  $R$  be  $n, n+2$  and  $n+4$  respectively in ascending order.  
According to the Question  

$$3n = 2(n+4) - 3 = 2n + 5$$

$$\therefore n = 5$$
Thus,  $R = 5+4 = 9$
20. (d)  $A \approx \frac{2}{8} \frac{1}{4}; B \approx \frac{3}{18} \frac{1}{6}; C \approx \frac{4}{16} \frac{1}{4}$   
 $\therefore B$  is the smallest.
21. (d) Given  $PQ = 64 = 1 \times 64 = 2 \times 32 = 4 \times 16 = 8 \times 8$ .  
Corresponding values of  $P+Q$  are 65, 34, 20, 16.  
Therefore,  $P+Q$  cannot be equal to 35.
22. (c) Maximum no. = 43210  
Minimum no. = 10234  
Hence, difference =  $43210 - 10234 = 32976$
23. (c) If  $n^3$  is odd then  $n$  and  $n^2$  will also be odd.
24. (b)  $(BE)^2 = MPB$   
If LHS has square, then according to question unit's digit of RHS can be 0, 1, 4, 5, 6, 9  
If  $B=0$ , then  $(BE)^2$  cannot be a three digit number  
If  $B \neq 1$  then LHS exceeds 3 digits and is not compatible with RHS.  
So  $B=1$   
 $\therefore E=1$  or 9  
1 is rejected since  $B$  &  $E$  are distinct integers  
hence  $BE=19 \therefore M=3$
25. (c) 1st wheel makes 1 rev. per sec  
2nd wheel makes  $\frac{6}{10}$  rev. per sec  
3rd wheel makes  $\frac{4}{10}$  rev. per sec  
In other words 1st, 2nd and 3rd wheel take  $1, \frac{5}{3}$  and  $\frac{5}{2}$  seconds respectively to complete one revolution.  

$$\text{L.C.M of } 1, \frac{5}{3} \text{ and } \frac{5}{2} = \frac{\text{L.C.M. of } 1, 5, 5}{\text{H.C.F. of } 1, 3, 2} = 5$$
Hence, after every 5 seconds the red spots on all the three wheels touch the ground.
26. (a) Dividend = Divisor  $\times$  Quotient + Remainder  
 $= 899 Q + 63$   
 $\text{Dividend} = 29 \times 31Q + 29 \times 2 + 5$   
 $= 29(31Q + 2) + 5$ 
Hence, remainder = 5 when same no. is divided by 29.
27. (b) Note that, 2-1 3-2 4-3 5-4 6-5 1  
Hence, the required number will be of the form LCM of  $(2, 3, 4, 5, 6)$   $n-1$  where  $n$  is any integer.
28. (d) LCM of  $2, 3, 4, 5, 6$  is 60. Hence the elements of  $A$  will be of the form  $60n - 1$ , where  $n$  is any integer.  
Only for  $n$  is equal to 1 the number  $(60 - 1 = 59)$  will be between 0 and 100.  
Hence, only one integer between 0 and 100 belongs to  $A$ .  
For Subject A - 60 students; Subject B - 84 students; Subject C - 108 students  
HCF of 60, 84 and 108 is 12.  
So, each room contain 12 students at minimum.  
But each room contains students of only 1 subject  
So, number of rooms  $\frac{60}{12} \frac{108}{12} \frac{84}{12} = 21$
29. (b) The digit in the unit's place of  $2^{51}$  is equal to the remainder when  $2^{51}$  is divided by 10.  
 $2^5 = 32$  leaves the remainder 2 when divided by 10.  
 $2^{50} = (2^5)^{10}$  leaves the remainder  $2^{10} = (2^5)^2$  which in turn leaves the remainder  $2^2 = 4$ .  
 $2^{51} = 2^{50} \times 2$ , when divided by 10, leaves the remainder  $4 \times 2 = 8$ .
30. (c) Given number  $(1234\dots 51525) \times 1000 = 354$   
Since  $1000 = 8 \times 125$   
So, remainder when 354 divided by 8 be 2  
Required remainder = 2.
31. (d) Let the four consecutive number be  $(a-2), (a-1), a, (a+1)$ .  
Multiplying these, we get  

$$(a^4 - 2a^3 - a^2 - 2a)$$
, which will always be even.  
By the problem we add 1.  
Thus the expression becomes  $(a^4 - 2a^3 - a^2 - 2a - 1)$ , which is odd.  
This is also the perfect square of  $(a^2 - a - 1)$ .  
You can also take any four consecutive numbers and check for the validity.
32. (d) Square root of given number = 11111111
33. (b) 
$$\frac{7^{84}}{342} \frac{(7^3)^{28}}{(7^3 - 1)} \frac{\{(7^3)^{28} - 1\}}{(7^3 - 1)}$$

$$\frac{\{(7^3)^{28} - 1\}}{(7^3 - 1)} \frac{1}{(7^3 - 1)}$$

$$\frac{\{(7^3)^{28} - 1\}}{(7^3 - 1)}$$
 is always divisible as it is in the form of  $\frac{(x^n - y^n)}{(x - y)}$ .  
Hence, the remainder is 1.  

$$(AB)^2 = CCB$$
The only number satisfying the given condition  $21^2 = 441$ .  
So,  $B=1$ .
35. (d)  $4x - 17y = 1$ , and given that  $1000 \geq x$   
Hence we can say that  $17y - 1 - 4x \leq 4000$   
i.e.,  $y \leq 235$

Further also note that every 4th value of y (e.g. 3, 7, 11, ..... ) will give an integer value of x.

$$\text{So, number of values of } y = \frac{235}{4} = 58$$

36. (b)

	1982	2
12	165	9
	13	1
	1	1

$$\text{Thus, } 1982(10) = 1192(12)$$

37. (b)  $D \ 0.\overline{a_1 a_2}$   
Multiplied by 100 on both side

$$100D \ a_1 a_2 \ \overline{a_1 a_2}$$

$$100D = a_1 a_2 \cdot D$$

$$\therefore 99D = a_1 a_2 \Rightarrow D = \frac{a_1 a_2}{99}$$

Required number should be the multiple of 99. So we can get an integer when multiplied by D.

Hence, 198 is the required number.

38. (a) There are only 2 prime numbers 5 & 2 between 1 & 100 which when multiplied will give zero in the end. Thus there will be only one zero at the end of the product of given number.

39. (c)  $N = 1421 \times 1423 \times 1425$ , when these numbers are divided by 12 we have remainders as 5, 7, 9. The product of remainders when divided by 12 gives 3 as its remainder. Thus when N divided by 12 remainder is 3

40. (b) Every term in the question is either 1 or -1. In order to have zero the number of terms must be even. Note that there are n number of terms. (since the first term in each product varies from  $x_1$  to  $x_n$ ).  
So n has to be even.

41. (b) Let the common remainder be x. Then numbers  $(34041 - x)$  and  $(32506 - x)$  would be completely divisible by n.  
Hence the difference of the numbers  $(34041 - x)$  and  $(32506 - x)$  will also be divisible by n  
or  $(34041 - x - 32506 + x) = 1535$  will also be divisible by n.  
Now, using options we find that 1535 is divisible by 307.

42. (d) Consider  $(x - y - z)(x - z)$  in which first term is odd and second term is even and the product of even and odd is always even  
∴ It is necessarily false.

43. (c)  $N = 55^3 + 17^3 - 72^3 = (54 + 1)^3 + (18 - 1)^3 - 72^3$   
or  $N = (51 + 4)^3 + 17^3 - (68 + 4)^3$   
These two different forms of given expression is divisible by 3 and 17 both.

44. (c) 128 boxes of oranges each has  $120 \leq 144$  oranges  
Since we have only 25 options of number of oranges i.e. oranges can count from 120, 121....144, and total boxes are 128.

So the boxes with same number of oranges will be

$$\frac{128}{25} = 5.1 \approx 6 \text{ boxes.}$$

45. (a) Let ABCD be the 4-digit number  
According to the question, we have

$$\begin{array}{cccc} A & B & C & D \end{array} \quad \dots(1)$$

$$\begin{array}{ccc} A & D & C \end{array} \quad \dots(2)$$

$$\begin{array}{ccc} B & D & 2(A \ C) \end{array} \quad \dots(3)$$

$$(1) - (2) \text{ gives } B - D = D \Rightarrow B = 2D$$

$$\text{Putting in (3), } 3D = 2(A \ C) = 2(A \ A \ D)$$

$$\text{or } 3D = 4A + 2D \text{ or } D = 4A \text{ & } B = 8A$$

Putting these values in (2),

$$C = A + 4A = 5A$$

This can only be true for A = 1, hence C = 5.

46. (d) Let the other multiplier be x

$$\therefore 53x - 35x = 540 \Rightarrow x = 30$$

$$\therefore \text{New product} = (53 \times 30) = 1590$$

47. (a) The product of 44 and 11 is 484.

But given product of 44 and 11 = 3414 (in number system)

$$\text{Here, } 3x^3 - 4x^2 - 1x^1 - 4 \times x^0 = 484$$

$$\Rightarrow 3x^3 - 4x^2 - x = 480$$

This equation is satisfied only when x = 5.

In decimal system, the number 3111 can be written as

$$406 = [3 \times 5^3 + 1 \times 5^2 + 1 \times 5^1 + 1 \times 5^0]$$

48. (c) Let the total no. of males in Chota Hazri be x.

According to the question,

No. of female in Chota Hazri = 2x

Village	Male	Female
Chota Hazri	x	2x
Mota Hazri	x 4522	x 8542

According to the question,

$$2x + 2910 + x + 8542 \Rightarrow x = 5632$$

49. (a)  $x, y, z > 0$ ; x and y are odd, z is even

Note : [odd – Even is odd], [odd – odd is even],

[odd × odd is odd]

Since,  $(x - z)$  is odd

$\therefore (x - z)^2$  is also odd and  $(x - z)^2 y$  is odd

$\therefore (x - z)^2 y$  can not be even

50. (b) Suppose  $D = 24 \therefore S = (2 + 4)^2 = 36$

According to the Question

$$S - D = 27 \Rightarrow 36 - 24 = 12 \neq 27 \therefore D \neq 24$$

If  $D = 54$  then  $(5 - 4)^2 = 54 - 81 = 54 - 27$

therefore D is 54

51. (a) Consider  $2^{256} - (2^4)^{64} - (16)^{64} - (17 - 1)^{64}$

$$= 17^{64} - {}^{64}C_1 \cdot 17^{63} \cdot 1 + {}^{64}C_2 \cdot (17)^{62} \cdot 1^2 + \dots + {}^{64}C_{64} \cdot 1^0 \cdot 1$$

(Using binomial theorem)

= K + 1, where K contains all the multiple terms of 17.

Therefore when  $2^{256}$  is divided by 17, remainder would be 1.

52. (c) Full name of the bookstore can be read again by taking

$$\text{LCM of the times } \frac{5}{2}, \frac{17}{4}, \frac{41}{8}$$

$$\begin{array}{r} \text{LCM of } (5, 17, 41) \quad 3485 \\ \text{HCF of } (2, 4, 8) \quad 2 \end{array} \quad 1742.5 \text{ seconds}$$

53. (d) According to the question the required no. is  
 $3[4(7x+4)+1]+2=84x+53$   
 So the remainder is 53, when the same number is divided by 84.

54. (c) We have  $u^m v^m w^m$   
 where  $u, v, w, m$  are natural numbers

Take  $u=2, v=4, w=6$ ; then  $2^m 4^m 6^m$   
 This will be true if  $m=1$   
 and  $1 < \min(2, 4, 6) = 2$   
 Hence,  $m < \min(u, v, w)$

55. (d)  $7^{6n} - 6^{6n}$ , where  $n$  is integer  $> 0$

$$\text{Let } n=1, \text{ then } 7^{6n} - 6^{6n} = 7^6 - 6^6 = (7^3)^2 - (6^3)^2 = (7^3 - 6^3)(7^3 + 6^3) = (127)(7^3 + 6^3) = (127)(559)$$

This number is divisible by 127, 559 and 13.

56. (d) 63 and 75 are ruled out as their last digit can't be 1.  
 Converting to base 2, 3, and 5, we get  
 $31 = (11111)_2 = (1011)_3 = (111)_5$ .  
 Taking  $91 = (1011011)_2 = (1010)_3 = (331)_5$ .  
 In 2 out of 3 cases, the first digit is 1, hence (d).

57. (c) Total even nos. between 100 and 200 (including 100 and 200) = 51  
 Even nos. divisible by 7 = 7  
 Even nos. divisible by 9 = 6

There is a common no. divisible both by 7 and 9 = 126  
 Hence total nos. which are divisible neither by 7 nor by 9 =  $7 - 6 = 1$

$\therefore$  Even integers  $n$ ,  $(100 \leq n \leq 200)$  are divisible neither by 7 nor by 9 =  $51 - 12 = 39$

58. (b) Consider the prime numbers between 12 and 40, which are 13, 17, 19, 23, 29, 31 and 37.  
 Given product is not divisible by these 7 prime numbers.

59. (d)  $\frac{4^{96}}{6}$ ; to find the remainder

Let us divide the different powers of 4 by 6 and find the remainder.

So remainder for  $4^1 = 4$ ,  $4^2 = 4$ ,  $4^3 = 4$ ,  $4^4 = 4$ ,  $4^5 = 4$ ,  $4^6 = 4$  and so on.

From this we know that remainder for any power of 4 will be 4 only.

60. (b)  $\text{MDCCCLXXXVII} = 1000 + 500 + 100 + 100 + 50 + 10 + 10 + 10 + 5 + 1 + 1 = 1787$

61. (a) M CM XC IX  
 1000 900 90 9  
 $1000 + 900 + 90 + 9 = 1999$

62. (c)  $\text{MCMLXXV} = 1975$ ,  $\text{MCMXCV} = 1995$ ,  
 $\text{MVD} = 1000 + (500 - 5) = 1495$ ,  $\text{MV M} = 1995$   
 Clearly II and IV can represent the numeral for 1995

63. (b) Number is of the form =  $7n + 3$ ;  $n = 1$  to 13

$$\text{So, } S = \sum_{n=1}^{13} (7n + 3) = 7 \times 13 \times 7 + 39 = 676$$

64. (d)  $x$  is prime say 7  
 $y$  is not prime but composite no. say 8, 9, 21

$$(a) 9 - 7 = 2 \quad (b) 7 \times 8 = 56 \quad (c) \frac{21}{7} = 4$$

Put  $x = 2$  and  $y = 6$  and check for the options.  
 By hit and trial all the 3 options can be proved wrong

65. (d) Let  $n = 6$

$$\text{Therefore } \sqrt{n} = \sqrt{6} \approx 2.4$$

Now, the divisor of 6 are 1, 2, 3

If we take 2 as divisor then  $\sqrt{n} = 2 = 1$ .  
 Statement I is true.

If we take 3 as divisor then  $6 = 3 = 2.4$ , i.e.  $n = \sqrt{6}$

Therefore statement II is true

Given  $a = 6b = 12c = 27d = 36e$

Multiplied and Divide by 108 in whole expression

$$\frac{108a}{108} = \frac{108b}{18} = \frac{108c}{9} = \frac{108d}{4} = \frac{108e}{3}$$

$$\frac{1}{108}a = \frac{1}{18}b = \frac{1}{9}c = \frac{1}{4}d = \frac{1}{3}e = 1 \text{ (say)}$$

$$\Rightarrow a = 108, b = 18, c = 9, d = 4, e = 3$$

So it is clear that  $\left(\frac{a}{6}, \frac{c}{d}\right)$  contains a number  $\frac{c}{d} = \left(\frac{9}{4}\right)$

which is not an integer

$a, a+2, a+4$  are prime numbers.

Put value of 'a' starting from 3, we will have 3, 5 and 7 as the only set of prime numbers satisfying the given relationships.

66. (d) The expression becomes  $(19 - 4)^{23} + (19 + 4)^{23}$ .  
 All the terms except the last one contains 19 and the last terms get cancelled out. Hence the remainder obtained on dividing by 19 will be 0.

**Alternatively :**  $a^n + b^n$  is always divisible by  $(a+b)$ , if  $n$  is odd

Here  $n$  is odd (23).

So the given expression is divisible by  $15 + 23 = 38$ , which is a multiple of 19.

69. (a) Remember that,  $a^3 + b^3 = (a+b)(a^2 + b^2 - ab)$   
 $x = (16^3 + 17^3 + 18^3 + 19^3)$   
 $x = (16^3 + 19^3) + (17^3 + 18^3)$   
 $x = (16 + 19)(16^2 + 19^2 - 16 \times 19) + (17 + 18)(17^2 + 18^2 - 17 \times 18)$   
 $x = 35[16^2 + 19^2 - 16 \times 19 + 17^2 + 18^2 - 17 \times 18]$   
 $x = 35 \times (\text{Even number})$

Hence,  $x$  is divisible by 70 and leaves remainder as zero.

70. (b) Let the 3 digits of number A be  $x, y$  and  $z$   
 Hence  $A = 100x + 10y + z$   
 On reversing the digits of number A, we get the number B i.e.,  $z y x$ .  
 $\therefore B = 100z + 10y + x$

As  $B > A \Rightarrow z > x$  ... (i)  
 $B - A = 99z - 99x = 99(z - x)$   
 As 99 is not divisible by 7  
 so  $(z - x)$  has to be divisible by 7. ... (ii)  
 Using (i) & (ii), the only possible values of  $z$  and  $x$  are (8, 1) and (9, 2)  
 So the minimum and maximum range of  $A$  are 108 and 299, which  $\in$  106 to 305

71. (a) The number  $30^{2720}$  will have 2720, zero's.  
 For the right most non-zero digit we have to check the power cycle of 3 and find when their multiplication again leads to a 3 as the right most digit.

$$3^1 = 3; 3^2 = 9; 3^3 = 27; 3^4 = 81; 3^5 = 243$$

Hence, 3 will appear after every fourth power of 3.

$$\text{Hence, } 30^{2720} = 3^{2720} \times 10^{2720} = (3^4)^{680} \times 10^{2720}$$

As the number 2720 is an exact multiple of 4, hence the last digit will be 1 similar to what we find in  $3^4$ .

72. (d) As  $x^n - y^n$  is divisible by  $x - y$  if  $n$  is odd.

$$x^n - y^n = (x - y)(x^{n-1}y^0 + x^{n-2}y^1 + \dots + x^0y^{n-1})$$

Hence numerator becomes

$$= (30 - 29)(30^{64} + \dots + 29^{64}) \\ = 30^{64} + \dots + 29^{64}$$

$$\therefore R = \frac{30^{64} + \dots + 29^{64}}{30^{64} - 29^{64}}$$

Clearly the numerator is greater than the denominator.  
 Hence  $R > 1.0$

73. (d) The no. can be 2 or 3 digit.

Firstly let  $n$  be the two digit no.

$$\text{Therefore, } n = 10x + y$$

$$p_n + s_n = n \Rightarrow xy + x + y = 10x + y \Rightarrow xy - 9x = 0 \\ \Rightarrow y = 9 \text{ as } x \neq 0$$

So the numbers can be 19, 29, ..., 99, i.e., 9 values.

$$\text{For 3 digits } n = 100x + 10y + z$$

$$\Rightarrow xyz + x + y + z = 100x + 10y + z$$

$$\Rightarrow xyz = 99x + 9y \text{ or } xz = \frac{9(11x - y)}{y}$$

It can be verified using various values of  $y$  that this equation do not have any solution.

E.g. : For  $y = 9$ ,  $x(z - 11) = y$  which is not possible.  
 So in all 9 integers.

74. (b) Putting the value of  $x = -0.5$  in all the options.

$$(a) 2^{1/-0.5} = 2^{-2} = \frac{1}{4} \quad (b) \frac{1}{-0.5} = -2$$

$$(c) \frac{1}{(-0.5)^2} = 4 \quad (d) 2^{-0.5} = \frac{1}{\sqrt{2}}$$

$$(e) \frac{1}{\sqrt{-(-0.5)}} = \sqrt{2}$$

So, clearly (b) is smallest.

75. (b) In this question it is advisable to raise all the numbers to the power of 12, so the numbers become,

$$(2^{1/2})^{12}, (3^{1/3})^{12}, (4^{1/4})^{12}, (6^{1/6})^{12}, (12^{1/12})^{12}$$

$$\text{or } 2^6, 3^4, 4^3, 6^2, 12 \quad \text{or } 64, 81, 64, 36, 12$$

So,  $3^{1/3}$  is the largest.

76. (a) Since in the four digits number first two digits are equal and the last two digits are also equal, therefore we can suppose that the digit at the thousand and hundred place each be  $x$  and the digit at the tenth and unit place each be  $y$ .

$$\text{Hence, the four digits number} = 1000x + 100x + 10y + y = 11(100x + y)$$

This number  $11(100x + y)$  will be perfect square, if  $100x + y$  is of the form  $11n$ , where  $n$  is a perfect square  
 $\text{Now } 100x + y = 11n \Rightarrow y = 11n - 100x$

On checking, we get for the value  $n = 64$  (a perfect square) only,  $y = 704 - 100x$ , for which a single digit positive integral value 7 of  $x$ , the value of  $y = 4$ , which is the single digit positive integer.

There is no single digit positive integral value of  $y$  for any other single positive integral value of  $x$  for the equation  $y = 704 - 100x$

Hence, 7744 is the only four digits number.

$$77. (a) \frac{1}{m} \frac{4}{n} \frac{1}{12} \\ \Rightarrow 12n + 48m - mn - 576 = -576$$

$$m - 12 = \frac{576}{n - 48} \quad \dots (i)$$

Since  $n$  is an odd, therefore,  $(n - 48)$  is an odd.

Also - 576 is an even, therefore  $(m - 12)$  is definitely even.

Now  $n$  is an odd integer less than 60. Hence, on checking, we get all possible value of  $n$  are 49, 51 and 57.

Therefore, there are three value of  $n$

$$78. (c) 1 + 2 + 3 + \dots + 40 = \frac{40 \times 41}{2} = 820$$

Since at each time any two numbers  $a$  and  $b$  are erased and a single new number  $(a + b - 1)$  is written. Hence, each one is subtracted and this process is repeated 39 times. Therefore, number left on the board at the end =  $820 - 39 = 781$ .

79. (d) All the numbers greater than 999 but not greater than 4000 are four digits number.

$$\text{The number of numbers between 999 and 4000} = 3 \times 5 \times 5 \times 5 = 375$$

Since one number 4000 will also be included. Hence number of total number greater than 999 but not greater than 4000 =  $375 + 1 = 376$

$$7^0 = 01$$

$$(7)^1 = 07$$

$$(7)^2 = 49$$

$$(7)^3 = 243$$

$$(7)^4 = 2401$$

$$(7)^5 = 16807$$

$$(7)^6 = 117649$$

$$(7)^7 = 823543$$

$$(7)^8 = 5764801$$

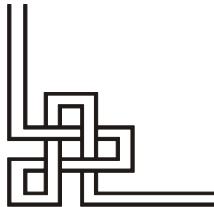
Here we see last two digit 01 is repeated when power of  $(7)^0$  is increased by 4 each time.

Now  $2008 \div 4 = 502$

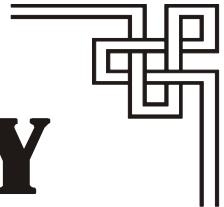
Hence when power of  $(7)^0$  increases 502 times by 4 (each time), then we get that 01 is the last two digits in the number  $(7)^{2008}$ .

# 2

CHAPTER



# SET THEORY



**Directions for questions 1 to 3 : Read the information given below and answer the questions that follow :**

Ghoshbabu is staying at Ghosh Housing Society, Aghosh Colony, Dighoshpur, Calcutta. In Ghosh Housing Society 6 persons read daily Ganashakti and 4 read Anand Bazar Patrika; In his colony there is no person who reads both. Total number of persons who read these two newspapers in Aghosh Colony and Dighoshpur is 52 and 200 respectively. Number of persons who read Ganashakti in Aghosh Colony and Dighoshpur is 33 and 121 respectively; while the persons who read Anand Bazar Patrika in Aghosh Colony and Dighoshpur are 32 and 117 respectively.

1. Number of persons in Dighoshpur who read only Ganashakti is (1994)  
(a) 121 (b) 83 (c) 79 (d) 127
2. Number of persons in Aghosh Colony who read both of these newspapers is (1994)  
(a) 13 (b) 20 (c) 19 (d) 14
3. Number of persons in Aghosh Colony who read only one newspaper (1994)  
(a) 29 (b) 19 (c) 39 (d) 20

**Directions for questions 4 & 5 : Read the information given below and answer the questions that follow :**

There are three different cable channels namely Ahead, Luck and Bang. In a survey it was found that 85% of viewers respond to Bang, 20 % to Luck, and 30% to Ahead. 20% of viewers respond to exactly two channels and 5% to none.

4. What percentage of the viewers responded to all three ? (1995)  
(a) 10 (b) 12 (c) 14 (d) None of these
5. Assuming 20% respond to Ahead and Bang and 16% respond to Bang and Luck, what is the percentage of viewers who watch only Luck ? (1995)  
(a) 20 (b) 10 (c) 16 (d) None of these
6. In a locality, two-thirds of the people have cable-TV, one-fifth have VCR, and one-tenth have both, what is the fraction of people having either cable -TV or VCR ? (1996)  
(a)  $19/30$  (b)  $3/5$  (c)  $17/30$  (d)  $23/30$

**Directions for questions 7 to 9 : Read the information given below and answer the questions that follow :**

A survey of 200 people in a community who watched at least one of the three channels — BBC, CNN and DD — showed that 80% of the people watched DD, 22% watched BBC, and 15% watched CNN.

7. What is the maximum percentage of people who can watch all the three channels? (1997)  
(a) 12.5 (b) 8.5 (c) 17 (d) Insufficient data
8. If 5% of the people watched DD and CNN, 10% watched DD and BBC, then what per cent of the people watched BBC and CNN only? (1997)  
(a) 2% (b) 5% (c) 8.5% (d) Can't be determined
9. Referring to the previous question, how many per cent of the people watched all the three channels? (1997)  
(a) 3.5% (b) 0% (c) 8.5% (d) Can't be determined
10. In a political survey, 78% of the politicians favour at least one proposal. 50% of them are in favour of proposal A, 30% are in favour of proposal B and 20% are in favour of proposal C. 5% are in favour of all three proposals. What is the percentage of people favouring more than one proposal? (1999)  
(a) 16 (b) 17 (c) 18 (d) 19

11. There are two disjoint sets  $S_1$  and  $S_2$  where (2000)  
 $S_1 = \{f(1), f(2), f(3), \dots\}$   
 $S_2 = \{g(1), g(2), g(3), \dots\}$  such that  $S_1 \cup S_2$  forms the set of natural numbers.  
 Also  $f(1) < f(2) < f(3) \dots$  &  $g(1) < g(2) < g(3) \dots$  and  $f(n) = g((g(n)) + 1)$  then what is  $g(1)$ ?  
 (a) 0 (b) 1 (c) 2 (d) can't be determined
12. Let 'f' be a function from set A to set B for a set, XCB define  $f^{-1}(X) = \{x \in A : f(x) \in X\}$  Then which of the following is necessarily true for a subset U of X? (2000)  
 (a)  $f((f^{-1}(U)) \subseteq U$  (b)  $f(f^{-1}(U)) \subset U$  (c)  $f\{f^{-1}(U)\} \supset U$  (d)  $f(f^{-1}(U)) \neq U$

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**Directions for questions 13 to 16 : Read the information given below and answer the questions that follow :**

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A and B are two sets (e.g. A = mothers, B = women). The elements that could belong to both the sets (e.g. women who are mothers) is given by the set C = A.B. The elements which could belong to either A or B, or both, is indicated by the set D = A  $\cup$  B. A set that does not contain any elements is known as null set, represented by  $\emptyset$  (for example, if none of the women in the set B is a mother, then C = A.B. is a null set, or C =  $\emptyset$ ).

Let 'V' signify the set of all vertebrates; 'M' the set all mammals; 'D' dogs, 'F' fish; 'A' alsatian and 'P', a dog named Pluto.

13. Given that X = M.D is such that X = D, which of the following is true? (2001)  
 (a) All dogs are mammals (b) Some dogs are mammals  
 (c)  $X = \emptyset$  (d) All mammals are dogs
14. If Y = F.(D.V), is not a null set, it implies that : (2001)  
 (a) All fish are vertebrates (b) All dogs are vertebrates  
 (c) Some fish are dogs (d) None of these
15. If Z = (P.D)  $\cup$  M, then (2002)  
 (a) The elements of Z consist of Pluto the dog or any other mammal  
 (b) Z implies any dog or mammal  
 (c) Z implies Pluto or any dog that is a mammal  
 (d) Z is a null set
16. If P.A =  $\emptyset$  and P  $\cup$  A = D, then which of the following is true? (2002)  
 (a) Pluto and alsatians are dogs (b) Pluto is an alsatian  
 (c) Pluto is not an alsatian (d) D is a null set
17. Let T be the set of integers {3, 11, 19, 27, ..., 451, 459, 467} and S be a subset of T such that the sum of no two elements of S is 470. The maximum possible number of elements in S is (2003C)  
 (a) 32 (b) 28 (c) 29 (d) 30
18. Consider the sets  $T_n = \{n, n+1, n+2, n+3, n+4\}$ , where  $n = 1, 2, 3, \dots, 96$ . How many of these sets contains 6 or any integral multiple thereof (i.e. any one of the numbers 6, 12, 18, ...)? (2004)  
 (a) 80 (b) 81 (c) 82 (d) 83

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**Directions for Questions 19 to 21 : Answer the questions on the basis of the tables given below.**

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Two binary operations  $\oplus$  and  $*$  are defined over the set {a, e, f, g, h} as per the following tables :

$\oplus$	a	e	f	g	h
a	a	e	f	g	h
e	e	f	g	h	a
f	f	g	h	a	e
g	g	h	a	e	f
h	h	a	e	f	g

*	a	e	f	g	h
a	a	a	a	a	a
e	a	e	f	g	h
f	a	f	h	e	g
g	a	g	e	h	f
h	a	h	g	f	e

Thus, according to the first table  $f \oplus g = a$ , while according to the second table  $g * h = f$ , and so on.  
 Also, let  $f^2 = f * f$ ,  $g^3 = g * g * g$ , and so on.

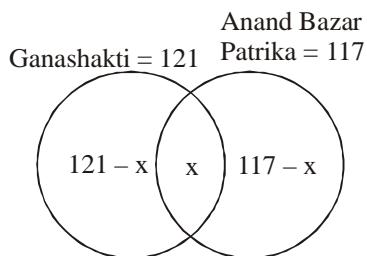
19. What is the smallest positive integer  $n$  such that  $g^n = e$ ? (2003)  
 (a) 4 (b) 5 (c) 2 (d) 3
20. Upon simplification,  $f \oplus [f * \{f \oplus (f * f)\}]$  equals (2003)  
 (a) e (b) f (d) g (d) h
21. Upon simplification,  $\{a^{10} * (f^{10} \oplus g^9)\} \oplus e^8$  equals (2003)  
 (a) e (b) f (d) g (d) h
22. A survey on a sample of 25 new cars being sold at a local auto dealer was conducted to see which of the three popular options — air-conditioning, radio and power windows - were already installed. The survey found (2003)  
 15 had air conditioning  
 2 had air conditioning and power windows but no radios  
 12 had radio  
 6 had air-conditioning and radio but no power windows  
 11 had power windows  
 4 had radio and power windows  
 3 had all three options.

What is the number of cars that had none of the options?

- (a) 4 (b) 3 (c) 1 (d) 2
23. 70 per cent of the employees in a multinational corporation have VCD players, 75 per cent have microwave ovens, 80 per cent have ACs and 85 per cent have washing machines. At least what percentage of employees has all four gadgets? (2003)  
 (a) 15 (b) 5 (c) 10 (d) Cannot be determined
24. A survey was conducted of 100 people to find out whether they had read recent issues of Golmal, a monthly magazine. The summarized information regarding readership in 3 months is given below: (2006)  
 Only September : 18; September but not August: 23; September and July : 8; September : 28;  
 July : 48; July and August : 10; None of the three months : 24.
- What is the number of surveyed people who have read exactly two consecutive issues (out of the three)?  
 (a) 7 (b) 9 (c) 12 (d) 14 (e) 17

## ANSWERS WITH SOLUTIONS

1. (b) Suppose G and A are represented by Ganashakti and Anand Bazar Patrika respectively



Given that

$$n(G \cup A) = 200$$

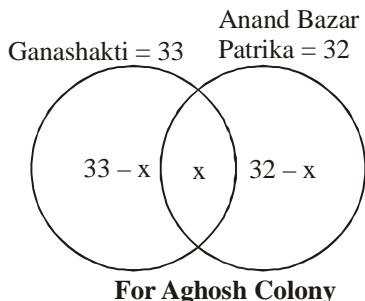
$$\Rightarrow (121 - x) + (117 - x) = 200$$

$$\Rightarrow x = 238 - 200 = 38$$

No. of persons in Dighospur who read only Ganashakti

$$121 - x = 121 - 38 = 83.$$

2. (a)



Given that,  $n(G \cup A) = 52$

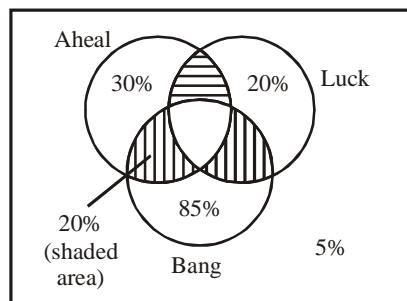
$$(33 - x) + (32 - x) = 52$$

$$x = 65 - 52 = 13$$

3. (c) No. of persons in Aghosh Colony who read only one newspaper

$$(33 - x) + (32 - x) - (33 - 13) - (32 - 13) = 20 + 19 = 39$$

4. (a)



$$\text{Here, } n(A \cup L \cup B) = 100 - 5 = 95$$

$$n(A \cap L) + n(L \cap B) + n(B \cap A)$$

$$- 3n(A \cap L \cap B) = 20$$

$$n(A \cup L \cup B)$$

$$= n(A) + n(L) + n(B) - n(A \cap L) - n(L \cap B)$$

$$- n(B \cap A) + n(A \cap L \cap B)$$

$$95 = 85 + 30 + 20 - [n(A \cap L) + n(L \cap B)]$$

$$+ n(B \cap A) - 3n(A \cap L \cap B)]$$

$$\Rightarrow 95 = 135 - 20 - 2n(A \cap L \cap B)$$

$$\text{or } n(A \cap L \cap B) = \frac{20}{2} = 10$$

5. (d) Percentage of viewers who watch only Luck

$$n(\text{only } L) = n(L) - n(L \cap B) - n(L \cap A) + n(L \cap B \cap A)$$

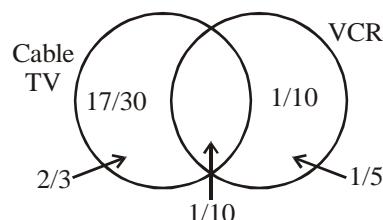
$$20 - (16) - [20 - \{16 - 10\} - \{20 - 10\}] = 10$$

$$20 - 16 - [20 - 6 - 10] = 10 \quad 20 - 16 - 14 = 10 \quad 0$$

6. (d) Fraction of people who watch Cable-TV only

$$= \left( \frac{2}{3} - \frac{1}{10} \right) = \frac{17}{30}$$

$$\text{Fraction of people who have VCR only} = \frac{1}{5} - \frac{1}{10} = \frac{1}{10}$$

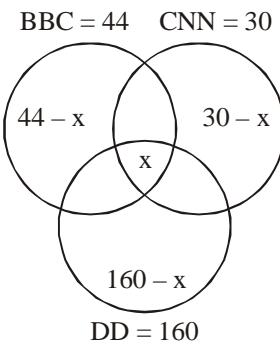


Fraction of people having either cable TV or VCR

$$\frac{17}{30} + \frac{1}{10} + \frac{1}{10} - \frac{23}{30}$$

7. (b) We solve such question from venn diagram. For max. percentage of people who watch all three channels, we consider that there are no such people who watch only two channels.

Let  $x$  persons of viewers responded all the three channels.

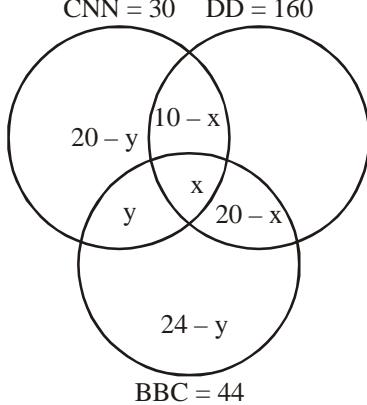


According to the given conditions,

$$160 - x + 44 - x + 30 - x = 200 \\ \Rightarrow 160 - 44 - 30 - 2x = 200 \Rightarrow x = 17$$

Hence, 8.5% of people watched all the three channels.

8. (a) CNN = 30 DD = 160



Let  $x$  viewers watch all the three channels.

Let  $y$  viewers watch CNN and BBC only.

From venn diagram :

$$160 - (24 - y) - y - (20 - y) = 200 \\ \Rightarrow y = 200 - 204 \Rightarrow y = 4$$

$\therefore$  2% of viewers watch BBC and CNN only.

9. (d) From the previous question data, we can't determine how many people watched all the three channels. The data are insufficient.

10. (b)  $n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(A \cap C) + n(A \cap B \cap C)$

$$\text{or } 78 = 50 + 30 + 20 - \sum n(A \cap B) - 5$$

$$\text{or } \sum n(A \cap B) = 27$$

This includes  $n(A \cap B \cap C)$  three times.

$\therefore$  Percentage of people favouring more than one proposal  $= 27 - 5 \times 2 = 17$

11. (b) It is given that  $f(n) = g(g(n)) + 1$

Therefore,  $f(n) \geq g(g(n))$

Also,  $g(1) \leq g(2) \leq g(3)$  shows that the function  $g(x)$  is an increasing function. So for a natural number  $n$ ,

$$g(n) \geq n$$

$$\Rightarrow g(g(n)) \geq g(n)$$

Thus,  $f(n) \geq g(n)$  for every  $n$

or  $f(1) \geq g(1) \Rightarrow g(1)$  is the least number in  $S_1 \cup S_2$ .

Now,  $S_1 \cup S_2$  = set of natural numbers.

Therefore, 1 in  $S_1 \cup S_2$  is the smallest number.

Thus,  $g(1) = 1$ .

12. (c) We have  $f^{-1}\{x \in A : f(x) \in X\}$

i.e., if there is an  $x$  such that  $f(x)$  is in  $X$  then  $x$  belongs to this set  $f^{-1}(X)$ .

Now, if  $u \in U$  and  $f(u) = v$  for some  $v \in f(U)$ .

$$\text{i.e., } u \in f^{-1}((f(U)))$$

Thus every element in  $U$  is in  $f^{-1}(f(U))$ .

The option (a) is possible but it is not true in every case as shown in the following example.

Let  $f(x) = x^2$ , defined on the set of integers and let  $U = \{-3, -2, -1, 1, 2, 3\}$  which is not same as  $U$ .

13. (a)  $X = M.D. \Rightarrow X = D$

It clearly shows that all dogs are mammals.

14. (c)  $\gamma = F \cap (D \cap V)$  is not a null set means some  $F$ 's are  $D$ 's and some  $D$ 's are  $V$ 's. That means some fishes are dogs.

15. (a) P.D. = A dog which name is Pluto

$$(P.D.) \cup M = P \cup M$$

This contains Pluto the dog or any other mammal.

16. (c) P.A.  $\phi \Rightarrow$  Pluto is not alsatian.

$P \cup A = D \Rightarrow$  Pluto and alsatians constitutes the dogs.

17. (d)  $T = \{3, 11, 19, 27, \dots, 467\}$  is an AP with  $a=3$  and  $d=8$ . To find number of terms, we use the formula for  $n$ th term :

$$a + (n-1)d = 3 + (n-1)8 = 467.$$

Hence,  $n = 59$ .  $S$  = subset in which not sum of two elements = 470.

So,  $S$  can be a set in which either the first half or the second half of the terms are present. So number of

maximum possible elements in  $S = \frac{59}{2} = 29.5 \approx 30$ .

18. (a) Sets starting from 1, 7, 13, ..., does not contain multiple of 6.

Now 1, 7, 13, 19, ..., forms an A.P.

$$\Rightarrow T_n = 1 + (n-1)6 \leq 96 \Rightarrow 6n \leq 101 \Rightarrow n = 16$$

$\therefore$  No. of sets which doesn't contain the multiple of 6  $= 96 - 16 = 80$ .

19. (a)  $g^*g = h$

$$\Rightarrow (g^*g)^*g = h^*g = f \Rightarrow g^*(g^*g^*g) = g^*f = e$$

$$\therefore n=4$$

20. (d)  $f \oplus [f^* \{f \oplus (f^*f)\}] = f \oplus [f^* \{f \oplus h\}]$

$$f \oplus [f^*e] = f \oplus [f] = h$$

21. (a) Clearly,  $a^{10} = a$

$$f^{10} = h^*f^*f^7 = g^*f^7 = e^*f^6 = f^*f^5 = f^*f = h$$

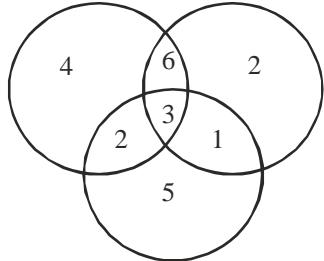
$$g^9 = g^4 * g^*g^4 = (e^*g)^*g^4 = g^*e = g$$

$$e^8 = e$$

Now,  $a^{10} * (f^{10} \oplus g^9) \oplus e^8$

$$= a^*(h \oplus g) \oplus e = (a^*f) \oplus e = a \oplus e = e.$$

22. (d)  $AC = 15$     $Radio = 12$



Power windows = 11

Total cars having any one of AC, radio or power windows =  $4 + 6 + 3 + 2 + 1 + 2 + 5 = 23$

Cars with no options =  $25 - 23 = 2$ .

23. (c) Employees who doesn't have VCD =  $100 - 70 = 30\%$

Employees who doesn't have MWO =  $100 - 75 = 25\%$

Employees who doesn't have AC =  $100 - 80 = 20\%$

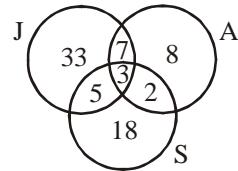
Employees who doesn't have WM =  $100 - 85 = 15\%$

$\therefore$  Total employees who doesn't have atleast one of the four equipments =  $30 + 25 + 20 + 15 = 90\%$

$\therefore$  Percentage of employees having all four gadgets

$$= 100 - 90 = 10\%.$$

24. (b) Putting the given information in the form of a venn diagram, we get



$n(J \cup A \cup S) = 100 - 24 = 76$

$n(S \cap J) = 8$ ;  $n(\text{only } S) = 18$

$$n(S \text{ but not } A) = 23 = \overbrace{n(\text{only } S)}^{18} + \underbrace{n(S) - n(S \cap A)}_5$$

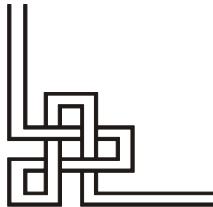
$n(S \cap A \cap J) = n(S \cap J) - 5 = 8 - 5 = 3$

To find the people who have read exactly 2 consecutive issues (out of 3) we shall find the people reading J & A and A & S.

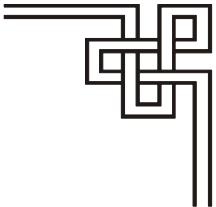
Hence required no. =  $7 + 2 = 9$ .

# 3

CHAPTER



# FUNCTIONS



**Directions for questions 1 & 2 : Read the information given below and answer the questions that follow :**

If  $md(x) = |x|$ ,

$mn(x, y) = \text{minimum of } x \text{ and } y$  and

$Ma(a, b, c, \dots) = \text{maximum of } a, b, c, \dots$

- Value of  $Ma[md(a), mn(md(b), a), mn(ab, md(ac))]$  where  $a = -2, b = -3, c = 4$  is (1994)  
(a) 2      (b) 6      (c) 8      (d) -2
- Given that  $a > b$  then the relation  $Ma[md(a), mn(a, b)] = mn[a, md(Ma(a, b))]$  does not hold if (1994)  
(a)  $a < 0, b < 0$       (b)  $a > 0, b > 0$       (c)  $a > 0, b < 0, |a| < |b|$       (d)  $a > 0, b < 0, |a| > |b|$

**Directions for questions 3 to 6 : Read the information given below and answer the questions that follow :**

If  $f(x) = 2x + 3$  and  $g(x) = \frac{x-3}{2}$ , then

- $fog(x) =$  (1994)  
(a) 1      (b)  $gof(x)$       (c)  $\frac{15x-9}{16x-5}$       (d)  $\frac{1}{x}$
- For what value of  $x$ ;  $f(x) = g(x-3)$ ? (1994)  
(a) -3      (b) 1/4      (c) -4      (d) None of these
- What is value of  $(gofofogof)(x)(fogofog)(x)$ ? (1994)  
(a)  $x$       (b)  $x^2$       (c)  $\frac{5x-3}{4x-1}$       (d)  $\frac{(x-3)(5x-3)}{(4x-5)(4x-1)}$
- What is the value of  $fo(fog) o (gof)(x)$ ? (1994)  
(a)  $x$       (b)  $x^2$       (c)  $2x+3$       (d)  $\frac{x-3}{4x-5}$

**Directions for questions 7 to 10 : Read the information given below and answer the questions that follow :**

$le(x, y) = \text{least of } (x, y)$

$mo(x) = |x|$

$me(x, y) = \text{maximum of } (x, y)$

- Find the value of  $me(a - mo(le(a, b)), mo(a - me(mo(a) mo(b))))$ , at  $a = -2$  and  $b = -3$ . (1995)  
(a) 1      (b) 0      (c) 5      (d) 3
- Which of the following must always be correct for  $a, b > 0$  (1995)  
(a)  $mo(le(a, b)) \geq me(mo(a), mo(b))$       (b)  $mo(le(a, b)) = me(mo(a), mo(b))$   
(c)  $mo(le(a, b)) < le(mo(a), mo(b))$       (d)  $mo(le(a, b)) < le(mo(a), mo(b))$
- For what values of  $a$  is  $me(a^2 - 3a, a - 3) = 0$ ? (1995)  
(a)  $0 < a < 3$       (b)  $a = 0$       (c)  $a = 3$       (d)  $a = 3$

10. For what values of  $a$  is  $(a^2 - 3a, a - 3) < 0$ ? (1995)  
 (a)  $1 < a < 3$       (b)  $a < 0$  and  $a < 3$       (c)  $a < 0$  and  $a \leq 3$       (d)  $a < 0$  or  $a > 3$
11. Largest value of  $\min(2 + x^2, 6 - 3x)$ , when  $x > 0$  is (1995)  
 (a) 1      (b) 2      (c) 3      (d) 4

**Directions for questions 12 & 13 : Read the information given below and answer the questions that follow :**

A, S, M and D are functions of  $x$  and  $y$ , and they are defined as follows :

$$A(x, y) = x + y$$

$$S(x, y) = x - y$$

$$M(x, y) = xy$$

$$D(x, y) = x/y \text{ where } y \neq 0.$$

12. What is the value of  $M(M(A(M(x, y), S(y, x)), x), A(y, x))$  for  $x = 2, y = 3$ ? (1996)  
 (a) 50      (b) 140      (c) 25      (d) 70
13. What is the value of  $S[M(D(A(a, b), 2), D(A(a, b), 2)), M(D(S(a, b), 2), D(S(a, b), 2))]$ ? (1996)  
 (a)  $a^2 - b^2$       (b)  $ab$       (c)  $a^2 - b^2$       (d)  $a/b$

**Directions for questions 14 to 16 : Read the information given below and answer the questions that follow :**

The following functions have been defined :

$$la(x, y, z) = \min(x + y, y + z)$$

$$le(x, y, z) = \max(x - y, y - z)$$

$$ma(x, y, z) = (\frac{1}{2}) [le(x, y, z) + la(x, y, z)]$$

14. Given that  $x > y > z > 0$ , which of the following is necessarily true? (1997)  
 (a)  $la(x, y, z) < le(x, y, z)$       (b)  $ma(x, y, z) < la(x, y, z)$   
 (c)  $ma(x, y, z) < le(x, y, z)$       (d) None of these
15. What is the value of  $ma(10, 4, le(la(10, 5, 3), 5, 3))$ ? (1997)  
 (a) 7.0      (b) 6.5      (c) 8.0      (d) 7.5
16. For  $x = 15, y = 10$  and  $z = 9$ , find the value of :  $le(x, \min(y, x - z), le(9, 8, ma(x, y, z)))$  (1997)  
 (a) 5      (b) 12      (c) 9      (d) 4

**Directions for questions 17 to 19 : Read the information given below and answer the questions that follow :**

The following operations are defined for real numbers  $a \# b = a + b$  if  $a$  and  $b$  both are positive else  $a \# b = 1$ .  $a \nabla b = (ab)^{a+b}$  if  $ab$  is positive else  $a \nabla b = 1$ .

17.  $(2 \# 1) / (1 \nabla 2) =$  (1998)  
 (a)  $1/8$       (b) 1      (c)  $3/8$       (d) 3
18.  $\{((1 \# 1) \# 2) - (10^{1.3} \nabla \log_{10} 0.1)\} / (1 \nabla 2) =$  (1998)  
 (a)  $3/8$       (b)  $4 \log_{10} 0.1/8$       (c)  $(4 + 10^{1.3})/8$       (d) None of these
19.  $((X \# -Y) / (-X \nabla Y)) = 3/8$ , then which of the following must be true? (1998)  
 (a)  $X = 2, Y = 1$       (b)  $X > 0, Y < 0$   
 (c)  $X$  and  $Y$  both are positive      (d)  $X$  and  $Y$  both are negative

**Directions for questions 20 to 22 : Read the information given below and answer the questions that follow :**

If  $x$  &  $y$  are real numbers, the functions are defined as  $f(x, y) = |x + y|$ ,  $F(x, y) = -f(x, y)$  and  $G(x, y) = -F(x, y)$ . Now with the help of this information answer the following questions.

20. Which of the following will be necessarily true? (1999)  
 (a)  $G(f(x, y), F(x, y)) > F(f(x, y), G(x, y))$   
 (c)  $F(G(x, y), (x + y)) \neq G(F(x, y), (x + y))$       (b)  $F(F(x, y), F(x, y)) = F(G(x, y), G(x, y))$   
 (d)  $F(f(x, y), f(x, y)) = G(F(x, y), f(x, y))$

21. If  $y = x$ , which of the following will give  $x^2$  as the final value ? (1999)
- (a)  $f(x, y) G(x, y) 4$       (b)  $G(f(x, y) f(x, y), F(x, y)/8$   
 (c)  $-F(x, y) G(x, y)/\log_2 16$       (d)  $-f(x, y) G(x, y) F(x, y)/F(3x, 3y)$
22. What will be the final value given by the function  $G(f(G(F(f(2, -3), 0) - 2), 0), -1)$  ? (1999)
- (a) 2      (b) -2      (c) 1      (d) -1

**Directions for questions 23 to 26 : Read the information given below and answer the questions that follow :**

Any function has been defined for a variable  $x$ , where range of  $x \in (-2, 2)$ .

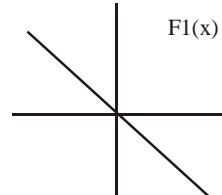
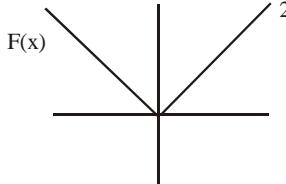
Mark (a) if  $F1(x) = -F(x)$

Mark (b) if  $F1(x) = F(-x)$

Mark (c) if  $F1(x) = -F(-x)$

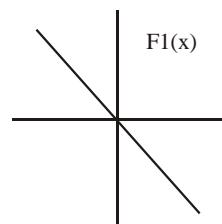
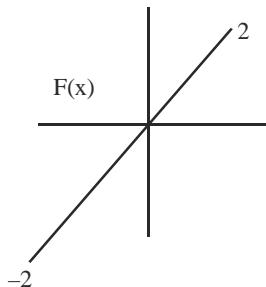
Otherwise mark (d).

23.



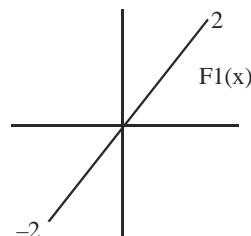
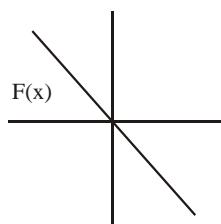
(1999)

24.



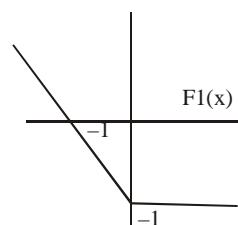
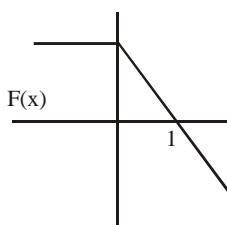
(1999)

25.



(1999)

26.



(1999)

27. There is a set of 'n' natural numbers. The function 'H' is such that it finds the highest common factor between any two numbers. What is the minimum number of times that the function has to be invoked to find the H.C.F. of the given set of numbers? (1999)
- (a)  $1/2 n$  (b)  $n - 1$  (c)  $n$  (d) None of these

**Directions for questions 28 & 29 : Read the information given below and answer the questions that follow :**

Certain relation is defined among variable A & B.

Using the relation answer the questions given below :

$@(A, B)$  = average of A and B

$\setminus(A, B)$  = product of A and B

$x(A, B)$  = the result when A is divided by B

28. The sum of A and B is given by (2000)
- (a)  $\setminus(@(A, B), 2)$  (b)  $@(\setminus(A, B), 2)$  (c)  $@(X(A, B), 2)$  (d) none of these
29. The average of A, B and C is given by (2000)
- (a)  $@(\times(\setminus(@(A, B), 2), C), 3)$  (b)  $\setminus(x(\setminus(@(A, B), 2), C), 2)$   
(c)  $X(@(\setminus(@(A, B), 2), C), 3)$  (d)  $X(\setminus(@(\setminus(@(A, B), 2), C), 2), 3)$

**Directions for questions 30 to 32 : Read the information given below and answer the questions that follow :**

x and y are non-zero real numbers

$f(x, y) = (x - y)^{0.5}$ , if  $(x - y)^{0.5}$  is real otherwise  $= (x + y)^2$

$g(x, y) = (x - y)^2$  if  $(x - y)^{0.5}$  is real, otherwise  $= -(x + y)$

30. For which of the following is  $f(x, y)$  necessarily greater than  $g(x, y)$ ? (2000)
- (a) x and y are positive (b) x and y are negative (c) x and y are greater than -1 (d) none of these
31. Which of the following is necessarily false ? (2000)
- (a)  $f(x, y) \geq g(x, y)$  for  $0 \leq x, y \leq 0.5$  (b)  $f(x, y) < g(x, y)$  when  $x, y > -1$   
(c)  $f(x, y) > g(x, y)$  for  $x, y > 1$  (d) None of these
32. If  $f(x, y) = g(x, y)$  then (2000)
- (a)  $x = y$  (b)  $x + y = 1$  (c)  $x + y = -2$  (d) Both b and c

33. Which of the following equations will best fit for the given data ? (2000)

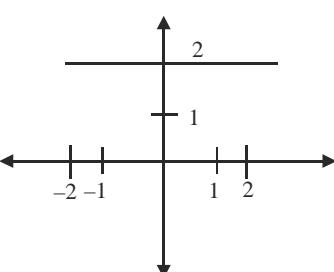
x	1	2	3	4	5	6
y	4	8	14	22	32	44

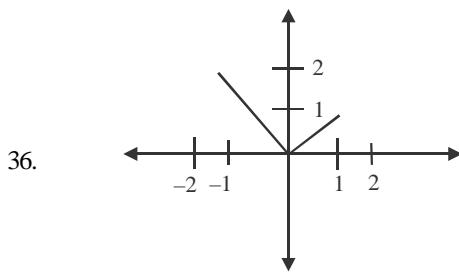
- (a)  $y = ax + b$  (b)  $y = a + bx + cx^2$  (c)  $y = e^{ax + b}$  (d) None of these
34. If  $f(0, y) = y - 1$ , and  $f(x - 1, y) = f(x, f(x, y))$  then, what is the value of  $f(1, 2)$ ? (2000)
- (a) 1 (b) 2 (c) 3 (d) 4

**Directions for questions 35 to 37 : Read the information given below and answer the questions that follow :**

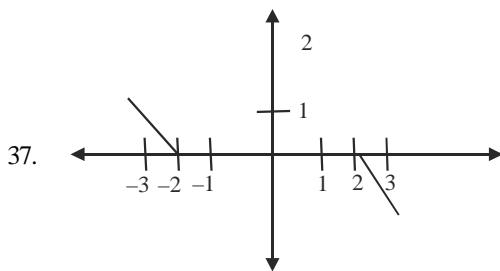
Graphs of some functions are given. Mark the correct options from the following:

- (a)  $f(x) = 3f(-x)$  (b)  $f(x) = f(-x)$  (c)  $f(x) = -f(-x)$  (d)  $6f(x) = 3f(-x)$  for  $x > 0$

35.  (2000)



(2000)



(2000)

**Directions for questions 38 to 40 : Read the information given below and answer the questions that follow :**

Functions m and M are defined as follows:

$$m(a, b, c) = \min(a + b, c, a)$$

$$M(a, b, c) = \max(a + b, c, a)$$

38. If  $a = -2$ ,  $b = -3$  and  $c = 2$  what is the maximum between  $[m(a, b, c) - M(a, b, c)]/2$  and  $[m(a, b, c) + M(a, b, c)]/2$ ? (2000)
- (a)  $3/2$  (b)  $7/2$  (c)  $-3/2$  (d)  $-7/2$
39. If a and b, c are negative, then what gives the minimum of a and b? (2000)
- (a)  $m(a, b, c)$  (b)  $-M(-a, a, -b)$  (c)  $m(a+b, b, c)$  (d) none of these
40. What is  $m(M(a-b, b, c), m(a+b, c, b), -M(a, b, c))$  for  $a = 2$ ,  $b = 4$ ,  $c = 3$ ? (2000)
- (a)  $-4$  (b)  $0$  (c)  $-6$  (d)  $3$

**Directions for questions 41 & 42 : Read the information given below and answer the questions that follow :**

$$f(x) = \frac{1}{1+x} \text{ if } x \text{ is positive}$$

$$= 1+x \text{ if } x \text{ is negative or zero}$$

$$f^n(x) = f(f^{n-1}(x))$$

41. If  $x = 1$  find  $f^1(x)f^2(x)f^3(x)f^4(x)$  (2000)
- (a)  $1/5$  (b)  $1/6$  (c)  $1/7$  (d)  $1/8$
42. If  $x = -1$  what will  $f^5(x)$  be (2000)
- (a)  $2/3$  (b)  $1/2$  (c)  $3/5$  (d)  $4$
43. If  $f(x) = \log \left\{ \frac{1-x}{1-x} \right\}$ , then  $f(x) + f(y)$  is (2002)
- (a)  $f(x+y)$  (b)  $f\left\{ \frac{x-y}{1-xy} \right\}$  (c)  $(x-y)f\left\{ \frac{1}{1-xy} \right\}$  (d)  $\frac{f(x) - f(y)}{1-xy}$

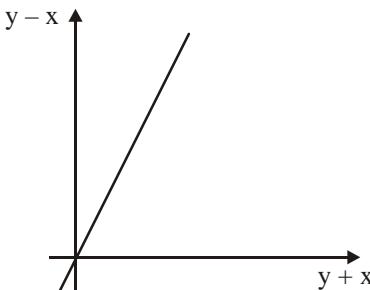
44. Suppose, for any real number  $x$ ,  $[x]$  denotes the greatest integer less than or equal to  $x$ . Let  $L(x, y) = [x] + [y] + [x + y]$  and  $R(x, y) = [2x] + [2y]$ . Then it's impossible to find any two positive real numbers  $x$  and  $y$  for which (2002)
- (a)  $L(x, y) = R(x, y)$       (b)  $L(x, y) \neq R(x, y)$       (c)  $L(x, y) < R(x, y)$       (d)  $L(x, y) > R(x, y)$
45. Let  $g(x) = \max(5-x, x+2)$ . The smallest possible value of  $g(x)$  is (2003C)
- (a) 4.0      (b) 4.5      (c) 1.5      (d) None of these
46. Let  $f(x) = |x-2| + |2.5-x| + |3.6-x|$ , where  $x$  is a real number, attains a minimum at? (2003C)
- (a)  $x=2.3$       (b)  $x=2.5$       (c)  $x=2.7$       (d) None of these
47. When the curves  $y = \log_{10} x$  and  $y = x^{-1}$  are drawn in the  $x$ - $y$  plane, how many times do they intersect for values  $x \geq 1$ ? (2003C)
- (a) Never      (b) Once      (c) Twice      (d) More than twice.
48. Consider the following two curves in the  $x$ - $y$  plane;  $y = x^3 - x^2 - 5$ ;  $y = x^2 - x - 5$ . (2003C)
- Which of the following statements is true for  $-2 \leq x \leq 2$ ?
- (a) The two curves intersect once      (b) The two curves intersect twice
- (c) The two curves do not intersect      (d) The two curves intersect thrice
49. On January 1, 2004 two new societies,  $S_1$  and  $S_2$ , are formed, each with  $n$  members. On the first day of each subsequent month,  $S_1$  adds  $b$  members while  $S_2$  multiplies its current number of members by a constant factor  $r$ . Both the societies have the same number of members on July 2, 2004. If  $b = 10.5n$ , what is the value of  $r$ ? (2004)
- (a) 2.0      (b) 1.9      (c) 1.8      (d) 1.7
50. If  $f(x) = x^3 - 4x + p$ , and  $f(0)$  and  $f(1)$  are of opposite signs, then which of the following is necessarily true? (2004)
- (a)  $-1 < p < 2$       (b)  $0 < p < 3$       (c)  $-2 < p < 1$       (d)  $-3 < p < 0$
51. Let  $f(x) = ax^2 - b|x|$ , where  $a$  and  $b$  are constants. Then at  $x = 0$ ,  $f(x)$  is (2004)
- (a) maximized whenever  $a > 0, b > 0$       (b) maximized whenever  $a > 0, b < 0$
- (c) minimized whenever  $a > 0, b > 0$       (d) minimized whenever  $a > 0, b < 0$

**Directions for Questions 52 and 53 : Answer the questions on the basis of the information given below :**

$$\begin{aligned}
 f_1(x) &= x & 0 \leq x \leq 1 \\
 &= 1 & x \geq 1 \\
 &= 0 & \text{otherwise} \\
 f_2(x) &= f_1(-x) & \text{for all } x \\
 f_3(x) &= -f_2(x) & \text{for all } x \\
 f_4(x) &= f_3(-x) & \text{for all } x
 \end{aligned}$$

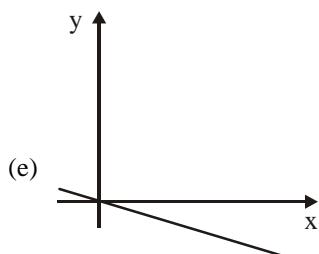
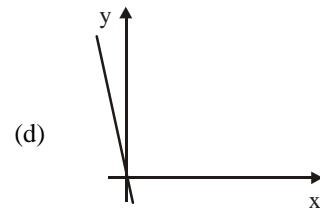
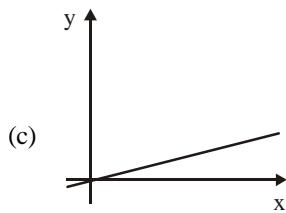
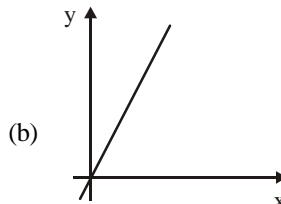
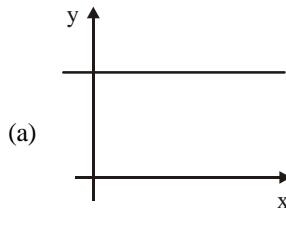
52. How many of the following products are necessarily zero for every  $x$ ? (2004 - 2 marks)
- $f_1(x) f_2(x)$ ,  $f_2(x) f_3(x)$ ,  $f_2(x) f_4(x)$
- (a) 0      (b) 1      (c) 2      (d) 3
53. Which of the following is necessarily true? (2004 - 2 marks)
- (a)  $f_4(x) = f_1(x)$  for all  $x$       (b)  $f_1(x) = -f_3(-x)$  for all  $x$       (c)  $f_2(-x) = f_4(x)$  for all  $x$       (d)  $f_1(x) + f_3(x) = 0$  for all  $x$
54. Let  $g(x)$  be a function such that  $g(x+1) + g(x-1) = g(x)$  for every real  $x$ . Then for what value of  $p$  is the relation  $g(x+p) = g(x)$  necessarily true for every real  $x$ ? (2005 - 2 marks)
- (a) 5      (b) 3      (c) 2      (d) 6

55. The graph of  $y - x$  against  $y + x$  is as shown below. (All graphs in this question are drawn to scale and the same scale is used on each axis).



Which of the following shows the graph of  $y$  against  $x$ ?

(2006)



56. Let  $f(x) = \max(2x + 1, 3 - 4x)$ , where  $x$  is any real number. Then the minimum possible value of  $f(x)$  is (2006)

(a)  $1/3$  (b)  $1/2$  (c)  $2/3$  (d)  $4/3$  (e)  $5/3$

57. A quadratic function  $f(x)$  attains a maximum of 3 at  $x = 1$ . The value of the function at  $x = 0$  is 1. What is the value of  $f(x)$  at  $x = 10$ ? (2007)

(a)  $-105$  (b)  $-119$  (c)  $-159$  (d)  $-110$  (e)  $-180$

**Directions for questions 58 and 59 :** Mr. David manufactures and sells a single product at a fixed price in a niche market. The selling price of each unit is Rs. 30. On the other hand, the cost, in rupees, of producing  $x$  units is  $240 + bx + cx^2$ , where  $b$  and  $c$  are some constants. Mr. David noticed that doubling the daily production from 20 to 40 units increases the daily production cost by  $66\frac{2}{3}\%$ . However, an increase in daily production from 40 to 60 units results in an increase of only 50% in the daily production cost. Assume that demand is unlimited and that Mr. David can sell as much as he can produce. His objective is to maximize the profit

58. How many units should Mr. David produce daily? (2007)

(a) 150 (b) 130 (c) 100  
(d) 70 (e) Cannot be determined



## ANSWERS WITH SOLUTIONS

1. (b)  $Ma[md(a), mn(md(b), a), mn(ab, md(ac))]$   
 $Ma[|-2|, mn(|-3|, -2), mn(6, |-8|)]$   
 $Ma[2, mn(3, -2), mn(6, 8)]$   
 $Ma[2, -2, 6] = 6.$
2. (a)  $Ma[md(a), mn(a, b)] \quad mn[a, md(Ma(a, b))]$   
 $Ma[2, -3] \quad mn[-2, md(-2)]$   
 $2 \quad mn(-2, 2) \text{ or } 2 = -2$   
relation does not hold for  $a = -2$  and  $b = -3$   
or  $a < 0, b < 0$
3. (b)  $fog(x) = f\{g(x)\} = f\left(\frac{x-3}{2}\right) = 2\left(\frac{x-3}{2}\right) = 3 - x$   
And  $gof(x) = g\{f(x)\} = g(2x - 3) = \frac{2x - 3 - 3}{2} = x$   
Clearly  $fog(x) = gof(x).$
4. (c)  $f(x) = g(x-3)$   
 $2x - 3 = \frac{x-3-3}{2} \Rightarrow 2x - 3 = \frac{x-6}{2}$   
 $4x - 6 = x - 6 \text{ or } 3x = -12 \text{ or } x = -4.$
5. (b)  $\{go fo fo go go f(x)\} \{fo go g(x)\}$   
From Q. 3 we have  $fog(x) = gof(x) = x$   
Therefore above expression becomes  $(x). (x) = x^2.$
6. (c)  $fo(fo g)o(go f)(x)$   
we have,  $fog(x) = gof(x) = x$   
So given expression reduces to  $f(x)$  that is  $2x + 3.$
7. (a) Find  $me(a \ mo(\ell e(a, b)), mo(a \ me(mo(a), mo(b))))$   
Given  $a = -2, b = -3$   
Now,  $a \ mo(\ell e(a, b)) = -2 + mo(\ell e(-2, -3))$   
 $= -2 + mo(-3) = -2 - 3 = 1$   
And  $mo(a \ me(mo(a), mo(b)))$   
 $mo(-2 \ me(mo(-2), mo(-3)))$   
 $mo(-2 \ me(2, 3)) = mo(-2 - 3) = mo(1) = 1$   
Hence,  $me(1, 1) = 1.$
8. (d) (a)  $mo(\ell e(a, b)) \geq me(mo(a), mo(b))$   
 $\Rightarrow \ell e(a, b) \geq me(a, b)$  as  $a, b > 0$  which is false.  
(b)  $mo(\ell e(a, b)) = me(mo(a), mo(b))$   
 $\Rightarrow \ell e(a, b) = me(a, b)$  which is again false.  
(c)  $mo(\ell e(a, b)) = \ell e(me(a), mo(b))$   
or  $\ell e(a, b) = \ell e(a, b)$  which is false  
(d)  $mo(\ell e(a, b)) = \ell e(me(a), mo(b))$   
or  $\ell e(a, b) = \ell e(a, b)$  TRUE
9. (a) To solve this, take arbitrary values of  $a$  in the range specified  
In option (a),  $0 < a < 3$ , take  $a = 1$ .  
Then  $me(a^2 - 3a, a - 3) < 0$   
 $\Rightarrow me(-2, -2) < 0 \Rightarrow -2 < 0$ , which is true  
In option (b),  $a < 0$ , take  $a = -2$ .  
Then  $me(a^2 - 3a, a - 3) < 0$   
 $\Rightarrow me(10, -5) < 0 \Rightarrow 10 < 0$ , which is false  
In option (c),  $a > 3$ , take  $a = 4$ .  
Then  $me(a^2 - 3a, a - 3) < 0$   
 $\Rightarrow me(4, 1) < 0 \Rightarrow 4 < 0$ , which is false  
In option (d),  $a = 3$  then  $me(a^2 - 3a, a - 3) < 0$   
 $\Rightarrow me(0, 0) < 0 \Rightarrow 0 < 0$ , which is false  
∴ Option (a) is right one.
10. (a,b) In option (a), take  $a = 2$   
 $\ell e(a^2 - 3a, a - 3) = \ell e(-2, -1) = -2 > 0$   
In option (b), take  $a = -1$   
 $\ell e(a^2 - 3a, a - 3) = \ell e(4, -4) = -4 > 0$   
Again take  $a = 2$   
 $\ell e(a^2 - 3a, a - 3) = \ell e(-2, -1) = -2 > 0$  which true  
In option (c), take  $a = 3$   
 $\therefore \ell e(a^2 - 3a, a - 3) = \ell e(6, 0) = 0 > 0$  which is false  
In option (d), take  $a = 4$   
 $\therefore \ell e(a^2 - 3a, a - 3) = \ell e(4, 1) = 1 > 0$  which is false.  
Hence options (a) and (b) are correct.
11. (c) Equating  $2 + x^2 = 6 - 3x$   
 $\Rightarrow x^2 - 3x - 4 = 0 \Rightarrow x^2 - 4x + x - 4 = 0$   
or  $(x - 4)(x + 1) = 0 \Rightarrow x = -4$  or  $1$   
But  $x > 0$ . So,  $x = 1$

Thus,  $2 + x^2 = 3$  and  $6 - 3x = 2$

It means the largest value of function  $\min(2 + x^2, 6 - 3x)$  is 3.

12. (d)  $M(M(A(M(x, y), S(y, x)), x), A(y, x))$   
 $\Rightarrow M(M(A(6, 1), 2), A(3, 2))$   
 $\Rightarrow M(M(7, 2), A(3, 2))$   
 $\Rightarrow M(14, 5) = 70.$

13. (b)  $S[M(D(A(a, b), 2), D(A(a, b), 2)), M(D(S(a, b), 2), D(S(a, b), 2))]$   
 $\Rightarrow S[M(D(a-b, 2), D(a-b, 2)), M(D(a-b, 2), D(a-b, 2))]$   
 $\Rightarrow S\left[M\left(\frac{a-b}{2}, \frac{a-b}{2}\right), M\left(\frac{a-b}{2}, \frac{a-b}{2}\right)\right]$   
 $\Rightarrow S\left[\left(\frac{a+b}{2}\right)^2, \left(\frac{a-b}{2}\right)^2\right] \frac{(a+b)^2 - (a-b)^2}{4} = ab.$

14. (d) Sine  $x > y > z > 0$

$$\therefore la(x, y, z) = y - z$$

$$and le = \max(x - y, y - z)$$

we cannot find the value of le. Therefore we can't say whether  $la > le$  or  $le > la$

Hence, we can't comment, as data is insufficient.

15. (b)  $la(10, 5, 3) = 8; le(8, 5, 3) = 3$

$$ma(10, 4, 3) = \frac{1}{2}[6 - 7] = \frac{13}{2} = 6.5.$$

16. (c)  $ma(15, 10, 9) = \frac{1}{2}[5 + 19] = 12$

$$\min(10, 6) = 6; le(9, 8, 12) = 1; le(15, 6, 1) = 9.$$

17. (c)  $\frac{(2 \# 1)}{1 \nabla 2} = \frac{2}{2^2} - \frac{1}{1} = \frac{3}{8}.$

18. (d) Here,  $(1 \# 1) \# 2 = (1 + 1) \# 2 = 2 + 2 = 4$

$$And 10^{1.3} \nabla \log_{10} 0.1 = 10^{1.3} \nabla (-1)$$

$$But 10^{1.3} \times (-1) = -10^{1.3} which is -ve,$$

so the operation  $(ab)^{a+b}$  fails.

19. (b) Equating with  $a \# b = a + b$  :

Option (a) :  $b = -Y = -1$

Operation fails for -ve value of b.

Option (b) :  $b = -Y > 0$  at  $Y < 0$

$$a = X > 0$$

$$\therefore (X \# -Y) / (-X \nabla Y) = (a \# b) (-a) \nabla (-b) \\ = (a + b) (ab)^{-(a+b)}$$

Operation succeeds.

Option (c) :

$$b = -Y < 0 \text{ as } Y > 0$$

Operation fails.

Option (d) :

$$a = X < 0 \text{ as } X < 0$$

Operation fails.

Hence option (b) is correct.

20. (b)  $f(x, y) = |x + y|$

$$F(x, y) = -f(x, y) = -|x + y|$$

$$G(x, y) = -F(x, y) = |x + y|$$

We will check all the options one by one.

Option (a) :

$$G(f(x, y), F(x, y)) > F(f(x, y), G(x, y))$$

$$G|x+y|, -(x+y) > F|x+y|, |x-y|$$

$$0 > -2|x+y|$$

which is invalid when  $x + y = 0$

Option (b) :

$$F F(x, y), F(x, y) > F G(x, y), G(x, y)$$

$$F|-x+y|, -|x-y| > F|x-y|, (x-y)$$

$$-|-x+y| - |x-y| > -2|x-y|$$

$$-2|x-y| > -2|x-y|$$

which is true.

Option (c) :

$$F G(x, y), (x+y) > G F(x, y), (x-y)$$

$$F|x-y|, (x-y) > G(-|x-y|, (x-y))$$

$$-||x-y| - x-y| > -|x-y| - x-y|$$

which is not valid when  $x = 0, y = 0$ .

Option (d) :

$$f f(x, y), f(x, y) > G F(x, y), f(x, y)$$

$$F|x-y|, |x-y| > G -|x-y|, |x-y|$$

$$-||x-y| - x-y| > -|x-y| - |x-y|$$

$$-2|x-y| > 0 \Rightarrow |x-y| > 0$$

which is not valid when  $x = 1, y = 0$  etc.

Hence option (b) is correct.

21. (c) Consider option (a) :

$$F(x, y) G(x, y) 4|x-y| \cdot |x-y| 4(x-y)^2 4$$

$$= 16x^2 \neq x^2 \text{ as } x = y$$

Consider option (b) :

$$G f(x, y) f(x, y), F(x, y) / 8 \quad G |x - y|^2, -|x - y| / 8$$

$$|x - y|^2 - |x - y| / 8$$

$$= \frac{x^2 - |x|}{4} \neq x^2 \text{ as } x = y$$

Consider option (c) :

$$\text{as } -F(x, y) \cdot G(x, y) = -[-|x + y| \cdot |x + y|] = 4x^2 \text{ for } x = y.$$

And  $\log_2 16 = \log_2 2^4 = 4$ , which gives value of (c) as  $x^2$ .

Consider option (d) :

$$\frac{-f(x, y)G(x, y)F(x, y)}{F(3x, 3y)} = \frac{-|x - y| |x - y| (-|x - y|)}{-|3x - 3y|}$$

$$\frac{|x - y|^3}{-3|x - y|}$$

$$= -\frac{4}{3}x^2 \neq x^2 \text{ as } x = y$$

22. (a) Solving the given function from innermost bracket, we obtain

$$G(f(G(F(f(2, -3), 0), -2), 0), -1)$$

$$= G(f(G(F|2-3|, 0), -2), 0), -1)$$

$$= G(f(G(-|1+0|, -2), 0), -1) \quad (\because |2-3| = 1)$$

$$= G(f(|-1-2|, 0), -1)$$

$$G(|3-0|, -1) \quad (\because |-1-2| = 3)$$

$$= |3-1| = 2$$

23. (d) From the graph  $F1(x) = F(x)$  for  $x \in (-2, 0)$

but,  $F1(x) = -F(x)$  for  $x \in (0, 2)$ .

No option of (a, b, c) satisfy this condition.

24. (d) From the graphs,  $F1(x) = -F(x)$  and also  $F1(x) = F(-x)$ . So, both (a) and (b) are satisfied which is not given in any of the option.

25. (d) By observation  $F1(x) = -F(x)$  and also  $F1(x) = F(-x)$ . So, both (a) and (b) are satisfied. Since no option is given, mark (d) as the answer.

26. (c) By observation  $F1(x) = -F(-x)$ . This can be checked by taking any value of  $x$  say 1, 2. So, answer is (c).

27. (b) Out of  $n$  numbers, HCF of 1st and 2nd numbers can be calculated by invoking the function once.

Then HCF of this HCF and 3rd number can be calculated by invoking the function 2nd time and so on.

Each time the function is invoked, instead of two numbers we are left with one, i.e., one number is eliminated. Getting the final HCF means eliminating  $(n - 1)$  numbers and thus function has to be invoked  $(n - 1)$  times.

28. (a) From the given conditions, we obtain

$$(A, B) = \frac{A \quad B}{2}$$

$$\backslash(A, B) = B \times A$$

$$\text{And } X(A, B) = \frac{A}{B}$$

$$@((A, B)) = \frac{A \quad B}{2}$$

$$\therefore \backslash @((A, B), 2) = \left( \frac{A \quad B}{2} \right) \times 2 = A \quad B$$

$$29. (d) \quad \frac{A \quad B \quad C}{3} = \frac{2 \left( \frac{A \quad B}{2} \right) \quad C}{3} = \frac{2 \left( \frac{2 \left( \frac{A \quad B}{2} \right) \quad C}{2} \right)}{3}$$

$$\frac{2 \left( \frac{2 @((A, B) \quad C)}{2} \right)}{3}$$

$$\frac{2}{3} @(\backslash @((A, B), 2), C)$$

$$\frac{1}{3} \backslash (@(\backslash @((A, B), 2), C), 2)$$

$$X((@(\backslash @((A, B), 2), C), 2), 3)$$

30. (d) We know that

$$\begin{cases} x^2 \leq x, & 0 \leq x \leq 1 \\ x^2 \geq x & 1 \leq x, x \leq 0 \end{cases}$$

Taking option (a) :

$$\left. \begin{array}{l} f(x, y) = (x - y)^{0.5} \\ g(x, y) = (x - y)^2 \end{array} \right\} \text{ when } x \text{ and } y \text{ are positive}$$

Thus for  $x + y > 1$ ,  $(x + y)^{0.5} < (x + y)^2$

Therefore,  $f(x, y) < g(x, y)$

Taking option (b) :

$$\left. \begin{array}{l} f(x, y) = (x - y)^2 \\ g(x, y) = -(x - y) \end{array} \right\} \text{x and y are negative}$$

$$\text{Take } x = -\frac{1}{4}, y = -\frac{1}{8}$$

$$f(x, y) = \left( -\frac{1}{4} - \frac{1}{8} \right)^2 = \frac{9}{64}$$

$$g(x, y) = -\left( -\frac{1}{4} - \frac{1}{8} \right) = \frac{24}{64}$$

Clearly,  $f(x, y) < g(x, y)$

Taking option (c) :

Using option (a) or (b), we get

$$f(x, y) < g(x, y)$$

Hence option (d) is correct.

31. (c) When  $0 \leq x, y \leq 0.5$ ,  $x - y$  may be 1 or  $\geq 0$  so given statement (a) is true.

When  $x, y < -1$ , again statement (b) is true.

When  $x, y > 1$ ,  $x + y > 1$ , hence  $f(x, y) < g(x, y)$ .

Thus statement (c) given is necessarily false.

32. (b) When  $x + y = 1$  we have  $(x - y)^2 = (x - y)^{0.5}$   
i.e.,  $f(x, y) = g(x, y)$

Thus correct answer is (b).

33. (b) At  $x = 1, y = 4$ ; and  $x = 1, y = 8$   
 $4 = a + b$  and  $8 = 2a + b$   
 $\Rightarrow a = 4, b = 0$

$$\text{So, } y = ax + b \Rightarrow y = 4x$$

The other values do not satisfy this last equation. so option (a) is not fit.

Similarly, we may find that option (c) is also not fit. But option (b) is absolutely fit.

34. (d)  $f(x - 1, y) = f[x, f(x, y)]$

$$\text{Put } x = 0,$$

$$f(1, y) = f[0, f(0, y)] = f[0, y - 1] = y - 1 - 1 = y - 2$$

$$\text{Put } y = 2, f(1, 2) = 4.$$

35. (b) As graph is symmetrical about y axis, we can say function is even, so  $f(x) = f(-x)$

36. (d) We see from the graph. Value of  $f(x)$  in the left region is twice the value of  $f(x)$  in the right region.

$$\text{So, } 2f(x) = f(-x) \text{ or } 6f(x) = 3f(-x)$$

37. (c)  $f(-x)$  is replication of  $f(x)$  about y axis,  $-f(x)$  is replication of  $f(x)$  about x-axis and  $-f(-x)$  is replication of  $f(x)$  about y axis followed by replication about x-axis. Thus given graph is  $f(x) = -f(-x)$ .

For Qs. 38-41.

Putting the actual values in the functions, we get the required answers.

38. (c)  $m(a, b, c) = -5, M(a, b, c) = 2$

$$\therefore \frac{m(a, b, c) - M(a, b, c)}{2} = \frac{-5 - 2}{2} = -\frac{3}{2}$$

$$\text{And } \frac{m(a, b, c) + M(a, b, c)}{2} = \frac{-5 + 2}{2} = -\frac{7}{2}$$

So  $\frac{m(a, b, c) + M(a, b, c)}{2}$  is maximum and maximum

value is  $-3/2$ .

39. (c) Suppose  $a = -1, b = -2, c = -4$

Then

$$\begin{aligned} m(a, b, c) &= \min(a + b, c, a) \\ &= \min(-3, -4, -1) = -4; -M(-a, a, -b) \\ &= -\max(0, -b, -a) = -\max(0, 2, 1) = -2; m(a + b, b, c) \\ &= \min(a + 2b, c, a + b) = \min(-5, -4, -3) \\ &= -5 \end{aligned}$$

Clearly option (c) is correct.

40. (c) Here,  $M(a - b, b, c) = \max(a, c, a - b)$   
 $= \max(2, 3, -2) = 3$

$$\begin{aligned} m(a + b, c, b) &= \min(a + b + c, b, a + b) \\ &= \min(9, 4, 6) = 4 \end{aligned}$$

$$\text{And } -M(a, b, c) = -\max(a + b, c, a) \\ = -\max(6, 3, 2) = -6$$

$$\therefore m(M(a - b, b, c), m(a + b, c, b), -M(a, b, c)) \\ = m(3, 4, -6) \\ = \min(3 + 4, -6, 3) = -6.$$

41. (d)  $f(1) = \frac{1}{1-1} = \frac{1}{2}$  as x is positive

$$f^2(1) = f(f(1)) = f\left(\frac{1}{2}\right) = \frac{1}{1-1/2} = \frac{2}{3};$$

$$f^3(1) = f(f^2(1)) = f[2/3] = \frac{3}{5};$$

$$f^4(1) = \frac{5}{8}. \text{ Thus } f(1)f^2(1)f^3(1)f^4(1) = \frac{1}{8}.$$

42. (c) When x is negative,  $f(x) = 1 + x$

$$f(-1) = 1 - 1 = 0;$$

$$f^2(-1) = f(f(-1)) = f(0) = 1;$$

$$f^3(-1) = f(f^2(-1)) = f(1) = \frac{1}{1-1} = \frac{1}{2};$$

$$f^4(-1) = f(1/2) = 2/3 \text{ and } f^5(-1) = f\left(\frac{2}{3}\right) = \frac{3}{5}.$$

43. (b)  $f(x) = \log\left(\frac{1-x}{1-x}\right)$  and  $f(y) = \log\left(\frac{1-y}{1-y}\right)$

$$\therefore f(x) - f(y) = \log\left(\frac{1-x}{1-x}\right) - \log\left(\frac{1-y}{1-y}\right)$$

$$\log\left\{\left(\frac{1-x}{1-x}\right)\left(\frac{1-y}{1-y}\right)\right\} = \log\left(\frac{1-x-y+xy}{1-x-y-xy}\right)$$

$$\log\frac{(1-xy)\left(1-\frac{x-y}{1-xy}\right)}{(1+xy)\left(1-\frac{x-y}{1-xy}\right)}$$

[Divide and multiply the numerator & denominator by  $(1+xy)$ ]

$$\log\frac{1-\frac{x-y}{1-xy}}{1-\frac{x-y}{1-xy}} = f\left(\frac{x-y}{1-xy}\right)$$

44. (d)  $[x]$  means if  $x = 5.5$ , then  $[x] = 5$

$$L[x, y] = [x] + [y] + [x+y], R(x, y) = [2x] + [2y]$$

Relationship between  $L(x, y)$  and  $R(x, y)$  can be found by putting various values of  $x$  and  $y$ .

Put  $x = 1.6$  and  $y = 1.8$ .

$$L(x, y) = 1 + 1 + 3 = 5 \text{ and } R(x, y) = 3 + 3 = 6$$

So, (b) and (c) are wrong.

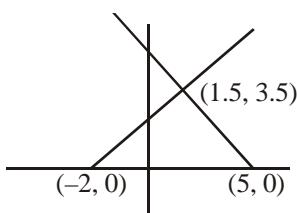
If  $x = 1.2$  and  $y = 2.3$ .

$$L(x, y) = 1 + 2 + 3 = 6 \text{ and } R(x, y) = 2 + 4 = 6$$

Or  $R(x, y) = L(x, y)$ , so (a) is not true

We see that (d) will never be possible

45. (d)  $g(x) = \max(5-x, x+2)$ . Drawing the graph,



The bold lines representing the function  $g(x)$  intersect one another at a unique point. It clearly shows that the smallest value of  $g(x) = 3.5$ .

46. (b)  $f(x) = |x-2| + |2.5-x| + |3.6-x|$  can attain minimum value when either of the three terms = 0.

**Case I :** When  $|x-2| = 0 \Rightarrow x = 2$ ,

$$\text{Value of } f(x) = 0.5 + 1.6 = 2.1.$$

**Case II :** When  $|2.5-x| = 0 \Rightarrow x = 2.5$

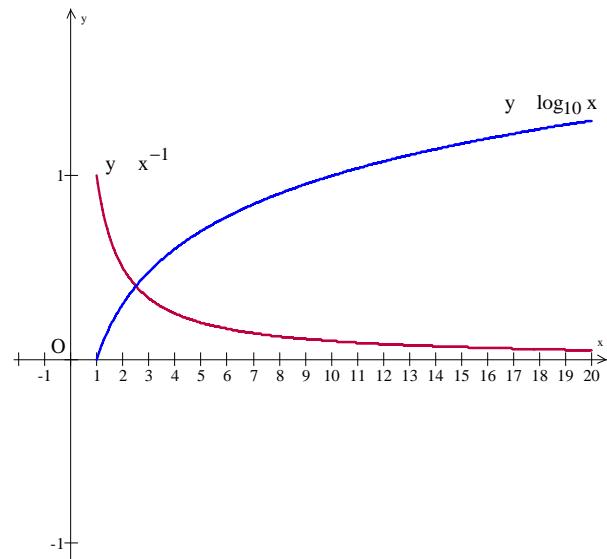
$$\text{Value of } f(x) = 0.5 + 0 + 1.1 = 1.6.$$

**Case III :** When  $|3.6-x| = 0 \Rightarrow x = 3.6$

$$\text{Value of } f(x) = 1.6 + 1.1 + 0 = 2.7.$$

Hence the minimum value of  $f(x)$  is 1.6 at  $x=2.5$ .

47. (b) The curves can be plotted as follows :



We see that they meet once.

48. (d) Solving the given two curves, we get

$$x^3 + x^2 + 5 = x^2 + x + 5 \Rightarrow x^3 - x = 0$$

$$\Rightarrow x = 0, 1, -1$$

All these three points lie in  $-2 \leq x \leq 2$ .

$$\text{At } x = 0, y = 0 + 0 + 5 = 5; y = 0 + 0 + 5 = 5$$

$$\Rightarrow \text{Point} = (0, 5)$$

$$\text{At } x = 1, y = 1^3 + 1^2 + 5 = 7; y = 1^2 + 1 + 5 = 7$$

$$\Rightarrow \text{Point} = (1, 7)$$

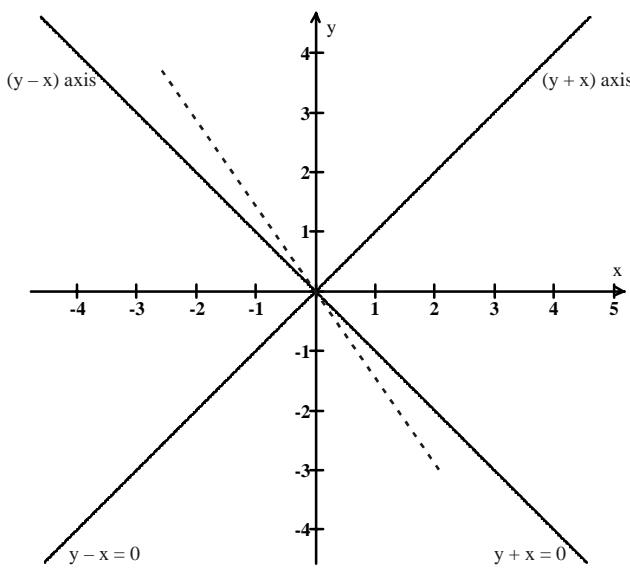
$$\text{At } x = -1, y = (-1)^3 + (-1)^2 + 5 = 5; y = (-1)^2 - 1 + 5 = 5$$

$$\Rightarrow \text{Point} = (-1, 5)$$

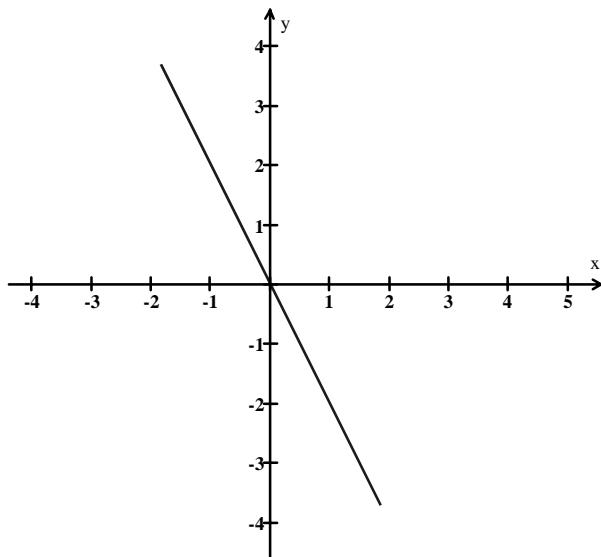
Hence, the two curves intersect at three points.

49. (a) Using the given conditions, we find the following number of members on the indicated date:





Here dotted line is the graph drawn in the question. If we observe this dotted line with respect to x- and y-axis, it looks like



So the option (d) is correct.

56. (e)  $f(x) = \max(2x + 1, 3 - 4x)$

The minimum possible value in this case will be when  $2x + 1 = 3 - 4x$ .

The reason for this is that the 'max' function will only take the higher value out of  $2x + 1$  and  $3 - 4x$ . So for minimum value of  $f(x)$

$$2x + 1 = 3 - 4x \quad \text{or} \quad x = \frac{1}{3}$$

$$\text{At } x = \frac{1}{3}, f(x) = 2 \times \frac{1}{3} = 1 = \frac{5}{3}$$

57. (c) Let the quadratic function be  $ax^2 + bx + c$

$$\text{At } x = 0, ax^2 + bx + c = 1 \Rightarrow c = 1$$

$$\text{At } x = 1, ax^2 + bx + c = a + b + c = 3 \text{ or } a + b = 2 \dots \text{(i)}$$

As the function attains maxima at  $x = 1$ , so

$$\frac{dy}{dx} \Big|_{x=1} = 0 \text{ or } 2ax + b \Big|_{x=1} = 2a + b = 0 \quad \dots \text{(ii)}$$

Using (i) and (ii), we get  $a = -2$  and  $b = 4$

$$\text{At } x = 10, ax^2 + bx + c = -2(10^2) + 4 \times 10 + 1 = -200 + 41 = -159.$$

58. (c) Cost function,  $C(x) = 240 + bx + cx^2$

When production changes from 20 to 40 units, then

$$C(40) - C(20) = \frac{2}{3}C(20)$$

$$\Rightarrow 3.C(40) - 5.C(20) = 0$$

$$\Rightarrow 3[240 + 40b + 1600c] - 5[240 + 20b + 400c] = 0$$

$$\Rightarrow 140c + b = 24 \quad \dots \text{(i)}$$

When production changes from 40 to 60 units, then

$$C(60) - C(40) = \frac{1}{2}C(40)$$

$$\Rightarrow 2.C(60) - 3.C(40) = 0$$

$$\Rightarrow 2[240 + 60b + 3600c] - 3[240 + 40b + 1600c] = 0$$

$$\Rightarrow 480 + 120b + 7200c - 720 - 120b - 4800c = 0$$

$$\Rightarrow 2400c - 240 = 0$$

$$\Rightarrow c = \frac{1}{10}$$

$$\therefore b = 10 \quad \text{[Putting } c = \frac{1}{10} \text{ in (i)]}$$

$$\therefore \text{Cost function, } C(x) = \frac{1}{10}x^2 + 10x + 240$$

Profit function,  $P(x) = R(x) - C(x)$

$$\Rightarrow P(x) = 30x - \left( \frac{x^2}{10} + 10x + 240 \right)$$

$$\Rightarrow P(x) = -\frac{x^2}{10} + 20x - 240$$

On differentiating we get,

$$P'(x) = -\frac{x}{5} - 20 \quad \dots \text{(ii)}$$

Put  $P'(x) = 0$ , for maxima or minima

$$\therefore x = 100$$

Again differentiating equation (ii), we get

$$P''(x) = -\frac{1}{5} \Rightarrow P''(100) = -\frac{1}{5} \neq 0$$

Hence, profit is maximum when production = 100 units

59. (a) Maximum daily profit =  $P(100)$

$$= -\frac{(100)^2}{10} + 20 \times 100 - 240 = -1000 + 2000 - 240 = \text{Rs}$$

760

60. (e) The given function can be described as seed (n) = Sum of the digits of n. Here, we have to find the number of positive integers n such that  $n < 500$  and sum of the digits of n = 9. So, the number n will be 9, 18, 27, .... and so on but less than 500. Actually these are the numbers divisible by 9 but less than 500.

$$\text{Now, } \frac{500}{9} = 55.55 \dots$$

Hence, required number of n = 55.

$$\begin{aligned} 61. \quad (b) \quad & f(x) \cdot f(y) = f(x \cdot y) \\ & \Rightarrow p(0) \cdot p(1) = p(0) \\ & \therefore p(1) = 1 \end{aligned}$$

$$\text{Now, } p(2) \cdot p\left(\frac{1}{2}\right) = p(1)$$

$$\begin{aligned} & \Rightarrow 4 \times p\left(\frac{1}{2}\right) = 1 \\ & \therefore p\left(\frac{1}{2}\right) = \frac{1}{4}. \end{aligned}$$

# 4

## CHAPTER

# AVERAGE, RATIO & PROPORTION

**Directions for questions 1 to 3 : Read the information given below and answer the questions that follow :**

Alphonso, on his death bed, keeps half his property for his wife and divides the rest equally among his three sons Ben, Carl and Dave. Some years later Ben dies leaving half his property to his widow and half to his brothers Carl and Dave together, shared equally. When Carl makes his will he keeps half his property for his widow and the rest he bequeaths to his younger brother Dave. When Dave dies some years later, he keeps half his property for his widow and the remaining for his mother. The mother now has Rs 1,575,000.

1. What was the worth of the total property? (1994)  
(a) Rs 30 lakh (b) Rs 8 lakh (c) Rs 18 lakh (d) Rs 24 lakh
2. What was Carl's original share? (1994)  
(a) Rs 4 lakh (b) Rs 12 lakh (c) Rs 6 lakh (d) Rs 5 lakh
3. What was the ratio of the property owned by the widows of the three sons, in the end? (1994)  
(a) 7 : 9 : 13 (b) 8 : 10 : 15 (c) 5 : 7 : 9 (d) 9 : 12 : 13
4. A man buys spirit at Rs 60 per litre, adds water to it and then sells it at Rs 75 per litre. What is the ratio of spirit to water if his profit in the deal is 37.5%? (1994)  
(a) 9 : 1 (b) 10 : 1 (c) 11 : 1 (d) None of these
5. Two liquids A and B are in the ratio 5 : 1 in container 1 and in container 2, they are in the ratio 1 : 3, what ratio should the contents of the two containers be mixed so as to obtain a mixture of A and B in the ratio 1 : 1? (1996)  
(a) 2 : 3 (b) 4 : 3 (c) 3 : 2 (d) 3 : 4

**Directions for questions 6 to 8 : Read the information given below and answer the questions that follow :**

There are 60 students in a class. These students are divided into three groups A, B and C of 15, 20 and 25 students each. The groups A and C are combined to form group D.

6. What is the average weight of the students in group D? (1997)  
(a) more than the average weight of A (b) more than the average weight of C  
(c) less than the average weight of C (d) Cannot be determined
7. If one student from Group A is shifted to group B, which of the following will be true? (1997)  
(a) The average weight of both groups increases (b) The average weight of both the groups decreases  
(c) The average weight of the class remains the same (d) Cannot be determined
8. If all the students of the class have the same weight, then which of the following is false? (1997)  
(a) The average weight of all the four groups is the same.  
(b) The total weight of A and C is twice the total weight of B.  
(c) The average weight of D is greater than the average weight of A.  
(d) The average weight of all the groups remains the same even if the number of students are shifted from one group to another.
9. The average marks of a student in ten papers are 80. If the highest and the lowest scores are not considered, the average is 81. If his highest score is 92, find the lowest. (1997)  
(a) 55 (b) 60 (c) 62 (d) Can't be determined

10. The value of each of a set of silver coins varies as the square of its diameter, if its thickness remains constant, and it varies as the thickness, if the diameter remains constant. If the diameters of two coins are in the ratio  $4 : 3$ , what should the ratio of their thicknesses be if the value of the first is 4 times that of the second? (1997)  
(a)  $16:9$  (b)  $9:4$  (c)  $9:16$  (d)  $4:9$

11. I have one rupee coins, fifty paise coins and twenty five paise coins. The number of coins are in the ratio  $2.5 : 3 : 4$ . If the total amount with me is Rs 210. Find the number of one rupee coins. (1998)  
(a) 90 (b) 85 (c) 100 (d) 105

12. There are two containers : the first contains 500 ml of alcohol, while the second contains 500 ml of water. Three cups of alcohol from the first container is removed and is mixed well in the second container. Then three cups of this mixture is removed and is mixed in the first container. Let 'A' denote the proportion of water in the first container and 'B' denote the proportion of alcohol in the second container. Then, (1998)  
(a)  $A > B$  (b)  $A < B$  (c)  $A = B$  (d) Cannot be determined

13. Mr Launcher plans to launch a new TV channel called Dekha Dekhi (DD). He envisages a viewership of 42%. He plans to capture the viewership from CAT TV and MAT TV, which currently hold viewership of 35% and 48%, each having a distinct and separate target audience. In what ratio should he capture the target audience of the two channels (1999)  
(a)  $6:7$  (b)  $7:6$  (c)  $1:1$  (d)  $8:9$

14. There are seven consecutive natural numbers such that the average of the first five is  $n$ . Then average of all seven numbers will be? (2000)  
(a)  $n$  (b)  $n + 1$   
(c)  $kn + \frac{1}{k}$  where  $k$  is a positive constant. (d)  $n - \frac{2}{7}$

15. Three friends, returning from a movie, stopped to eat at a restaurant. After dinner, they paid their bill and noticed a bowl of mints at the front counter. Sita took  $1/3$  of the mints, but returned four because she had a momentary pang of guilt. Fatima then took  $1/4$  of what was left but returned three for similar reasons. Eswari then took half of the remainder but threw two back into the bowl. The bowl had only 17 mints left when the raid was over. How many mints were originally in the bowl? (2001)  
(a) 38 (b) 31 (c) 41 (d) None of these

16. Three maths classes: X, Y and Z take an algebra test.  
The average score in class X is 83.  
The average score in class Y is 76.  
The average score in class Z is 85.  
The average score of all students in classes X and Y together is 79.  
The average score of all students in classes Y and Z together is 81.  
What is the average for all the three classes? (2001)  
(a) 81 (b) 81.5 (c) 82 (d) 84.5

17. A set of consecutive positive integers beginning with 1 is written on the blackboard. A student came along and erased one number. The average of the remaining numbers is  $35 \frac{7}{17}$ . What was the number erased? (2001)  
(a) 7 (b) 8 (c) 9 (d) None of these

18. A change making machine contains 1 rupee, 2 rupee and 5 rupee coins. The total number of coins is 300. The amount is Rs 960. If the number of 1 rupee coins and the number of 2 rupee coins are interchanged, the value comes down by Rs 40. The total number of 5 rupee coins is (2001)  
(a) 100 (b) 140 (c) 60 (d) 150

19. At a certain fast food restaurant, Brian can buy 3 burgers, 7 shakes, and one order of fries for Rs 120 exactly. At the same place it would cost Rs 164.5 for 4 burgers, 10 shakes, and one order of fries. How much would it cost for an ordinary meal of one burger, one shake, and one order of fries? (2001)  
(a) Rs 31 (b) Rs 41 (c) Rs 21 (d) Cannot be determined

20. Mayank, Mirza, Little and Jaspal bought a motorbike for \$60.00. Mayank paid one half of the sum of the amounts paid by the other boys, Mirza paid one third of the sum of the amounts paid by the other boys; and Little paid one fourth of the sum of the amounts paid by the other boys. How much did Jaspal have to pay? (2002)  
(a) 15 (b) 13 (c) 17 (d) None of these

21. Using only 2, 5, 10, 25 and 50 paise coins, what will be the minimum number of coins required to pay exactly 78 paise, 69 paise, and Rs 1.01 to three different persons? (2003)
- (a) 19 (b) 20 (c) 17 (d) 18
22. In a coastal village, every year floods destroy exactly half of the huts. After the flood water recedes, twice the number of huts destroyed are rebuilt. The floods occurred consecutively in the last three years namely 2001, 2002 and 2003. If floods are again expected in 2004, the number of huts expected to be destroyed is (2003)
- (a) Less than the number of huts existing at the beginning of 2001  
 (b) Less than the total number of huts destroyed by floods in 2001 and 2003  
 (c) Less than the total number of huts destroyed by floods in 2002 and 2003  
 (d) More than the total number of huts built in 2001 and 2002

**Directions for questions 23 & 24 : Read the information given below and answer the questions that follow :**

A certain perfume is available at a duty-free shop at the Bangkok International Airport. It is priced in the Thai currency Baht but other currency are also acceptable. In particular, the shop accepts Euro and US Dollar at the following rates of exchange : US Dollar 1 = 41 Bahts, Euro 1 = 46 Bahts

The perfume is priced at 520 Bahts per bottle. After one bottle is purchased, subsequent bottles are available at a discount of 30%. Three friends S, R and M together purchase three bottles of the perfume, agreeing to share the cost equally. R pays 2 Euros. M pays 4 euros and 27 Thai Bahts and S Pays the remaining amount in US Dollars.

23. How much does R owe to S in Thai Baht? (2003C)
- (a) 428 (b) 416 (c) 334 (d) 324
24. How much does M owe to S in US Dollars? (2003C)
- (a) 3 (b) 4 (c) 5 (d) 6
25. A milkman mixes 20 litres of water with 80 litres milk. After selling one-fourth of this mixture, he adds water to replenish the quantity that he has sold. What is the current proportion of water to milk? (2004)
- (a) 2:3 (b) 1:2 (c) 1:3 (d) 3:4
26. A sprinter starts running on a circular path of radius  $r$  metres. Her average speed (in meters/minute) is  $\pi r$  during the first 30 seconds,  $\frac{\pi r}{2}$  during next one minute,  $\frac{\pi r}{4}$  during next 2 minutes,  $\frac{\pi r}{8}$  during next 4 minutes, and so on. What is the ratio of the time taken for the  $n$ th round to that for the previous round? (2004 - 2 marks)
- (a) 4 (b) 8 (c) 16 (d) 32
27. The number of employees in Obelix Menhir Co. is a prime number and is less than 300. The ratio of the number of employees who are graduates and above, to that of employees who are not, can possibly be: (2006)
- (a) 101:88 (b) 87:100 (c) 110:111 (d) 85:98 (e) 97:84
28. If  $\frac{a}{b} = \frac{1}{3}$ ,  $\frac{b}{c} = 2$ ,  $\frac{c}{d} = \frac{1}{2}$ ,  $\frac{d}{e} = 3$  and  $\frac{e}{f} = \frac{1}{4}$ , then what is the value of  $\frac{abc}{def}$ ? (2006)
- (a)  $\frac{3}{8}$  (b)  $\frac{27}{8}$  (c)  $\frac{3}{4}$  (d)  $\frac{27}{4}$  (e)  $\frac{1}{4}$
29. Ten years ago, the ages of the members of a joint family of eight people added up to 231 years. Three years later, one member died at the age of 60 years and a child was born during the same year. After another three years, one more member died, again at 60, and a child was born during the same year. The current average age of this eight-member joint family is nearest to (2007)
- (a) 24 years (b) 23 years (c) 22 years (d) 21 years (e) 25 years

## ANSWERS WITH SOLUTIONS

1. (d) Let the total property of Alphonso be Rs x.  
After his demise,

**First distribution**

Wife got  $\frac{x}{2}$  and each son got  $\frac{x}{6}$ ;

**2nd distribution**

After demise of Ben,

Ben's wife got  $\frac{x}{12}$

Carl and Dave got

$\frac{x}{6}$  (from father)  $\frac{x}{24}$  (from Ben)  $\frac{5x}{24}$  each

**3rd distribution**

Carl's bequest

Carl's widow gets  $\frac{5x}{48}$  and Dave gets  $\frac{5x}{48}$

$\therefore$  Dave's total property  $\frac{5x}{48} + \frac{5x}{24} + \frac{15x}{48}$

**4th distribution**

When Dave dies his mother gets  $\frac{15x}{96}$  and

Dave's widow gets  $\frac{15x}{96}$

Mother's total property is  $\frac{x}{2} + \frac{15x}{96} + \frac{63x}{96}$

So,  $\frac{63x}{96} = 1575000$

or  $x = \frac{1575000 \times 32}{21} = 24$  lakh

$\therefore$  Total property was Rs 24 lakh.

2. (a) Carl's original share  $\frac{x}{6}$  and  $x = 24$  lakh

$\therefore$  Share  $\frac{24}{6} = 4$  lakh

3. (b) Ben's widow gets  $\frac{x}{12} = \frac{24}{12} = 2$  lakh

Carl's widow gets  $\frac{5x}{48} = \frac{5 \times 24}{48} = \frac{5}{2}$  lakh

Dave's widow gets  $\frac{15x}{96} = \frac{15 \times 24}{96} = \frac{15}{4}$  lakh

Required ratio  $2 : \frac{5}{2} : \frac{15}{4}$  or  $8 : 10 : 15$

4. (b) Cost of mixture, C.P. = S.P. - Profit  
Let C.P. of mixture be Rs x per litre.

$$x - 75 - x \times \frac{37.5}{100} \text{ or } x - \frac{37.5x}{100} = 75$$

$$\text{or } \frac{137.5}{100}x - 75 \Rightarrow x = \frac{75 \times 100}{137.5} = \frac{600}{11}$$

$$\text{Fraction of pure spirit in the mixture} = \frac{600}{11 \times 60} = \frac{10}{11}$$

$$\therefore \text{Fraction of water in mixture} = 1 - \frac{10}{11} = \frac{1}{11}$$

$$\text{Hence, ratio of spirit to water} = \frac{10}{11} : \frac{1}{11} = 10 : 1$$

5. (d) Let the ratio in which the contents of the two containers are mixed be x : y  
Hence, we have

$$\begin{array}{r} \frac{5x}{6} \quad \frac{y}{4} \\ \hline \frac{x}{6} \quad \frac{3y}{4} \end{array} \quad \begin{array}{r} \frac{20x}{4} \quad \frac{6y}{18y} \\ \hline \frac{4x}{6} \quad \frac{1}{4} \end{array} \quad \begin{array}{r} 1 \\ 1 \end{array}$$

$$\Rightarrow 20x - 6y = 4x - 18y \Rightarrow 16x = 12y \Rightarrow \frac{x}{y} = \frac{3}{4}$$

6. (d) Average weight of the students in group D cannot be determined since we do not know the average weight of each student. The given data is insufficient to compare its average with other groups.

7. (c) If one student from group A is shifted to group B, still there is no effect on the whole class. In any case, the no. of students inside the class is same. Hence the average weight of the class remains same.

8. (c) Since all the students of the class have the same weight, then the average of weight of any group of any no. of students will be the same as that of each student's weight. Hence, the average weight of D cannot be greater than average weight of A.

9. (b) Let the lowest marks be x

Then,  $(x - 92) \times 8 = 800$

$$\Rightarrow x - 92 = 152 \therefore x = 60$$

10. (b) Let the diameters and thickness of the two coins be  $D_1, T_1$  and  $D_2, T_2$  respectively  
Value of coin 1 : value of coin 2 = 4 : 1

$$\Rightarrow \frac{4}{1} = \left( \frac{T_1}{T_2} \right) \times \left( \frac{D_1}{D_2} \right)^2 = \left( \frac{4}{3} \right)^2 \times \left( \frac{T_1}{T_2} \right) \text{ or } \frac{9}{4} = \frac{T_1}{T_2}$$

11. (d) Let the no. of one rupee, fifty paise and twenty five paise coins be  $2.5x, 3x$  and  $4x$  respectively.

$$\text{So, } 2.5x \times 1 + \frac{3x}{2} \times \frac{4x}{4} = 210$$

$$\Rightarrow 5x = 210 \Rightarrow x = 42$$

$$\therefore 1 \text{ Re coins} = 2.5 \times 42 = 105$$

12. (c) Let capacity of each cup be 100 ml

After first operation, first container will have 200 ml of alcohol and second container will have 300 ml alcohol and 500 ml water.

Ratio of water to alcohol in the second container = 5 : 3.  
After second operation, the quantity of water and

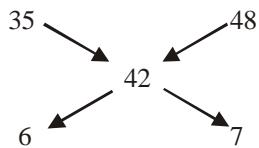
alcohol left would be  $\left(300 \times \frac{5}{8}\right)$  187.5 ml and

$\left(300 \times \frac{3}{8}\right)$  112.5 ml respectively in the first container.

and the quantity of water and alcohol in the first container is 187.5 ml and  $(200 + 112.5)$  ml = 312.5 ml hence, ratio of water and alcohol = 187.5 : 312.5 = 3 : 5 and the ratio of alcohol to water = 5 : 3.

Hence, on comparing ratio of water and alcohol in both the containers we find that A = B.

13. (a) This is an alligation problem where the mean rate is given as 42% i.e. % of viewership for Dheka-Dheki and the other two rates are 35% i.e., % of viewership of the CAT TV and 48% i.e., % viewership of MAT TV respectively.



Hence, the ratio in which he captures the target audience is 6 : 7.

14. (b) If n is the average of 5 natural numbers. Therefore n should be the middle term.

Then the first five numbers will

$n-2, n-1, n, n+1, n+2$

Now,  $n-2, n-1; n, n-1, n, n+1, n+2, n+3, n+4$  will be all seven no.

$\therefore$  Hence, new average will be  $(n+1)$ .

15. (d) Let number of mints = x

$$\text{Sita took : } \frac{x}{3} - 4; \text{ Fatima took : } \frac{1}{4} \left( x - \frac{x}{3} - 4 \right) - 3;$$

$$\text{Eswari took : } \frac{1}{2} \left[ \frac{3}{4} \left( x - \frac{x}{3} - 4 \right) - 3 \right] - 2$$

$\therefore$  Mints remaining in the bowl

$$= x - \left[ \frac{x}{3} - 4 + \frac{1}{4} \left( x - \frac{x}{3} - 4 \right) - 3 + \frac{3}{8} \left( x - \frac{x}{3} - 4 \right) - \frac{3}{2} - 2 \right] \\ = 17$$

$$\Rightarrow x - \left[ \frac{x}{3} - \frac{5}{8} \left( \frac{2x}{3} - 4 \right) - \frac{15}{2} \right] = 17$$

$$\Rightarrow x - \left[ \frac{x}{3} - \frac{5x}{12} - \frac{15}{2} - \frac{5}{2} \right] = 17$$

$$\Rightarrow x - \left[ \frac{3x}{4} - 5 \right] = 17 \Rightarrow \frac{x}{4} = 5 \Rightarrow x = 48.$$

16. (b) Let no. of students in classes X, Y and Z = x, y and z respectively.

$$\frac{83x}{x} \frac{76y}{y} = 79 \quad \dots(i)$$

$$\text{and } \frac{76y}{y} \frac{85z}{z} = 81 \quad \dots(ii)$$

$$\text{We have to find } \frac{83x}{x} \frac{76y}{y} \frac{85z}{z}$$

$$\text{From (i) } 4x = 3y \text{ or } y = \frac{4x}{3};$$

$$\text{From (ii) } 5y = 4z \text{ or } z = \frac{5}{4}y = \frac{5}{4} \times \frac{4}{3}x = \frac{5}{3}x$$

$$\therefore \text{Required average } \frac{\frac{83x}{3} \frac{76 \times \frac{4x}{3}}{3} \frac{85 \times \frac{5}{3}x}{3}}{\frac{3x}{3} \frac{4x}{3} \frac{5x}{3}} \\ = \frac{83}{4} \frac{729}{3} = 81.5$$

17. (a) Let number erased be x  
The average of the remaining no.

$$= \frac{\left( \frac{n(n-1)}{2} - x \right)}{n-1} = 35 \frac{7}{17} = \frac{602}{17}$$

Here n = 69 and x = 7 satisfy the above equation.

18. (b) Let number of 1 rupee coins = x;

2 rupees coin = y and

5 rupees coin = z

$$x + y + z = 300 \quad \dots(i)$$

$$x - 2y - 5z = 960 \quad \dots(ii)$$

$$(x - 2y - 5z) - (y - 2x - 5z) = 40 \quad \dots(iii)$$

$$y - x = 40 \text{ or } y = 40 + x$$

Multiply (i) by 5 and subtract (ii),

$$540 = 4x + 3y \text{ put } y = 40 + x$$

$$549 = 4x + 3x + 120 \text{ or } 420 = 7x$$

$$\text{or } x = 60, y = 100 \text{ & } z = 140$$

19. (a) Let the cost of burger, shake and one order of fries be x, y and z respectively.

According to question

$$3x - 7y - z = 120 \quad \dots(i)$$

$$\text{and } 4x - 10y - z = 164.5 \quad \dots(ii)$$

Subtracting (i) from (ii),

$$x - 3y = 44.5 \quad \dots(iii)$$

Multiplying (i) by 4, (ii) by 3 and subtracting (ii) from (i)  
We get,

$$-2y - z = 480 - 493.5 = -13.5 \quad \dots(iv)$$

Adding (iii) and (iv), we get,

$$x - y - z = 44.5 - 13.5 = 31$$

20. (b) Let Mayank Paid \$ x, Mirza Paid \$ y, Little paid \$ z, Jaspal paid \$ u  
According to question

$$x = \frac{y+z+u}{2}; y = \frac{x+z+u}{3} \text{ and } z = \frac{x+y+u}{4}$$

$$\text{Given } x+y+z+u = 60, u = ?$$

$$\text{So, } x = \frac{60-x}{2} \Rightarrow x = 20$$

$$y = \frac{60-y}{3} \Rightarrow y = 15$$

$$z = \frac{60-z}{4} \Rightarrow z = 12$$

$$x+y+z+u = 60 \Rightarrow 20+15+12+u = 60$$

$$\therefore u = 60-47 = 13$$

21. (a) For minimum number of coins

78 paise	69 paise	101 paise
50 × 1	50 ×	50 ×
10 × 2	10 ×	25 ×
—	5 ×	10 × 2
2 × 4	—	—
—	2 × 2	2 × 3
Total = 7	Total = 5	Total = 7
∴ Total number of coins = 19		

22. (c) Let total number of huts in beginning of year 2001 are 100, then we find the following table.

Year	Beginning	Destroy	Rebuilt
2001	100	50	50 2(5) 150
2002	150	75	75 150 225
2003	225	112.5	112.5 225 337.5
2004	337.5	168.75	

$$\text{expected to be destroyed} = \frac{337.5}{2} = 168.75$$

$$\text{Option (c)} \Rightarrow 168.75 \quad 75 \quad 112.5$$

23. (d) Cost of perfume bottle in Bahts =  $520 + 2 [70\% \text{ of } 520] = 1248$  Bahts

$$\text{Cost to each friend} = \frac{1248}{3} = 416 \text{ Baht}.$$

$$R \text{ pays 2 Euros} = 2 \times 46 = 92 \text{ Bahts}$$

$$M \text{ pays} = 46 \times 4 = 27 = 211 \text{ Bahts.}$$

$$S \text{ pays} = 1248 - (211 + 92) = 945 \text{ Bahts}$$

$$R \text{ owes } S = 416 - 92 = 324 \text{ Bahts}$$

24. (c) M owes =  $(416 - 211) = 205$  Bahts.

$$\text{Converting into dollars we get } \frac{205}{41} = 5 \text{ dollars.}$$

25. (a) Ratio of water and milk in mixture =  $20 : 80 = 1 : 4$   
25% of mixture is sold  
 $\therefore$  amount of water in mixture =  $15l$   
& amount of milk in mixture =  $60l$

$$\text{In new mixture ratio of water and milk} = (15 + 25) : 60 = 2 : 3$$

26. (c) Distance covered by the sprinter in  $\frac{1}{2}$  minutes, 1 minutes, 2 minutes, 4 minutes, and so on

$$= \pi r \times \frac{1}{2}, \frac{\pi r}{2}, \frac{\pi r \times 2}{4}, \frac{\pi r \times 4}{8}, \dots$$

$$\frac{\pi r}{2}, \frac{\pi r}{2}, \frac{\pi r}{2}, \frac{\pi r}{2}, \dots$$

i.e., sprinter covers  $\frac{\pi r}{2}$  distance in each round of time.

Time taken to cover the first round

$$\frac{1}{2} \quad 1 \quad 2 \quad 4 \quad 7.5 \text{ min}$$

Time taken to cover the second round

$$= 8 + 16 + 32 + 64 = 120 \text{ minutes}$$

The ratio of  $n^{\text{th}}$  to  $(n - 1)^{\text{th}}$  round = ratio of any two consecutive rounds.

$$\therefore \text{Required ratio} = \frac{120}{7.5} = 16$$

27. (e) This problem can be easily solved by adding the Denominator and Numerator of all the ratios and checking whether it is prime or not.

[Note : Ratios are such that any of its integral multiples will not be  $< 300$ ]

(a) 189, is divisible by 3. (b) 187, is divisible by 11.

(c) 221, is divisible by 17. (d) 183, is divisible by 3.

(e) 181, is prime.

$$28. (a) \frac{a}{b} = \frac{1}{3} \Rightarrow \text{for } a = 1, b = 3$$

$$\frac{b}{c} = \frac{2}{1} \Rightarrow \text{for } b = 3, c = \frac{3}{2}$$

$$\frac{c}{d} = \frac{1}{2} \Rightarrow \text{for } c = \frac{3}{2}, d = 3$$

$$\frac{d}{e} = \frac{3}{1} \Rightarrow \text{for } d = 3, e = 1$$

$$\frac{e}{f} = \frac{1}{4} \Rightarrow \text{for } e = 1, f = 4$$

$$\Rightarrow \frac{abc}{def} = \frac{1 \times 3 \times 3/2}{3 \times 1 \times 4} = \frac{3}{8}$$

29. (a) Ten years ago, sum of the ages of 8 people of the family = 231 years

Age of the members before 8 years who died after 3 years =  $60 - 3 = 57$  years.

And age of the member before 8 years, who died after 6 years =  $60 - 6 = 54$  years

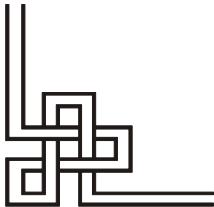
Sum of ages of the two children in the current year =  $7 + 4 = 11$  years

Sum of the ages of 8 members in the current year =  $(\text{Sum of ages of 6 members before 10 years}) + 6 \times 10 + (\text{Sum of ages of two children in the current year}) = 231 - (57 + 54) + 60 + 11 = 291$

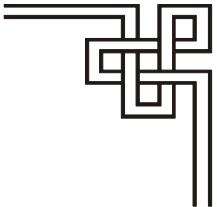
Hence, average age =  $\frac{191}{8} = 24$  years (Approx).

5

## CHAPTER



# ALGEBRA 1



1. If  $a + b + c = 0$ , where  $a \neq b \neq c$ , then,  $\frac{a^2}{2a^2 - bc}$   $\frac{b^2}{2b^2 - ac}$   $\frac{c^2}{2c^2 - ab}$  is equal to (1994)

(a) zero (b) 1 (c) -1 (d) abc

2. If one root of  $x^2 - px - 12 = 0$  is 4, while the equation  $x^2 - px - q = 0$  has equal roots, then the value of q is (1994)

(a) 49/4 (b) 4/49 (c) 4 (d) 1/4

3. Nineteen years from now Jackson will be 3 times as old as Joseph is now. Joseph is three years younger than Jackson. (1994)

I. Johnson's age now II. Joseph's age now

(a) I > II (b) I < II (c) I = II (d) Nothing can be said

4. What is the value of m which satisfies  $3m^2 - 21m + 30 < 0$ ? (1995)

(a)  $m < 2$  or  $m > 5$  (b)  $m > 2$  (c)  $2 < m < 5$  (d)  $m > 5$

5. The value of  $\frac{55^3 - 45^3}{55^2 - 55 \times 45 - 45^2}$  is (1995)

(a) 100 (b) 105 (c) 125 (d) 75

6. One root of  $x^2 + kx - 8 = 0$  is square of the other. Then the value of k is (1995)

(a) 2 (b) 8 (c) -8 (d) -2

7. Once I had been to the post-office to buy stamps of five rupees, two rupees and one rupee. I paid the clerk Rs 20, and since he did not have change, he gave me three more stamps of one rupee. If the number of stamps of each type that I had ordered initially was more than one, what was the total number of stamps that I bought? (1996)

(a) 10 (b) 9 (c) 12 (d) 8

8. Given the quadratic equation  $x^2 - (A - 3)x - (A - 7)$ , for what value of A will the sum of the squares of the roots be zero? (1996)

(a) -2 (b) 3 (c) 6 (d) None of these

9. Which of the following values of x do not satisfy the inequality  $(x^2 - 3x - 2 > 0)$  at all? (1996)

(a)  $1 \leq x \leq 2$  (b)  $-1 \geq x \geq -2$  (c)  $0 \leq x \leq 2$  (d)  $0 \geq x \geq -2$

10. Out of two-thirds of the total number of basket-ball matches, a team has won 17 matches and lost 3 of them. what is the maximum number of matches that the team can lose and still win three-fourths of the total number of matches, if it is true that no match can end in a tie ? (1996)

(a) 4 (b) 6 (c) 5 (d) 3

11. If the roots,  $x_1$  and  $x_2$ , of the quadratic equation  $x^2 - 2x + c = 0$  also satisfy the equation  $7x_2 - 4x_1 = 47$ , then which of the following is true? (1997)

(a)  $c = -15$  (b)  $x_1 = -5, x_2 = 3$  (c)  $x_1 = 4.5, x_2 = -2.5$  (d) None of these

12. One year payment to a servant is Rs 90 plus one turban. The servant leaves after 9 months and receives Rs 65 and a turban. Then find the price of the turban (1998)

(a) Rs 10 (b) Rs 15 (c) Rs 7.5 (d) Cannot be determined

13. You can collect Rubies and Emeralds as many as you can. Each Ruby is worth Rs 4crores and each Emerald is worth of Rs 5crore. Each Ruby weights 0.3 kg. and each Emerald weighs 0.4 kg. Your bag can carry at the most 12 kg. What you should collect to get the maximum wealth? (1998)

(a) 20 Rubies and 15 Emeralds (b) 40 Rubies (c) 28 Rubies and 9 Emeralds (d) None of these

14.  $|r - 6| = 11$  and  $|2q - 12| = 8$ , then what is the minimum value of  $q/r$ ? (1999)

(a) -2 (b)  $\frac{17}{10}$  (c)  $-\frac{1}{5}$  (d)  $\frac{2}{5}$

15. The expenses of a boarding school depends upon the fixed cost and variable cost. Variable cost varies directly as the number of students. If the expenses per student were Rs 600 for 50 students and Rs 700 for 25 students then what are the expenses for 100 students? (1999)  
 (a) 50000 (b) 60000 (c) 57500 (d) 55000
16.  $x = 2, y = -1$  then which of the following holds good ? (2000)  
 (a)  $xy = -2$  (b)  $xy = -2$  (c)  $x > -\frac{2}{y}$  (d) None of these
17. A, B and C are 3 cities that form a triangle and where every city is connected to every other one by at least one direct routes. There are 33 routes direct & indirect from A to C and there are 23 direct routes from B to A. How many direct routes are there from A to C ? (2000)  
 (a) 15 (b) 10 (c) 20 (d) 25
18. If the equation  $x^3 - ax^2 - bx - a = 0$  has three real roots then which of the following is true? (2000)  
 (a)  $a = 11$  (b)  $a \neq 1$  (c)  $b = 1$  (d)  $b \neq 1$
19.  $|x^2 - y^2| = 0.1$  and  $|x - y| = 0.2$ , then the value of  $|x| - |y|$  is (2000)  
 (a) 0.6 (b) 0.2 (c) 0.36 (d) 0.4
20. If  $x > 5$  and  $y < -1$ , then which of the following statements is true? (2001)  
 (a)  $(x + 4y) > 1$  (b)  $x > -4y$  (c)  $-4x < 5y$  (d) None of these
21. Two men X and Y started working for a certain company at similar jobs on January 1, 1950. X asked for an initial salary of Rs 300 with an annual increment of Rs 30. Y asked for an initial salary of Rs 200 with a rise of Rs 15 every six months. Assume that the arrangements remained unaltered till December 31, 1959. Salary is paid on the last day of the month. What is the total amount paid to them as salary during the period? (2001)  
 (a) Rs 93,300 (b) Rs 93,200 (c) Rs 93,100 (d) None of these
22. x and y are real numbers satisfying the conditions  $2 < x < 3$  and  $-8 < y < -7$ . Which of the following expressions will have the least value? (2001)  
 (a)  $x^2y$  (b)  $xy^2$  (c)  $5xy$  (d) None of these
23. m is the smallest positive integer such that for any integer  $n \leq m$ , the quantity  $n^3 - 7n^2 + 11n - 5$  is positive. What is the value of m? (2001)  
 (a) 4 (b) 5 (c) 8 (d) None of these
24. Let x, y be two positive numbers such that  $x + y = 1$ . Then, the minimum value of  $\left(x - \frac{1}{x}\right)^2 + \left(y - \frac{1}{y}\right)^2$  is (2001)  
 (a) 12 (b) 20 (c) 12.5 (d) 13.3
25. Let b be a positive integer and  $a = b^2 - b$ . If  $b \leq 4$ , then  $a^2 - 2a$  is divisible by (2001)  
 (a) 15 (b) 20 (c) 24 (d) none of these
26. Ujakar and Keshab solve a quadratic equation. Ujakar made a mistake in writing down the constant term. He ended up with the roots (4, 3). Keshab made a mistake in writing down the coefficient of x. He got the roots as (3, 2). What will be the exact roots of the original quadratic equation? (2001)  
 (a) (6, 1) (b) (-3, -4) (c) (4, 3) (d) (-4, -3)

**Directions for questions 27 & 28 : Read the information given below and answer the questions that follow :**

The batting average (BA) of a test batsman is computed from runs scored and innings played - completed innings and incomplete innings (not out) in the following manner :

$$r_1 = \text{number of runs scored in completed innings} \quad n_1 = \text{number of completed innings}$$

$$r_2 = \text{number of runs scored in incomplete innings} \quad n_2 = \text{number of incomplete innings. BA} = \frac{r_1 - r_2}{n_1}$$

To better assess a batsman's accomplishments, the ICC is considering two other measures MB A<sub>1</sub> and MB A<sub>2</sub> defined as follows :

$$\text{MB A}_1 = \frac{r_1}{n_1} + \frac{n_2}{n_1} \max \left[ 0, \left( \frac{r_2}{n_2} - \frac{r_1}{n_1} \right) \right]. \quad \text{MB A}_2 = \frac{r_1 - r_2}{n_1 - n_2}$$

27. Based on the information provided which of the following is true? (2001)
- (a)  $MB A_1 \leq BA \leq MB A_2$  (b)  $BA \leq MB A_2 \leq MB A_1$   
 (c)  $MB A_2 \leq BA \leq MB A_1$  (d) None of these
28. An experienced cricketer with no incomplete innings has a BA of 50. The next time he bats, the innings is incomplete and he scores 45 runs. It can be inferred that (2001)
- (a) BA and  $MB A_1$  will both increase  
 (b) BA will increase and  $MB A_2$  will decrease  
 (c) BA will increase and not enough data is available to assess change in  $MB A_1$  and  $MB A_2$   
 (d) None of these
29. If  $x, y$  and  $z$  are real numbers such that,  $x + y + z = 5$  and  $xy + yz + zx = 3$  (2002)  
 What is the largest value that  $x$  can have?
- (a)  $5/3$  (b)  $\sqrt{19}$  (c)  $\frac{13}{3}$  (d) None of these
30. If  $x^2 - 5y^2 - z^2 = 2y(2x - z)$  then which of the following statements are necessarily true? (2002)
- I.  $x = 2y$  II.  $x = 2z$  III.  $2x = z$   
 (a) Only I (b) Only II and III (c) Only I and II (d) None of these
31. The number of real roots of the equation  $\frac{A^2}{x} - \frac{B^2}{x-1} = 1$  where  $A$  and  $B$  are real numbers not equal to zero simultaneously is (2002)
- (a) None (b) 1 (c) 2 (d) 1 or 2
32. If  $pqr = 1$ , the value of the expression  $\frac{1}{1-p-q^{-1}} - \frac{1}{1-q-r^{-1}} - \frac{1}{1-r-p^{-1}}$  is equal to (2002)
- (a)  $p+q+r$  (b)  $\frac{1}{p+q+r}$  (c) 1 (d)  $p^{-1} - q^{-1} - r^{-1}$
33. A piece of string is 40 centimeters long. It is cut into three pieces. The longest piece is 3 times as long as the middle-sized piece and the shortest piece is 23 centimeters shorter than the longest piece. Find the length of the shortest piece. (2002)
- (a) 27 (b) 5 (c) 4 (d) 9
34. Three pieces of cakes of weight  $4\frac{1}{2}$  lbs,  $6\frac{3}{4}$  lbs and  $7\frac{1}{5}$  lbs respectively are to be divided into parts of equal weights. Further, each part must be as heavy as possible. If one such part is served to each guest, then what is the maximum number of guests that could be entertained? (2002)
- (a) 54 (b) 72 (c) 20 (d) None of these
35. Which one of the following conditions must  $p, q$  and  $r$  satisfy so that the following system of linear simultaneous equations has at least one solution, such that  $p \neq q \neq r \neq 0$ ? (2003C)
- $$\begin{aligned} x - 2y - 3z &= p; 2x - 6y - 11z = q; x - 2y - 7z = r \end{aligned}$$
- (a)  $5p - 2q - r = 0$  (b)  $5p - 2q + r = 0$  (c)  $5p + 2q - r = 0$  (d)  $5p - 2q - r = 0$
36. The number of non-negative real roots of  $2^x - x - 1 = 0$  equals (2003C)
- (a) 1.0 (b) 1 (c) 2 (d) 3
37. Let  $a, b, c, d$  be four integers such that  $a + b + c + d = 4m + 1$  where  $m$  is a positive integer. Given  $m$ , which one of the following is necessarily true? (2003C)
- (a) The minimum possible value of  $a^2 - b^2 - c^2 - d^2$  is  $4m^2 - 2m - 1$   
 (b) The minimum possible value of  $a^2 - b^2 - c^2 - d^2$  is  $4m^2 - 2m - 1$   
 (c) The maximum possible value of  $a^2 - b^2 - c^2 - d^2$  is  $4m^2 - 2m - 1$   
 (d) The maximum possible value of  $a^2 - b^2 - c^2 - d^2$  is  $4m^2 - 2m - 1$

38. Let  $p$  and  $q$  be the roots of the quadratic equation  $x^2 - (\alpha - 2)x - \alpha - 1 = 0$ . What is the minimum possible value of  $p^2 - q^2$ ? (2003C)  
 (a) 0 (b) 3 (c) 4 (d) 5
39. If the product of  $n$  positive real numbers is unity, then their sum is necessarily (2003C)  
 (a) a multiple of  $n$  (b) equal to  $n - \frac{1}{n}$  (c) never less than  $n$  (d) a positive integer
40. Given that  $-1 \leq v \leq 1$ ,  $-2 \leq u \leq -0.5$  and  $-2 \leq z \leq -0.5$  and  $w = \frac{vz}{u}$ , then which of the following is necessarily true? (2003C)  
 (a)  $-0.5 \leq w \leq 2$  (b)  $-4 \leq w \leq 4$  (c)  $-4 \leq w \leq 2$  (d)  $-2 \leq w \leq -0.5$
41. If  $x, y, z$  are distinct positive real numbers then  $\frac{x^2(y-z) - y^2(x-z) - z^2(x-y)}{xyz}$  would be (2003C)  
 (a) greater than 4 (b) greater than 5 (c) greater than 6 (d) None of the above.
42. A test has 50 questions. A student scores 1 mark for a correct answer,  $-1/3$  for a wrong answer, and  $1/6$  for not attempting a question. If the net score of a student is 32, the number of questions answered wrongly by that student can not be less than (2003C)  
 (a) 6 (b) 12 (c) 3 (d) 9
43. The number of roots common between the two equations  $x^3 + 3x^2 + 4x + 5 = 0$  and  $x^3 + 2x^2 + 7x + 3 = 0$  is (2003)  
 (a) 0 (b) 1 (c) 2 (d) 3
44. A real number  $x$  satisfying  $1 - \frac{1}{n} < x \leq 3 + \frac{1}{n}$ , for every positive integer  $n$ , is best described by (2003)  
 (a)  $1 < x < 4$  (b)  $1 < x \leq 3$  (c)  $0 < x \leq 4$  (d)  $1 \leq x \leq 3$
45. If  $x$  and  $y$  are integers then the equation  $5x + 19y = 64$  has (2003)  
 (a) no solution for  $x < 300$  and  $y < 0$  (b) no solution for  $x > 250$  and  $y > -100$   
 (c) a solution for  $250 < x < 300$  (d) a solution for  $-59 < y < -56$
46. If both  $a$  and  $b$  belong to the set  $\{1, 2, 3, 4\}$ , then the number of equations of the form  $ax^2 + bx + 1 = 0$  having real roots is (2003)  
 (a) 10 (b) 7 (c) 6 (d) 12
47. If three positive real numbers  $x, y, z$  satisfy  $y - x = z - y$  and  $xyz = 4$ , then what is the minimum possible value of  $y$ ? (2003)  
 (a)  $2^{1/3}$  (b)  $2^{2/3}$  (c)  $2^{1/4}$  (d)  $2^{3/4}$
48. If  $n$  is such that  $36 \leq n \leq 72$ , then  $x = \frac{n^2 - 2\sqrt{n}(n-4) - 16}{n - 4\sqrt{n} - 4}$  satisfies (2003)  
 (a)  $20 < x < 54$  (b)  $23 < x < 58$  (c)  $25 < x < 64$  (d)  $28 < x < 60$
49. If  $13x + 1 < 2z$  and  $z + 3 = 5y^2$ , then (2003)  
 (a)  $x$  is necessarily less than  $y$  (b)  $x$  is necessarily greater than  $y$   
 (c)  $x$  is necessarily equal to  $y$  (d) None of the above is necessarily true
50. If  $|b| \geq 1$  and  $x = -|a|b$ , then which one of the following is necessarily true? (2003)  
 (a)  $a - xb < 0$  (b)  $a - xb \geq 0$  (c)  $a - xb > 0$  (d)  $a - xb \leq 0$
51. The total number of integer pairs  $(x, y)$  satisfying the equation  $x + y = xy$  is (2004)  
 (a) 0 (b) 1 (c) 2 (d) None of the above
52. If  $\frac{a}{b-c} = \frac{b}{c-a} = \frac{c}{a-b} = r$ , then  $r$  cannot take any value except (2004)  
 (a)  $\frac{1}{2}$  (b)  $-1$  (c)  $\frac{1}{2}$  or  $-1$  (d)  $-\frac{1}{2}$  or  $-1$

53. Let  $y = \frac{1}{2 - \frac{1}{3 - \frac{1}{2 - \frac{1}{3 - \dots}}}}$  (2004)

What is the value of  $y$ ?

(a)  $\frac{\sqrt{13} - 3}{2}$  (b)  $\frac{\sqrt{13} - 3}{2}$  (c)  $\frac{\sqrt{15} - 3}{2}$  (d)  $\frac{\sqrt{15} - 3}{2}$

54. For which value of  $k$  does the following pair of equations yield a unique solution for  $x$  such that the solution is positive?

$$x^2 - y^2 = 0$$

$$(x - k)^2 + y^2 = 1$$

(2005 - 1 mark)

(a) 2 (b) 0 (c)  $\sqrt{2}$  (d)  $-\sqrt{2}$

55. Let  $x = \sqrt{4 - \sqrt{4 - \sqrt{4 - \sqrt{4 - \dots \text{to infinity}}}}}$ . Then  $x$  equals (2005 - 2 marks)

(a) 3 (b)  $\left( \frac{\sqrt{13} - 1}{2} \right)$  (c)  $\left( \frac{\sqrt{13} - 1}{2} \right)$  (d)  $\sqrt{13}$

56. A telecom service provider engages male and female operators for answering 1000 calls per day. A male operator can handle 40 calls per day whereas a female operator can handle 50 calls per day. The male and the female operators get a fixed wages of Rs. 250 and Rs. 300 per day respectively. In addition, a male operator gets Rs. 15 per call he answers and a female operator gets Rs. 10 per call she answers. To minimize the total cost, how many male operators should the service provider employ assuming he has to employ more than 7 of the 12 female operators available for the job?

(a) 15 (b) 14 (c) 12 (d) 10

**Directions for questions 57 & 58 : These questions are based on the information given below :**

An airline has a certain free luggage allowance and charges for excess luggage at a fixed rate per kg. Two passengers, Raja and Praja have 60 kg of luggage between them, and are charged Rs 1200 and Rs 2400 respectively for excess luggage. Had the entire luggage belonged to one of them, the excess luggage charge would have been Rs 5400.

57. What is the weight of Praja's luggage? (2006)

(a) 20 kg (b) 25 kg (c) 30 kg (d) 35 kg (e) 40 kg

58. What is the free luggage allowance? (2006)

(a) 10 kg (b) 5 kg (c) 20 kg (d) 15 kg (e) 30 kg

59. When you reverse the digits of the number 13, the number increases by 18. How many other two-digit numbers increase by 18 when their digits are reversed? (2006)

(a) 5 (b) 6 (c) 7 (d) 8 (e) 9

60. What values of  $x$  satisfy  $x^{2/3} + x^{1/3} - 2 \leq 0$ ? (2006)

(a)  $-8 \leq x \leq 1$  (b)  $-1 \leq x \leq 8$  (c)  $1 < x < 8$   
(d)  $1 \leq x \leq 8$  (e)  $-8 \leq x \leq 8$

61. What are the values of  $x$  and  $y$  that satisfy both the equations? (2006)

$$2^{0.7x} \cdot 3^{-1.25y} = 8 \frac{\sqrt{6}}{27}$$

$$4^{0.3x} \cdot 9^{0.2y} = 8 \cdot (81)^{1/5}$$

(a)  $x = 2, y = 5$  (b)  $x = 2.5, y = 6$  (c)  $x = 3, y = 5$   
(d)  $x = 3, y = 4$  (e)  $x = 5, y = 2$

62. The number of solutions of the equation  $2x + y = 40$  where both  $x$  and  $y$  are positive integers and  $x \leq y$  (2006)  
 (a) 7 (b) 13 (c) 14 (d) 18 (e) 20
63. The sum of four consecutive two-digit odd numbers, when divided by 10, becomes a perfect square. Which of the following can possibly be one of these four numbers? (2006)  
 (a) 21 (b) 25 (c) 41 (d) 67 (e) 73
64. The price of Darjeeling tea (in rupees per kilogram) is  $100 + 0.10n$ , on the  $n^{\text{th}}$  day of 2007 ( $n = 1, 2, \dots, 100$ ), and then remains constant. On the other hand, the price of Ooty tea (in rupees per kilogram) is  $89 + 0.15n$ , on the  $n^{\text{th}}$  day of 2007 ( $n = 1, 2, \dots, 365$ ). On which date in 2007 will the prices of these two varieties of tea be equal? (2007)  
 (a) June 30 (b) May 21 (c) April 11 (d) May 20 (e) April 10
65. A confused bank teller transposed the rupees and paise when he cashed a cheque for Shailaja, giving her rupees instead of paise and paise instead of rupees. After buying a toffee for 50 paise, Shailaja noticed that she was left with exactly three times as much as the amount on the cheque. Which of the following is a valid statement about the cheque amount? (2007)  
 (a) Over Rupees 4 but less than Rupees 5 (b) Over Rupees 13 but less than Rupees 14  
 (c) Over Rupees 7 but less than Rupees 8 (d) Over Rupees 22 but less than Rupees 23  
 (e) Over Rupees 18 but less than Rupees 19
66. A shop stores  $x$  kg of rice. The first customer buys half this amount plus half a kg of rice. The second customer buys half the remaining amount plus half a kg of rice. Then the third customer also buys half the remaining amount plus half a kg of rice. Thereafter, no rice is left in the shop. Which of the following best describes the value of  $x$ ? (2008)  
 (a)  $2 \leq x \leq 6$  (b)  $5 \leq x \leq 8$  (c)  $9 \leq x \leq 12$   
 (d)  $11 \leq x \leq 14$  (e)  $13 \leq x \leq 18$
67. Three consecutive positive integers are raised to the first, second and third powers respectively and then added. The sum so obtained is a perfect square whose square root equals the total of the three original integers. Which of the following best describes the minimum, say  $m$ , of these three integers? (2008)  
 (a)  $1 \leq m \leq 3$  (b)  $4 \leq m \leq 6$  (c)  $7 \leq m \leq 9$   
 (d)  $10 \leq m \leq 12$  (e)  $13 \leq m \leq 15$
68. If the roots of the equation  $x^3 - ax^2 + bx - c = 0$  are three consecutive integers, then what is the smallest possible value of  $b$ ? (2008)  
 (a)  $-\frac{1}{\sqrt{3}}$  (b)  $-1$  (c)  $0$  (d)  $1$  (e)  $\frac{1}{\sqrt{3}}$

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**Directions for Questions 69 and 70 :** Let  $f(x) = ax^2 + bx + c$ , where  $a$ ,  $b$  and  $c$  are certain constants and  $a \neq 0$ . It is known that  $f(5) = -3f(2)$  and that 3 is a root of  $f(x) = 0$ .

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69. What is the other root of  $f(x) = 0$ ? (2008)  
 (a)  $-7$  (b)  $-4$  (c)  $2$   
 (d)  $6$  (e) cannot be determined
70. What is the value of  $a + b + c$ ? (2008)  
 (a)  $9$  (b)  $14$  (c)  $13$   
 (d)  $37$  (e) cannot be determined

## ANSWERS WITH SOLUTIONS

1. (b) Take any value of  $a, b, c$  such that  
 $a + b + c = 0$  where  $a \neq b \neq c$   
say  $a = 1, b = -1$  and  $c = 0$   
substituting these values in  

$$\frac{a^2}{2a^2 - bc} - \frac{b^2}{2b^2 - ac} - \frac{c^2}{2c^2 - ab} = \frac{1}{2} - \frac{1}{2} - 0 = 1$$
2. (a) Given  $x^2 + px + 12 = 0$   
Since,  $x = 4$  is the one root of the equation, therefore  
 $x = 4$  will satisfy this equation  
 $\therefore 16 + 4p + 12 = 0 \Rightarrow p = -7$   
Other quadratic equation becomes  $x^2 - 7x - q = 0$   
(By putting value of  $p$ )  
Its roots are equal, so,  $b^2 = 4ac$   
 $\Rightarrow 49 = 4q \text{ or } q = \frac{49}{4}$
3. (d) Let present age of Jackson be  $x$  years and  
present age of Joseph be  $y$  years;  
then present age of Joseph =  $x - 3$   
After 19 years Jackson's age =  $(x + 19)$  years and  
Joseph's age =  $(y + 19)$  years.  
According to the question:  
 $x + 19 = 3(y + 19)$   
or  $x - 3y = 38$   
So only from above equation  $x$  and  $y$  cannot be found.
4. (c)  $3m^2 - 21m - 30 = 0$   
or  $m^2 - 7m - 10 = 0$   
or  $m^2 - 5m - 2m - 10 = 0$  (factorize)  
or  $m(m-5) - 2(m-5) = 0$   
or  $(m-2)(m-5) = 0$   
**Case I:**  $m-2 = 0$  and  $m-5 = 0$   
 $\Rightarrow m = 2$  and  $m = 5 \Rightarrow 2 < m < 5$   
**Case II:**  $m-2 = 0$  and  $m-5 \neq 0 \Rightarrow m = 2$  and  $m = 5$   
nothing common  
Hence,  $2 < m < 5$
5. (a) We know,  $\frac{a^3 - b^3}{a^2 - ab - b^2}$   

$$\frac{(a - b)(a^2 + b^2 - ab)}{(a^2 + b^2 - ab)} \text{ [using, } a^3 + b^3 = (a + b)(a^2 + b^2 - ab)]$$
  
 $a - b = 45 - 55 = 100 \quad (\because \text{on comparing with given information } a = 55, b = 45)$
6. (d) Given  $x^2 - kx - 8 = 0$   
Let  $a$  and  $b$  be the roots of given equation and  
 $b = a^2$  (given)  
Sum of roots  $a + b = -k \quad a = a^2$  .....(i)  
Product of roots  $ab = -8 \quad a^3 = a \Rightarrow a = -2$   
Using  $a = -2$  in (i),  $-k = -2 + 4 = 2$  or  $k = -2$
7. (a) The number of stamps that were initially bought were more than one of each type. Hence, the total number of stamps  
 $= 2(5 \text{ rupee}) + 2(2 \text{ rupee}) + 3(1 \text{ rupee}) + 3(1 \text{ rupee})$   
 $= 10$
8. (d) Let the roots be  $m$  and  $n$ . The given quadratic equation can be written as  $ax^2 + bx + c = 0$   
where  $a = 1, b = -(A-3), c = -(A-7)$ .  
The sum of the roots is  $(m + n) = -(b/a) = A - 3$  and the product of the roots is  $(mn) = (c/a) = -(A-7)$   
The sum of the squares of the roots  $= m^2 + n^2$   
 $= [(m + n)^2 - 2mn] = (A-3)^2 - 2.(-)(A-7) = 0$   
On solving, we get,  
 $A^2 - 4A - 5 = 0$   
 $A^2 - 5A + A - 5 = 0$   
 $A(A-5) + 1(A-5) = 0$   
 $(A+1)(A-5) = 0$   
 $A = 5 \text{ or } -1$   
None of these values are given in the options.
9. (a) Given inequality is  $x^2 - 3x - 2 > 0$   
 $\Rightarrow x^2 - 2x - x - 2 > 0$   
 $\Rightarrow x(x-2) - 1(x-2) > 0$   
 $\Rightarrow (x-2)(x-1) > 0$   
This gives ( $x > 2$ ) as one range and ( $x < 1$ ) as the other. or  $x < 2$  as one range and  $x > 1$  as the other.  
In between these two extremes, there is no value of  $x$  which satisfies the given inequality.
10. (a) Let total number of matches be  $x$   
 $\therefore \frac{2}{3}x = 17 + 3 = 20 \Rightarrow x = 30$ .  
Hence, to win  $\frac{3}{4}$  of the total number of matches, the team has to win  $\frac{3}{4} \times 30 = 22.5 \approx 23$  matches.

Hence, if team loses 4 more matches, it can still win  $\frac{3}{4}$  of the matches.

11. (a)  $7x_2 - 4x_1 = 47$   
 $x_1 + x_2 = 2$   
 Solving  $11x_2 = 55$   
 $x_2 = 5$  &  $x_1 = -3$   
 $\therefore c = -15$

12. (a) Let turban be of cost Rs x. So, payment to the servant =  $90 + x$  for 12 month  
 Payment for 9 months

$$\frac{9}{12} \times (90 - x) = 65 + x$$

$$\Rightarrow x = \text{Rs } 10$$

13. (b) Basically, the question is of weights, so let us analyse them.  
 4 Rubies weight as much as 3 Emeralds  
 Cost of 4 Rubies = 16 crores  
 Cost of 3 Emeralds = 15 crores  
 $\therefore$  All Rubies, multiple of 4 allowed, is the best deal,

$$\text{so } \frac{12}{0.3} = 40 \text{ Rubies} \equiv 160 \text{ crores}$$

14. (a) When  $\frac{q}{r}$  is min. then  $q = \text{min.}$  and  $r = \text{max.}$

$$|r - 6| = 11 \Rightarrow r = 17 \text{ or } -5$$

$$|2q - 12| = 8 \Rightarrow q = 10 \text{ or } q = 2$$

$$\text{Now, } \frac{q}{r} = \frac{-2}{5}, \frac{2}{17}, \frac{-10}{5}, \frac{10}{17}$$

$$\therefore \text{Minimum value of } \frac{q}{r} = -2$$

-2 is given which is the least among the given values.

15. (d) Let a and X be the fixed cost and constant of proportionality respectively. The expenses are given by Z.

$$E = a + nx \Rightarrow 50 \times 600 = a + 50x = 30000 \quad \dots(1)$$

Where n = no. of students

$$\text{Again, } 25 \times 700 = a + 25x = 17500 \quad \dots(2)$$

Subtracting (2) from (1),

$$25x = 12500 \text{ or } x = 500$$

$$\Rightarrow a = 30000 - 50 \times 500 = 5000$$

Now,  $E = 5000 + 100 \times 500 = \text{Rs. } 55,000$  for 100 stds.

16. (d) Given,  $y > -1$  i.e. if y is positive no. then product of x and y also positive.

But any option does not give  $xy$  is +ve.

By putting different values of x and y we see that none of these three hold good.

17. (b) Let the no. of direct routes from A to B be x, from A to C be z and that from C to B be y.

Then the total no. of routes from A to C are  $= xy + z = 33$ .  
 Since the no. of direct routes from A to B are 23,  
 $\therefore x = 23$ .

Therefore,  $23y + z = 33$ .

Then y must take value 1 and then  $z = 10$ .

Hence, 10 routes are direct from A to C.

18. (d) Let  $f(x) = x^3 - ax^2 + bx - a = 0$

In the given equation, there are 3 sign changes, therefore, there are at most 3 positive real roots.

In  $f(-x)$ , there is no sign change.

Thus, there is no negative real root. i.e. if  $\alpha, \beta$  and  $\gamma$  are the roots then they are all positive and we have

$$f(x) = (x - \alpha)(x - \beta)(x - \gamma) = 0$$

$$x^3 - \alpha\beta\gamma x^2 - \alpha\beta\gamma\alpha x - \alpha\beta\gamma$$

$$\Rightarrow b = \alpha\beta\gamma\alpha\gamma\alpha\beta\gamma \text{ and } \Rightarrow a = \alpha\beta\gamma\alpha\beta\gamma$$

$$\Rightarrow \frac{\alpha + \beta + \gamma}{\alpha\beta\gamma} = 1$$

$$\Rightarrow \frac{1}{\alpha\beta}, \frac{1}{\alpha\gamma}, \frac{1}{\beta\gamma} = 1$$

$$\Rightarrow \alpha\beta, \alpha\gamma, \beta\gamma = 1$$

$$\Rightarrow b = \alpha\beta + \beta\gamma + \gamma\alpha = 1 + 1 + 1 = 3.$$

Thus,  $b \neq 1$ .

19. (d)  $x - y = +0.2$  or  $(x - y)^2 = 0.04$ .

Also,  $x^2 + y^2 = 0.1$  (since  $x^2 + y^2 > 0$ )

And solving these two we get,  $2xy = 0.06$ .

From this we can find value of  $x + y$  which comes out to be +0.4 or -0.4 and we get  $|x| + |y| = 0.4$ .

20. (d)  $x > 5$  and  $y < -1 \Rightarrow 4y < -4$

(i)  $x > 5$  and  $4y < -4$  so  $x + 4y < 1$

(ii) Let  $x > -4y$  be true  $\Rightarrow 4y < -4$  or  $-4y > 4$

So,  $x > 4$ , which is not true as given  $x > 5$ .

So,  $x > -4y$  is not necessarily true.

(iii)  $x > 5 \Rightarrow -4x < -20$  and  $5y < -5$

It is not necessary that  $-4x < 5y$  as  $-4x$  can be greater than  $5y$ , since  $5y < -5$ .

Hence none of the options is true.

21. (a) For total salary paid to X

$$= 12 \times (300 + 330 + 360 + 390 + 420 + 450 + 480 + 510 + 540 + 570)$$

$$= 12 \times \frac{10}{2} [2 \times 300 + 9 \times 30] \quad [\text{sum of A.P.}]$$

$$= 60 \times 870 = \text{Rs } 52,200$$

For total salary paid to Y

$$= 6 \times [200 + 215 + 230 + 245 + 260 \dots 20 \text{ terms}] \\ = 6 \times 10 \times [2 \times 200 + 19 \times 15] \quad [\text{sum of A.P.}]$$

$$= 60 \times [400 - 285] = \text{Rs } 41,100$$

Total sum of both =  $\text{Rs } 93,300$

22. (b)  $2 < x < 3$  and  $-8 < y < -7$

$$4 < x^2 < 9$$

and  $-8 < y < -7$

$$-32 < x^2 y < -63$$

$$\text{While } -80 < 5xy < -105$$

Hence,  $5xy$  is the least because  $xy^2$  is positive

23. (d) Let  $y = n^3 - 7n^2 - 11n - 5$

$$= (n-1)(n^2 - 6n - 5) = (n-1)^2(n-5)$$

Now,  $(n-1)^2$  is always positive. And for  $n < 5$ , the expression gives a negative quantity. Therefore, the least value of  $n$  will be 6. Hence  $m = 6$ .

24. (c) Given,  $x + y = 1$

$$\text{Then, } \left( x - \frac{1}{x} \right)^2 = \left( y - \frac{1}{y} \right)^2 = x^2 - y^2 - \frac{1}{x^2} - \frac{1}{y^2} = 4$$

Minimum value of  $x^2 + y^2$  occur when  $x = y$

$$[\because x + y = 1]$$

$$\text{Put } x = y = \frac{1}{2}$$

$$\text{Minimum value} = \left( \frac{5}{2} \right)^2 = \left( \frac{5}{2} \right)^2 = \frac{25}{2} = 12.5$$

25. (c)  $a \mid b(b-1)$

$$a^2 - 2a \mid b^2 - 1 - 2b - 2b(b-1)$$

$$\text{or } a(a-2) \mid b(b-1)(b^2 - b - 2)$$

$$b(b-1)(b^2 - 2b - b - 2)$$

$$b(b-1)(b-1)(b-2)$$

So, this is divisible by 24 for  $b \leq 4$ .

26. (a) Ujakar's equation  $x^2 - 7x - 12$

(sum of roots = 7, product of roots = 12)

$$\text{Keshab's equation } x^2 - 5x - 6$$

(sum of roots = 5, product of roots = 6)

Hence, the correct equation is  $x^2 - 7x - 6$ .

So, roots are 6 and 1.

27. (d) Clearly  $BA \geq \text{MBA}_1$  and  $\text{MBA}_2 \leq BA$  as  $n_1 \leq n_1 - n_2$

So, option (a), (b) and (c) are neglected.

$$\text{see BA } \frac{r_1}{n_1} - \frac{r_2}{n_1} \geq \frac{r_1}{n_1} - \frac{n_2}{n_1} \max \left[ 0, \frac{r_2}{n_2} - \frac{r_1}{n_1} \right]$$

because  $\frac{r_2}{n_1} \geq 0$  and

$$\frac{r_2}{n_1} \geq \left( \frac{n_2}{n_1} \times \frac{r_2}{n_2} - \frac{n_2}{n_1} \times \frac{r_1}{n_1} \right) \text{ or } \frac{r_2}{n_1} \geq \frac{r_2}{n_1} - \frac{n_2 r_1}{n_1^2}$$

which is always true.

So, none of the answers match

28. (b) Initially  $BA = 50$ ,  $BA$  increases as numerator increases with denominator remaining the same.

$\text{MBA}_2 = \frac{r_1}{n_1} - \frac{r_2}{n_2}$  decreases as average of total runs

decreases from 50, as runs scored in this inning are less than 50.

29. (c) We know,

$$(x + y + z)^2 = x^2 + y^2 + z^2 + 2(xy + yz + zx)$$

$$\text{or } (5)^2 = x^2 + y^2 + z^2 + 2 \times 3$$

$$\Rightarrow x^2 + y^2 + z^2 = 19$$

For maximum value of  $x, y = z = 0$

but both cannot be zero at the same time

as  $xy + yz + zx \neq 0$

So,  $x^2 < 19$

$$\therefore x \text{ can be } \frac{13}{3} \text{ as } x^2 = \frac{169}{9}$$

30. (c)  $x^2 - 5y^2 - z^2 = 2y(2x - z)$

$$\text{Put } x = 2y$$

$$4y^2 - 5y^2 - z^2 = 2y(4y - z)$$

$$\text{or } 9y^2 - z^2 = 8y^2 - 2yz \quad \dots \dots (i)$$

This is not necessarily true

Put  $y = z$  in (i) we get,

$$9z^2 - z^2 = 8z^2 - 2z^2$$

$$\text{or } 10z^2 = 10z^2$$

(i) is true for  $y = z$  ( $x = 2y$  and  $x = 2z \Rightarrow y = z$ )

Therefore, only I and II satisfy the given result

31. (d)  $\frac{A^2}{x} - \frac{B^2}{x-1} = 1$

If only  $A = 0$  then there is only one root

If only  $B = 0$  then there is only one root

If both  $A$  and  $B$  are not zero then, there would be two roots (because quadratic equation forms)

$\therefore$  Required number roots be 1 or 2

32. (c)  $pqr = 1$  (given)

$$\begin{aligned}
 & \frac{1}{1-p-q^{-1}} \quad \frac{1}{1-q-r^{-1}} \quad \frac{1}{1-r-p^{-1}} \\
 &= \frac{q}{q-pq-1} \quad \frac{r}{r-qr-1} \quad \frac{p}{p-pr-1} \\
 &= \frac{q}{q-\frac{1}{r}-1} \quad \frac{r}{r-\frac{1}{p}-1} \quad \frac{p}{p-\frac{pr}{p}-1} \\
 &= \frac{qr}{qr-1-r} \quad \frac{pr}{pr-1-p} \quad \frac{p}{p-pr-1} \\
 &= \frac{qr}{\frac{1}{p}-1-r} \quad \frac{pr}{pr-p-1} \quad \frac{p}{p-pr-1} \\
 &= \frac{pqr}{1-p-pr} \quad \frac{pr}{1-p-pr} \quad \frac{p}{1-p-pr} \\
 &= \frac{pqr}{1-p-pr} = \frac{1}{1-p-pr} = 1 \quad (\because pqr = 1)
 \end{aligned}$$

33. (c) Let the length of shortest piece be  $x$  cm.  
Then length of longest piece be  $23 + x$

and length of middle piece be  $\frac{23-x}{3}$

$$\begin{aligned}
 \text{According to question, } 23-x &= \frac{23-x}{3} + 40 \\
 69-3x &= 23-x+3x+120 \\
 \text{or } 92-7x &= 120 \\
 \text{or } x &= 4 \text{ cm.}
 \end{aligned}$$

34. (d) The required weight of each part would be the HCF of given prices of cakes (i.e., HCF of  $4\frac{1}{2}$ ,  $6\frac{3}{4}$  and  $7\frac{1}{5}$ ).

$$\text{So, } \text{HCF} = \frac{9}{20}$$

Now, total number of parts

$$\begin{aligned}
 &= \frac{9}{2} \times \frac{20}{9} + \frac{27}{4} \times \frac{20}{9} + \frac{36}{5} \times \frac{20}{9} \\
 &= 10 + 15 + 16 = 41
 \end{aligned}$$

35. (a) Solving from the choices,

$$\begin{aligned}
 5p-2q-r &= 0 \\
 \Rightarrow 5(x+2y-3z) - 2(2x+6y-11z) - (x-2y-7z) &= 0 \\
 \Rightarrow (5x+10y-15z) - (4x+12y-22z) - (x-2y-7z) &= 0 \\
 \Rightarrow 0 &= 0
 \end{aligned}$$

For no other choices above condition is satisfied, hence option (a) is correct.

36. (c) It is clear that the equation  $2^x - x - 1 = 0$  is satisfied by  $x = 0$  and 1 only.

For  $x > 1$ ,  $f(x) = 2^x - x - 1$  start increasing.

Hence, there are 2 non-negative real roots.

37. (b) The minimum value of  $4m-1$  is  $4(1)-1=5$ .

(By putting  $m=1$ )

Since,  $a+b+c+d=5$ .

We have,  $a=b=c=1$  and  $d=2$ .

Then,  $a^2-b^2-c^2-d^2=1^2-1^2-1^2-2^2=7$

38. (d) Given equation is  $x^2 - (\alpha-2)x - \alpha - 1 = 0$

Sum of the roots,  $p+q = \alpha - 2$

Product of the roots  $pq = -\alpha - 1$

$$\begin{aligned}
 \text{Now, } p^2 + q^2 &= (p+q)^2 - 2pq \\
 &= (\alpha-2)^2 + 2(\alpha+1)
 \end{aligned}$$

$$\alpha^2 - 4\alpha - 2\alpha - 2 = (\alpha-1)^2 + 5$$

Hence, the minimum value of  $p^2 + q^2$  will be 5

39. (c) The numbers must be reciprocals of each other.

For example  $2 \times \frac{1}{2} = 1$  and  $2 \times \frac{1}{2} = 2 \times \frac{1}{2} = 2$ .

Hence, the sum is greater than the product of numbers.

40. (b) Substitute the extreme values in the given equation :  $v=1, u=-0.5, z=-2$ .

$$\text{Then } w = \frac{vz}{u} = 4.$$

Only option (b) gives this.

41. (c) Simply substitute  $x=1, y=2$  and  $z=3$  in the expression

$$\text{we get } \frac{5}{6} + \frac{16}{6} + \frac{27}{6} = 8 \text{ which is greater than 6.}$$

42. (c) Let  $x$  be the number of questions answered correctly,  $y$  be wrong attempts and hence  $(50-x-y)$  becomes the number of questions not attempted.

Then, net score

$$\frac{x}{1} + \frac{y}{3} + \frac{(50-x-y)}{6} = 32.$$

$$\text{or } 7x-y=242, \text{ or } y=7x-242.$$

We get  $y=3$  for  $x=35$ , which is the minimum value of  $y$  as for any value of  $x > 35$ ,  $y$  starts increasing.

43. (a) Subtract the both equations, we get

$$x^2 - 3x - 2 = 0$$

$$(x-1)(x-2) = 0 \Rightarrow x=1, 2$$

Roots 1 and 2 do not satisfy any of the original equation.

In case there is a common root, it will be the root of the subtracted equation.

Therefore there is no common root between both the given equations.

44. (c) Given inequality is

$$1 - \frac{1}{n} < x \leq 3 - \frac{1}{n} \quad \dots(1)$$

For any positive  $n$ ,

$$0 < \frac{1}{n} \leq 1 \quad \dots(2)$$

Add 3 to each part in inequality (2), we get

$$3 - \frac{1}{n} \leq 4 \quad \dots(3)$$

Again from inequality (2), we get

$$0 > -\frac{1}{n} \geq -1 \quad (\text{multiply } (-1) \text{ in each part})$$

$$\Rightarrow 1 > 1 - \frac{1}{n} \geq 0 \quad (\text{Add 1 in each part})$$

$$\Rightarrow 0 \leq 1 - \frac{1}{n} \leq 1 \quad \dots(4)$$

From inequalities (1), (3) and (4), we get  $0 < x \leq 4$

45. (c)
- $5x + 19y = 64$

We see that if  $y = 1$ , we get an integer solution  $x = 9$ , Now if  $y$  changes (increases or decreases) by 5,  $x$  will change (decrease or increase) by 19

Looking at options, if  $x = 256$ , we get,  $y = 64$

Using these values we see option a, b and d which are eliminated and also that there exists a solution for

$$250 < x < 300.$$

46. (b)
- $ax^2 - bx - 1 = 0$

For real roots  $b^2 - 4ac \geq 0$

$$b^2 - 4a \geq 0 \Rightarrow b^2 \geq 4a \quad (\because c = 1)$$

$$4a \in \{4, 8, 12, 16\} \quad (\because a \in \{1, 2, 3, 4\})$$

$$b^2 \in \{1, 4, 9, 16\} \quad (\because b \in \{1, 2, 3, 4\})$$

For  $b^2 = 4$ , no. of solution =

For  $b^2 = 9$ , no. of solution = 2

For  $b^2 = 16$ , no. of solution = 4

Total no. of solutions =  $4 + 2 + 1 = 7$

47. (b)
- $y = \frac{x-z}{2}, xyz = 4$

$$\Rightarrow (x-z)xyz = 8$$

Let  $x = z = a$

$$\Rightarrow a z (a-z) = 8 \Rightarrow az^2 - a^2z + 8 = 0$$

For,  $z$  to be real,  $b^2 - 4ac \geq 0$

$$\therefore a^4 - 32a \geq 0 \Rightarrow a^3 \geq 32$$

$$y = \frac{x-z}{2} = \frac{(32)^{1/3}}{2} = 2^{2/3}$$

Hence, minimum possible value of  $y = 2^{2/3}$

$$48. (d) x = \frac{n^2 - 2\sqrt{n}(n-4) - 16}{n - 4\sqrt{n} - 4}$$

Let  $\sqrt{n} = t$

$$\Rightarrow x = \frac{t^4 - 2t(t^2 - 4) - 16}{t^2 - 4t - 4}$$

$$= \frac{(t-2)(t^3 - 8)}{(t-2)^2} = \frac{t^3 - 8}{t-2}$$

$$\Rightarrow x = t^2 - 2t - 4 \quad \dots(1)$$

For  $t = 6$  to  $t = 6\sqrt{2}$

$$(40-12) < x < (72-4-12\sqrt{2})$$

[putting in equation (1)]

$$\Rightarrow 28 < x < 76-12\sqrt{2} \text{ or } 28 < x < 60$$

49. (d)
- $13x = 1 - 2z$
- and
- $z = 3 - 5y^2$

$$\Rightarrow 13x = 1 - 2(5y^2 - 3)$$

$$\Rightarrow 13x = 7 - 10y^2 \Rightarrow 10y^2 = 13x - 7$$

In the above equation, all the options a, b & c are possible but not necessarily true.

50. (b)
- $|b| \geq 1 \Rightarrow b \geq 1 \text{ or } b \leq -1$

$$x = -|a|b \text{ (given)}$$

Consider  $a - xb = a - (-|a|b)b$

$$a - |a|b^2 \geq 0 \text{ since, } b^2 \geq 1$$

51. (c) Equation
- $x + y = xy$
- can be satisfied for
- $(x, y) \equiv (0, 0)$
- ,
- $(2, 2)$

Hence, total no. of integer pairs (0 and 2) = 2

52. (c) There are 2 cases, first, the given condition will be satisfied only when
- $a$
- ,
- $b$
- and
- $c$
- are equal and second, when
- $a + b + c = 0$
- . Case (i) : If
- $a = b = c = 1$
- , we get
- $r = 1/2$
- , Case (ii) : when
- $a + b + c = 0$
- , then we get the value of
- $r = -1$
- . There are no other values that
- $r$
- can take. Hence (c) is the correct option.

53. (d) The expression can be written as

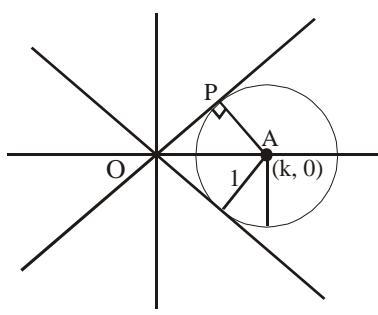
$$y = \frac{1}{2} \frac{3-y}{6-2y} = \frac{3-y}{3-y}$$

$$\Rightarrow 2y^2 + 7y = 3 + y \Rightarrow 2y^2 + 6y - 3 = 0$$

$$\Rightarrow y = \frac{-6 - \sqrt{36 - 24}}{2 \times 2} = \frac{-6 - 2\sqrt{15}}{4} = \frac{\sqrt{15} - 3}{2}$$

(as  $y$  cannot be negative)

54. (c)



$(x - k)^2 + y^2 = 1$ , represents a circle with centre  $(k, 0)$  and radius = 1.

For a positive unique solution the line  $y = x$  will be tangent to the circle at point P.

$$OA^2 = AP^2 + OP^2 \Rightarrow OA = \sqrt{1^2 + 1^2} = \sqrt{2}$$

55. (c) The given expression can be reduced to

$$x = \sqrt{4 - \sqrt{4 - x}}$$

$$\Rightarrow x^2 - 4 = \sqrt{4 - x} \Rightarrow (x^2 - 4)^2 = 4 - x$$

Putting the values of x in the options we find that

$$\left( \frac{\sqrt{13} - 1}{2} \right) \text{ is the correct option.}$$

Therefore,

$$\left[ \left( \frac{\sqrt{13} - 1}{2} \right)^2 - 4 \right]^2 = 4 - \frac{\sqrt{13} - 1}{2} - \frac{7 - \sqrt{13}}{2} \quad \dots\dots(1)$$

$$\text{L.H.S.} = \left( \frac{13 - 1 - 2\sqrt{13}}{4} - 4 \right)^2 \left( \frac{7 - \sqrt{13}}{2} - 4 \right)^2$$

$$\left( \frac{\sqrt{13} - 1}{2} \right)^2 - \frac{7 - \sqrt{13}}{2} \quad \text{(from (1))}$$

= R.H.S.

56. (d) Cost of a male operator per call

$$\frac{250}{40} \quad 15 \quad 6.25 \quad 15 \quad 21.25$$

$$\text{Cost of a female operator per call} \quad \frac{300}{50} \quad 10 \quad 16$$

As cost of a female operator is cheaper so he shall employ maximum no. of females, i.e., 12 and let x be the no. of male operators employed.

$$\therefore 12 \times 50 + x \times 40 = 1000$$

$$\text{or } 40x = 1000 - 600 = 400 \Rightarrow x = 10$$

$$\Rightarrow \text{Males employed} = 10$$

For Qs. 57-58.

Let the free luggage be 's' kg and excess luggage possessed by Raja and Praja be 'r' and 'p' kg respectively.

$$\Rightarrow 2s + r + p = 60 \quad \dots\dots(1)$$

Again let the charge for excess luggage be Rs x/kg.

$$\Rightarrow \text{For Raja, } rx = 1200 \quad \dots\dots(2)$$

$$\text{and for Praja, } px = 2400 \quad \dots\dots(3)$$

$$\text{or } \frac{px}{rx} = \frac{2400}{1200} \Rightarrow \frac{p}{r} = \frac{2}{1} \quad \dots\dots(4)$$

If the entire luggage belongs to one only, then only 's' will be the free luggage and  $s + r + p$  will be the charge for excess luggage

$$\Rightarrow (s + r + p)x = 5400$$

$$\text{or } (s + 3r)x = 5400 \quad \dots\dots(5)$$

Dividing (5) by (2),

$$\Rightarrow \frac{(s - 3r)x}{rx} = \frac{5400}{1200} = \frac{9}{2}$$

$$\Rightarrow \frac{s}{r} - 3 = \frac{9}{2} \Rightarrow \frac{s}{r} = \frac{3}{2} \quad \dots\dots(6)$$

Using in (1),

$$2s = \frac{2}{3}s \quad \frac{2 \times 2}{3}s = 60$$

$$\Rightarrow 12s = 60 \times 3 \text{ or } s = 15 \text{ kg}$$

$$\text{Again } 2 \times 15 + 3r = 60$$

$$\Rightarrow r = 10 \text{ kg and } p = 20 \text{ kg}$$

57. (d) Praja's luggage =  $s + p = 15 + 20 = 35 \text{ kg}$

58. (d) Free luggage =  $s = 15 \text{ kg.}$

59. (b) Let one of the nos. be  $10x + y$

Reversing the digits it become  $10y + x$ .

As per question.

$$10y + x - (10x + y) = 18$$

$$\Rightarrow 9(y - x) = 18 \text{ or } y - x = 2$$

So, it will be possible in all the cases where the difference between the two digits = 2.

So, the nos. are 13, 24, 35, 46, 57, 68, 79.

Hence the no. of such two-digit numbers apart from 13 is 6.

60. (a)  $x^{2/3} + x^{1/3} - 2 \leq 0$

$$\text{Put } x^{1/3} = y \text{ or } x = y^3 \Rightarrow y^2 - y - 2 \leq 0$$

$$\text{or } y^2 - 2y - y - 2 \leq 0$$

$$\text{or } (y-1)(y-2) \leq 0 \Rightarrow -2 \leq y \leq 1$$

$$\text{or } (-2)^3 \leq x \leq 1^3 \text{ or } -8 \leq x \leq 1$$

61. (e) 
$$\frac{2^{10}x}{3^4y} = 2^3 \cdot 2^{1/2} \cdot 3^{1/2} \cdot 3^{-3}$$

$$\Rightarrow \frac{7x}{2^{10}} \cdot \frac{-5y}{3^4} = 2^{\frac{7}{2}} \cdot \frac{-5}{3^{\frac{5}{2}}}$$

Equating the powers of 2 and 3

$$\Rightarrow \frac{7}{10}x = \frac{7}{2} \text{ or } x = 5 \text{ and } \frac{-5}{4}y = \frac{-5}{2} \text{ or } y = 2$$

Using  $x = 5$  and  $y = 2$  in equation

$$\begin{aligned} & 4^{0.3x} \cdot 9^{0.2y} = 8(81)^{1/5} \\ \Rightarrow & 4^{0.3 \times 5} \cdot 9^{0.2 \times 2} = 2^3 \cdot 3^{4/5} \\ \Rightarrow & 2^3 \cdot 3^{0.8} = 2^3 \cdot 3^{0.8}; \text{ Which is true hence correct} \end{aligned}$$

62. (b)  $2x + y = 40$ ;  $x \leq y$ ;  $x, y \in \mathbb{I}^+$

This problem can be solved by putting various values for  $x$  and  $y$ . Starting from  $x = 1$ . The above equation can be solved till  $x = 13$ .

At  $x = 13$ ,  $y = 14$  which is  $> x$ . But above this value of  $x$ , it becomes greater than  $y$  so the condition  $x \leq y$  is violated.

63. (c) Let the first number be  $10x + y$ .

So the other numbers would be

$$10x + y + 2, 10x + y + 4, 10x + y + 6$$

$$\therefore (\text{S}) \text{ Sum} = 40x + 4y + 12$$

This is divisible by 10

$$\text{or } S = \frac{40x + 4y + 12}{10} = 4x + \left( \frac{4y + 12}{10} \right)$$

It means  $4y + 12$  has to be divisible by 10 and  $y$  is odd (1, 3, 5, 7, 9). This condition can be fulfilled by 7 only. So the numbers become

$$= 10x + 7, 10x + 9, 10x + 11, 10x + 13.$$

Now using the options and finding whether the sum divided by 10 is a perfect square or not.

For (a), the nos. are 17, 19, 21, 23

$$\Rightarrow \frac{17 + 19 + 21 + 23}{10} = 8 \text{ not a perfect square.}$$

(b), can not be the no. as none of the 4 nos. have 5 as last digit.

For (c), the nos. are 37, 39, 41, 43

$$\Rightarrow \frac{37 + 39 + 41 + 43}{10} = 16 = 4^2, \text{ perfect square}$$

For (d) the nos. are 67, 69, 71, 73

$$\Rightarrow \frac{67 + 69 + 71 + 73}{10} = 28, \text{ not a perfect square}$$

For (e), the nos. are same as for (d).

64. (d) On 100th day of 2007,  
Price per kg of Darjeeling Tea =  $100 + 0.10 \times 100 = \text{Rs. } 110$   
Price per kg of Ooty Tea =  $89 + 0.15 \times 100 = \text{Rs. } 104$   
Therefore, there will be a day after 100th day of 2007, on which prices of the two tea varieties will be same, let it be the  $x$ th day after the 100th day  
 $\therefore 110 = 89 + 0.15(100 + x)$

$$\Rightarrow 110 = 89 + 15 + \frac{3}{20}x$$

$$\Rightarrow 6 = \frac{3}{20}x, \therefore x = 40$$

Hence, the day on which the prices of the two varieties of the tea are same = 140th day = 20th may, 07.

65. (e) Let the original amount of the cheque be  $x$  rupees and  $y$  paise.

Hence, original cheque amount =  $(100x + y)$  paise

The amount paid by bank teller =  $(100y + x)$  paise

According to the given question,

$$100y + x - 50 = 3(100x + y)$$

$$\Rightarrow y = \frac{299x - 50}{97} = \frac{291x + 8x - 50}{97}$$

$$\Rightarrow y = 3x + \frac{8x - 50}{97}$$

On checking, we get if  $x = 18$  (a positive integer), then only  $y$  has an positive integral value 56.

Hence, original amount of the cheque = Rs. 18.56  
i.e., over rupees 18 but less than rupees 19.

66. (b) Quantity of rice purchased by first customer

$$\left( \frac{x}{2} - \frac{1}{2} \right) \text{ kg}$$

Hence, remaining quantity of rice after first customer

$$x - \left( \frac{x}{2} - \frac{1}{2} \right) = \left( \frac{x}{2} - \frac{1}{2} \right) \text{ kg}$$

Remaining quantity of rice after second customer

$$\left( \frac{\frac{x}{2} - \frac{1}{2}}{2} - \frac{1}{2} \right) = \left( \frac{\frac{x}{2} - \frac{1}{2}}{2} - \frac{1}{2} \right) \text{ kg}$$

Remaining quantity of rice after third customer

$$\frac{\frac{\frac{x}{2} - \frac{1}{2}}{2} - \frac{1}{2}}{2} = \frac{\frac{\frac{x}{2} - \frac{1}{2}}{2} - \frac{1}{2}}{2} \text{ kg}$$

Since, no rice is left after third customer,

$$\begin{aligned} & \frac{x}{2} - \frac{1}{2} - \frac{1}{2} - \frac{1}{2} = 0 \\ \therefore & \frac{\frac{x}{2} - \frac{1}{2}}{2} - \frac{1}{2} = 0 \\ \Rightarrow & x = 7. \end{aligned}$$

67. (a) Let the three consecutive positive integers are  $x - 1$ ,  $x$  and  $(x + 1)$

$$\text{Then, } (x - 1) + x^2 + (x + 1)^3 = (x - 1 + x + x + 1)^2$$

$$\Rightarrow x(x^2 - 5x + 4) = 0$$

$$\Rightarrow x(x - 4)(x - 1) = 0$$

$$\Rightarrow x \neq 0, \therefore x = 1 \text{ or } 4$$

If  $x = 1$ , then the three consecutive positive integers are 0, 1, 2, which is not possible (as '0' is not a positive integer).

If  $x = 4$ , then the three consecutive positive integers are 3, 4, 5.

$$\therefore m = 3.$$

68. (b) Let roots are  $(n - 1)$ ,  $n$  and  $(n + 1)$

Sum of the roots =  $b$

$$(n - 1) + n + (n + 1) + (n + 1)(n - 1) = b$$

$$\Rightarrow n^2 - n + n^2 + n + n^2 - 1 = b$$

$$\Rightarrow 3n^2 - 1 = b$$

The value of  $b$  will be minimum when the value of  $n^2$  is minimum i.e.,  $n^2 = 0$

Hence, minimum value of  $b = -1$ .

69. (b)  $f(x) = ax^2 + bx + c$

Since 3 is a root of  $f(x) = 0$

$$\therefore f(3) = 0$$

$$\Rightarrow 9a + 3b + c = 0 \quad \dots(i)$$

$$\text{Now } f(5) = -3 f(2)$$

$$25a + 5b + c = -3(4a + 2b + c)$$

$$\Rightarrow 37a + 11b + 4c = 0 \quad \dots(ii)$$

Multiply equation (i) by 4 and subtract it from equation (ii) we get

$$37a + 11b + 4c = 0$$

$$36a + 12b + 4c = 0$$

$$\begin{array}{r} - \\ - \\ - \\ \hline a - b = 0 \end{array}$$

$$\Rightarrow a = b$$

$$\text{Now sum of the roots } -\frac{b}{a} = -1$$

If other root be  $n$ , then

$$n + 3 = -1$$

$$\therefore n = -4$$

Hence the root = -4.

70. (e) From the solution of previous questions,  $a = b$  and roots are 3 and -4

$$\text{Now, } f(3) = 9a + 3b + c = 0$$

$$\Rightarrow 12a + c = 0 \quad [\because a = b]$$

$$f(-4) = 16a - 4b + c = 0$$

$$\Rightarrow 12a + c = 0 \quad [\because a = b]$$

And  $f(5) = -3 f(2)$

$$\Rightarrow 25a + 5b + c = -3(4a + 2b + c)$$

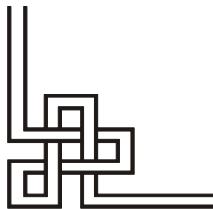
$$\Rightarrow 37a + 11b + 4c = 0$$

$$\Rightarrow 48a + 4c = 0 \quad [\because a = b]$$

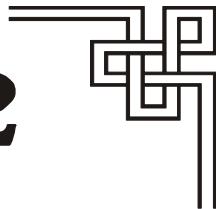
$$\Rightarrow 12a + c = 0$$

# 6

## CHAPTER



# ALGEBRA 2



1.  $\log 216\sqrt{6}$  to the base 6 is (1994)  
(a) 3 (b) 3/2 (c) 7/2 (d) None of these
2. If  $\log_7 \log_5 (\sqrt{x} + 5 + \sqrt{x}) = 0$ , find the value of x. (1994)  
(a) 1 (b) 0 (c) 2 (d) None of these
3. If the harmonic mean between two positive numbers is to their geometric mean as 12 : 13; then the numbers could be in the ratio (1994)  
(a) 12 : 13 (b) 1/12 : 1/13 (c) 4 : 9 (d) 2 : 3
4. Fourth term of an arithmetic progression is 8. What is the sum of the first 7 terms of the arithmetic progression? (1994)  
(a) 7 (b) 64 (c) 56 (d) Can't be determined
5. Along a road lie an odd number of stones placed at intervals of 10 m. These stones have to be assembled around the middle stone. A person can carry only one stone at a time. A man carried out the job starting with the stone in the middle, carrying stones in succession, thereby covering a distance of 4.8 km. Then the number of stones is (1994)  
(a) 35 (b) 15 (c) 29 (d) 31
6. If  $\log_2 [\log_7 (x^2 - x + 37)] = 1$ , then what could be the value of x? (1997)  
(a) 3 (b) 5 (c) 4 (d) None of these

**Directions for Questions 7 to 9 : These questions are based on the situation given below :**

There are fifty integers  $a_1, a_2, \dots, a_{50}$ , not all of them necessarily different. Let the greatest integer of these fifty integers be referred to as G, and the smallest integer be referred to as L. The integers  $a_1$  through  $a_{24}$  form sequence S1, and the rest form sequence S2. Each member of S1 is less than or equal to each member of S2.

7. All values in S1 are changed in sign, while those in S2 remain unchanged. Which of the following statements is true? (1999)  
(a) Every member of S1 is greater than or equal to every member of S2.  
(b) G is in S1.  
(c) If all numbers originally in S1 and S2 had the same sign, then after the change of sign, the largest number of S1 and S2 is in S1  
(d) None of the above
8. Elements of S1 are in ascending order, and those of S2 are in descending order.  $a_{24}$  and  $a_{25}$  are interchanged then which of the following statements is true (1999)  
(a) S1 continues to be in ascending order.  
(b) S2 continues to be in descending order.  
(c) S1 continues to be in ascending order and S2 in descending order.  
(d) None of the above
9. Every element of S1 is made greater than or equal to every element of S2 by adding to each element of S1 an integer x. Then x cannot be less than (1999)  
(a)  $2^{10}$  (b) The smallest value of S2  
(c) The largest value of S2 (d)  $(G - L)$

**Directions for questions 10 to 12 : Read the information given below and answer the questions that follow :**

There are m blue vessels with known volumes  $V_1, V_2, \dots, V_m$  arranged in ascending order of volumes, where  $V_1$  is greater than 0.5 litres and  $V_m$  is less than 1 litre. Each of these is full of water. The water is emptied into a minimum number of white empty vessels each having volume 1 litre. If the volumes of the vessels increases with the value of lower bound  $10^{-1}$ .

10. What is the maximum possible value of m? (1999)  
(a) 7 (b) 8 (c) 9 (d) 10

11. If  $m$  is maximum then what is the minimum number of white vessels required to empty it? (1999)  
 (a) 7 (b) 6 (c) 5 (d) 8
12. If  $m$  is maximum then what is range of the volume remaining empty in the vessel with the maximum empty space? (1999)  
 (a)  $0.45 - 0.55$  (b)  $0.55 - 0.65$  (c)  $0.1 - 0.75$  (d)  $0.75 - 0.85$
13. Find the following sum (2000)
- $$\frac{1}{(2^2 - 1)} + \frac{1}{(4^2 - 1)} + \frac{1}{(6^2 - 1)} + \dots + \frac{1}{(20^2 - 1)}$$
- (a)  $\frac{9}{10}$  (b)  $\frac{10}{11}$  (c)  $\frac{19}{21}$  (d)  $\frac{10}{21}$
14.  $a_1 = 1$  and  $a_{n+1} = 2a_n + 5$  for  $n$  being a natural number. The value of  $a_{100}$  is (2000)  
 (a)  $5 \times 2^{99} + 6$  (b)  $5 \times 2^{99} - 6$  (c)  $6 \times 2^{99} + 5$  (d)  $6 \times 2^{99} - 5$
15. All the page numbers from a book are added, beginning at page 1. However, one page number was mistakenly added twice. The sum obtained was 1000. Which page number was added twice? (2001)  
 (a) 44 (b) 45 (c) 10 (d) 12
16. If  $a, b, c$  and  $d$  are four positive real numbers such that  $abcd = 1$ , what is the minimum value of  $(1+a)(1+b)(1+c)(1+d)$ ? (2001)  
 (a) 4 (b) 1 (c) 16 (d) 18
17. For a Fibonacci sequence, from the third term onwards, each term in the sequence is the sum of the previous two terms in that sequence. If the difference in squares of seventh and sixth terms of this sequence is 517, what is the tenth term of this sequence? (2001)  
 (a) 147 (b) 76 (c) 123 (d) Cannot be determined
18. The  $n$ th element of a series is represented as  $X_n = (-1)^n X_{n-1}$ . If  $X_0 = x$  and  $x > 0$  then which of the following is always true (2002)  
 (a)  $X_n$  is positive if  $n$  is even (b)  $X_n$  is positive if  $n$  is odd  
 (c)  $X_n$  is negative if  $n$  is even (d) None of these
19. Let  $S$  denote the infinite sum  $2 + 5x + 9x^2 + 14x^3 + 20x^4 + \dots$ , where  $|x| < 1$  and the coefficient of  $x^{n-1}$  is  $\frac{1}{2}n(n-3)$ , ( $n = 1, 2, \dots$ ). Then  $S$  equals (2002)  
 (a)  $\frac{2-x}{(1-x)^3}$  (b)  $\frac{2-x}{(1-x)^2}$  (c)  $\frac{2-x}{(1-x)^4}$  (d)  $\frac{2-x}{(1-x)^5}$
20. Amol was asked to calculate the arithmetic mean of ten positive integers each of which had two digits. By mistake, he interchanged the two digits, say  $a$  and  $b$ , in one of these ten integers. As a result, his answer for the arithmetic mean was 1.8 more than what it should have been. Then  $b - a$  equals (2002)  
 (a) 1 (b) 2 (c) 3 (d) None of these
21. A child was asked to add first few natural numbers (that is,  $1 + 2 + 3 + \dots$ ) so long his patience permitted. As he stopped he gave the sum as 575. When the teacher declared the result wrong the child discovered he had missed one number in the sequence during addition. The number he missed was (2002)  
 (a) less than 10 (b) 10 (c) 15 (d) more than 15
22. If  $\frac{1}{3} \log_3 M + 3 \log_3 N = 1 + \log_{0.008} 5$ , then (2003)  
 (a)  $M^9 = \frac{9}{N}$  (b)  $N^9 = \frac{9}{M}$  (c)  $M^3 = \frac{3}{N}$  (d)  $N^9 = \frac{3}{M}$
23. The sum of 3rd and 15th elements of an arithmetic progression is equal to the sum of 6th, 11th and 13th elements of the progression. Then, which element of the series should necessarily be equal to zero (2003C)  
 (a) 1st (b) 9th (c) 12th (d) None of the above.



**Directions for Qs. 40 and 41 :** Let  $a_1 = p$  and  $b_1 = q$ , where  $p$  and  $q$  are positive quantities. Define  $a_n = pb_{n-1}$ ,  $b_n = qb_{n-1}$ , for even  $n > 1$ , and  $a_n = pa_{n-1}$ ,  $b_n = qa_{n-1}$ , for odd  $n > 1$ .

40. Which of the following best describes  $a_n + b_n$  for even  $n$ ?

(2007)

- (a)  $q(pq)^{\frac{1}{2}n-1}(p-q)^{\frac{1}{2}n}$       (b)  $q(pq)^{\frac{1}{2}n-1}(p-q)$       (c)  $qp^{\frac{1}{2}n-1}(p-q)$   
 (d)  $q^{\frac{1}{2}n}(p-q)$       (e)  $q^{\frac{1}{2}n}(p-q)^{\frac{1}{2}n}$

41. If  $p = \frac{1}{3}$  and  $q = \frac{2}{3}$ , then what is the smallest odd  $n$  such that  $a_n + b_n < 0.01$ ?

(2007)

- (a) 15      (b) 7      (c) 13      (d) 11      (e) 9

42. Consider the set  $S = \{2, 3, 4, \dots, 2n+1\}$ , where  $n$  is a positive integer larger than 2007. Define  $X$  as the average of the odd integers in  $S$  and  $Y$  as the average of the even integers in  $S$ . What is the value of  $X - Y$ ?

(2007)

- (a) 2008      (b) 0      (c) 1      (d)  $\frac{1}{2}n$       (e)  $\frac{n-1}{2n}$

43. A function  $f(x)$  satisfies  $f(1) = 3600$  and  $f(1) + f(2) + \dots + f(n) = n^2 f(n)$ , for all positive integers  $n > 1$ . What is the value of  $f(9)$ ?

(2007)

- (a) 120      (b) 80      (c) 240      (d) 200      (e) 100

44. What is the number of distinct terms in the expansion of  $(a + b + c)^{20}$ ?

(2008)

- (a) 231      (b) 253      (c) 242      (d) 210      (e) 228

45. Find the sum

$$\sqrt{1 \frac{1}{1^2} \frac{1}{2^2}} + \sqrt{1 \frac{1}{2^2} \frac{1}{3^2}} + \dots + \sqrt{1 \frac{1}{2007^2} \frac{1}{2008^2}} \quad (2008)$$

- (a)  $2008 - \frac{1}{2008}$       (b)  $2007 - \frac{1}{2007}$       (c)  $2007 - \frac{1}{2008}$   
 (d)  $2008 - \frac{1}{2007}$       (e)  $2008 - \frac{1}{2009}$

46. The number of common terms in the two sequences 17, 21, 25, ..., 417 and 16, 21, 26, ..., 466 is

(2008)

- (a) 78      (b) 19      (c) 20      (d) 77      (e) 22

## ANSWERS WITH SOLUTIONS

1. (c)  $\log_6 216\sqrt{6} = \log_6 (6)^3 (6)^{1/2}$   
 $= \log_6 (6)^{7/2} = \frac{7}{2} \log_6 6 - \frac{7}{2}$  ( $\because \log_a a = 1$ )  
 $4800 = 2[20 + 40 + 60 + \dots + n]$   
 $2400 = 20[1 + 2 + 3 + \dots + n]$   
 $120 = \frac{n(n+1)}{2} \Rightarrow n = 15$
2. (b)  $\log_7 \log_5 (\sqrt{x} - 5 - \sqrt{x}) = 0$   
use  $\log_a x = b$   
 $\Rightarrow a^b = x$   
 $\therefore \log_5 (\sqrt{x} - 5 - \sqrt{x}) = 7^0 = 1$   
 $\sqrt{x} - 5 - \sqrt{x} = 5^1 - 5 \Rightarrow 2\sqrt{x} = 0 \therefore x = 0$
3. (c) Let a and b be 2 positive numbers  
Such that  $\frac{1}{\text{H.M.}} = \frac{\frac{1}{a} + \frac{1}{b}}{\frac{2}{\sqrt{ab}}} = \frac{12}{13}$   
 $\Rightarrow \frac{2ab}{(a+b)\sqrt{ab}} = \frac{12}{13}$   
or  $\frac{2\sqrt{ab}}{a+b} = \frac{12}{13}$  or  $\frac{a+b}{2\sqrt{ab}} = \frac{13}{12}$   
By componendo & dividendo  

$$\begin{array}{r} a-b & 2\sqrt{ab} & 13-12 & 25 \\ \hline a-b-2\sqrt{ab} & & 13-12 & 1 \end{array}$$
  

$$\begin{array}{r} (\sqrt{a}-\sqrt{b})^2 & 25 \\ (\sqrt{a}+\sqrt{b})^2 & 1 \end{array}$$
  
Taking square root on each side  

$$\begin{array}{r} \sqrt{a}-\sqrt{b} & 5 \\ \sqrt{a}+\sqrt{b} & 1 \end{array}$$
  
Again by componendo & dividendo  

$$\begin{array}{r} 2\sqrt{a} & 6 & \text{or} & a & 9 & \text{or} & b & 4 \\ 2\sqrt{b} & 4 & & b & 4 & & a & 9 \end{array} = 4:9$$
4. (c) Fourth term of an A.P. = 8  $\Rightarrow a + 3d = 8$   
Sum of seven terms  
 $= S_7 = \frac{7}{2}[2a + (7-1)d] = \frac{7}{2} \times 2(a + 3d) = 7 \times 8 = 56$
5. (d) Suppose there are n stones are placed. So, there are  $(2n+1)$  stones, on each side of middle stone  
To pick up and return at middle point the man will travel 20m for 1st, 40 m for 2nd, and so on. Therefore total distance (4.8 km) is given by
6. (c) Given  $\log_2[\log_7(x^2 - x - 37)] = 1$   
Use  $\log_p x = y$   
 $\Rightarrow p^y = x$   
 $\therefore 2^1 = \log_7(x^2 - x - 37)$   
 $7^2 = x^2 - x - 37$   
 $\Rightarrow 49 = x^2 - x - 37 \Rightarrow x^2 - x - 86 = 0$   
 $\Rightarrow (x-4)(x-3) = 0$   
 $\Rightarrow x = 4, -3$   
 $\therefore x = 4$
- For Qs. 7-9.**
- $S_1 = a_1, a_2, \dots, a_{24}$   
 $S_2 = a_{25}, \dots, a_{50}$
- And we also know that L which is the least number has to be in S1 and G which is the greatest number must be in S2.
7. (d) With the change in the sign of the members of S1 nothing definitely can be said because if both the sequences contain negative number then each term of S1 will be greater than each term of S2. So the answer must be none of these.
8. (a) With the interchanging of  $a_{24}$  and  $a_{25}$  still the sequence of S1 will be in ascending order because each term of S2 is either greater than or equal to each term of S1.
9. (d) x must be equal to the greatest difference in the value of members of S1 and S2.
10. (d) The lower bound is 0.5 and increases with 0.05.  
It forms an Arithmetic progression, where 0.05 is the common difference and 0.5 is the first term.  
The last term is less than 1 and hence it is 0.95.  
To find the no. of terms in the series use the formulae for nth term  
i.e.,  $T_n = a + (n-1)d$ . Where 'a' is the first term and 'd' is the common difference.  
Hence the value of n comes as 10. Maximum possible value of m is 10.
11. (d) To find the minimum number of white vessel required to empty the vessel for maximum possible value of m i.e. 10, we have to use the formulae of sum to n terms of this A.P. series.

Sum to n terms is given by

$$S_n = \frac{n \times (\text{First term} + \text{Last term})}{2},$$

where n is the number of terms in the series. For this sum,

$$S_n = \frac{10 \times (0.5 + 0.95)}{2} = 7.25.$$

Hence, minimum number of white vessels is 8 as the capacity of white vessel is 1 litre.

12. (c) From the above solution we can see that the eighth vessel is empty by 0.75 litres and hence that is the upper limit for the range.  
Further for the lower limit, make all the vessels equally full, which makes them all 0.1 parts empty.  
So, the option that satisfies the above condition is (c).

$$13. (d) \text{ } n^{\text{th}} \text{ term, } T_n = \frac{1}{(4n^2 - 1)} = \frac{2}{2(2n+1)(2n-1)}$$

$$= \frac{1}{2} \left[ \frac{1}{(2n-1)} - \frac{1}{2n+1} \right], n = 1, 2, \dots, 10$$

$$S = \frac{1}{2} \left[ \frac{1}{1} - \frac{1}{3} + \frac{1}{3} - \frac{1}{5} + \dots + \frac{1}{19} - \frac{1}{21} \right]$$

$$= \frac{1}{2} \left[ 1 - \frac{1}{21} \right] = \frac{10}{21}$$

14. (d) This can be solved by going through options. The general term of the series formed will be  $6^{(2n-1)} + 1$  which again will be written as  $6 \times 2^{n-1} - 5$ . So the hundredth term of the series will be  $6 \times 2^{99} - 5$ .
15. (c) Let total number of pages be x and page number which was added twice be y.

$$\text{Then, Sum of x numbers} = \frac{x(x-1)}{2} = 1000 \dots (1)$$

$$\Rightarrow x^2 + x - 2000 = 0$$

For integral value of 'x',  $b^2 - 4ac$  should be perfect square.

$$\therefore x = \frac{-1 \pm \sqrt{1 - 8000}}{2} = \frac{-1 \pm \sqrt{8001}}{2}$$

$$= \frac{-1 \pm \sqrt{89^2 - 80}}{2} = \frac{89-1}{2} = 44$$

(∴ x cannot be negative; neglecting -80)

Putting x = 44 in (1)

$$\therefore \frac{44 \times 45}{2} = 990$$

But sum of total pages = 1000

$$\therefore \text{Page number which was added twice} = y = 1000 - 990 = 10.$$

16. (c)  $\because AM \geq GM \Rightarrow 1+a \geq 2\sqrt{a}$  (For numbers 1 & a)  
 $\therefore \text{Minimum value of } (1-a)(1-b)(1-c)(1-d) = 2\sqrt{a} \times 2\sqrt{b} \times 2\sqrt{c} \times 2\sqrt{d} = 16\sqrt{abcd} = 16$  ( $\because abcd = 1$ )

17. (c)  $x_{n-1} \ x_n \ x_{n-1}$   
Given,  $x_7^2 - x_6^2 = 517 \dots (i)$

Here  $x_7 = 29$  and  $x_6 = 18$  satisfy (i)  
Now,  $x_8 = x_7 + x_6 = 47$  and  $x_9 = 47 + 29 = 76$   
and  $x_{10} = 76 + 47 = 123$ .

18. (d)  $X_n = (-1)^n X_{n-1}$   
Put  $n = 1$ ,  $X_1 = (-1)^1 X_0$   
 $X_1 = -x$  ( $X_0 = x$  given)  
As  $x > 0 \therefore X_1$  is -ve  
 $X_2 = (-1)^2 \times X_1 = -x, X_2$  is -ve ( $\because x > 0$ )  
 $X_3 = (-1)^3 \times X_2 = x \Rightarrow X_3$  is +ve  
 $X_4 = (-1)^4 \times X_3 = x \Rightarrow X_4$  is +ve  
therefore, none of these option is correct.

19. (a) From option (a),

$$\frac{2-x}{(1-x)^3} = (2-x)(1-x)^{-3}$$

Using Binomial here

$$= (2-x)(1 - 3x + 6x^2 - 10x^3 + \dots) \frac{(r-1)(r-2)}{2!} x^r \dots$$

$$= 2 - 5x + 9x^2 - 14x^3 \dots$$

this is same series as given

Thus, option (a) is correct answer.

20. (b) Let  $x_1, x_2, \dots, x_{10}$  are two digit +ve numbers  
Let digits of  $x_{10}$  are interchanged  
original  $x_{10} = 10a + b$   
after interchanging  $x_{10} = 10b + a$   
According to question,

$$\frac{x_1 \ x_2 \ \dots \ x_9 \ 10b \ a}{10}$$

$$1.8 \frac{x_1 \ \dots \ x_9 \ 10a \ b}{10}$$

$$\Rightarrow \frac{x_1 \ x_2 \ \dots \ x_9 \ 10b \ a}{10}$$

$$1.8 \frac{x_1 \ x_2 \ \dots \ x_9 \ 10a \ b}{10}$$

$$1.8$$

$$\Rightarrow \frac{9b-9a}{10} = 1.8 \Rightarrow (b-a) = \frac{1.8 \times 10}{9} = 2$$



This becomes a GP with the first term =  $\frac{2}{7}$  and common ratio =  $1/7$

$$\Rightarrow S_n \left( \frac{36}{49} \right) - 1 - \frac{2}{7} \left( \frac{1}{1 - \frac{1}{7}} \right) \text{ or } S_n = \frac{49}{27}$$

29. (d)  $S = \log m \log \frac{m^2}{n} \log \frac{m^3}{n^2} \dots \dots n \text{ terms}$

$$\log \left( m \frac{m^2}{n} \frac{m^3}{n^2} \dots \frac{m^n}{n^{n-1}} \right) \log \left( \frac{m^1 \cdot 2 \cdot 3 \dots n}{n^1 \cdot 2 \cdot 3 \dots n-1} \right)$$

$$\log \left( \frac{m^{\frac{n(n-1)}{2}}}{n^{\frac{n(n-1)}{2}}} \right) \log \left( \frac{m^{\frac{(n-1)}{2}}}{n^{\frac{(n-1)}{2}}} \right)^{n/2}$$

30. (a) Let given numbers  $a, a+d, a+2d, \dots$  are in A.P.

$$S_{11} = S_{19} \Rightarrow 11a + \frac{10 \times 11}{2}d = 19a + \frac{18 \times 19}{2}d$$

$$\Rightarrow 11(a+5d) = 19(a+9d)$$

$$\Rightarrow 19a - 11a = -171d + 55d$$

$$\Rightarrow 8a = -116d \Rightarrow 2a = -29d \Rightarrow 2a + 29d = 0$$

$$\therefore S_{30} = 30a + \frac{29 \times 30}{2}d$$

$$15(2a + 29d) = 15(0) = 0$$

31. (b) Let  $\log_{10} x - \log_{10} \sqrt{x} = 2 \log_x 10$

$$\Rightarrow \frac{1}{2} \log_{10} x - 2 \log_x 10 \Rightarrow \log_{10} x = \log_x 10^4$$

$$\Rightarrow \frac{\log_{10} x}{\log_x 10} = 4 \Rightarrow (\log_{10} x)^2 = 4$$

$$\Rightarrow \log_{10} x = \pm 2$$

$$\Rightarrow x = 10^2 \text{ or } 10^{-2}$$

32. (c)  $a_1 = 81.33; a_2 = -19; a_3 = a_2 - a_1; a_4 = a_3 - a_2; a_5 = a_4 - a_3$  and so on

$$\therefore a_1 + a_2 + a_3 + \dots + \infty = a_1 + a_{6001} = a_1 + a_2 = 81.33 - 19 = 62.33$$

33. (b)  $x^u = 256$

Taking log to the base 2 on both sides

$$u \log_2 x = \log_2 256 = \log_2 2^8 = 8 \log_2 2 = 8 \quad (\because \log_a a = 1)$$

$$\Rightarrow u = \frac{8}{\log_2 x}$$

Let  $\log_2 x = a$

$$\Rightarrow \text{Equation becomes, } \frac{8}{a} = a^2 - 6a - 12$$

(from given value of 'a')

$$\Rightarrow a^3 - 6a^2 + 12a - 8 = 0 \Rightarrow (a-2)^3 = 0$$

$$\Rightarrow a = 2 \Rightarrow \log_2 x = 2 \Rightarrow u = \frac{8}{2} = 4$$

$\therefore$  There is only one solution.

34. (c)  $a_{n+1} = 3a_n + 4n - 2$

Given,

$$a_1 = 1 = 3^1 - 2$$

$$a_2 = 3 \times 1 + 4 - 2 = 5 = 3^2 - 4$$

$$a_3 = 3 \times 5 + 4 \times 2 - 2 = 21 = 3^3 - 6$$

$$\text{or } a_n = 3^n - 2n$$

$$\Rightarrow a_{100} = 3^{100} - 2 \times 100 = 3^{100} - 200$$

35. (d) Let  $A = \log_x \left( \frac{x}{y} \right) = \log_y \left( \frac{y}{x} \right)$

$$\log_x x - \log_x y = \log_y y - \log_y x$$

$$\Rightarrow A = 2 - (\log_y x - \log_x y) = 2 - \left( \log_y x - \frac{1}{\log_y x} \right)$$

$$\text{We know, } a = \frac{1}{a} = 1$$

$$\Rightarrow A = 2 - (\text{a real no more than one}) \text{ or } A < 1$$

So, A can now be 1.

36. (a)  $t_n = \frac{n}{n-2} \Rightarrow t_3 = \frac{3}{5}; t_4 = \frac{4}{6}; t_5 = \frac{5}{7}$

Thus,  $t_3 \times t_4 \times t_5 \times \dots \times t_{53}$

$$= \frac{3}{5} \times \frac{4}{6} \times \frac{5}{7} \times \frac{6}{8} \times \dots \times \frac{51}{53} \times \frac{52}{54} \times \frac{53}{55}$$

$$= \frac{3 \times 4}{54 \times 55} = \frac{2}{495}$$

37. (e)  $\log_y x = a, \log_z y = b, \log_x z = ab$

$$\Rightarrow a \log_z y = ab \text{ or } \log_z y = b$$

$$\text{or } y = z^b$$

$$\text{and } b \log_x z = ab \text{ or } \log_x z = a$$

$$\text{or } z = x^a$$

$$\text{and } \log_y x = ab \Rightarrow x = y^{ab} \quad \dots \dots (3)$$

$$x = y^{ab} = (z^b)^{ab} = (x^a)^{bab} = x^{a^2 b^2}$$

$$\text{or } a^2 b^2 = 1 \quad \dots \dots (4)$$

Putting the options in condition 4, we see that it is not satisfied only when  $a = 2$  and  $b = 2$ .

38. (d) We know, the last term,

$$\ell = a + (n-1)d$$

Here,  $\ell = 1000$ ,  $a = 1$ ,  $n \geq 3$

$$\Rightarrow 1000 = 1 + (n-1)d \quad \text{or} \quad 999 = (n-1)d$$

An AP with the elements of the set S will be possible only when 999 will be divisible by  $(n-1)$  where  $n \geq 3$ .

So, we need to find the factors of 999, which are 3, 9, 27, 37, 111, 333, 999.

An AP is possible for all the 7 above factors of 999 with  $n = 4, 10, 28, 38, 112, 334$  and 1000 elements.

39. (d) This is an AP problem with common difference,  $d = -3$

$$\text{Sum of AP} = \frac{n}{2}(2a + (n-1)d) = 630$$

( $\because$  total children = 630)

$$\text{or } 2an + n(n-1)(-3) = 630 \times 2 = 1260$$

$$\text{or } 2an - 3n^2 - 3n = 1260$$

$$\text{or } 2a - 3n - 3 = \frac{1260}{n}$$

Now using all the options given, we find that

(a) For  $n = 3$ ,  $a = 213$  and the AP is 213, 210, 207.

(b) For  $n = 4$ ,  $a = 162$  and the AP is 162, 159, 156, 153

(c) For  $n = 5$ ,  $a = 132$ , and the AP is 132, 129, 126, 123, 120.

(d) For  $n = 6$ ,  $a = 117.5$  which is not possible

(e) For  $n = 7$ ,  $a = 99$  and the AP is 99, 96, 93, 90, 87, 84, 81.

40. (b)  $a_1 = p$ ,  $b_1 = q$

$$a_2 = pb_1, b_2 = qb_1$$

$$\Rightarrow a_2 = pq, b_2 = q^2 \quad \dots(i)$$

$$\text{Now, } a_3 = pa_2, b_3 = qa_2$$

$$\Rightarrow a_3 = p^2q, b_3 = pq^2 \quad \dots(ii)$$

$$\text{Now, } a_4 = pb_3, b_4 = qb_3$$

$$\Rightarrow a_4 = p^2q^2, b_4 = pq^3 \quad \dots(ii)$$

$$\text{Now, } a_5 = pa_4, b_5 = qa_4$$

$$\Rightarrow a_5 = p^3q^2, b_5 = p^2q^3 \quad \dots(iii)$$

$$\text{Now, } a_6 = pb_5, b_6 = qb_5$$

$$\Rightarrow a_6 = p^3q^3, b_6 = p^2q^3 \quad \dots(iii)$$

On viewing the equation (i), (ii) and (iii)

For even integral value of  $n$ , we conclude that

$$a_n = p^{n/2}q^{n/2}, b_n = p^{\frac{n}{2}}q^{\frac{n}{2}}$$

$$\therefore a_n = b_n = p^{n/2} \cdot q^{n/2} = p^{\frac{n-1}{2}} \cdot q^{\frac{n}{2}}$$

$$p^{\frac{n-1}{2}} \cdot q^{\frac{n}{2}} (p - q) = q \cdot p^{\frac{n-1}{2}} \cdot q^{\frac{n-1}{2}} (p - q)$$

$$a_n = b_n = q \cdot (p \cdot q)^{\frac{n-1}{2}} (p - q)$$

41. (e)  $a_1 = pq^0$ ,

$$a_3 = p^2q$$

$$a_5 = p^3q^2$$

$$b_1 = p^0q$$

$$b_3 = pq^2$$

$$b_5 = p^2q^3$$

... (iv)

... (v)

... (vi)

On viewing the above equations (v), (vi) and (vii) for odd integral value of  $n$ , we conclude that

$$a_n = p^{\frac{n+1}{2}} \cdot q^{\frac{n-1}{2}}, b_n = p^{\frac{n-1}{2}} \cdot q^{\frac{n+1}{2}}$$

$$\therefore a_n = b_n = p^{\frac{n+1}{2}} \cdot q^{\frac{n-1}{2}} = p^{\frac{n-1}{2}} \cdot q^{\frac{n-1}{2}}$$

$$\Rightarrow a_n = b_n = p^{\frac{n-1}{2}} \cdot q^{\frac{n-1}{2}} (p - q)$$

Now checking for option  $n = 9$ , we get

$$a_9 + b_9 = p^4 \cdot q^4 (p + q)$$

$$\left(\frac{1}{3}\right)^4 \left(\frac{2}{3}\right)^4 \left(\frac{1}{3} \quad \frac{2}{3}\right)$$

$$a_9 + b_9 = \frac{1}{81} \times \frac{16}{81} \times 1 = \frac{16}{6561} = 0.0024 < 0.01 = 9$$

$$42. (c) x - y = \frac{3}{n} \cdot \frac{5}{n} \cdot \frac{7}{n} \dots \frac{(2n-1)}{n} - \frac{2}{n} \cdot \frac{4}{n} \cdot \frac{6}{n} \dots \frac{2n}{n}$$

$$\frac{(3-2) + (5-4) + (7-6) \dots [(2n-1) - 2n]}{n}$$

$$\frac{1}{n} \cdot \frac{1}{n} \cdot \frac{1}{n} \dots \text{nth term} = \frac{n}{n} = 1$$

$$43. (b) f(1) + f(2) + \dots + f(n) = n^2 f(n)$$

$$\Rightarrow f(1) + f(2) + \dots + f(n-1) = n^2 f(n) - f(n)$$

$$\Rightarrow \sum f(n-1) = (n^2 - 1) f(n)$$

$$\Rightarrow f(n) = \frac{\sum f(n-1)}{n^2 - 1}$$

$$f(1) = 3600$$

$$f(2) = \frac{f(1)}{3} = \frac{3600}{3} = 1200$$

$$f(3) = \frac{f(1)}{8} \cdot \frac{f(2)}{8} = \frac{4800}{8} = 600$$

$$f(4) = \frac{f(1)}{15} \cdot \frac{f(2)}{15} \cdot \frac{f(3)}{15} = \frac{5400}{15} = 360$$

$$f(5) = \frac{f(1)}{24} \dots \frac{f(4)}{24} = \frac{5760}{24} = 240$$

$$f(6) = \frac{f(1)}{35} \dots \frac{f(5)}{35} = \frac{6000}{35} = \frac{1200}{7}$$

$$f(7) = \frac{f(1)}{48} \dots \frac{f(6)}{48} = \frac{6000}{48} = \frac{1200}{7} = \frac{900}{7}$$

$$f(8) = \frac{f(1) \dots f(7)}{63}$$

$$\frac{6000}{7} \cdot \frac{1200}{7} \cdot \frac{900}{7} = \frac{63}{100}$$

$$f(9) = \frac{f(1) \dots f(8)}{80}$$

$$\frac{6000}{7} \cdot \frac{1200}{7} \cdot \frac{900}{7} \cdot \frac{100}{80} = 80$$

44. (a) 
$$(a+b+c)^{20} = [(a+b)+c]^{20}$$
  

$$= {}^{20}C_0 (a+b)^{20} \cdot c^0 + {}^{20}C_1 (a+b)^{19} \cdot c + {}^{20}C_2 (a+b)^{18} \cdot c^2$$
  

$$+ \dots + {}^{20}C_{19} (a+b) \cdot c^{19} + {}^{20}C_{20} (a+b)^0 c^{20}$$

Since, number of terms in a binomial expansion for natural number index is one more than the index i.e.,  $(n+1)$ . Hence, if we further expand the each terms except the last term we get total number of distinct terms

$$= 21 + 20 + 19 + \dots + 2 + 1$$

$$\frac{21(21-1)}{2} = 21 \times 11 = 231$$

45. (a) 
$$\sqrt{1 \frac{1}{1^2} \frac{1}{2^2}} \quad \sqrt{1 \frac{1}{2^2} \frac{1}{3^2}} \quad \dots \quad \sqrt{1 \frac{1}{2007^2} \frac{1}{2008^2}}$$
  

$$\sqrt{\frac{1^2 \cdot 2^2 \cdot 2^2 \cdot 1^2}{1^2 \cdot 2^2}} \quad \sqrt{\frac{2^2 \cdot 3^2 \cdot 3^2 \cdot 2^2}{2^2 \cdot 3^2}} \quad \dots$$
  

$$\sqrt{\frac{(2007)^2 \times (2008)^2 \quad (2008)^2 \quad (2007)^2}{(2007)^2 \times (2008)^2}}$$
  

$$\sqrt{\frac{(1 \times 2 + 1)^2}{1^2 \cdot 2^2}} \quad \sqrt{\frac{(2 \times 3 - 1)^2}{2^2 \cdot 3^2}} \quad \dots \quad \sqrt{\frac{(2007 \times 2008 - 1)^2}{(2007)^2 \times (2008)^2}}$$
  

$$\frac{1 \times 2 + 1}{1 \times 2} \quad \frac{2 \times 3 - 1}{2 \times 3} \quad \dots \quad \frac{2007 \times 2008 - 1}{2007 \times 2008}$$

$$\left(1 \frac{1}{1 \times 2}\right) \left(1 \frac{1}{2 \times 3}\right) \dots \left(1 \frac{1}{2007 \times 2008}\right)$$

$$2007 \left[ \frac{1}{1 \times 2} \frac{1}{2 \times 3} \dots \frac{1}{2007 \times 2008} \right]$$

$$2007 \left[ \frac{2-1}{1 \times 2} \frac{3-2}{2 \times 3} \dots \frac{2008-2007}{2007 \times 2008} \right]$$

$$2007 \left[ \left( \frac{1}{1} - \frac{1}{2} \right) \left( \frac{1}{2} - \frac{1}{3} \right) \dots \left( \frac{1}{2007} - \frac{1}{2008} \right) \right]$$

$$2007 \left( 1 - \frac{1}{2008} \right) = 2008 - \frac{1}{2008}$$

46. (c) The given first sequence can be written as  $17 + (n-1)4$  i.e.,  $4n + 13$ , where  $n = 1, 2, 3, \dots, 101$

The given second sequence can be written as  $16 + (m-1)5$  i.e.,  $5m + 11$  where  $m = 1, 2, 3, \dots, 91$

For common terms,

$$4n + 13 = 5m + 11$$

$$\therefore m = \frac{4n + 2}{5}$$

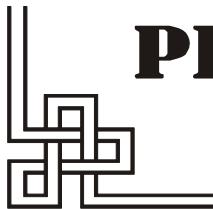
For positive integral value of  $m$ , the unit digit of the number  $n$  will be 2 or 7.

Hence, total possible value of  $n = 2, 7, 12, 17, \dots, 97$  i.e., 20 values of  $n$ .

Hence, there will be 20 common terms in given two sequences.

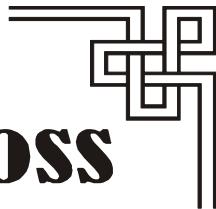
# 7

## CHAPTER



# PERCENTAGE,

# PROFIT AND LOSS



1. The number of votes not cast for the Praja Party increased by 25% in the National General Elections over those not cast for it in the previous Assembly Polls, and the Praja Party lost by a majority twice as large as that by which it had won the Assembly Polls. If a total of 2,60,000 people voted each time, how many voted for the Praja Party in the Assembly Elections? **(1994)**  
(a) 1,10,000      (b) 1,50,000      (c) 1,40,000      (d) 1,20,000
2. A dealer offers a cash discount of 20% and still makes a profit of 20%, when he further allows 16 articles to a dozen to a particularly sticky bargainer. How much per cent above the cost price were his wares listed? **(1994)**  
(a) 100%      (b) 80%      (c) 75%      (d) 66 2/3%
3. Last week Martin received \$ 10 in commission for selling 100 copies of a magazine. Last week Miguel sold 100 copies of this magazine. He received his salary of \$ 5 per week plus a commission of 2 cents for each of the first 25 copies sold, 3 cents for each of next 25 copies sold and 4 cents for each copy thereafter. (\$1 = 100 cents) **(1994)**  
I. Martin's commission in the last week      II. Miguel's total income for last week  
(a) I > II      (b) I < II      (c) I = II      (d) Nothing can be said
4. A person who has a certain amount with him goes to the market. He can buy 50 oranges or 40 mangoes. He retains 10% of the amount as taxi fare and buys 20 mangoes and of the balance he purchases oranges. Number of oranges he can purchase is **(1995)**  
(a) 36      (b) 40      (c) 15      (d) 20
5. Ram purchased a flat at Rs 1 lakh and Prem purchase a plot of land worth Rs 1.1 lakh. The respective annual rates at which the prices of the flat and the plot increased were 10 % and 5%. After two years they exchanged their belongings and one paid the other the difference. Then... **(1995)**  
(a) Ram paid Rs 275 to Prem      (b) Ram paid Rs 475 to Prem  
(c) Ram paid Rs 2750 to Prem      (d) Prem paid Rs 475 to Ram
6. The rate of inflation was 1000%. Then, what will be cost of an article, which costs 6 units of currency now, two years from now? **(1995)**  
(a) 666      (b) 660      (c) 720      (d) 726
7. A man invests Rs 3000 at a rate of 5% per annum. How much more should he invest at a rate of 8%, so that he can earn a total of 6% per annum ? **(1995)**  
(a) Rs 1200      (b) Rs 1300      (c) Rs 1500      (d) Rs 2000
8. 2/5 of the voters promise to vote for P and the rest promised to vote for Q. Of these, on the last day 15% of the voters went back of their promise to vote for P and 25% of voters went back of their promise to vote for Q and P lost by 2 votes. Then the total number of voters is **(1995)**  
(a) 100      (b) 110      (c) 90      (d) 95
9. I sold two watches for Rs 300 each, one at a loss of 10% and the other at a profit of 10%. What is the per cent loss (–) or the per cent profit (+) that resulted from the transaction ? **(1996)**  
(a) (+) 10      (b) (–) 1      (c) (+) 1      (d) 0
10. The price of a Maruti Car rises by 30% while the sales of the car come down by 20%. What is the per cent change in the total revenue? **(1996)**  
(a) – 4      (b) – 2      (c) + 4      (d) + 2
11. The cost of a diamond varies directly as the square of its weight. Once, this diamond broke into four pieces with weights in the ratio 1:2:3:4. When the pieces were sold, the merchant got Rs 70,000 less. Find the original price of the diamond. **(1996)**  
(a) Rs 1.4 lakh      (b) Rs 2.0 lakh      (c) Rs 1.0 lakh      (d) Rs 2.1 lakh
12. I bought 5 pens, 7 pencils and 4 erasers. Rajan bought 6 pens, 8 erasers and 14 pencils for an amount which was half more than what I had paid. What percent of the total paid by one was paid for the pens? **(1996)**  
(a) 37.5%      (b) 62.5%      (c) 50%      (d) None of these

**Directions for questions 13 & 14:** Read the information given below and answer the questions that follow :

A watch dealer incurs an expense of Rs 150 for producing every watch. He also incurs an additional expenditure of Rs30, 000, which is independent of the number of watches produced. If he is able to sell a watch during the season, he sells it for Rs 250. If he fails to do so, he has to sell each watch for Rs 100. (1996)



**Directions for questions 21 & 22 :** Read the information given below and answer the questions that follow :

A company purchases components A and B from Germany and USA respectively. A and B form 30% and 50% of the total production cost. Current gain is 20%. Due to change in the international scenario, cost of the German Mark increased by 30% and that of USA Dollar increased by 22%. Due to market conditions the selling price cannot be increased beyond 10%. Then

21. What is the maximum current gain possible? **(1998)**  
(a) 10% (b) 12.5% (c) 0% (d) 7.5%

22. If the USA Dollar becomes cheap by 12% over its original cost and the cost of German Mark increased by 20%. The selling price is not altered. What will be the gain? **(1998)**  
(a) 10% (b) 20% (c) 15% (d) 7.5%

23. In a company 40% are male, out of which 75% earn a salary of 25,000 plus. If 45% of the employees 25,000 plus salaries, what is the fraction of female employees earning less than or equal to 25,000? **(1999)**  
(a)  $1/4$  (b)  $3/7$  (c)  $3/4$  (d)  $5/9$

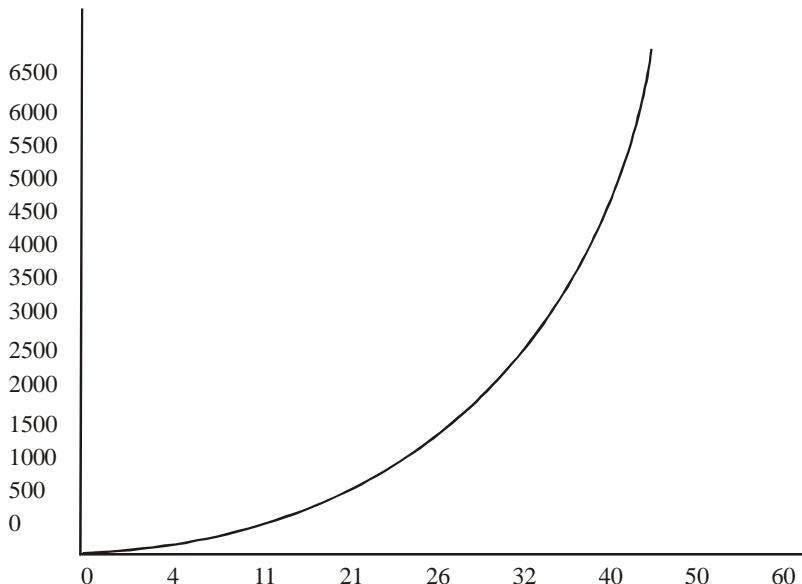
**Directions for questions 24 to 27 : Read the information given below and answer the questions that follow :**

The following graph represents the variable cost of widgets as a function of quantity produced. The cost of production has two components, variable cost — which is given in the graph, and fixed cost — which is Rs 800 for the first shift in which 30 widgets can be produced and if more production is desired then a second shift is started which can produce an additional 30 widgets. The fixed cost of the second shift is Rs 1200.

Average cost is defined as the total cost

total number of the widgets

Marginal cost is defined as change in total cost  
change in number of widgets produced.



24. What is the average cost if number of widgets in July is 40? (2000)  
 (a) 110 (b) 140 (c) 3600 (d) 180
25. If the number of widgets increase from 40 in July to 41 in September what is the marginal cost ? (2000)  
 (a) 110 (b) 130 (c) 170 (d) 150
26. What is the total cost of production in July? (2000)  
 (a) 3600 (b) 5600 (c) 6400 (d) 4300
27. What number of widgets give the maximum profit? (2000)  
 (a) 30 (b) 40 (c) 25 (d) 60
28. What number of widgets being 0-60 which of the following is true? (2000)  
 (a) The average cost increases consistently  
 (b) The average cost decreases consistently  
 (c) The average cost decreases till minimum then increases  
 (d) The average cost increases till maximum then decreases
29. A student took five papers in an examination, where the full marks were the same for each paper. His marks in these papers were in the proportion of 6 : 7 : 8 : 9 : 10. In all papers together, the candidate obtained 60% of the total marks. Then the number of papers in which he got more than 50% marks is (2001)  
 (a) 2 (b) 3 (c) 4 (d) 5
30. A college has raised 75% of the amount it needs for a new building by receiving an average donation of Rs 600 from the people already solicited. The people already solicited represent 60% of the people, the college will ask for donations. If the college is to raise exactly the amount needed for the new building, what should be the average donation from the remaining people to be solicited? (2001)  
 (a) Rs 300 (b) Rs 250 (c) Rs 400 (d) Rs 500
31. The owner of an art shop conducts his business in the following manner. Every once in a while he raises his prices by X %, then a while later he reduces all the new prices by X %. After one such up-down cycle, the price of a painting decreased by Rs 441. After a second up-down cycle the painting was sold for Rs 1944.81. What was the original price of the painting? (2001)  
 (a) 2756.25 (b) 2256.25 (c) 2500 (d) 2000
32. Davji Shop sells Samosas in boxes of different sizes. The Samosas are priced at Rs 2 per Samosa up to 200 Samosas. For every additional 20 Samosas, the price of the whole lot goes down by 10 paise per Samosa. What should be the maximum size of the box that would maximise the revenue? (2002)  
 (a) 240 (b) 300 (c) 400 (d) None of these

	Time required (Hours/bag)	
	Machine A	Machine B
Standard Bag	4	6
Deluxe Bag	5	10

The total time available on machine A is 700 hours and on machine B is 1250 hours. Among the following production plans, which one meets the machine availability constraints and maximizes the profit? (2003C)

- (a) Standard 75 bags, Deluxe 80 bags      (b) Standard 100 bags, Deluxe 60 bags  
(c) Standard 50 bags, Deluxe 100 bags      (d) Standard 60 bags, Deluxe 90 bags.

**Directions for Questions 35 & 36 :** Shabnam is considering three alternatives to invest her surplus cash for a week. She wishes to guarantee maximum returns on her investment. She has three options, each of which can be utilized fully or partially in conjunction with others.

**Option A:** Invest in a public sector bank. It promises a return of +0.10%.

**Option B:** Invest in mutual funds of ABC Ltd. A rise in the stock market will result in a return of +5%, while a fall will entail a return of -3%.

**Option C:** Invest in mutual funds of CBA Ltd. A rise in the stock market will result in a return of  $-2.5\%$ , while a fall will entail a return of  $+2\%$ .

35. The maximum guaranteed return to Shabnam is (2007)  
(a) 0.30% (b) 0.25% (c) 0.10%  
(d) 0.20% (e) 0.15%

36. What strategy will maximize the guaranteed return to Shabnam? (2007)  
(a) 30% in option A, 32% in option B and 38% in option C  
(b) 100% in option A  
(c) 36% in option B and 64% in option C  
(d) 64% in option B and 36% in option C  
(e) 1/3 in each of the three options

## ANSWERS WITH SOLUTIONS

1. (c) Suppose no. of people voted in Assembly for Praja Party =  $x$   
 and no. of people voted in national polls for Praja Party =  $y$   
 Then, people not voted in assembly for Praja Party =  $2,60,000 - x$   
 People not voted in national polls for Praja Party =  $2,60,000 - y$   
 Party won assembly polls by a margin  

$$= x - (2,60,000 - x) = 2x - 2,60,000$$
  
 Lost vote in national polls by a margin  

$$= (2,60,000 - y) - y = 2,60,000 - 2y$$
  
 Given that,  $2,60,000 - y = \left(1 - \frac{25}{100}\right)(2,60,000 - x)$   

$$\Rightarrow 100(2,60,000 - y) = 125(2,60,000 - x)$$
  

$$\Rightarrow 100y - 125x = -25(2,60,000)$$
  

$$\Rightarrow 4y - 5x = -2,60,000 \quad \dots\dots(i)$$
  
 Also given,  $2,60,000 - 2y = 2(2x - 2,60,000)$   

$$\Rightarrow 4x - 2y = 3 \times 2,60,000$$
  

$$\Rightarrow 2x + y = 3,90,000 \quad \dots\dots(ii)$$
  
 From (i) and (ii) we get  $x = 1,40,000$
2. (a) If listed price of article be Rs 100 then discounted price be Rs 80 (since discount = 20%)  
 After offering 16 articles to a dozen  
 Price of 16 articles =  $80 \times 12$   
 Price of one article  $\frac{80 \times 12}{16} = 60$   
 Profit = 20 %  

$$\text{Cost price } x \text{ (say)} = 60 - x \times \frac{20}{100}$$
  

$$\Rightarrow x - \frac{x}{5} = 60 \Rightarrow x = 60 \times \frac{5}{6} = 50$$
  
 Per cent above the cost price  $\frac{100 - 50}{50} \times 100 = 100\%$
3. (a) Miguel's income  

$$5(0.02 \times 25) + (0.03 \times 25) + (0.04 \times 50)$$
  

$$5(0.50) (0.75) (2.00) = \$8.25$$
  
 Martin's commission = \$ 10  
 Thus, Martin's commission > Miguel's income
4. (d) Let the price of an orange and a mango be Rs. 'x' and Rs. 'y' respectively.  
 Then,  $50x = 40y$  or  $y = \frac{5}{4}x$   
 As he buys only for 90% of the amount he can buy a maximum of  $40 \times 0.9 = 36$  mangoes.  
 But he buys only 20 mangoes and remain oranges.  
 Hence,  $36 \text{ mangoes} = 20 \text{ mangoes} = 16 \times \frac{5}{4} \text{ oranges}$   

$$20 \text{ mangoes} = 20 \text{ oranges}$$
  

$$\therefore \text{No. of oranges purchased} = 20$$
5. (a) Ram's flat value after 2 years =  $1(1 + 0.1)^2 = 1.1^2$   
 Prem's flat value after 2 years =  $1.1(1 + 0.05)^2 = 1.1(1.05)^2$   
 Difference =  $1.1(1.05)^2 - 1.1^2$   

$$1.1(1.1025 - 1.1) = 1.1 \times 0.0025 \text{ lakh}$$
  

$$= 1.1 \times 0.0025 \times 100000 = 25 \times 11 = \text{Rs } 275$$
  
 Ram paid Rs 275 to prem
6. (d) Cost of article after 2 years  

$$6 \left(1 + \frac{1000}{100}\right)^2 = 6 \times 11 \times 11 = 726$$
7. (c) Let Rs  $x$  more be invested at the rate of 8%  
 Then,  

$$3000(1 + 0.05) + x(1 + 0.08) = (3000 + x)(1 + 0.06)$$
  
 or  $3150 + 1.08x = 3180 + 1.06x$   

$$\text{or } 0.02x = 30 \text{ or } x = \frac{30}{0.02} = \text{Rs } 1500$$
8. (a) Voters to vote for P  $\frac{2}{5}V$   
 Voters to vote for Q  $\frac{3}{5}V$   
 On the last day  
 Voters voted for P  $\frac{85}{100} \times \frac{2}{5}V = \frac{25}{100} \times \frac{3}{5}V = \frac{245}{500}V$   
 Voters voted for Q  $\frac{75}{100} \times \frac{3}{5}V = \frac{15}{100} \times \frac{2}{5}V = \frac{255}{500}V$   
 As P lost by 2 votes,  

$$\frac{255}{500}V - \frac{245}{500}V = \frac{V}{50} = 2 \text{ or } V = 100$$
  
**Alternatively**  
 Let total voters be 100  
 Voters to vote for P = 40

Voters to vote for Q = 60

On the last day

Voters voted for

$$P = 40 - \frac{15}{100} \times 40 = \frac{25}{100} \times 60 = 40 - 6 = 15 = 49$$

Voters voted for

$$Q = 60 - \frac{25}{100} \times 60 = \frac{15}{100} \times 40 = 60 - 15 = 9 = 51$$

$\therefore$  P lost by  $51 - 49 = 2$  votes

Hence, total voters = 100.

9. (b) Let cost price of 1st watch be  $CP_1$  and 2nd watch be  $CP_2$   
Then CP of 1st watch

$$= \frac{10}{100} = \frac{CP_1 - 300}{CP_1} \therefore CP_1 = \text{Rs } 333.33$$

CP of 2nd watch

$$= \frac{10}{100} = \frac{300 - CP_2}{CP_2} \therefore CP_2 = \text{Rs } 272.72$$

$\therefore$  Total CP = 333.33 + 272.72 = Rs 606.05  
Total SP = Rs 600

$$\therefore \% \text{ loss} = \frac{6.05}{606.05} \times 100 = 1\%$$

10. (c) Let initial price = x and sales = y  
Then, total revenue = xy  
After price rise

$$\text{Price} = x = \frac{3x}{10} + \frac{13x}{10} \text{ and sales} = y = \frac{20y}{100} = \frac{4y}{5}$$

$\therefore$  Change in revenue

$$\left( \frac{13x}{10} \right) \left( \frac{4y}{5} \right) - xy = \frac{52xy}{50} - xy = \frac{2xy}{50}$$

$$\% \text{ change} = \frac{2xy}{50xy} \times 100 = +4\%$$

11. (c) Let the weight of the diamond be 10 units. Hence the cost will vary by  $10^2$  i.e. cost = 100 x  
After the diamond is broken, the cost becomes

$$(1^2 + 2^2 + 3^2 + 4^2)x \text{ i.e., } 30x.$$

Thus,  $(100 - 30)x = 70,000$

$$70x = 70,000$$

$$x = 1,000$$

$\therefore$  Original cost =  $100(x) = 100 \times 1000 = \text{Rs } 1,00,000$

12. (b) Let the price of a pen, pencil and eraser be Rs x, y and z respectively.

$$(5x + 7y + 4z) = A \quad \dots(i)$$

$$6x + 14y + 8z = 1.5A \quad \dots(ii)$$

Multiply (i) by 2,

$$10x + 14y + 8z = 2A \quad \dots(iii)$$

Subtracting (ii) from (iii) we have,

$$4x = 0.5A$$

$$\Rightarrow x = \frac{0.5}{4}A = 0.125A$$

$\therefore$  For 5 pens, amount paid =  $0.125A \times 5 = 0.625A$

Hence, 62.5 % of total amount paid by me

### For Qs. 13-14.

Let watch dealer makes x watches then

Total cost price =  $30,000 + 150x$

Selling price of per watch = 250 in season or  $S = 100$  otherwise

13. (b)  $CP = 30,000 + 2,25,000 = 2,55,000$

$$SP = 1200 \times 250 + 300 \times 100 = 3,30,000$$

$$\text{Profit} = 3,30,000 - 2,55,000 = \text{Rs } 75000$$

14. (b)  $CP = 30000 + 150 \times 1500 = 30000 + 225000 = 255000$

Let he sells x watches at Rs 250

$$\Rightarrow (1500 - x) \text{ watches sells at Rs } 100$$

$$\therefore 255000 = 250x + (1500 - x)100$$

$$\Rightarrow 255000 = 250x + 150000 - 100x$$

$$\Rightarrow 105000 = 150x \text{ or } x = \frac{105000}{150}$$

$$= 700 \text{ watches}$$

15. (a) Let the cost of cloth per cm be Rs. x

As he uses 120 cm scale, so, he has 120 cm cloth cost incurred =  $100x$ . While selling he uses 80 cm scale, so

actually he charges for  $\frac{100}{80} \times 120 = 150$  cm of cloth

Amount obtained after 20% discount

$$= 0.8x \times 150 = 120x$$

$$\therefore \text{Profit} = \frac{20x}{100x} \times 100 = 20\%$$

16. (c) Let maximum marks be 100

Hence his average = 60

Let his marks be  $10x, 9x, 8x, 7x, 6x$  respectively in 5 subjects

i.e.  $10x + 9x + 8x + 7x + 6x = 60\% \text{ of } 5 \times 100$

$$= \frac{60}{100} \times 500 = 60 \times 5 \quad \dots(i)$$

Solving we get his marks were

$$75, 67.5, 60, 52.5, 45$$

Since passing marks are 50

He passed in 4 subjects

17. (a) Let the C.P be Rs 100 and selling price be Rs x

$$\text{Discount } \left( \frac{11.11}{100} x \right) \text{ or } 114.78 - x \left( 1 - \frac{11.11}{100} \right)$$

$$\Rightarrow x \times \frac{88.89}{100} = 114.28$$

$$\Rightarrow x = \frac{100}{88.89} \times 114.28 = 128.56$$

∴ Price above the cost price = Rs 28.56 = 28.56%

18. (b) 100 kg of fresh grapes have 90 kg water and 100 kg of dry grapes have 20 kg water

$$20 \text{ kg fresh grapes have } \frac{9}{10} \times 20 = 18 \text{ kg water}$$

i.e., 2 kg non water

$$\text{For dry grapes non- water material } \frac{80}{100}$$

$$\text{If any grapes are } x \text{ kg } \Rightarrow \frac{8}{10} \times x = 2 \Rightarrow x = 2.5 \text{ kg}$$

19. (b) According to question

$$700 - \frac{x}{100} \times 2000 - \frac{y}{100} \times 2000 \quad \dots(i)$$

$$\Rightarrow 20(x - y) = 700$$

$$\text{and } 900 - \frac{x}{100} \times 2000 - \frac{y}{100} \times 3000 \quad \dots(ii)$$

Solving from (i) and (ii) we get

$$y = 20 \text{ and } x = 15$$

20. (a) Let  $n_1$  be the bacteria in 1st generation

$$\text{Hence, } n_2 = 8 \frac{(n_1)}{2} = 4n_1$$

$$\text{Similarly, } n_3 = 4n_2 = 4^2 n_1$$

$$n_4 = 4n_3 = 4^3 n_1$$

$$n_5 = 4n_4 = 4^4 n_1$$

$$\therefore n_7 = 4^6 n_1 = 4096 n_1$$

Hence  $n_1 = 1$  million

21. (a) Let cost of component A and B be Rs. 30 and Rs. 50 respectively.

Then cost of production = Rs.  $(30 + 50 + 20)$ , where Rs. 20 contributes to the other expenses, assuming total production cost Rs. 100.

Since, profit is 20%. Hence, selling price = Rs. 120.

Now, new cost price of component A

$$= 30 \times \frac{130}{100} = \text{Rs. 39}$$

New cost price of component B

$$= 50 \times \frac{122}{100} = \text{Rs. 61}$$

New production cost (other expenses do not change)  
 $= (39 + 61 + 20) = \text{Rs. 120}$

$$\text{Since new S.P.} = 120 \times \frac{110}{100} = 132$$

$$\therefore \text{New profit \%} = \frac{132 - 120}{120} \times 100 = 10\%.$$

22. (b) New cost of component A =  $30 \times \frac{120}{100} = \text{Rs. 36}$

$$\text{New cost of component B} = 50 \times \frac{88}{100} = \text{Rs. 44}$$

New production cost = Rs.  $(36 + 44 + 20) = \text{Rs. 100}$   
 New selling price is same.

Hence profit =  $120 - 100 = 20$  or 20%.

23. (c) Let total no. of employees be  
 Employees who get 25000 plus salaries = 45

Male employees = 40

Female employees = 60

Male employees who get 25000 plus salaries = 30

Female employees who get 25000 plus salaries = 15

Female employees who get less than or equal to 25000  
 $= (60 - 15) = 45$

$$\text{i.e., } \frac{45}{60} = \frac{3}{4}$$

24. (b) No. of widgets produced = 40

$$\text{Total cost} = \text{variable cost} + \text{fixed cost}$$

$$= 3600 + 800 + 1200 = 5600$$

$$\text{Average cost} = \frac{5600}{40} = 140$$

25. (d) In this case only the variable cost + changes

$$\text{Hence, marginal final cost} = \frac{3700 - 3600}{1} = 150 \text{ (from graph)}$$

26. (b) Total cost in July = Rs 5600 (see solution 26).

27. (c) The maximum profit can not be attained in case of 40 and 60 widgets as it would require to run the second shift which is costlier than the first. Further the average cost will be less for 25 widgets cost, as the variable cost increases parabolically with number of widgets.

28. (c) From the graph and earlier question it can be inferred that the average cost per unit reduces till no. of units = 30. Thereafter it increases with the no. of units because the production moves into the 2nd shift and hence the additional fixed cost becomes Rs 1200.

29. (c) Let Maximum marks be 100. Hence, his average = 60

Let marks in subjects be  $6x, 7x, 8x, 9x$  and  $10x$

According to question,

$$(6 + 7 + 8 + 9 + 10)x = 60 \times 5$$

$$\Rightarrow (40)x = 300$$

$$\therefore x = \frac{15}{2}$$

Hence, his marks, supposing the maximum marks to be 100 for each subject

$$75, 67.5, 60, 52.5, 45$$

Hence, he got above 50% in 4 subjects

30. (a) Let the total donors be =  $x$   
60% of donors pay 75% of the amount.

$$\therefore \text{Total amount raised} = \left( \frac{60}{100} \times x \right) \times 100 = 480x$$

Remaining amount = 25%

Now, 25% of the amount is raised by 40% of the donors.  
Therefore, average donation of these people

$$= \left( \frac{25}{100} \times 480x \right) \times 100 = \text{Rs } 300$$

31. (a) In first up-down cycle, the reduction price is Rs 441.  
According to this, option (b) and (d) are removed.  
Now we see the option (c), if the original price is Rs 2500, then after first operation, the price will be

$$2500 - 441 = \text{Rs } 2059$$

In second operation, it will come down around Rs 400.

So the value is not equivalent to Rs 1944.81.

Hence, Rs 2756.25 is the correct option.

**Alternatively :**

Let the initial price be Rs A.

$$\text{Then, } A - A \left( \frac{100-X}{100} \right) \left( \frac{100-X}{100} \right) = 441$$

$$\Rightarrow \left( \frac{100^2 - X^2}{100^2} \right) \frac{A - 441}{A} = \dots \text{(i)}$$

$$\text{and } A \left( \frac{100^2 - X^2}{100^2} \right) = 1944.81 \quad \dots \text{(ii)}$$

From (i) and (ii)

$$A \left( \frac{A - 441}{A} \right)^2 = 1944.81 \Rightarrow A = \text{Rs } 2756.25$$

32. (b) For 200 Samosas prices =  $2 \times 200 = \text{Rs } 400$   
For 220 Samosas prices =  $1.90 \times 220 = \text{Rs } 418$   
For 240 Samosas prices =  $1.80 \times 240 = \text{Rs } 432$   
For 260 Samosas prices =  $1.70 \times 260 = \text{Rs } 442$   
For 280 Samosas prices =  $1.60 \times 280 = \text{Rs } 448$   
For 300 Samosas prices =  $1.50 \times 300 = \text{Rs } 450$   
For 320 Samosas prices =  $1.40 \times 320 = \text{Rs } 448$   
Hence we see that revenue increase when size increases up to 300. After 300 revenue reduces therefore maximum size for maximise the revenue = 300 Samosas

33. (c) Shephard adds  $p\%$  of 108 goats every year and sells  $q\%$  of  $(108 + \frac{p}{100} \times 108)$ .

It is observed that the goats sold is a percentage of a higher quantity as compared to the goats added.  
Hence, if he has 108 goats left, it means he should have added more (higher percentage of small quantity) than he sold. Hence,  $p > q$ .

34. (a) Let the standard bags produced be 's' and deluxe bags produced bE 'd'

$$\text{For machine A, } 4s + 5d = 700 \quad \dots \text{(i)}$$

$$\text{For machine B, } 6s + 10d = 1250 \quad \dots \text{(ii)}$$

Solving for s and d from (i) and (ii) we get,  $s = 75$  and  $d = 80$

$$\therefore \text{Profit, } P = 20s + 30d$$

$$= 75 \times 20 + 80 \times 30 = 1500 + 2400 = 3900$$

This is the maximum profit meeting the complete machine availability constraints.

The options (c) & (d) do not satisfy equations (i) and (ii). Profit in option (b),  $P = 100 \times 20 + 60 \times 30 = 3800$  which is less than option (a).

35. (d) Investment in option A will fetch + 0.10% return.  
We need to compare this return with the return from the rise and fall in the stock market for investment in option B and C.  
Let the amount invested in options B and C be in the ratio  $x : 1$ .

For rise in stock market, return =  $5x - 2.5$

For fall in stock market, return =  $2 - 3x$

$\therefore$  The maximum guaranteed return will be earned when  $5x - 2.5 = 2 - 3x$

$$\Rightarrow 8x = 4.5 \text{ or } x = \frac{9}{16}$$

$\therefore$  The maximum guaranteed return is when, the amounts invested are in the ratio 9 : 16 i.e., 36% and 64% respectively.

Guaranteed return for this distribution

$$= 5 \times \frac{9}{25} - 2.5 \times \frac{16}{25} = \frac{45 - 40}{25} = \frac{5}{25} = 0.2\%$$

$\therefore$  Maximum guaranteed return = 0.20%

36. (c) Let us calculate the guaranteed return in each option

(1) For rise in market:

$$0.3 \times 0.1 + 0.32 \times 5 - 0.38 \times 2.5 = 0.68\%$$

Fall in market:

$$0.3 \times 0.1 + 0.32 \times (-3) + 0.38 \times 2 = -0.17\%$$

(2) It will give a return of 0.1%

(3) Return = 0.2% (as calculated in above question)

(4) Rise in market:

$$5 \times 0.64 - 2.5 \times 0.36 = 3.2 - 0.9 = 2.4\%$$

Fall in market:

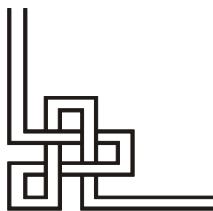
$$2 \times 0.36 - 3 \times 0.64 = 0.72 - 1.92 = -1.20 \text{ (loss)}$$

Similarly, the guaranteed return options [e] can be calculated. The guaranteed return cannot be calculated in case of options (a), (d) and (e) as it depends on the rise and fall of the market, whose probability cannot be predicted. So option (c) is correct as it gives a higher return (than option b) of 0.2%.

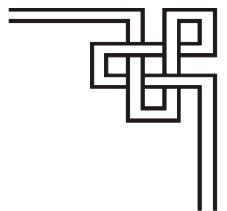
**Note:** Return for, option 3 could be calculated as in this case the return for rise and fall of market is same.

# 8

## CHAPTER

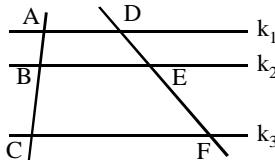


# GEOMETRY



1.  $k_1, k_2, k_3$  are parallel lines.  $AD = 2 \text{ cm}$ ,  $BE = 8 \text{ cm}$  and  $CF = 32 \text{ cm}$

(1994)



Then

I.  $(AB) \times (EF)$

(a)  $I > II$

(b)  $I < II$

II.  $(BC) \times (DE)$

(c)  $I = II$

(d) Nothing can be said

2. Which one of the following cannot be the ratio of angles in a right angled triangle?

(1995)

(a)  $1 : 2 : 3$

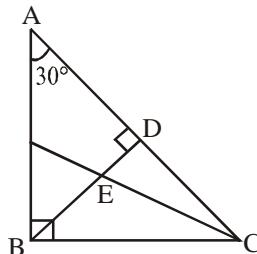
(b)  $1 : 1 : 2$

(c)  $1 : 3 : 6$

(d) None of these

3. In  $\triangle ABC$ ,  $AB \perp BC$  and  $BD \perp AC$ . And  $CE$  bisects the angle  $C$ .  $\angle A = 30^\circ$ . What is  $\angle CED$ ?

(1995)



(a)  $30^\circ$

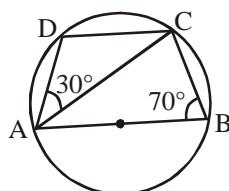
(b)  $60^\circ$

(c)  $45^\circ$

(d)  $65^\circ$

4. In the given figure, AB is diameter of the circle and the points C and D are on the circumference such that  $\angle CAD = 30^\circ$  and  $\angle CBA = 70^\circ$ . What is the measure of  $\angle ACD$ ?

(1995)



(a)  $40^\circ$

(b)  $50^\circ$

(c)  $30^\circ$

(d)  $90^\circ$

5. The length of a ladder is exactly equal to the height of the wall it is resting against. If lower end of the ladder is kept on a stool of height 3 m and the stool is kept 9 m away from the wall the upper end of the ladder coincides with the tip of the wall. Then, the height of the wall is

(1995)

(a) 12m.

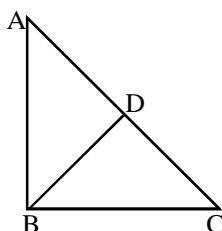
(b) 15m.

(c) 18m.

(d) 11m.

6. In triangle ABC, angle B is a right angle. If  $(AC)$  is 6 cm, and D is the mid - point of side AC. The length of BD is

(1996)



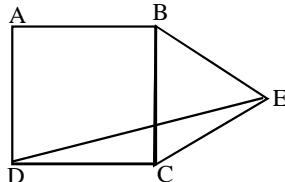
(a) 4 cm

(b)  $\sqrt{6}$  cm

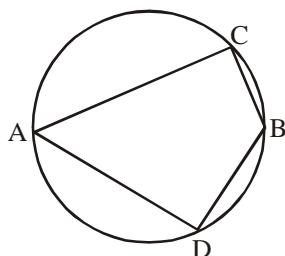
(c) 3 cm

(d) 3.5 cm

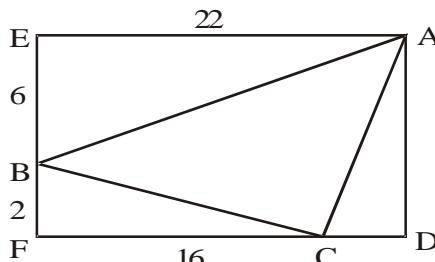
7. The points of intersection of three lines ,  $2X - 3Y - 5 = 0$ ,  $5X - 7Y - 2 = 0$ ,  $9X - 5Y - 4 = 0$ , (1996)
- (a) form a triangle (b) are on lines perpendicular to each other  
 (c) are on lines parallel to each other (d) are coincident
8. If ABCD is a square and BCE is an equilateral triangle, what is the measure of the angle DEC? (1996)



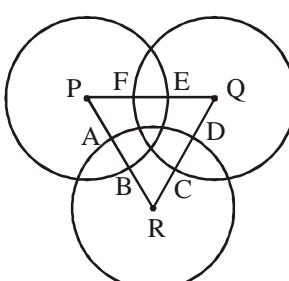
- (a)  $15^\circ$  (b)  $30^\circ$  (c)  $20^\circ$  (d)  $45^\circ$
9. AB is the diameter of the given circle, while points C and D lie on the circumference as shown. If AB is 15 cm, AC is 12 cm and BD is 9 cm, find the area of the quadrilateral ACBD (1997)



- (a)  $54 \text{ cm}^2$  (b)  $216 \text{ cm}^2$  (c)  $162 \text{ cm}^2$  (d) None of these
10. In the given figure, EADF is a rectangle and ABC is a triangle whose vertices lie on the sides of EADF. (1997)  
 $AE = 22$ ,  $BE = 6$ ,  $CF = 16$  and  $BF = 2$   
 Find the length of the line joining the mid-points of the sides AB and BC.



- (a)  $4\sqrt{2}$  (b) 5 (c) 3.5 (d) None of these
11. Three circles, each of radius 20 and centres at P, Q, R. further, AB = 5, CD = 10 and EF = 12. What is the perimeter of the triangle PQR? (1998)



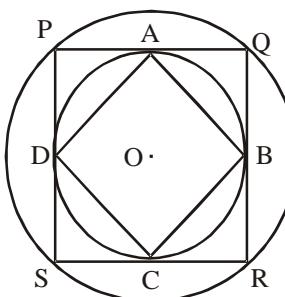
- (a) 120 (b) 66 (c) 93 (d) 87

12. There is a circle of radius 1 cm. Each member of a sequence of regular polygons  $S_1(n)$ ,  $n = 4, 5, 6, \dots$ , where  $n$  is the number of sides of the polygon, is circumscribing the circle; and each member of the sequence of regular polygons  $S_2(n)$ ,  $n = 4, 5, 6, \dots$ , where  $n$  is the number of sides of the polygon, is inscribed in the circle. Let  $L_1(n)$  and  $L_2(n)$  denote the perimeters of the corresponding polygons of  $S_1(n)$  and  $S_2(n)$ . Then  $\frac{[L_1(13) + 2\pi]}{L_2(17)}$  is (1999)

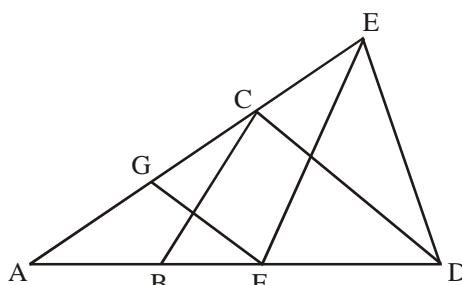
(a) Greater than  $\pi/4$  and less than 1  
(c) Greater than 2

(b) Greater than 1 and less than 2  
(d) Less than  $\pi/4$

13. The figure below shows two concentric circles with centre O. PQRS is a square inscribed in the outer circle. It also circumscribes the inner circle, touching it at point B, C, D and A. What is the ratio of the perimeter of the outer circle to that of polygon ABCD? (1999)



- (a)  $\frac{\pi}{3}$  (b)  $\pi$  (c)  $\frac{\pi}{2}$  (d)  $\frac{\pi}{4}$
14. In the figure below,  $AB = BC = CD = DE = EF = FG = GA$ . Then,  $\angle DAE$  is approximately (2000)



- (a)  $15^\circ$  (b)  $30^\circ$  (c)  $20^\circ$  (d)  $25^\circ$
15. ABCD is a rhombus with diagonals AC and BD intersecting at the origin on the xy plane. If the equation of the line AD is  $x + y = 1$  then the equation of line BC is (2000)

(a)  $x - y = 1$  (b)  $x + y = -1$  (c)  $x - y = 1$  (d) None of these

16. There is a regular octagon ABCDEFGH, a frog is at the vertex A. It can jump on to any of the vertices except the exactly opposite vertex. The frog visits all the vertices exactly once and then reaches vertex E then how many times did it jump before reaching E? (2000)

(a) 7 (b)  $2n + 1$  (c) 6 (d) can't be determined

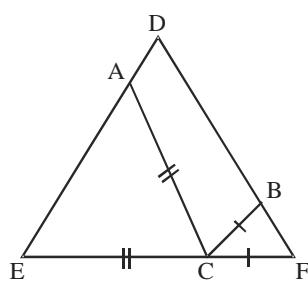
17. If the perimeter of a triangle is 14 and the sides are integers, then how many different triangles are possible? (2000)

(a) 6 (b) 5 (c) 4 (d) 3

18. a, b and c are sides of a triangle. If  $a^2 + b^2 + c^2 = ab + bc + ac$  then the triangle will be (2000)

(a) equilateral (b) isosceles (c) right angled (d) obtuse angle

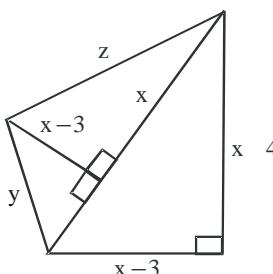
19. In triangle DEF shown below, points A, B, and C are taken on DE, DF and EF respectively such that  $EC = AC$  and  $CF = BC$ . If angle D =  $40^\circ$  degrees then what is angle ACB in degrees? (2001)



(a)  $140^\circ$  (b)  $70^\circ$  (c)  $100^\circ$  (d) None of these

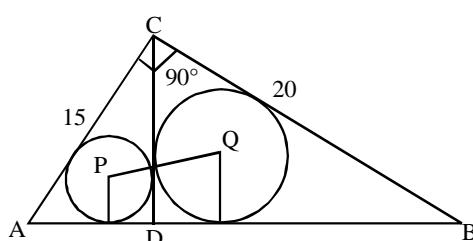
20. Based on the figure below, what is the value of  $x$ , if  $y = 10$

(2001)

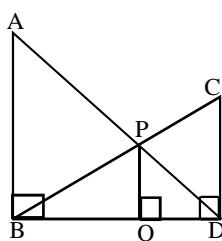


- (a) 10 (b) 11 (c) 12 (d) None of these
21. In a triangle ABC, the internal bisector of the angle A meets BC at D. If  $AB = 4$ ,  $AC = 3$  and  $\angle A = 60^\circ$ , then the length of  $AD$  is (2002)

- (a)  $2\sqrt{3}$  (b)  $\frac{12\sqrt{3}}{7}$  (c)  $15\sqrt{\frac{3}{8}}$  (d)  $6\sqrt{\frac{3}{7}}$
22. The length of the common chord of two circles of radii 15 cm and 20 cm, whose centres are 25 cm apart, is (in cm) (2002)
- (a) 24 (b) 25 (c) 15 (d) 20
23. In the figure,  $ACB$  is a right angled triangle.  $CD$  is the altitude. Circles are inscribed within the triangles  $ACD$ ,  $BAD$ .  $P$  and  $Q$  are the centres of the circles. The distance  $PQ$  is (2002)

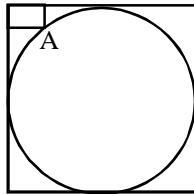


- (a) 5 (b)  $\sqrt{50}$  (c) 7 (d) 8
24. Instead of walking along two adjacent sides of a rectangular field, a boy took a short cut along the diagonal and saved a distance equal to half the longer side. Then the ratio of the shorter side to the longer side is (2002)
- (a) 1/2 (b) 2/3 (c) 1/4 (d) 3/4
25. Each side of a given polygon is parallel to either the X or the Y axis. A corner of such a polygon is said to be convex if the internal angle is  $90^\circ$  or concave if the internal angle is  $270^\circ$ . If the number of convex corners in such a polygon is 25, the number of concave corners must be (2003C)
- (a) 20 (b) 0 (c) 21 (d) 22
26. In a triangle ABC,  $AB = 6$ ,  $BC = 8$  and  $AC = 10$ . A perpendicular dropped from B, meets the side AC at D. A circle of radius BD (with centre B) is drawn. If the circle cuts AB and BC at P and Q respectively, then  $AP: QC$  is equal to (2003C)
- (a) 1:1 (b) 3:2 (c) 4:1 (d) 3:8
27. In the diagram given below,  $\angle ABD = \angle CDB = \angle PQD = 90^\circ$ . If  $AB: CD = 3:1$ , the ratio of  $CD:PQ$  is (2003C)

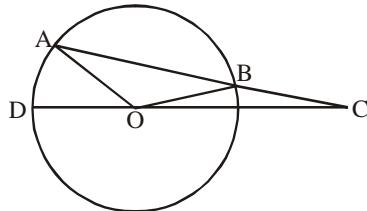


- (a) 1:0.69 (b) 1:0.75 (c) 1:072 (d) None of the above.

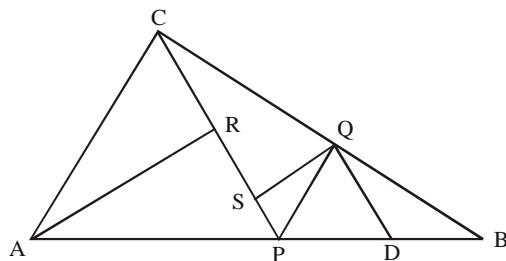
28. In the figure below, the rectangle at the corner measures  $10\text{ cm} \times 20\text{ cm}$ . The corner A of the rectangle is also a point on the circumference of the circle. What is the radius of the circle in cm? (2003C)



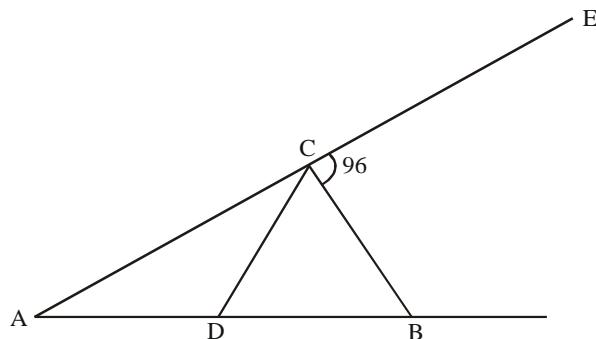
- (a) 10 cm (b) 40 cm (c) 50 cm (d) None of the above.
29. A vertical tower OP stands at the centre O of a square ABCD. Let  $h$  and  $b$  denote the length of OP and AB respectively. Suppose  $\angle APB = 60^\circ$  then the relationship between  $h$  and  $b$  can be expressed as (2003C)
- (a)  $2b^2 = h^2$  (b)  $2h^2 = b^2$  (c)  $3b^2 = 2h^2$  (d)  $3h^2 = 2b^2$
30. In the figure given below, AB is the chord of a circle with centre O. AB is extended to C such that  $BC = OB$ . The straight line CO is produced to meet the circle at D. If  $\angle ACD = y$  degrees and  $\angle AOD = x$  degrees such that  $x = ky$ , then the value of  $k$  is (2003C)



- (a) 3 (b) 2 (c) 1 (d) None of the above
31. In the figure (not drawn to scale) given below, P is a point on AB such that  $AP : PB = 4 : 3$ . PQ is parallel to AC and QD is parallel to CP. In  $\triangle ACR$ ,  $\angle ARC = 90^\circ$ , and in  $\triangle PQS$ ,  $\angle PSQ = 90^\circ$ . The length of QS is 6 cms. What is ratio AP : PD? (2003)

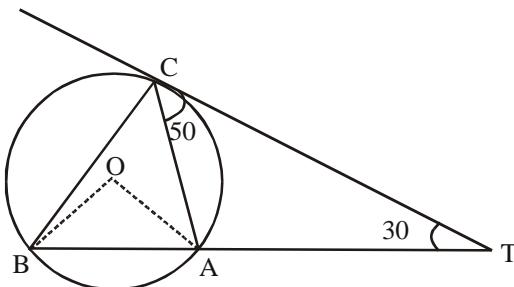


- (a) 10 : 3 (b) 2 : 1 (c) 7 : 3 (d) 8 : 3
32. In the figure (not drawn to scale) given below, if  $AD = CD = BC$ , and  $\angle BCE = 96^\circ$ , how much is  $\angle DBC$ ? (2003)



- (a)  $32^\circ$  (b)  $84^\circ$  (c)  $64^\circ$  (d) Cannot be determined.

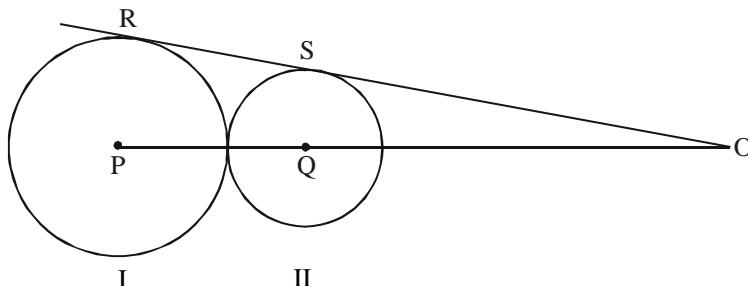
33. In the figure given below (not drawn to scale), A, B and C are three points on a circle with centre O. The chord BA is extended to a point T such that CT becomes a tangent to the circle at point C. If  $\angle ATC = 30^\circ$  and  $\angle ACT = 50^\circ$ , then the angle  $\angle BOA$  is (2003)



- (a)  $100^\circ$  (b)  $150^\circ$  (c)  $80^\circ$  (d) not possible to determine
34. A father and his son are waiting at a bus stop in the evening. There is a lamp post behind them. The lamp post, the father and his son stand on the same straight line. The father observes that the shadows of his head and his son's head are incident at the same point on the ground. If the heights of the lamp post, the father and his son are 6 metres, 1.8 metres and 0.9 metres respectively, and the father is standing 2.1 metres away from the post, then how far (in meters) is the son standing from his father? (2004)
- (a) 0.9 (b) 0.75 (c) 0.6 (d) 0.45

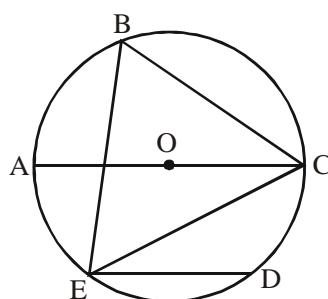
**Directions for Questions 35 to 37 :** Answer the questions on the basis of the information given below.

In the adjoining figure, I and II are circles with centers P and Q respectively. The two circles touch each other and have a common tangent that touches them at points R and S respectively. This common tangent meets the line joining P and Q at O. The diameters of I and II are in the ratio 4 : 3. It is also known that the length of PO is 28 cm.



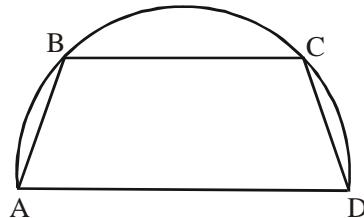
35. What is the ratio of the length of PQ to that of QO? (2004)  
 (a) 1 : 4 (b) 1 : 3 (c) 3 : 8 (d) 3 : 4
36. What is the radius of the circle II? (2004)  
 (a) 2 cm (b) 3 cm (c) 4 cm (d) 5 cm
37. The length of SO is (2004)  
 (a)  $8\sqrt{3}$  cm (b)  $10\sqrt{3}$  cm (c)  $12\sqrt{3}$  cm (d)  $14\sqrt{3}$  cm

38. In the adjoining figure, chord ED is parallel to the diameter AC of the circle. If  $\angle CBE = 65^\circ$ , then what is the value of  $\angle DEC$ ? (2004)

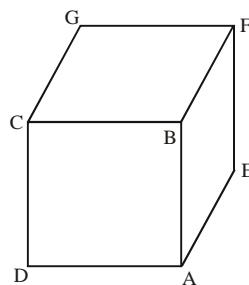


- (a)  $35^\circ$  (b)  $55^\circ$  (c)  $45^\circ$  (d)  $25^\circ$

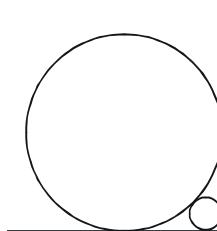
39. On a semicircle with diameter AD, chord BC is parallel to the diameter. Further, each of the chords AB and CD has length 2, while AD has length 8. What is the length of BC? (2004)



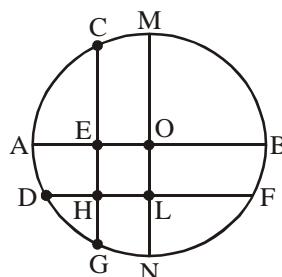
- (a) 7.5 (b) 7 (c) 7.75 (d) None of the above  
 40. If the length of diagonals DF, AG and CE of the cube shown in the adjoining figure are equal to the three sides of a triangle, then the radius of the circle circumscribing that triangle will be (2004)



- (a) equal to the side of the cube (b)  $\sqrt{3}$  times the side of the cube  
 (c)  $\frac{1}{\sqrt{3}}$  times the side of the cube (d) impossible to find from the given information  
 41. A circle with radius 2 is placed against a right angle. Another smaller circle is also placed as shown in the adjoining figure. What is the radius of the smaller circle? (2004)



- (a)  $3-2\sqrt{2}$  (b)  $4-2\sqrt{2}$  (c)  $7-4\sqrt{2}$  (d)  $6-4\sqrt{2}$   
 42. What is the distance in cm between two parallel chords of lengths 32 cm and 24 cm in a circle of radius 20 cm? (2005)  
 (a) 1 or 7 (b) 2 or 14 (c) 3 or 21 (d) 4 or 28  
 43. In the following figure, the diameter of the circle is 3 cm. AB and MN are two diameters such that MN is perpendicular to AB. In addition, CG is perpendicular to AB such that AE : EB = 1 : 2, and DF is perpendicular to MN such that NL : LM = 1 : 2. The length of DH in cm is (2005)

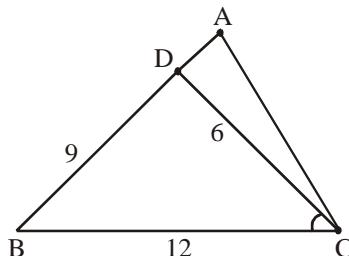


- (a)  $2\sqrt{2}-1$  (b)  $\frac{(2\sqrt{2}-1)}{2}$  (c)  $\frac{(3\sqrt{2}-1)}{2}$  (d)  $\frac{(2\sqrt{2}-1)}{3}$

44. P, Q, S and R are points on the circumference of a circle of radius  $r$ , such that PQR is an equilateral triangle and PS is a diameter of the circle. What is the perimeter of the quadrilateral PQSR? (2005)

(a)  $2r(1 - \sqrt{3})$  (b)  $2r(2 - \sqrt{3})$  (c)  $r(1 - \sqrt{5})$  (d)  $2r - \sqrt{3}$

45. Consider the triangle ABC shown in the following figure where  $BC = 12$  cm,  $DB = 9$  cm,  $CD = 6$  cm and  $\angle BCD = \angle BAC$ . (2005)



What is the ratio of the perimeter of the triangle ADC to that of the triangle BDC?

(a)  $\frac{7}{9}$  (b)  $\frac{8}{9}$  (c)  $\frac{6}{9}$  (d)  $\frac{5}{9}$

46. Consider a triangle drawn on the X-Y plane with its three vertices at  $(41, 0)$ ,  $(0, 41)$  and  $(0, 0)$ , each vertex being represented by its  $(X, Y)$  coordinates. The number of points with integer coordinates inside the triangle (excluding all the points on the boundary) is (2005)

(a) 780 (b) 800 (c) 820 (d) 741

47. An equilateral triangle BPC is drawn inside a square ABCD. What is the value of the angle APD in degrees? (2006)

(a) 75 (b) 90 (c) 120 (d) 135  
(e) 150

48. Two circles with centres P and Q cut each other at two distinct points A and B. The circles have the same radii and neither P nor Q falls within the intersection of the circles. What is the smallest range that includes all possible values of the angle AQP in degrees? (2007)

(a) Between 0 and 45 (b) Between 0 and 90 (c) Between 0 and 30  
(d) Between 0 and 60 (e) Between 0 and 75

49. Consider obtuse-angled triangles with sides 8 cm, 15 cm and  $x$  cm. If  $x$  is an integer, then how many such triangles exist? (2008)

(a) 5 (b) 21 (c) 10 (d) 15  
(e) 14

50. In a triangle ABC, the lengths of the sides AB and AC equal 17.5 cm and 9 cm respectively. Let D be a point on the line segment BC such that AD is perpendicular to BC. If  $AD = 3$  cm, then what is the radius (in cm) of the circle circumscribing the triangle ABC? (2008)

(a) 17.05 (b) 27.85 (c) 22.45 (d) 32.25  
(e) 26.25

## ANSWERS WITH SOLUTIONS

1. (c) Since lines are parallel

$$\text{therefore } \frac{AB}{BC} = \frac{DE}{EF}$$

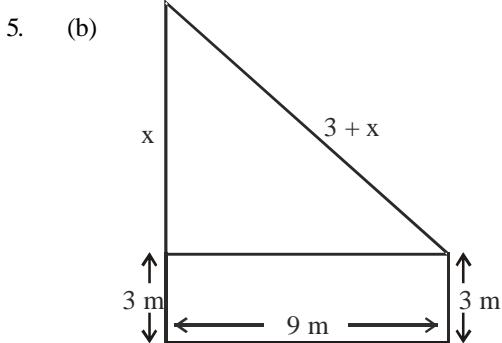
$$\Rightarrow (AB) \times (EF) = (DE) \times (BC)$$

2. (c) Clearly option (a) shows the angles would be 30, 60 and 90. It can be the ratio of angle in a right angled triangle.  
Option (b) shows the angles would be 45, 45 and 90, then it can be the ratio of angle in a right angled triangle.  
But option (c) cannot form the ratio of angles of right angled triangle.
3. (b) In  $\Delta ABC$ ,  $\angle C = 180 - 90 - 30 = 60$

$$\therefore \angle DCE = \frac{60}{2} = 30$$

Again in  $\Delta DEC$ ,  $\angle CED = 180 - 90 - 30 = 60$

4. (a)  $\angle D = 180 - \angle B = 180 - 70 = 110$   
 $\therefore \angle ACD = 180 - \angle D - \angle CAD$   
 $= 180 - 110 - 30 = 40$



Using Pythagoras theorem,  $x^2 = 81 - (3 - x)^2$

$$\Rightarrow x^2 = 81 - 9 + x^2 - 6x \Rightarrow 6x = 72 \Rightarrow x = 12 \text{ m}$$

Height of wall =  $12 + 3 = 15 \text{ m}$

6. (c) In a right angled  $\Delta$ , the length of the median is  $\frac{1}{2}$  the length of the hypotenuse. Hence,  $BD = \frac{1}{2} AC = 3 \text{ cm}$ .

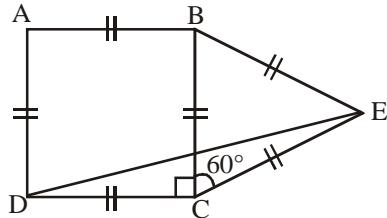
$$7. (d) \Delta = \begin{vmatrix} 2 & 3 & -5 \\ 5 & -7 & 2 \\ 9 & -5 & -4 \end{vmatrix}$$

$$= 2(28 - 10) - 3(-20 - 18) - 5(-25 - 63)$$

$$76 - 114 + 190 = 0$$

This means the points of intersection are coincident

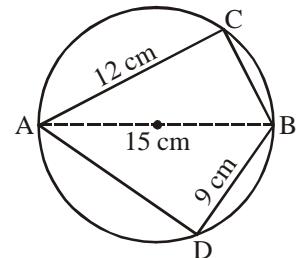
8. (a)



In  $\Delta DEC$ ,  $\angle DCE = 90^\circ$ ,  $\angle DEC = 60^\circ$ ,  $\angle CDE = 150^\circ$

$$\angle CDE = \angle DEC = \frac{180 - 150}{2} = 15^\circ$$

9. (d) Since AB is diameter  $= AB = 15 \text{ cm}$



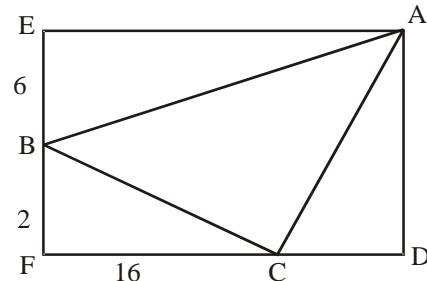
$\therefore \angle ACB$  and  $\angle ADB = 90^\circ$

[Angle subtended by diameter forms  $90^\circ$ ]  
Hence, using Pythagorean theorem,  $BC = 9$   
 $\therefore AD = 12$

Hence, area of  $\Delta ABC = \Delta ABD$

$$\therefore \text{Area of quadrilateral } ABCD = 2 \times \left( \frac{1}{2} \times 12 \times 9 \right) = 108 \text{ cm}^2$$

10. (b) Since EADF is a rectangle



$$\therefore DF = AE = 22$$

$$CD = 22 - 16 = 6$$

$$AD = EF = 8$$

$\therefore AC = 10$  (By Pythagorean theorem)

Also since line joining mid-points of two sides is half the length of the third side.

$$\text{Hence, required length } \frac{1}{2} \times AC = 5$$

11. (c)  $PR = PB + AR - 5 = 20 + 20 - 5$  [Since AB = 5 cm]

So, perimeter =  $PR + PQ + QR$

$$= 20 + (20 - 5) + 20 + (20 - 10) + 20 + (20 - 12) = 35 + 30 + 28 = 93$$





In right angled  $\Delta BAC$ ,  
 $BC^2 = 15^2 + 20^2 \Rightarrow BC = 25$

In right angled  $\Delta ADB$ ,

$$AB^2 = x_1^2 + AD^2$$

$$\Rightarrow 15^2 = x_1^2 + AD^2 \quad \dots(i)$$

In right angled  $\Delta ADC$ ,  
 $AC^2 = DC^2 + AD^2$

$$\Rightarrow 20^2 = x_2^2 + AD^2 \quad \dots(ii)$$

$$x_1 = x_2 = 25 \quad \dots(iii)$$

Subtracting (i) from (ii),

$$\Rightarrow 400 - 225 = x_2^2 - x_1^2 \quad (x_2 - x_1)(x_2 + x_1)$$

$$\Rightarrow 175 = (x_2 - x_1) \times 25$$

$$\Rightarrow x_2 - x_1 = 7 \quad \dots(iv)$$

Adding, (iii) and (iv), we get,

$$x_2 = 16 \text{ and } x_1 = 9$$

Using  $x_1, x_2$  in (ii), we get,

$$400 - 256 = AD^2 \Rightarrow AD = 12$$

In  $\Delta ADB$ , using the formula for inradius

$$r_1 = \frac{\text{Area}}{S} = \frac{\left(\frac{1}{2} \times x_1 \times AD\right)}{\left(\frac{AB + BD + AD}{2}\right)} = \frac{\left(\frac{1}{2} \times 9 \times 12\right) \times 2}{15 + 12 + 9} = 3$$

Where  $S$  is semi-perimeter

In  $\Delta ADC$ ,

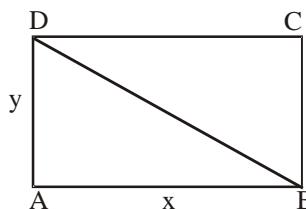
$$r_2 = \frac{\left(\frac{1}{2} \times x_2 \times AD\right)}{\left(\frac{AC + AD + CD}{2}\right)} = \frac{\left(\frac{1}{2} \times 16 \times 12\right) \times 2}{20 + 12 + 16} = 4$$

$$\therefore r_1 = r_2 = 3 = 4 = 7 \text{ and } r_2 - r_1 = 1$$

In  $\Delta PQR$ ,  $PQ^2 = QR^2 = PR^2$

$$\Rightarrow PQ = \sqrt{(r_1 - r_2)^2 + (r_2 - r_1)^2} = \sqrt{7^2 - 1^2} = \sqrt{50}$$

24. (d)



Let  $x$  and  $y$  be the longer and shorter side respectively of the rectangular field.

According to the question,

$$(x - y) - \sqrt{x^2 - y^2} = \frac{x}{2}$$

$$(x - y) - \frac{x}{2} = \sqrt{x^2 - y^2}$$

Squaring both sides, we get,

$$\left(\frac{x}{2} - y\right)^2 = x^2 - y^2$$

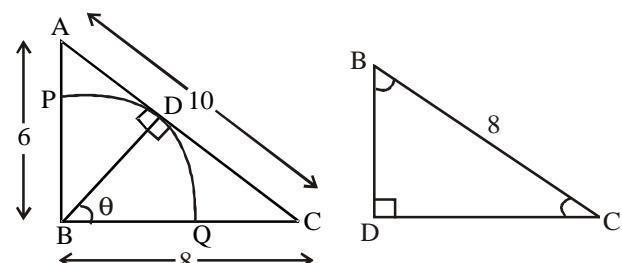
$$\frac{x^2}{4} - y^2 - xy = x^2 - y^2$$

$$x^2 - 4xy = 4x^2 - 4x^2$$

$$\Rightarrow 4xy = 3x^2 \Rightarrow 4y = 3x$$

$$\therefore \frac{y}{x} = \frac{3}{4}$$

25. (c) The number of convex corners is always less than concave corners by 4. Hence  $25 - 4 = 21$ .
26. (d) From the question, we get the following diagram:



In  $\Delta ABC$  and  $\Delta BDC$ ,  
 $\angle ABC = \angle BDC = 90^\circ$  ;  
 $\angle C$  is common;  
One side is common

$\therefore \Delta ABC \sim \Delta BDC$

$$\therefore \frac{AB}{BD} = \frac{AC}{BC} \text{ or } \frac{6}{8} = \frac{10}{BD} \text{ or } BD = \frac{24}{5}$$

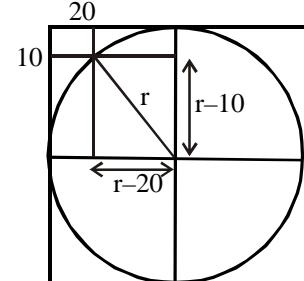
$$AP = 6 - \frac{24}{5} = \frac{6}{5} \text{ and } QC = 8 - \frac{24}{5} = \frac{16}{5}$$

$$\therefore \frac{AP}{QC} = \frac{6}{16} = \frac{3}{8}$$

27. (b) Using the quality of similar triangles,  $\frac{CP}{PB} = \frac{CD}{AB} = \frac{1}{3}$

In  $\Delta BPQ$  and  $BCD$ ,  $\frac{CD}{PQ} = \frac{BC}{BP} = \frac{4}{3} = 1:0.75$

28. (c)

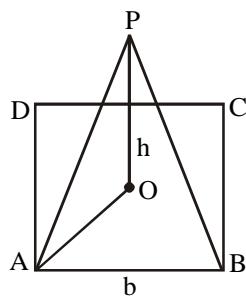


$$\text{In the right angled } \Delta, r^2 = (r-20)^2 + (r-10)^2$$

$$= 2r^2 - 60r + 500$$

Solving, we get,  $r = 50$ .

29. (b)

Given that  $\angle APB = 60^\circ$ Then,  $\triangle APB$  is an equilateral  $\triangle$  ( $\because \angle A = \angle B$ )

$$\therefore AP = AB = b.$$

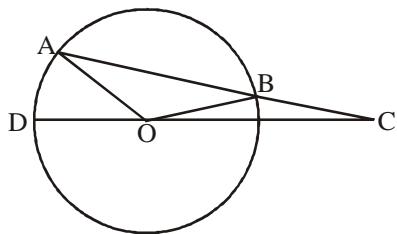
Now in right angled  $\triangle AOP$ ,

$$AP^2 = AO^2 + PO^2$$

$$\Rightarrow b^2 = \left(\frac{\sqrt{2}}{2}b\right)^2 + h^2$$

$$\Rightarrow b^2 - \frac{1}{2}b^2 = h^2 \Rightarrow \frac{1}{2}b^2 = h^2 \Rightarrow 2h^2 = b^2$$

30. (a)

In  $\triangle BOC$ ,

$$\angle BOC = \angle BCO = y \quad [\text{since } BC = OB]$$

Then,  $\angle ABO = 2y$ 

[external angles]

In  $\triangle AOB$ ,

$$\angle ABO = \angle OAB = 2y \quad [\text{isosceles triangle}]$$

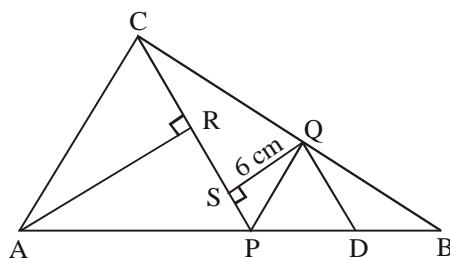
$$\angle AOB = (180 - 4y) \quad [\text{sum of angles} = 180^\circ]$$

Then,  $\angle DOA = \angle AOB = \angle BOC = 180^\circ$ 

$$x + (180 - 4y) = y = 180 \Rightarrow x = 3y$$

Hence  $k = 3$ 

31. (c) From figure



Given that,

 $PQ \parallel AC$ ,

$$\therefore \frac{CQ}{QB} = \frac{AP}{PB} = \frac{4}{3}$$

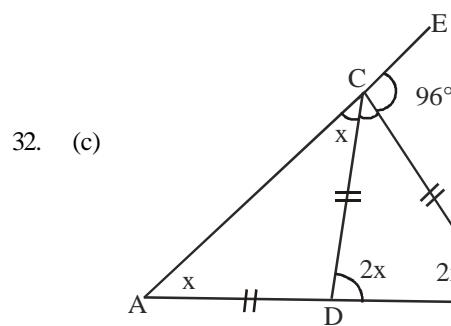
Again,  $QD \parallel CP$ ,

$$\therefore \frac{PD}{BD} = \frac{CQ}{QB} = \frac{4}{3}$$

$$\text{As } \frac{PD}{DB} = \frac{4}{3} \Rightarrow \frac{PD}{DB} = \frac{4}{3} \Rightarrow \frac{PD}{PB} = \frac{4}{7}$$

$$\Rightarrow PD = \frac{4}{7}PB$$

$$\therefore \frac{AP}{PD} = \frac{AP}{\frac{4}{7}PB} = \frac{7}{4} \times \frac{AP}{PB} = \frac{7}{4} \times \frac{4}{3} = 7:3$$

Let  $\angle CAD = \angle ACD = x$ 

At point C,

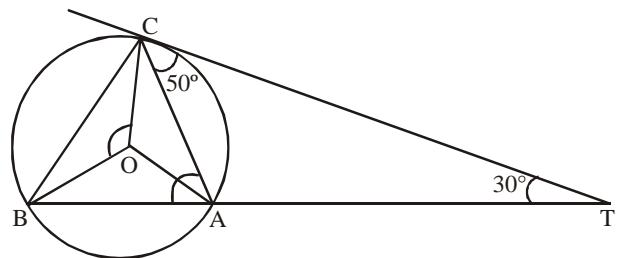
$$x + (180^\circ - 4x) + 96^\circ = 180^\circ$$

$$\Rightarrow 180^\circ - 3x = 96^\circ - 180^\circ$$

$$\therefore x = 32^\circ$$

Hence,  $\angle DBC = 2 \times 32^\circ = 64^\circ$ 

33. (a)

In  $\triangle ACT$ ,  $\angle C = 50^\circ$  and  $\angle T = 30^\circ$ 

$$\therefore \angle A = 100^\circ$$

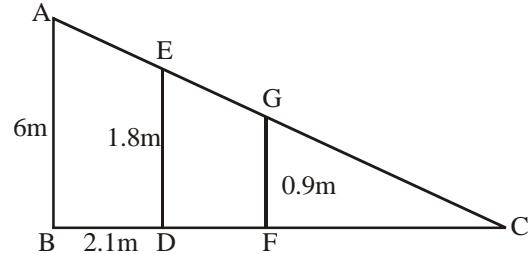
Applying tangent theorem

$$\angle B = 50^\circ$$

$$\angle C = 50^\circ$$

$$\therefore \angle BOA = 100^\circ$$

34. (a) We get the following diagram.



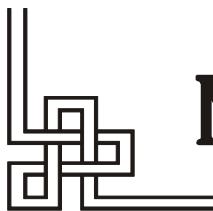






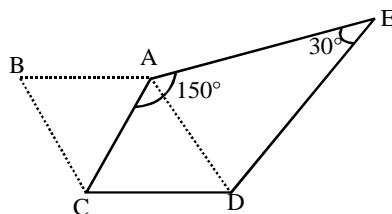
# 9

## CHAPTER



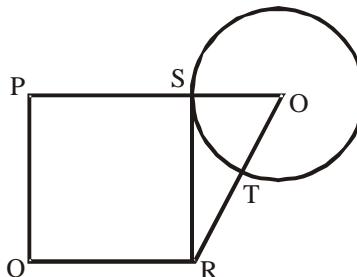
# MENSURATION

- A right circular cone, a right circular cylinder and a hemisphere, all have the same radius, and the heights of cone and cylinder are equal to their diameters. Then their volumes are proportional, respectively, to (1994)  
 (a) 1 : 3 : 1      (b) 2 : 1 : 3      (c) 3 : 2 : 1      (d) 1 : 2 : 3
- A right circular cone of height  $h$  is cut by a plane parallel to the base and at a distance  $h/3$  from the base, then the volumes of the resulting cone and frustum are in the ratio (1994)  
 (a) 1 : 3      (b) 8 : 19      (c) 1 : 4      (d) 1 : 7
- In  $\Delta ACD$ ,  $AD = AC$  and  $\angle C = 2\angle E$ . The distance between parallel lines  $AB$  and  $CD$  is  $h$ . (1994)

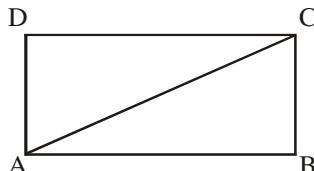


Then

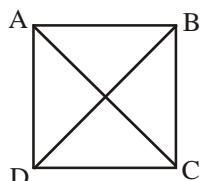
- I. Area of parallelogram ABCD      II. Area of  $\Delta ADE$   
 (a) I > II      (b) I < II      (c) I = II      (d) Nothing can be said
- PQRS is a square. SR is a tangent (at point S) to the circle with centre O and  $TR = OS$ . Then, the ratio of area of the circle to the area of the square is (1995)



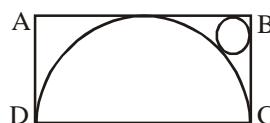
- (a)  $\pi/3$       (b)  $11/7$       (c)  $3/\pi$       (d)  $7/11$
- In the adjoining figure,  $AC + AB = 5 AD$  and  $AC - AD = 8$ . Then the area of the rectangle ABCD is (1995)



- (a) 36      (b) 50      (c) 60      (d) Cannot be answered
- ABCD is a square of area 4, which is divided into four non overlapping triangles as shown in the fig. Then the sum of the perimeters of the triangles is (1995)



- (a)  $8(2 - \sqrt{2})$       (b)  $8(1 - \sqrt{2})$       (c)  $4(1 - \sqrt{2})$       (d)  $4(2 - \sqrt{2})$

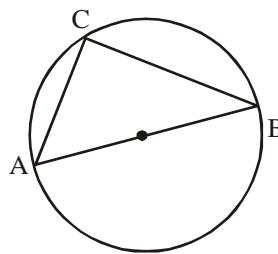


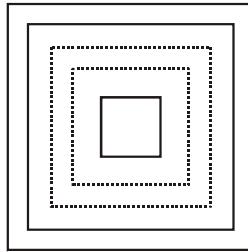
- (a)  $(\sqrt{2}-1)^2 : 1$       (b)  $2(\sqrt{2}-1)^2 : 1$       (c)  $(\sqrt{2}-1)^2 : 2$       (d) None of these

11. A cube of side 12 cm. is painted red on all the faces and then cut into smaller cubes, each of side 3cm. What is the total number of smaller cubes having none of their faces painted? **(1996)**

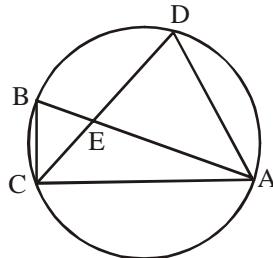
(a) 16      (b) 8      (c) 12      (d) 24

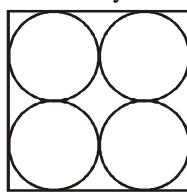
12. The figure shows a circle of diameter AB and radius 6.5 cm. If chord CA is 5 cm long, find the area of triangle ABC **(1996)**



17. In the adjoining figure, points A, B, C and D lie on the circle.  $AD = 24$  and  $BC = 12$ . What is the ratio of the area of the triangle CBE to that of the triangle ADE **(1997)**

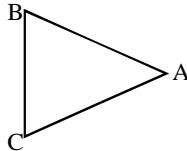


- (a)  $16(\pi-2)$  (b)  $16(8-\pi)$  (c)  $16(4-\pi)$  (d)  $16(4-\pi/2)$

**Directions for questions 19 & 20 :** Read the information given below and answer the questions that follow :

A cow is tethered at A by a rope. Neither the rope nor the cow is allowed to enter the triangle ABC.



$$m \angle A = 30^\circ$$

$$\ell(\overline{AB}) = \ell(\overline{AC}) = 10 \text{ m.}$$

$$\ell(\text{BC}) = 6 \text{ m.}$$

19. What is the area that can be grazed by the cow if the length of the rope is 8 m? (1998)  
(a)  $133 \frac{1}{6} \pi$  sq. m. (b)  $121 \pi$  sq. m. (c)  $132 \pi$  sq. m. (d)  $176/3 \pi$  sq. m.

20. What is the area that can be grazed by the cow if the length of the rope is 12 m? (1998)  
(a)  $133 \frac{1}{6} \pi$  sq. m. (b)  $121 \pi$  sq. m. (c)  $132 \pi$  sq. m. (d)  $176/3 \pi$  sq. m.

21. There is a square field of side 500 metres. From one corner of the field a triangular area has to be cordoned off with a straight fence of length 100 metres, using the boundaries of the field as the other two sides. What is the maximum area that can be cordoned off

22. There are two tanks, one cylindrical and the other conical. The cylindrical tank contains 500 litres limca more than the conical tank. 200 litres is poured out from the cylindrical and conical tank. Now the cylindrical tank contains double the volume of the conical tank.

- tank. 200 litres is removed both from the cylindrical and conical tank. Now the cylindrical tank contains double the volume of liquid in the conical tank. What is the capacity of the cylindrical tank in litre? (2000)

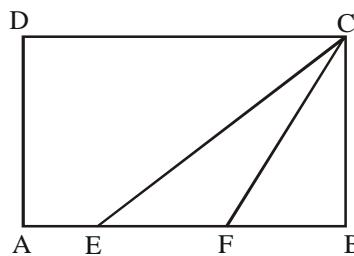
23. Consider a circle with unit radius. There are seven adjacent sectors with area  $S_1, S_2, S_3, \dots, S_7$ , in the circle such that their total area is  $\frac{\pi}{4}$  units. Further, the area of the  $j$ th sector is twice that of the  $(j-1)$ th sector i.e.,  $S_j = 2S_{(j-1)}$  for  $j = 2, \dots, 7$ . What is the angle, in radians, subtended by the arc of  $S_1$  at the centre of the circle?

- (a)  $\frac{\pi}{508}$       (b)  $\frac{\pi}{2040}$       (c)  $\frac{\pi}{1016}$       (d)  $\frac{\pi}{1524}$

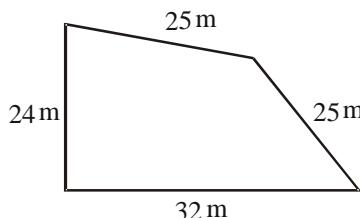
24. What is the area of the region bounded by  $|x - y| = 1$ ,  $|x| = 1$  &  $|y| = 1$  (2000)

(a) 2      (b) 4      (c) 1      (d) 3

25. A rectangular pool 20 metres wide and 60 metres long is surrounded by a walkway of uniform width. If the total area of the walkway is 516 square metres, how wide, in metres, is the walkway? (2001)  
 (a) 43 (b) 4.3 (c) 3 (d) 3.5
26. A square, whose side is 2 metres, has its corners cut a way so as to form an octagon with all sides equal. Then the length of each side of the octagon, in metres is (2001)  
 (a)  $\frac{\sqrt{2}}{\sqrt{2}-1}$  (b)  $\frac{2}{\sqrt{2}-1}$  (c)  $\frac{2}{\sqrt{2}-1}$  (d)  $\frac{\sqrt{2}}{\sqrt{2}-1}$
27. A certain city has a circular wall around it, and this wall has four gates pointing north, south, east and west. A house stands outside the city, three kms north of the north gate, and it can just be seen from a point nine kms east of the south gate. What is the diameter of the wall that surrounds the city? (2001)  
 (a) 6km (b) 9km (c) 12km (d) None of these
28. In the diagram, ABCD is a rectangle with AE = EF = FB. What is the ratio of the area of the triangle CEF and that of the rectangle? (2001)

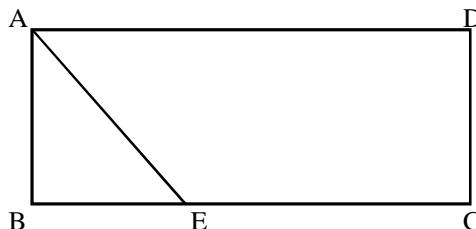


- (a)  $\frac{1}{6}$  (b)  $\frac{1}{8}$  (c)  $\frac{1}{9}$  (d) None of these
29. A ladder leans against a vertical wall. The top of the ladder is 8m above the ground. When the bottom of the ladder is moved 2m farther away from the wall, the top of the ladder rests against the foot of the wall. What is the length of the ladder? (2001)  
 (a) 10m (b) 15m (c) 20m (d) 17m
30. Two sides of a plot measure 32 metres and 24 metres and the angle between them is a perfect right angle. The other two sides measure 25 metres each and the other three angles are not right angles.



- What is the area of the plot? (2001)  
 (a) 768 (b) 534 (c) 696.5 (d) 684
31. Euclid has a triangle in mind. Its longest side has length 20 and another of its sides has length 10. Its area is 80. What is the exact length of its third side? (2001)  
 (a)  $\sqrt{260}$  (b)  $\sqrt{250}$  (c)  $\sqrt{240}$  (d)  $\sqrt{270}$
32. Four horses are tethered at four corners of a square plot of side 14 metres so that the adjacent horses can just reach one another. There is a small circular pond of area  $20 \text{ m}^2$  at the centre. The area left ungrazed is (2002)  
 (a)  $22 \text{ m}^2$  (b)  $42 \text{ m}^2$  (c)  $84 \text{ m}^2$  (d)  $168 \text{ m}^2$
33. Neeraj has agreed to mow the front lawn, which is a 20 m by 40 m rectangle. The mower mows a 1 m wide strip. If Neeraj starts at one corner and mows around the lawn toward the centre, about how many times would he go round before he has mowed half the lawn? (2002)  
 (a) 2.5 (b) 3.5 (c) 3.8 (d) 4.0

34. In the figure given below, ABCD is a rectangle. The area of the isosceles right triangle ABE = 7 cm<sup>2</sup>; EC = 3 (BE). The area of ABCD (in cm<sup>2</sup>) is (2002)

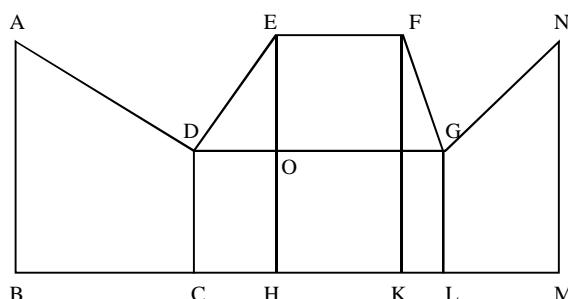


- (a) 21 (b) 28 (c) 42 (d) 56 (2002)
35. The area of the triangle whose vertices are (a, a), (a + 1, a + 1), (a + 2, a) is (a)  $a^3$  (b) 1 (c) 2a (d)  $2^{1/2}$  (2002)

**Directions for questions 36 & 37 : Read the information given below and answer the questions that follow :**

Answer these questions based on the following diagram.

In the diagram below :  $\angle ABC = \angle DCH = \angle DOE = \angle EHK = \angle FKL = \angle GLM = \angle LMN = 90^\circ$  and  $AB = BC = 2CH = 2CD = EH = FK = 2HK = 4KL = 2LM = MN$



36. The magnitude of  $\angle FGO =$  (2002)

(a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d) None of these

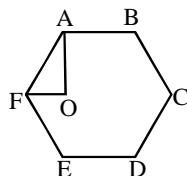
37. The ratio of the areas of the two quadrangles ABCD and DEFG is (2002)

(a) 1 : 2 (b) 2 : 1 (c) 12 : 7 (d) None of these

38. Let A and B be two solid spheres such that the surface area of B is 300% higher than the surface area of A. The volume of A is found to be k% lower than the volume of B. The value of k must be (2003C)

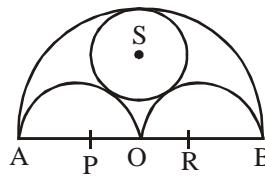
(a) 85.5 (b) 92.5 (c) 90.5 (d) 87.5

39. In the figure below, ABCDEF is a regular hexagon and  $\angle AOF = 90^\circ$ . FO is parallel to ED. What is the ratio of the area of the triangle AOF to that of the hexagon ABCDEF? (2003C)



(a)  $\frac{1}{12}$  (b)  $\frac{1}{6}$  (c)  $\frac{1}{24}$  (d)  $\frac{1}{18}$

40. Three horses are grazing within a semi-circular field. In the diagram given below, AB is the diameter of the semi-circular field with centre at O. The horses are tied up at P, R and S such that PO and RO are the radii of semi-circles with centres at P and R respectively, and S is the centre of the circle touching the two semi-circles with diameters AO and OB. The horses tied at P and R can graze within the respective semi-circles and the horse tied at S can graze within the circle centred at S. The percentage of the area of the semi circle with diameter AB that cannot be grazed by the horses is nearest to (2003C)



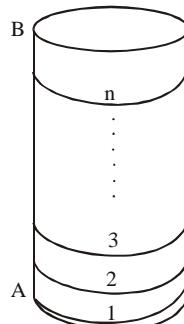
(a) 20 (b) 28 (c) 36 (d) 40

41. There are two concentric circles such that the area of the outer circle is four times the area of the inner circle. Let A, B and C be three distinct points on the perimeter of the outer circle such that AB and AC are tangents to the inner circle. If the area of the outer circle is 12 square centimeters then the area (in square centimeters) of the triangle ABC would be (2003C)
- (a)  $\pi\sqrt{12}$       (b)  $\frac{9}{\pi}$       (c)  $\frac{9\sqrt{3}}{\pi}$       (d)  $\frac{6\sqrt{3}}{\pi}$
42. The length of the circumference of a circle equals the perimeter of a triangle of equal sides, and also the perimeter of a square. The areas covered by the circle, triangle, and square are  $c$ ,  $t$ , and  $s$ , respectively. Then (2003)
- (a)  $s > t > c$       (b)  $c > t > s$       (c)  $c > s > t$       (d)  $s > c > t$
43. Let  $S_1$  be a square of side  $a$ . Another square  $S_2$  is formed by joining the mid-points of the sides of  $S_1$ . The same process is applied to  $S_2$  to form yet another square  $S_3$  and so on. If  $A_1, A_2, A_3, \dots$  be the areas and  $P_1, P_2, P_3, \dots$  be the perimeters of  $S_1, S_2, S_3, \dots$ , respectively, then the ratio  $\frac{P_1}{A_1} \frac{P_2}{A_2} \frac{P_3}{A_3} \dots$  equals (2003)
- (a)  $2(1 + \sqrt{2})/a$       (b)  $2(2 - \sqrt{2})/a$       (c)  $2(2 + \sqrt{2})/a$       (d)  $2(1 + 2\sqrt{2})/a$
44. Consider two different cloth-cutting processes. In the first one,  $n$  circular cloth pieces are cut from a square cloth piece of side  $a$  in the following steps : the original square of side  $a$  is divided into  $n$  smaller squares, not necessarily of the same size ; then a circle of maximum possible area is cut from each of the smaller squares. In the second process, only one circle of maximum possible area is cut from the square of side  $a$  and the process ends there. The cloth pieces remaining after cutting the circles are scrapped in both the processes. The ratio of the total area of scrap cloth generated in the former to that in the latter is (2003)
- (a)  $1:1$       (b)  $\sqrt{2}:1$       (c)  $\frac{n(4-\pi)}{4n-\pi}$       (d)  $\frac{4n-\pi}{n(4-\pi)}$

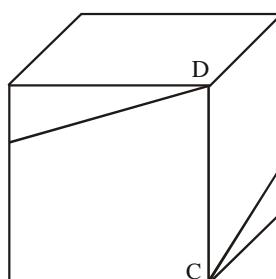
**Directions for questions 45 to 47 : Read the information given below and answer the questions that follow :**

Consider a cylinder of height  $h$  cms and radius  $r = \frac{2}{\pi}$  cms as shown in the figure (not drawn to scale). A string of a certain length, when wound on its cylindrical surface, starting at point A and ending at point B, gives a maximum of  $n$  turns (in other words, the string's length is the minimum length required to wind  $n$  turns).

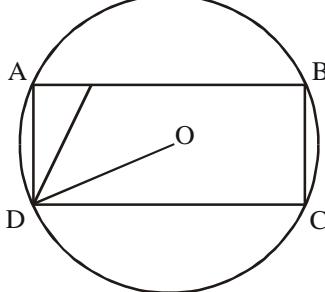
45. What is the vertical spacing in cms between two consecutive turns? (2003)



- (a)  $h/n$       (b)  $h/\sqrt{n}$       (c)  $h/n^2$       (d) Can't be determined
46. The same string, when wound on the exterior four walls of a cube of side  $n$  cms, starting at point C and ending at point D, can give exactly one turn (see figure, not drawn to scale). The length of the string, in cms, is (2003)



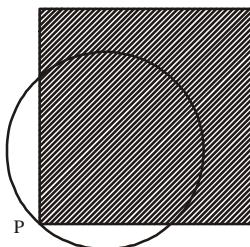
- (a)  $\sqrt{2}n$       (b)  $\sqrt{17}n$       (c)  $n$       (d)  $\sqrt{13}n$

47. In the setup of the previous two questions, how is  $h$  related to  $n$ ? (2003)
- (a)  $h = \sqrt{2} n$       (b)  $h = \sqrt{17} n$       (c)  $h = n$       (d)  $h = \sqrt{13} n$
48. A piece of paper is in the shape of a right angled triangle and is cut along a line that is parallel to the hypotenuse, leaving a smaller triangle. There was 35% reduction in the length of the hypotenuse of the triangle. If the area of the original triangle was 34 square inches before the cut, what is the area (in square inches) of the smaller triangle? (2003)
- (a) 16.665      (b) 16.565      (c) 15.465      (d) 14.365
49. A square tin sheet of side 12 inches is converted into a box with open top in the following steps: The sheet is placed horizontally; Then, equal sized squares, each of side  $x$  inches, are cut from the four corners of the sheet; Finally, the four resulting sides are bent vertically upwards in the shape of a box. If  $x$  is an integer, then what value of  $x$  maximizes the volume of the box? (2003)
- (a) 3      (b) 4      (c) 1      (d) 2
50. Let ABCDEF be a regular hexagon. What is the ratio of the area of the triangle ACE to that of the hexagon ABCDEF? (2003)
- (a)  $\frac{1}{3}$       (b)  $\frac{1}{2}$       (c)  $\frac{2}{3}$       (d)  $\frac{5}{6}$
51. In the figure below (not drawn to scale), rectangle ABCD is inscribed in the circle with center at O. The length of side AB is greater than that of side BC. The ratio of the area of the circle to the area of the rectangle ABCD is  $\pi : \sqrt{3}$ . The line segment DE intersects AB at E such that  $\angle ODC = \angle ADE$ . What is the ratio AE : AD? (2003)
- 
- (a)  $1 : \sqrt{3}$       (b)  $1 : \sqrt{2}$       (c)  $1 : 2\sqrt{3}$       (d)  $1 : 2$
52. A rectangular sheet of paper, when halved by folding it at mid-point of its longer side, results in a rectangle, whose longer and shorter sides are in the same proportion as the longer and shorter sides of the original rectangle. If the shorter side of the original rectangle is 2, what is the area of the smaller rectangle? (2004)
- (a)  $4\sqrt{2}$       (b)  $2\sqrt{2}$       (c)  $\sqrt{2}$       (d) None of the above
53. Let C be a circle with center  $P_0$  and AB be a diameter of C. Suppose  $P_1$  is the mid-point of the line segment  $P_0B$ ,  $P_2$  is the mid-point of the line segment  $P_1B$  and so on. Let  $C_1, C_2, C_3, \dots$  be circles with diameters  $P_0P_1, P_1P_2, P_2P_3, \dots$  respectively. Suppose the circles  $C_1, C_2, C_3, \dots$  are all shaded. The ratio of the area of the unshaded portion of C to that of the original circle C is (2004)
- (a) 8:9      (b) 9:10      (c) 10:11      (d) 11:12
54. Two identical circles intersect so that their centres, and the points at which they intersect, form a square of side 1 cm. The area in sq. cm of the portion that is common to the two circles is (2005)
- (a)  $\frac{\pi}{4}$       (b)  $\frac{\pi}{2} - 1$       (c)  $\frac{\pi}{5}$       (d)  $\sqrt{2} - 1$
55. A jogging park has two identical circular tracks touching each other and a rectangular track enclosing the two circles. The edges of the rectangles are tangential to the circles. Two friends, A and B, start jogging simultaneously from the point where one of the circular tracks touches the smaller side of the rectangular track. A jogs along the rectangular track, while B jogs along the two circular tracks in a figure of eight. Approximately, how much faster than A does B have to run, so that they take the same time to return to their starting point? (2005)
- (a) 3.88%      (b) 4.22%      (c) 4.44%      (d) 4.72%
56. In the X-Y plane, the area of the region bounded by the graph  $|x + y| + |x - y| = 4$  is (2005)
- (a) 8      (b) 12      (c) 16      (d) 20
57. A rectangular floor is fully covered with square tiles of identical size. The tiles on the edges are white and the tiles in the interior are red. The number of the white tiles is the same as the number of red tiles. A possible value of the number of tiles along one edge of the floor is : (2005)
- (a) 10      (b) 12      (c) 14      (d) 16

58. Four points A, B, C and D lie on a straight line in the X-Y plane, such that  $AB = BC = CD$  and the length of AB is 1 meter. An ant at A wants to reach a sugar particle at D. But there are insect repellents kept at points B and C. The ant would not go within one meter of any insect repellent. The minimum distance in meters the ant must traverse to reach the sugar particle is (2005)
- (a)  $3\sqrt{2}$  (b)  $1 + \pi$  (c)  $4\pi/3$  (d) 5
59. Rectangular tiles each of size 70 cm by 30 cm must be laid horizontally on a rectangular floor of size 110 cm by 130 cm, such that the tiles do not overlap. A tile can be placed in any orientation so long as its edges are parallel to the edges of the floor. No tile should overshoot any edge of the floor. The maximum number of tiles that can be accommodated on the floor is (2005)
- (a) 4 (b) 5 (c) 6 (d) 7
60. The length, breadth and height of a room are in the ratio 3:2:1. If the breadth and height are halved while the length is doubled, then the total area of the four walls of the room will (2006)
- (a) remain the same (b) decrease by 13.64% (c) decrease by 15% (d) decrease by 18.75%
- (e) decrease by 30%

**Directions for Questions 61 & 62 : Answer the questions on the basis of the information given below.**

A punching machine is used to punch a circular hole of diameter two units from a square sheet of aluminium of width 2 units, as shown below. The hole is punched such that the circular hole touches one corner P of the square sheet and the diameter of the hole originating at P is in line with a diagonal of the square.



61. The proportion of the sheet area that remains after punching is: (2006)
- (a)  $(\pi + 2)/8$  (b)  $(6 - \pi)/8$  (c)  $(4 - \pi)$  (d)  $(\pi - 2)/4$   
(e)  $(\pi - 2)/6$
62. Find the area of the part of the circle (round punch) falling outside the square sheet. (2006)
- (a)  $\pi/4$  (b)  $(\pi - 1)/2$  (c)  $(\pi - 1)/4$  (d)  $(\pi - 2)/2$   
(e)  $(\pi - 2)/4$
63. A semi-circle is drawn with AB as its diameter. From C, a point on AB, a line perpendicular to AB is drawn meeting the circumference of the semi-circle at D. Given that  $AC = 2$  cm and  $CD = 6$  cm, the area of the semi-circle (in sq.cm) will be: (2006)
- (a)  $32\pi$  (b)  $50\pi$  (c)  $40.5\pi$  (d)  $81\pi$   
(e) undeterminable
64. Consider a right circular cone of base radius 4 cm and height 10 cm. A cylinder is to be placed inside the cone with one of the flat surfaces resting on the base of the cone. Find the largest possible total surface area (in sq. cm) of the cylinder. (2008)
- (a)  $\frac{100\pi}{3}$  (b)  $\frac{80\pi}{3}$  (c)  $\frac{120\pi}{7}$  (d)  $\frac{130\pi}{9}$  (e)  $\frac{110\pi}{7}$
65. Consider a square ABCD with midpoints E, F, G, H of AB, BC, CD and DA respectively. Let L denote the line passing through F and H. Consider points P and Q, on L and inside ABCD, such that the angles APD and BQC both equal  $120^\circ$ . What is the ratio of the area of ABQCDP to the remaining area inside ABCD? (2008)
- (a)  $\frac{4\sqrt{2}}{3}$  (b)  $2\sqrt{3}$  (c)  $\frac{10-3\sqrt{3}}{9}$  (d)  $1 - \frac{1}{\sqrt{3}}$  (e)  $2\sqrt{3} - 1$
66. Two circles, both of radii 1 cm, intersect such that the circumference of each one passes through the centre of the other. What is the area (in sq cm) of the intersecting region? (2008)
- (a)  $\frac{\pi}{3} - \frac{\sqrt{3}}{4}$  (b)  $\frac{2\pi}{3} - \frac{\sqrt{3}}{2}$  (c)  $\frac{4\pi}{3} - \frac{\sqrt{3}}{2}$  (d)  $\frac{4\pi}{3} - \frac{\sqrt{3}}{2}$  (e)  $\frac{2\pi}{3} - \frac{\sqrt{3}}{2}$



$$\Rightarrow 166 + 64 = 16b^2 + 64 - 64b$$

$$\Rightarrow 16b^2 - 80b = 0 \text{ or } b = 0 \text{ or } 5$$

Putting  $b = 5$  in (iii), we have

$$a = 4b - 8 = 20 - 8 = 12$$

$$\text{Area of rectangle} = 12 \times 5 = 60$$

**Alternatively :**

$$AC + AB = 5AD \text{ (given)}$$

$$\text{or } AC + AB = 5BC \quad \dots(i)$$

(ABCD being a rectangle)

$$\text{and } AC - BC = 8 \quad \text{(given)}$$

$$\text{or } AC = BC + 8 \quad \dots(ii)$$

$$\text{From (i) } AC + AB = 5BC$$

$$BC + 8 + AB = 5BC \quad \text{(using ii)}$$

$$\Rightarrow AB = 4(BC - 2) \quad \dots(iii)$$

By the Pythagoras theorem,

$$AB^2 + BC^2 = AC^2$$

Expressing AB and AC in terms of BC, we get

$$BC = 5$$

$$\therefore AB = 12 \text{ and } AC = 13.$$

$$\text{So area of the rectangle} = 5 \times 12 = 60 \text{ sq. units.}$$

6. (b) Let each side of square be a  
Then, area  $= a^2 = 4$

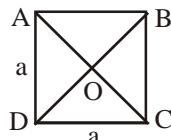
$$\therefore a = 2$$

$$AC = BD = 2\sqrt{2}$$

Perimeters of four triangles

$$AB = BC = CD = DA = 2(AC = BD)$$

$$8 = 2(2\sqrt{2} = 2\sqrt{2}) = 8(1 = \sqrt{2})$$



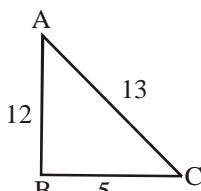
7. (b) ABC forms a right angled triangle  
Since  $(12^2 + 5^2 = 13^2)$

$$\therefore \text{Area} = \frac{1}{2} \times 12 \times 5 = 30$$

Let  $l$  be the length of rectangle

$$\text{Then, area of rectangle} = 30 = l \times 10 \text{ or } l = 3 \text{ units}$$

$$\therefore \text{Perimeter} = 2(10 + 3) = 26$$



8. (c) Required ratio =  $\frac{\text{Uncut portion}}{\text{Cut portion}}$

$$= \frac{\text{Total area} - \text{cut area}}{\text{cut area}}$$

$$= \frac{(\pi \times 20 \times 20) - 4 \times \pi \times 5 \times 5}{(4 \times \pi \times 5 \times 5)}$$

$$\frac{300\pi}{100\pi} = \frac{3}{1}$$

9. (c) The total area painted for the closed box will be the total inside surface area.

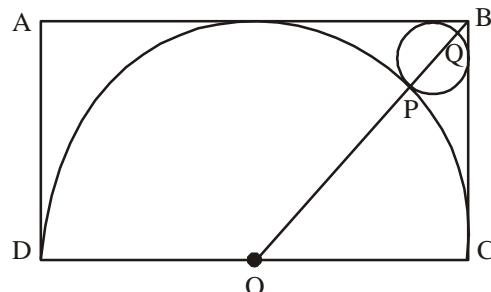
Hence, total inside area

$$= 2[20 \times 5 + 5 \times 10 + 20 \times 10] \text{ sq. cm} = 700 \text{ sq. cm.}$$

Therefore, the rate of painting per sq. cm.

$$\frac{70}{700} = \text{Rs } 0.1$$

10. (d) Let the radius of the semi-circle be  $R$ .



Now join O to B

$$OC = OD = R$$

$$\therefore OB = R\sqrt{2}$$

The diameter of the smaller circle  $= OQ - OP$

And  $< OB - OP$

$$< R\sqrt{2} - R$$

$$< R\sqrt{2} - 1$$

$$\text{Area of the semicircle} = \frac{\pi R^2}{2}$$

$$\text{Area of the circle} = \frac{\pi R^2}{2^2} = \frac{\pi R^2}{4}$$

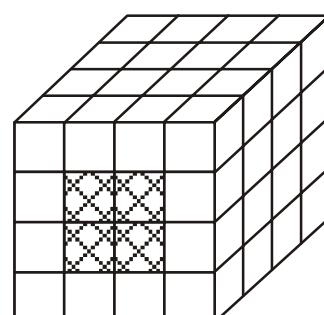
Hence the ratio of the area of the smaller circle to that

$$\text{of the semicircle} = \frac{\sqrt{2} - 1}{2}$$

$$\text{or } < \sqrt{2} - 1 : 2$$

but all the given options are greater than this ratio.  
Thus option (d) is the correct alternative.

11. (b) Total No. of cubes =  $\frac{12 \times 12 \times 12}{3 \times 3 \times 3} = 64$  cubes



Total no. of smaller cubes having none of their faces painted will be just behind the shaded cubes = centre cubes = 8

12. (b) In the  $\Delta ABC$ ,  $\angle ACB$  is  $90^\circ$   
 $(\because$  Angle subtended by diameter  $= 90^\circ)$   
 $AC = 5$  and  $AB = 6.5 \times 2 = 13$ .

Using Pythagoras theorem,

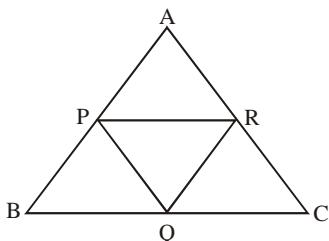
$$AB^2 - AC^2 = CB^2 \Rightarrow CB = \sqrt{13^2 - 5^2} = 12$$

$$\text{Area of } \Delta ABC = \frac{1}{2} \times 5 \times 12 = 30 \text{ sq. cm.}$$

13. (b) Diagonal of innermost square  $= 2$   
Diagonal of 7th square  $= 14$   
then, diagonal of 8th square  $= 16$   
Required difference between the area of

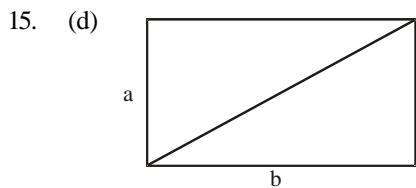
$$\frac{(16)^2}{2} - \frac{(14)^2}{2} = 30$$

14. (c)  $\Delta ABC$  will be an equilateral triangle. Because it consists of 4 such triangles with end-points on the mid-points of  $AB$ ,  $BC$  and  $CA$



$$\text{Hence } \frac{1}{4} \text{ area of } \Delta ABC = \text{area of } \Delta PQR$$

$$\Rightarrow \text{area of } \Delta PQR = 5 \text{ sq. units}$$



Let 'a' be the shorter and 'b' be the longer sides of rectangle

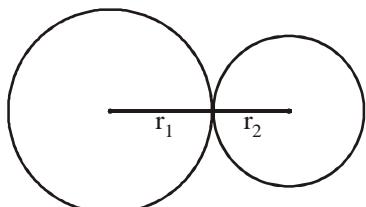
$$\text{then, } a + b - \sqrt{a^2 + b^2} = \frac{b}{2} \Rightarrow \sqrt{a^2 + b^2} = \frac{b}{2} - a$$

Squaring both sides,

$$a^2 + b^2 = \left(\frac{b}{2} - a\right)^2$$

$$\therefore \frac{a}{b} = \frac{3}{4}$$

16. (a) Let the radii be  $r_1$  and  $r_2$



$$\pi r_1^2 + \pi r_2^2 = 153\pi$$

$$r_1^2 + r_2^2 = 153 \quad \dots\dots(i)$$

$$r_1 + r_2 = 15 \quad \dots\dots(ii)$$

$$\Rightarrow r_1^2 + r_2^2 - 2r_1r_2 = 225$$

$$\Rightarrow 2r_1r_2 = 72 \Rightarrow r_1r_2 = 36$$

If  $r_1$  and  $r_2$  are roots of equation

$$\text{then, } r^2 - 15r - 36 = 0$$

$$\Rightarrow r^2 - 12r - 3r - 36 = 0 \Rightarrow (r-12)(r-3) = 0$$

$$\therefore \frac{r_1}{r_2} = 4$$

17. (a)  $AD = 24, BC = 12$

In  $\Delta CBE$  and  $\Delta ADE$

since  $\angle CBA = \angle CDA$  (Angles by same arc)

$\angle BCE = \angle DAE$  (Angles by same arc)

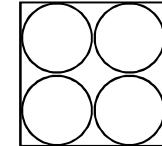
$\angle BEC = \angle DEA$  (Opp. angles)

$\therefore \Delta BCE$  and  $\Delta ADE$  are similar [From AAA]

with sides in the ratio  $1 : 2$

Hence, ratio of area  $= 1 : 4$  (i.e. square of sides)

18. (c) Let 'r' be the radius of each circle. Then by given condition



$$\frac{\pi r^2}{2\pi r} = \frac{2\pi r}{\pi r^2} \Rightarrow \pi r^2 = 2\pi r \Rightarrow r = 2 \quad [\text{since } r \neq 0]$$

$\therefore$  Length of the side of the square  $= 8$

The area of square which is not covered by the coins  
 $= 64 - 4\pi(2)^2 = 16(4 - \pi)$

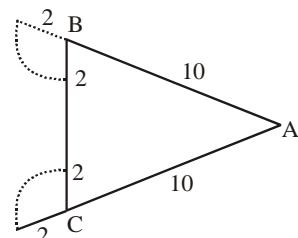
19. (d) Area grazed  $= \pi r^2 \left(1 - \frac{30}{360}\right)$

$$\text{or Area} = \pi \times 64 \times \frac{11}{12} = \frac{176}{3}\pi \text{ sq. cm.}$$

20. (a) If the length of the rope (radius) is 12 m

$$\text{Then, area grazed} = \pi r^2 \times \left(1 - \frac{30}{360}\right)$$

$$r = 12$$

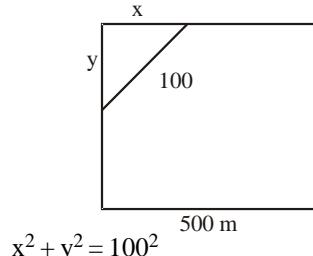


Then, we can consider B, C as centres and it will also graze some area without attending the triangle. Thus required area would be

$$> \pi \times 144 \left(1 - \frac{1}{12}\right) = \pi \times 12 \times 11 = 132\pi$$

Hence, only option (a) is greater than  $132\pi$

21. (a) Let x and y be the sides of triangular portion



$$x^2 + y^2 = 100^2$$

$$\therefore \text{Area of triangular portion} = \frac{1}{2}xy$$

By rule, given that the sum of two variables is constant, their product is maximum when they are equal. Thus  $x^2 = y^2$ . Therefore we have,

$$2y^2 = 100^2 \text{ or } 2x^2 = 100^2 \text{ i.e., } x = y = \frac{100}{\sqrt{2}}.$$

$$\text{Hence, the maximum area is } \frac{1}{2} \frac{100}{\sqrt{2}} \frac{100}{\sqrt{2}} = 2500.$$

22. (d) Let the capacity of cylindrical tank = a litres and that of conical tank = b litres

$$\text{Then, } a = b + 500 \quad \dots(i)$$

From the second given condition

$$a - 200 = 2(b - 200) \quad \dots(ii)$$

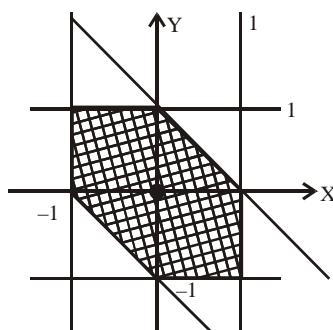
After solving (i) & (ii) we get,  
 $a = 1200$  litres

23. (a) We know the area of sectors is directly proportional to the angle subtended by the arc at the centre for a given radius. Hence, area  $S_1, S_2, \dots, S_7$  are in the ratio of  $1 : 2 : 4 : 8 : 16 : 32 : 64$  and the area of the sectors taken together is 127.

So, the ratio of the areas are  $1 : 127$  and the angle subtended by the combined sector is  $\frac{\pi}{4}$  radians and

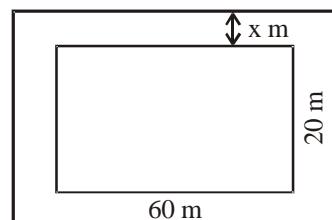
$\frac{1}{127} = \frac{q}{\pi/4}$  where q is the angle subtended by the arc of combined sector and by solving this comes out to be  $\frac{\pi}{508}$  radians.

24. (d) Required area is shown as the shaded portion.



$$\text{Required area} = \frac{1}{2} \cdot \frac{1}{2} \cdot 1 \cdot 1 = 3 \text{ sq. units.}$$

25. (c)



Let width of the walkway be x metre

$$\text{Then, } (20 - 2x)(60 - 2x) = 516 - 1200$$

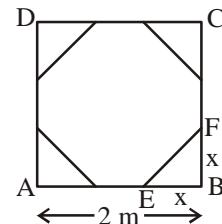
$$\Rightarrow 1200 - 120x - 40x + 4x^2 = 516 - 1200$$

$$\Rightarrow 4x^2 - 160x - 516 = 0 \Rightarrow x^2 + 40x - 129 = 0$$

$$\Rightarrow x^2 - 43x - 3x - 129 = 0 \Rightarrow x = 3, x = -43$$

$\therefore$  Width of walkway = 3 metres

26. (a)



Let side of octagon be x metre

Since the resulting figure is a regular octagon

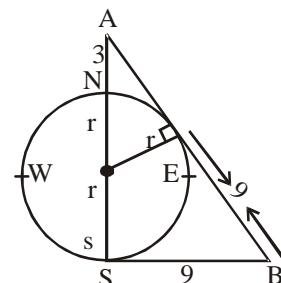
$$\text{then, } \sqrt{x^2 - x^2} = 2 - 2x$$

$$\Rightarrow \sqrt{2x^2} = 2 - 2x$$

$$\Rightarrow \sqrt{2}x = 2 - 2x$$

$$\Rightarrow x = \frac{\sqrt{2}}{\sqrt{2} - 1}$$

27. (b)



Using the fact, that it makes equal (in length) tangents to a circle from a point.

Length of the total hypotenuse (AB)

$$9 \sqrt{(3-r)^2 - r^2} = 9 \sqrt{9 - 6r} \quad \dots(i)$$

From  $\Delta ABS$

$$AB = \sqrt{81 - (3-2r)^2} = \sqrt{81 - 9 + 4r^2 - 12r} = \sqrt{81 - 9 + 4r^2 - 12r} \quad \dots(ii)$$

From (i) & (ii),

$$9\sqrt{9-6r} = \sqrt{(4r^2 - 12r - 90)}$$

$$\text{On squaring, } 81 - 9 \cdot 6r - 18\sqrt{9-6r} = 4r^2 - 12r - 90$$

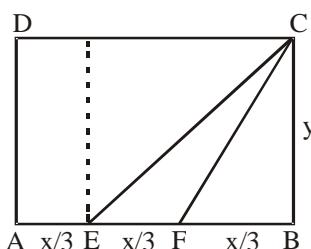
$$\Rightarrow 18\sqrt{9-6r} = 4r^2 + 6r$$

$$\Rightarrow 9\sqrt{9-6r} = 2r^2 + 3r$$

$$\text{again squaring and solving, we get, } r = \frac{9}{2}$$

Hence diameter = 9 km

28. (a)



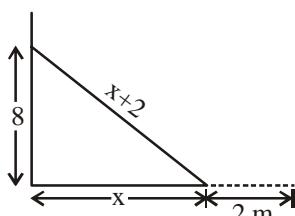
Let AB = x and BC = y

$$\text{Area } (\Delta CEF) = \frac{1}{2} \times \frac{x}{3} \times \frac{y}{3} = \frac{xy}{18}$$

Area of rectangle = xy

$$\therefore \text{Ratio } \frac{xy}{6xy} = \frac{1}{6}$$

29. (d)



Let base be x metre

$\therefore$  Length of ladder = x + 2

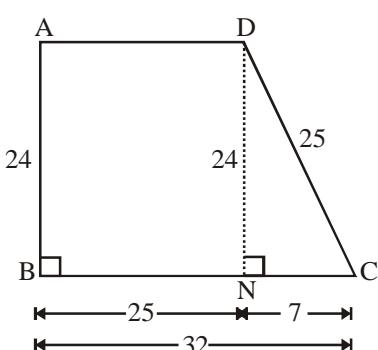
$$(x+2)^2 = x^2 + 64$$

$$x^2 + 4x + 4 = x^2 + 64 \Rightarrow 4x = 60 \Rightarrow x = 15$$

$$\therefore x+2 = 17$$

Hence the length of the ladder = 17 m

30. (d) Drawing DN  $\perp$  BC



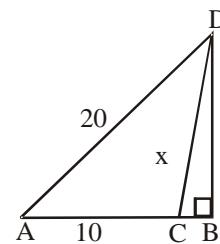
Area of ABND = AB  $\times$  AD = 25  $\times$  24 = 600 sq. units

$$\text{and Area of } \Delta DNC = \frac{1}{2} \times NC \times ND$$

$$= \frac{1}{2} \times 7 \times 24 = 84 \text{ sq. units}$$

$$\therefore \text{Area of ABCDA} = \text{area of ABND} + \text{Area of } \Delta DNC \\ = (600 + 84) \text{ sq. units} = 684 \text{ sq. units}$$

31. (a)



Let attitude of  $\Delta ADC$  be h and third side be x

$$\text{Then, area of triangle} = 80 = \frac{1}{2} \times 10 \times h \Rightarrow h = 16$$

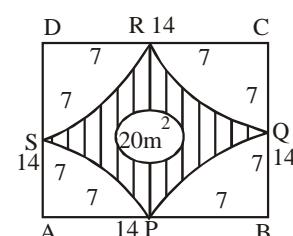
So, using Pythagorean theorem

$$AB = \sqrt{400 - 256} = 12$$

$$\Rightarrow BC = 2$$

$$\therefore x = \sqrt{4 - 256} = \sqrt{260}$$

32. (a)



Shaded region of the above figure is ungrazed

$$\text{Area of grazed portion} = \text{Area of APS} + \text{Area of BPQ} \\ + \text{Area of CRQ} + \text{Area of DRS}$$

$$\frac{1}{4}\pi(7)^2 + \frac{1}{4}\pi(7)^2 + \frac{1}{4}\pi(7)^2 + \frac{1}{4}\pi(7)^2$$

$$= 49\pi = 49 \times \frac{22}{7} = 154\text{ m}^2$$

$$\therefore \text{Ungrazed area} = (14)^2 - 154 = 20$$

$$= 196 - 174 = 22\text{ m}^2$$

$$33. (c) \text{Area of lawn} = 20 \times 40 = 800 \text{ m}^2$$

$$\therefore \text{area of half lawn} = 400 \text{ m}^2$$

$$\text{Area left after mowing 2 rounds} = 36 \times 16 = 576 \text{ m}^2$$

$$\text{Area left after mowing 3 rounds} = 34 \times 14 = 476 \text{ m}^2$$

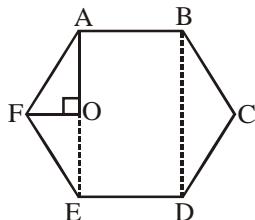
$$\text{Similarly, area left after moving 4 rounds}$$

$$= 32 \times 12 = 384 \text{ m}^2$$

Thus, he has to make rounds slightly less than 4 in order to mow just less than half the area.



39. (a)



$$\text{Area of } \triangle AOF = \frac{1}{2} \times OF \times AO$$

Area of hexagon, ABCDEF

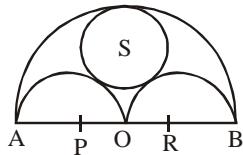
$$= (\text{Area of } \triangle AOF) \times 4 - \text{Area of rectangle ABDE}$$

$$= 2OF \times AO + 2AO \times 2OF = 6OFAO$$

[ $\because ED = AB = 2OF$  and  $AE = 2AO$ ]

$$\Rightarrow \text{Required ratio } \frac{1/2}{6} = \frac{1}{12}$$

40. (b)



Let  $PO = r$

Then area grazed by the horses P and R =  $\pi r^2$ .

Radius of circle with centre S  $\frac{2}{3}r$  (by theorem)

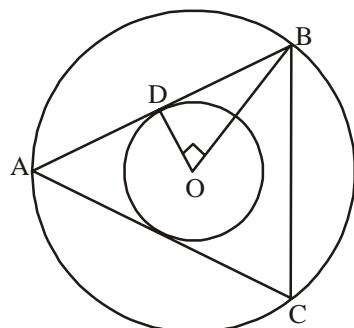
$$\text{Area grazed by S } \pi \left( \frac{2}{3}r \right)^2 = \frac{4}{9} \pi r^2$$

$$\text{Total area grazed } \pi r^2 - \frac{4}{9} \pi r^2 = \frac{13}{9} \pi r^2$$

Percentage of area that cannot be grazed

$$\frac{2\pi r^2 - \frac{13}{9}\pi r^2}{2\pi r^2} \times 100 = \frac{5}{18} \times 100 = 28\% \text{ approx}$$

41. (c)



$$\sin \angle OBD = \frac{OD}{OB} = \frac{1}{2} \therefore \angle OBD = 30^\circ$$

$$\Rightarrow \angle ABC = 60^\circ$$

Hence  $\triangle ABC$  is equilateral.

The next step is to find side AB and  $OD = \frac{1}{2} \sqrt{\frac{12}{\pi}}$

(Since  $\pi r^2 = 12$ , we get,  $r = OB = \sqrt{\frac{12}{\pi}}$  and  $OD = \frac{1}{2} \sqrt{\frac{12}{\pi}}$ )

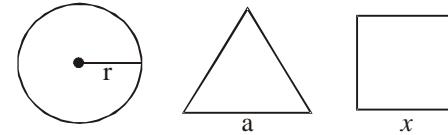
Using Pythagoras theorem, we get,

$$DB^2 = OB^2 - OD^2 = \frac{12}{\pi} - \frac{1}{4} \times \frac{12}{\pi} = \frac{9}{\pi}$$

$$\text{Hence, side AB} = 2 \times \frac{3}{\sqrt{\pi}} = \frac{6}{\sqrt{\pi}}$$

$$\text{Area of } \triangle ABC = \frac{\sqrt{3}}{4} \times \text{side}^2 = \frac{\sqrt{3}}{4} \times \frac{36}{\pi} = \frac{9\sqrt{3}}{\pi}$$

42. (c) Let  $r$  be the radius of circle,  $a$  and  $x$  be the side of triangle and square respectively.

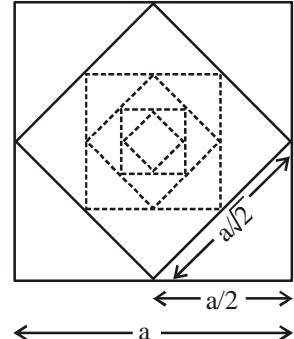


$$\text{Then, } \pi r^2 = 3a = 4x$$

$$\text{So, } c:s:t = \frac{4}{\pi} : \frac{4\sqrt{3}}{9} : 1$$

Thus,  $c > s > t$

43. (c)



Required ratio

$$\frac{(4a) \left[ 1 - \frac{1}{\sqrt{2}} \frac{1}{2} \dots \right]}{(a^2) \left[ 1 - \frac{1}{2} \frac{1}{4} \dots \right]} = \frac{4}{a} \left[ \frac{1 - \frac{1}{2}}{1 - \frac{1}{\sqrt{2}}} \right]$$

$$\frac{4}{a} \left[ \frac{1}{\sqrt{2}(\sqrt{2}-1)} \right] = \frac{2\sqrt{2}(\sqrt{2}-1)}{a} = \frac{2(2-\sqrt{2})}{a}$$

44. (a) **First Process :** Consider a square of side  $a$ , which is divided into  $n$  squares of different sides. In each square there is a circle of maximum area cut out. The remaining area of square is scrap. For any square say side be  $b$ ,

$$\frac{\text{Area of scrap}}{\text{Area of square}} = \frac{b^2 - \frac{\pi b^2}{4}}{b^2} = \frac{4 - \pi}{4} / \text{sq. unit}$$

The ratio remains same for all the squares combined.

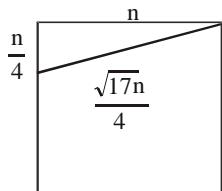
**Second Process :** The above ratio is

$$\frac{a^2 - \frac{\pi a^2}{4}}{a^2} = \frac{4 - \pi}{4} \text{ / sq. unit}$$

Hence, the required ratio = 1 : 1

45. (a) Vertical spacing in cms =  $h/n$   
because the total height  $h$  used divided equally in  $n$  parts. Also the strings' length is the minimum required to wound  $n$  turns.

46. (b)



$$\text{length} = \sqrt{n^2 + \left(\frac{n}{4}\right)^2} = \sqrt{n^2 + \frac{n^2}{16}} = \frac{\sqrt{17}n}{4}$$

As this string passes through the four faces of the cube.

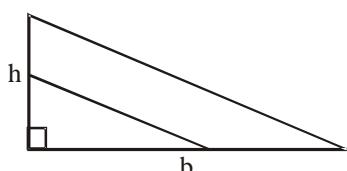
$$\text{Hence, length of the string} = \frac{\sqrt{17}n}{4} \times 4 = \sqrt{17}n$$

47. (c) Straighten the wire on the cylinder and apply Pythagoras theorem

$$\left(\frac{h}{n}\right)^2 + 4^2 = 17 \quad \frac{h}{n} = \sqrt{17} \quad h = \sqrt{17}n$$

$$\left(\frac{h}{n}\right)^2 + 1^2 = 1 \quad \text{or} \quad h = n \quad 2n(2/n) = 4$$

48. (d) Let  $h$  and  $b$  be the height and breadth respectively of original triangle.



$$\text{Then, area of original triangle} = \frac{1}{2} b \times h = 34 \Rightarrow bh = 68$$

$$\text{Hence, area of smaller triangle} = \frac{1}{2} \times (0.65b)(0.65h)$$

$$= \frac{1}{2} \times 0.65 \times 0.65 \times 68 = 14.36$$

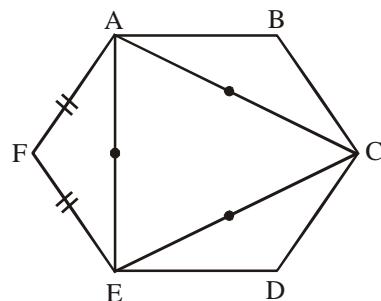
49. (d) Volume =  $(12 - 2x)^2 \times x$

For  $V$  to be maximum,

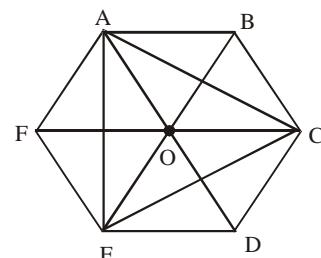
$$\frac{dv}{dx} = 12 - 2x^2 - 2x(12 - 2x)(-2) = 0$$

$$= (12 - 2x)[12 - 2x - 4x] = 0 \Rightarrow x = 2 \text{ or } 6$$

50. (b)



Join all the vertices with the centre

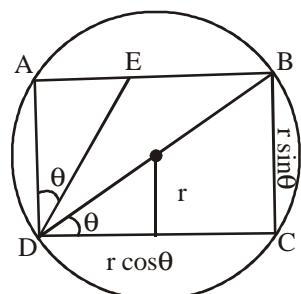


$$\text{Area}(\Delta ACE) = \text{Area}(\Delta AOC) + \text{Area}(\Delta OAE) + \text{Area}(\Delta OEC)$$

$$\text{Area}(\Delta OEC) = \text{Area}(\Delta ABC) + \text{Area}(\Delta AFE) + \text{Area}(\Delta EDC)$$

$$\text{Hence, required ratio} = \frac{\text{Area of } \Delta ACE}{\text{Area of } ABCDEF} = \frac{1}{2}$$

51. (a)



Given that, ratio of area of the circle to area of the

$$\text{rectangle ABCD} = \frac{\pi}{\sqrt{3}} = \frac{\pi r^2}{\sqrt{3}r^2}$$

$$\therefore \text{Area of rectangle} = \sqrt{3}r^2$$

$$\sqrt{3}r^2 = r^2 \sin \theta \cos \theta$$

$$\sin 2\theta = \sqrt{3}/2 \Rightarrow 2\theta = 60 \Rightarrow \theta = 30$$

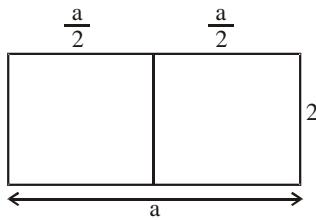
$$\sin(30^\circ) = 1/2$$

$$AE = DE \sin \theta, AD = DE \cos \theta$$

$$\frac{AE}{AD} = \frac{\sin \theta}{\cos \theta} = \frac{1}{\sqrt{3}}$$

52. (b) Let longer side of larger rectangle = a

Initial ratio of larger to shorter side  $\frac{a}{2}$



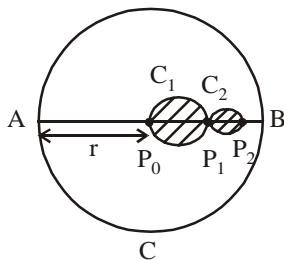
Ratio of longer to shorter side in case of second rectangle  $\frac{2}{a/2} \frac{4}{a}$

$$\text{According to given conditions, } \frac{a}{2} \frac{4}{a} \Rightarrow a^2 = 8$$

$$\Rightarrow a = 2\sqrt{2}$$

$$\therefore \text{Area of smaller rectangle} = \frac{2 \times a}{2} = a = 2\sqrt{2}$$

53. (d)



$$\text{Area of } C = \pi r^2$$

$$\text{Area of } C_1 = \pi \left(\frac{r}{4}\right)^2 = \frac{\pi r^2}{16};$$

$$\text{Area of } C_2 = \pi \left(\frac{r}{8}\right)^2 = \frac{\pi r^2}{64}$$

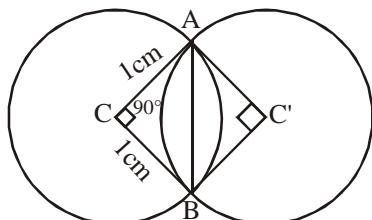
$$\therefore \text{Area of shaded region} = \pi r^2 \left[ \frac{1}{16} \frac{1}{64} \dots \dots \right]$$

$$= \pi r^2 \left[ \frac{1/16}{1-1/4} \right]$$

$$\pi r^2 \frac{1}{16} \times \frac{4}{3} = \frac{\pi r^2}{12}$$

$$\therefore \frac{\text{Ratio of area of unshaded portion}}{\text{Ratio of area of shaded portion}} = \frac{\pi - \frac{\pi r^2}{12}}{\frac{\pi r^2}{12}} = \frac{11}{12}$$

54. (b)



$$\text{Area of each circle} = \pi r^2 = \pi \text{ sq cm}$$

$$\text{Area of sector } ACB$$

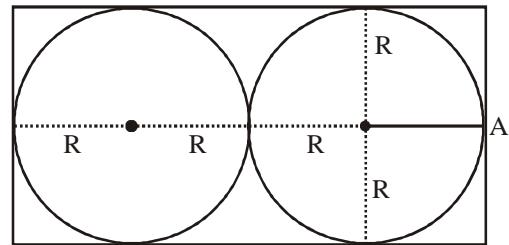
$$\frac{90^\circ}{360^\circ} \times \pi = \frac{\pi}{4} = \text{Area of sector } AC'B$$

$$\text{Area of the square } ACBC' = 1 \text{ sq. cm.}$$

$$\text{Common Area} = \text{Area of sector } ACB + \text{Area of sector } AC'B$$

$$\text{AC}'B - \text{Area of Square} = \frac{\pi}{4} - 1 = \frac{\pi}{2} - 1$$

55. (d)



$$\text{Speed of A} = \frac{4R}{t}, \frac{4R}{t}, \frac{2R}{t}, \frac{2R}{t}, \frac{12R}{t}$$

$$\text{Speed of B} = \frac{2\pi R}{t}, \frac{2\pi R}{t}, \frac{4\pi R}{t}$$

$$\therefore \text{Required percentage} = \frac{(4\pi - 12) \frac{R}{t}}{12 \frac{R}{t}} \times 100 \approx 4.72\%$$

56. (c) The four equations are :

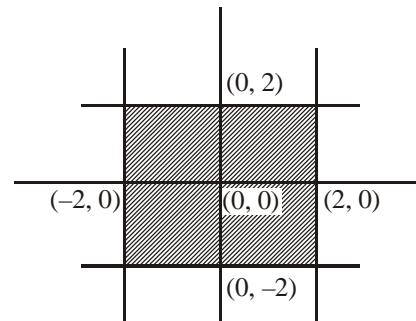
$$x + y + x - y = 4 \quad \text{or} \quad x = 2 \quad \dots \text{(i)}$$

$$x + y - (x - y) = 4 \quad \text{or} \quad y = 2 \quad \dots \text{(ii)}$$

$$-(x + y) + x - y = 4 \quad \text{or} \quad y = -2 \quad \dots \text{(iii)}$$

$$-(x + y) - (x - y) = 4 \quad \text{or} \quad x = -2 \quad \dots \text{(iv)}$$

The area bounded by the given curve is shown below



Hence, area =  $4 \times 4 = 16$  sq. units.

57. (b) Consider the tile is of unit length and let the dimensions of the rectangular floor be  $x$  and  $y$ .

$$\text{No. of tiles on the edges} = 2x + 2(y - 2)$$

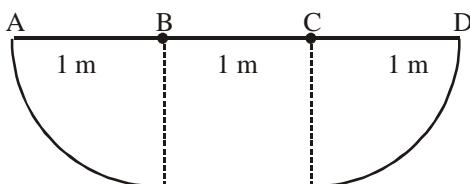
$$\text{No. of tiles in the interior} = (x - 2)(y - 2)$$

$$\therefore 2x + 2(y - 2) = (x - 2)(y - 2)$$

$$\Rightarrow 2x = (y - 2)(x - 4) \quad \text{or} \quad y = \frac{2x}{x - 4} - 2$$

Hence  $x > 4$ , at  $x = 5, y = 12$ .

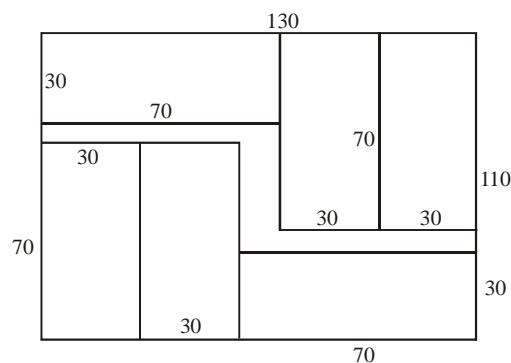
58. (b) The ant would follow the path :



Hence it follows 2 quarter circles of radius 1 m and a distance of 1 m.

$$\therefore \text{Minimum distance covered} = \frac{2\pi r}{2} = 1 \times \pi = 1$$

59. (c) The tiles can be adjusted on the floor as shown below



So, maximum 6 tiles can be accommodated on the floor.

60. (e) Total area of four walls of a room =  $2h(\ell + b)$

Let the height of the room be  $x$ .

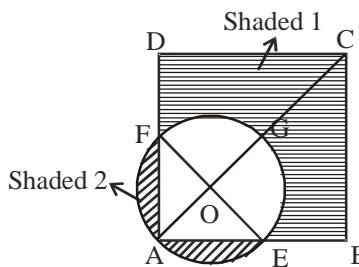
The breadth =  $2x$  and length =  $3x$

$$\text{Area}_{(1)} = 2x(2x + 3x) = 10x^2$$

$$\text{Area}_{(2)} = 2 \times \frac{x}{2} \left( \frac{2x}{2} + 3x \times 2 \right) = 7x^2$$

$\therefore$  Area of 4 walls decreases by 30%.

For Qs. 61-62.



In  $\triangle FAE$ ,  $\angle FAE = 90^\circ$  as it is an angle of a square. Further EF will be the diameter of the circle as an angle subtended by a diameter on the circumference of a circle =  $90^\circ$ . So, EF will pass through the centre O.

In  $\triangle FOA$  and  $\triangle AOE$

OF = OE (radius of circle)

AO is common

$\angle FAO = \angle EAO$  ( $45^\circ$ )

So  $\triangle FOA \sim \triangle AOE \Rightarrow AF = AE$

$$\text{Area of } \triangle AFE = \frac{1}{2}bh = \frac{1}{2}AF^2$$

$$AF^2 = AE^2 = FE^2 = 2^2 = 4$$

(Pythagoras theorem)

$$\text{or } AF^2 = 2 \Rightarrow \text{Area of } \triangle AFE = \frac{1}{2} \times 2 = 1$$

Area of shaded region 2

$$= \frac{\pi r^2}{2} - 1 = \frac{\pi \times 1^2}{2} - 1 = \frac{\pi - 2}{2}$$

Area of the white portion of circle

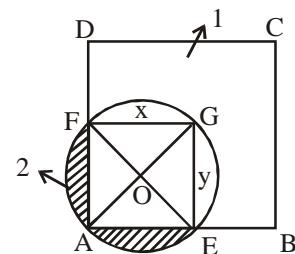
$$= \pi r^2 - \frac{\pi - 2}{2} = \frac{\pi - (\pi - 2)}{2} = \frac{\pi}{2}$$

$$\therefore \text{Area of shaded region 1} = 2^2 - \frac{\pi - 2}{2} = \frac{6 - \pi}{2}$$

Hence required proportion of the sheet

$$= \frac{\left( \frac{6 - \pi}{2} \right)}{4} = \frac{6 - \pi}{8}$$

Alternatively



Complete the square AEGF. Note 2 diagonals of a square make angles of  $90^\circ$  with each other.

The area of the shaded region 2 can also be found by:

$$2(\text{Area of sector AOE} - \text{Area of } \triangle AOE)$$

$$= 2 \left( \frac{\pi r^2}{4} - \frac{1}{2} \times 1 \times 1 \right) \quad [\text{AO} = \text{OE} = \text{radius} = 1]$$

$$= 2 \left( \frac{\pi}{4} - \frac{1}{2} \right) = \frac{\pi - 2}{2}$$

Again, area of region 1 = Area of square ABCD - Area of square AEGF - Area of region 2.

[Note : Area of region 2 = Area of region x + region y]

$$\Rightarrow \text{Area (region 1)} = 2^2 - 2 - \left( \frac{\pi - 2}{2} \right)$$

[Note : Area of square AEGF =  $AE^2$ ]

Further  $AE^2 = GE^2 = 2^2 = 2AE^2$  or  $AE^2 = 2$

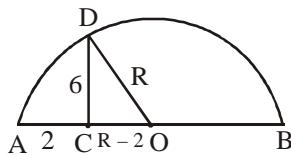
$$\Rightarrow \text{Area (region 1)} = 2 - \left( \frac{\pi - 2}{2} \right) = \frac{6 - \pi}{2}$$

$$\text{Required proportion} = \frac{(6 - \pi)/2}{4} = \frac{6 - \pi}{8}$$

61. (b)

62. (e)

63. (b)

In  $\triangle DCO$ , using Pythagoras theorem

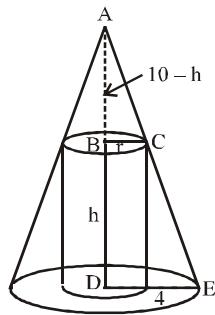
$$R^2 = (R-2)^2 + 6^2 \Rightarrow R^2 = R^2 - 4R + 4 + 36$$

$$\text{or } 4R = 40 \Rightarrow R = 10 \text{ cm}$$

$$\therefore \text{Area of semi-circle} = \left( \frac{\pi R^2}{2} \right)$$

$$= \frac{1}{2} \times \pi \times 10^2 = 50\pi \text{ cm}^2$$

64. (a)

Let height and radius of the cylinder are  $h$  and  $r$  cm respectively.Since  $\triangle ABC \sim \triangle ADE$ 

$$\therefore \frac{10-h}{10} = \frac{r}{h},$$

$$\therefore h = 10 - \frac{r}{2}$$

Total surface area of the cylinder,

$$S = 2\pi rh + 2\pi r^2$$

$$\Rightarrow S = 2\pi r \left( 10 - \frac{r}{2} \right) + 2\pi r^2$$

$$\Rightarrow S = 20\pi r - 6\pi r^2$$

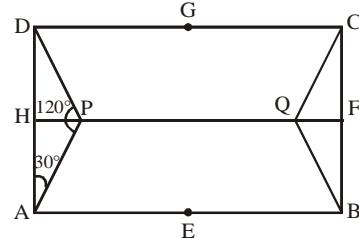
$$\text{Now, } \frac{ds}{dr} = 20\pi - 12\pi r$$

$$\text{But } \frac{ds}{dr} = 0, \therefore r = \frac{10}{3} \text{ cm}$$

$$\text{Now, } \frac{d^2s}{dr^2} = -6\pi \neq 0$$

Hence, area of the cylinder is maximum when  $r = \frac{10}{3} \text{ cm}$ and  $h = \frac{5}{3} \text{ cm}$ Therefore, total surface area of the largest possible cylinder  $= \frac{100}{3}\pi \text{ cm}^2$ .

65. (e)

Let  $AD = 2$  units, then  $AH = 1$  unit.

$$\text{In right } \triangle AHP, \tan 30^\circ = \frac{HP}{AH}$$

$$\Rightarrow HP = \frac{1}{\sqrt{3}}$$

$$\therefore \text{Area of } \triangle APD = \frac{1}{2} \times 2 \times \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}} \text{ sq. units}$$

Now, area of  $ABQCDP$ 

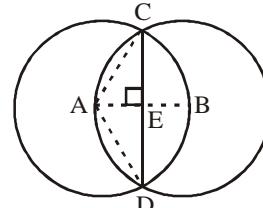
$$= \text{Area of square } ABCD - 2 \times (\text{Area of } \triangle APD)$$

$$= 4 - 2 \times \frac{1}{\sqrt{3}}$$

$$\frac{4\sqrt{3} - 2}{\sqrt{3}} \text{ sq. units}$$

$$\text{Required ratio} = \frac{\frac{4\sqrt{3} - 2}{\sqrt{3}}}{2\sqrt{3} - 1} = \frac{4\sqrt{3} - 2}{2\sqrt{3}}$$

66. (e)



$$AE = \frac{1}{2} AB = \frac{1}{2} \times 1 = \frac{1}{2} \text{ cm}$$

$$AC = 1 \text{ cm}$$

$$CD = 2 \times CE = 2 \times \sqrt{AC^2 - AE^2} = 2 \times \sqrt{1 - \frac{1}{4}}$$

$$= 2 \times \frac{\sqrt{3}}{2} = \sqrt{3} \text{ cm}$$

In right  $\Delta AEC$ ,

$$\cos CAE = \frac{1}{2} = \frac{1}{2} \cos 60^\circ$$

$\Delta CAE = 60^\circ$ ,  $\Delta CAD = 120^\circ$

Area of intersecting region

$= 2 \times (\text{Area of minor segment } BCDB \text{ of circle with centre } A)$

$$= 2 \times \left[ \frac{\pi r^2 \theta}{360} - \frac{1}{2} \times CD \times AE \right]$$

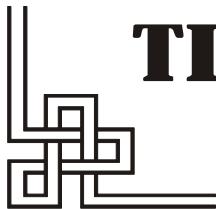
$$= 2 \times \left[ \frac{\pi \times 1 \times 120}{360} - \frac{1}{2} \times \sqrt{3} \times \frac{1}{2} \right]$$

$$2 \left[ \frac{\pi}{3} - \frac{\sqrt{3}}{4} \right] \text{cm}^2$$

$$\left( \frac{2\pi}{3} - \frac{\sqrt{3}}{2} \right) \text{cm}^2$$

# 10

CHAPTER



# TIME, DISTANCE

# & WORK



- Two towns A and B are 100 km apart. A school is to be built for 100 students of town B and 30 students of town A. Expenditure on transport is Rs 1.20 per km per student. If the total expenditure on transport by all 130 students is to be as small as possible, then the school should be built at  
(a) 33 km from Town A      (b) 33 km from Town B      (c) Town A      (d) Town B (1994)
- One man can do as much work in one day as a woman can do in 2 days. A child does one third the work in a day as a woman. If an estate-owner hires 39 pairs of hands, men, women and children in the ratio 6 : 5 : 2 and pays them in all Rs 1113 at the end of the days work. What must be the daily wage of a child, if the wages are proportional to the amount of work done? (1994)  
(a) Rs 14      (b) Rs 5      (c) Rs 20      (d) Rs 7
- A water tank has three taps A, B and C. A fills four buckets in 24 minutes, B fills 8 buckets in 1 hour and C fills 2 buckets in 20 minutes. If all the taps are opened together a full tank is emptied in 2 hours. If a bucket can hold 5 litres of water, what is the capacity of the tank?  
(a) 120 litres      (b) 240 litres      (c) 180 litres      (d) 60 litres (1994)
- Shyam went from Delhi to Simla via Chandigarh by car. The distance from Delhi to Chandigarh is  $\frac{3}{4}$  times the distance from Chandigarh to Simla. The average speed from Delhi to Chandigarh was half as much again as that from Chandigarh to Simla. If the average speed for the entire journey was 49 kmph. What was the average speed from Chandigarh to Simla?  
(a) 39.2 kmph      (b) 63 kmph      (c) 42 kmph      (d) None of these (1994)
- It takes the pendulum of a clock 7 seconds to strike 4 o'clock. How much time will it take to strike 11 o'clock?  
(a) 18 seconds      (b) 20 seconds      (c) 19.25 seconds      (d) 23.33 seconds (1994)
- Four friends start from four towns, which are at the four corners of an imaginary rectangle. They meet at a point which falls inside the rectangle, after travelling distances of 40, 50, and 60 metres. The maximum distance that the fourth could have travelled is (approximately)  
(a) 67 metres      (b) 52 metres      (c) 22.5 metres      (d) Can't be determined (1994)
- A and B walk from X to Y, a distance of 27 km at 5 kmph and 7 kmph respectively. B reaches Y and immediately turns back meeting A at Z. What is the distance from X to Z?  
(a) 25 km      (b) 22.5 km      (c) 24 km      (d) 20 km (1994)
- There is leak in the bottom of a tank. This leak can empty a full tank in 8 hours. When the tank is full, a tap is opened into the tank which admits 6 litres per hour and the tank is now emptied in 12 hours. What is the capacity of the tank?  
(a) 28.8 litres      (b) 36 litres      (c) 144 litres      (d) Can't be determined (1994)
- The winning relay team in a high school sports competition clocked 48 minutes for a distance of 13.2 km. Its runners A, B, C and D maintained speeds of 15 kmph, 16 kmph, 17 kmph, and 18 kmph respectively. What is the ratio of the time taken by B to time taken by D?  
(a) 5 : 16      (b) 5 : 17      (c) 9 : 8      (d) 8 : 9 (1994)
- In a race of 200 metres run, A beats S by 20 metres and N by 40 metres. If S and N are running a race of 100 metres with exactly same speed as before then, by how many metres will S beat N?  
(a) 11.11 metres      (b) 10 metres      (c) 12 metres      (d) 25 metres (1995)

**Directions for questions 11 to 14 : Read the information given below and answer the questions that follow :**

A and B are running along a circular course of radius 7 km in opposite directions such that when they meet they reverse their directions and when they meet A will run at the speed of B and vice-versa. Initially, the speed of A is thrice the speed of B. Assume that they start from  $M_0$  and they first meet at  $M_1$ , then at  $M_2$ , next at  $M_3$ , and finally at  $M_4$

- What is the shortest distance between  $M_1$  and  $M_2$ ?  
(a) 11km.      (b)  $7\sqrt{2}$  km      (c) 7km      (d) 14 km (1995)
- What is the shortest distance between  $M_1$  and  $M_3$  along the course?  
(a) 22 km      (b)  $14\sqrt{2}$  km      (c)  $22\sqrt{2}$  km      (d) 14 km (1995)
- Which is the point that coincides with  $M_0$ ?  
(a)  $M_1$       (b)  $M_2$       (c)  $M_3$       (d)  $M_4$  (1995)

14. What is the distance travelled by A when they meet at  $M_3$  (1995)  
 (a) 77 km. (b) 66 km (c) 99 km (d) 88 km
15. A man travels three-fifths of a distance AB at a speed of  $3a$ , and the remaining at a speed of  $2b$ . If he goes from B to A and back at a speed of  $5c$  in the same time, then (1996)  
 (a)  $1/a + 1/b = 1/c$  (b)  $a + b = c$  (c)  $1/a + 1/b = 2/c$  (d) None of these

**Directions for questions 16 to 20 :** Read the information given below and answer the questions that follow :

- Persons X, Y and Z wish to go from place A to place B, which are separated by a distance of 70 km. All the three persons start off together from A, with X and Y going by Luna at a speed of 20 kmph. X drops Y somewhere along the way and returns to pick up Z, who has already started walking towards B at a speed of 5 kmph. Y, after being dropped by X, starts walking towards B at a speed of 5 kmph. In this manner, all three of them reach B at the same time.
16. How much distance is covered by Z on foot? (1996)  
 (a) 25 km (b) 10 km (c) 20 km (d) 15 km
17. What is the total distance travelled by X? (1996)  
 (a) 130 km (b) 140 km (c) 110 km (d) 90 km
18. How long does it take them to go from A to B? (1996)  
 (a) 6.0 hours (b) 6.5 hours (c) 7.0 hours (d) 14.0 hours
19. After how much time is Y dropped on the way by X? (1996)  
 (a) 2.0 hours (b) 3.0 hours (c) 2.5 hours (d) 1.5 hours
20. For how long does X travel alone over the entire journey? (1996)  
 (a) 2.5 hours (b) 1.0 hours (c) 2.0 hours (d) 1.5 hours
21. A man travels from A to B at a speed of  $x$  kmph. He then rests at B for  $x$  hours. He then travels from B to C at a speed of  $2x$  kmph and rests at C for  $2x$  hours. He moves further to D at a speed twice as that between B and C. He thus reaches D in 16 hours. If distances A-B, B-C, C-D are all equal to 12 km, the time for which he rested at B could be (1996)  
 (a) 3 hours (b) 6 hours (c) 2 hours (d) 4 hours
22. In a watch, the minute hand crosses the hour hand for the third time exactly after every 3 hrs., 18 min., 15 seconds of watch time. What is the time gained or lost by this watch in one day? (1996)  
 (a) 14 min. 10 seconds lost (b) 13 min. 50 seconds lost  
 (c) 13 min. 20 seconds gained (d) 14 min. 40 seconds gained
23. In a mile race, Akshay can be given a start of 128 metres by Bhairav. If Bhairav can give Chinmay a start of 4 metres in a 100 metres dash, then who out of Akshay and Chinmay will win a race of one and a half mile, and what will be the final lead given by the winner to the loser? (one mile is 1600 metres) (1996)  
 (a) Akshay, 1/12 miles (b) Chinmay, 1/32 miles (c) Akshay, 1/24 miles (d) Chinmay, 1/16 miles
24. An express train travelling at 80 kmph overtakes a goods train, twice as long and going at 40 kmph on a parallel track, in 54 seconds. How long will the express train take to cross a station 400 m long? (1997)  
 (a) 36 sec (b) 45 sec (c) 27 sec (d) None of these

**Directions for questions 25 to 27 :** Read the information given below and answer the questions that follow :

- Boston is 4 hours ahead of Frankfurt and two hours behind India. X leaves Frankfurt at 06:00 pm on Friday and reaches Boston the next day. After waiting there for two hours, he leaves exactly at noon and reaches India at 01:00 am. On his return journey, he takes the same route as before, but halts at Boston for one hour less than his previous halt there. He then proceeds to Frankfurt.
25. If his journey, including stoppages, was covered at an average speed of 180 miles per hour, what was the distance between Frankfurt and India? (1997)  
 (a) 3600 miles (b) 4500 miles (c) 5580 miles (d) Insufficient data
26. If X had started his return journey from India at 02:55 am on the same day that he reached there, after how much time would he reach Frankfurt? (1997)  
 (a) 24 hrs (b) 25 hrs (c) 26 hrs (d) Insufficient data
27. What was X's average speed for the entire journey? (1997)  
 (a) 170 mph (b) 180 mph (c) 165 mph (d) Insufficient data

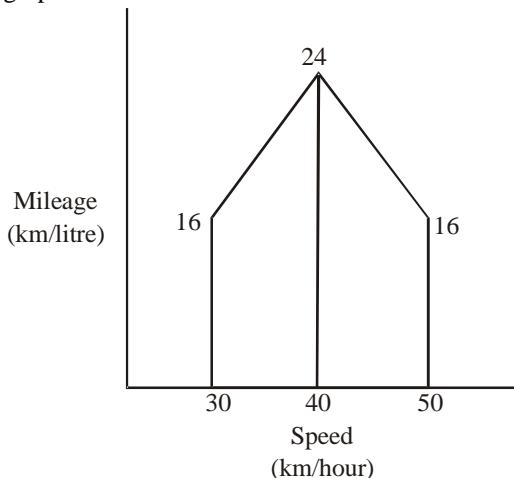
**Directions for questions 28 & 29 : Read the information given below and answer the questions that follow :**

A thief, after committing the burglary, started fleeing at 12:00 noon, at the speed of 60 kmph. He was then chased by a policeman X. X started the chase 15 minutes after the thief had started, at a speed of 65 kmph.

28. At what time did X catch the thief? (1997)  
 (a) 3:30 pm. (b) 3:00 pm (c) 3:15 pm (d) None of these
29. If another policeman had started the same chase along with X, but at a speed of 60 kmph, then how far behind was he when X caught the thief? (1997)  
 (a) 18.75 km (b) 15 km (c) 21 km (d) 37.5 km
30. A company has a job to prepare certain no. of cans and there are three machines A, B & C for this job. A can complete the job in 3 days, B can complete the job in 4 days and C can complete the job in 6 days. How many days the company will take to complete job if all the machines are used simultaneously? (1998)  
 (a) 4 days (b) 4/3 days (c) 3 days (d) 12 days
31. Distance between A and B is 72 km. Two men started walking from A and B at the same time towards each other. The person who started from A travelled uniformly with average speed 4 kmph. While the other man travelled with varying speeds as follows : In first hour his speed was 2 kmph, in the second hour it was 2.5 kmph, in the third hour it was 3 kmph, and so on. When will they meet each other? (1998)  
 (a) 7 hours (b) 10 hours (c) 35 km from A (d) midway between A & B
32. I started climbing up the hill at 6 am and reached the temple at the top at 6 pm. Next day I started coming down at 6 am and reached the foothill at 6 pm. I walked on the same road. The road is so short that only one person can walk on it. Although I varied my pace on my way, I never stopped on my way. Then which of the following must be true (1998)  
 (a) My average speed downhill was greater than that uphill  
 (b) At noon, I was at the same spot on both the days.  
 (c) There must be a point where I reached at the same time on both the days.  
 (d) There cannot be a spot where I reached at the same time on both the days.

**Directions for questions 33 & 34 : Read the information given below and answer the questions that follow :**

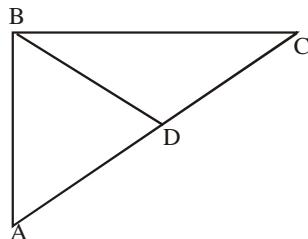
Rajiv travels to B from A in 4 hrs. travelling at 35 kmph for two hrs and at 45 kmph for the next two hrs. Aditi travels on the same route at speeds of 30, 40 and 50 kmph, covering equal distances at each of these speeds. The relation between fuel consumption and speed is given in the following graph.



33. How many litres of fuel is consumed by Aditi (1999)  
 (a) 7 (b) 9 (c) 10 (d) 15
34. Zorin would like to drive Aditi's car over the same route from A to B. minimize the petrol consumption for the trip. The amount of petrol required by him is (1999)  
 (a) 6.67 litres (b) 7 litres (c) 6.33 litres (d) 6.0 litres
35. Navjeevan exp., which goes from Ahmedabad to Chennai leaves Ahmedabad at 6:30 am and travels at a constant speed of 50 kmph towards Baroda, which is 100 kms away. At 7:00, the How-Ambd exp. leaves for Ahmedabad from Baroda at a constant speed of 40 kmph. At 7:30 Mr. Shah, the control officer, realises that both the trains are on the same track. How much time does Mr. Shah have to avert the accident? (1999)  
 (a) 30 min (b) 20 min (c) 25 min (d) 15 min

**Directions for questions 37 to 39 :** Read the information given below and answer the questions that follow :

There is a network of routes as shown in the figure given below. D is the mid point of AC, AB is perpendicular to BC and AB = 100km. The persons, X & Y, go from A to C, starting at the same time and reaching at the same time. X follows the path A-B-C with an average speed of 61.875 kmph, and Y follows the straight path A-C, covering part AD at 45 kmph and part DC at 55 Kmph.



37. What is the average speed of Y between A-C (1999)  
(a) 52 kmph (b) 50 kmph (c) 49.5 kmph (d) 48 kmph

38. What is the distance B-C? (1999)  
(a) 30.55 km (b) 37.5 km (c) 62.5 km (d) Indeterminable

39. What is the distance A-C (1999)  
(a) 105 km (b) 112.5 km (c) 135.5 km (d) Indeterminable

40. A and B are two cities 10 km apart. A load of 80 kg has to be transported from A to B. The courier service charges @ 10Rs per hour. The optimal speed that one can go without load is 10 km/hr, the speed reduces to 5 km/hr with a weight of 10 Kg. Further with 20 kg (which is the maximum weight that can be carried), the speed is 2 km/hr. what is the minimum cost? (2000)  
(a) 200 (b) 180 (c) 160 (d) 140

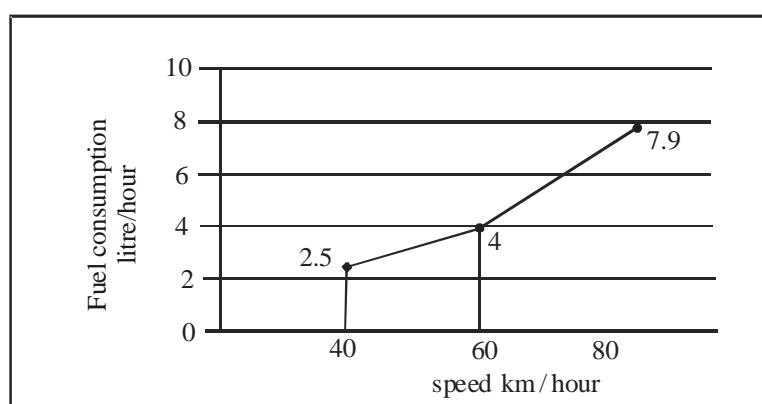
**Directions for questions 41 & 42 :** Read the information given below and answer the questions that follow :

There are five machines A, B, C, D and E – situated on a straight line at distances of 10 m, 20 m, 30 m, 40 m and 50 m respectively from the origin of the line. A robot is stationed at the origin of the line. The robot serves the machines with raw material whenever a machine becomes idle. All the raw materials are located at the origin. The robot is in an idle state at the origin at the beginning of a day. As soon as one or more machines become idle, they send messages to the robot-station and the robot starts and serves all the machines from which it received messages. If a message is received at the station while the robot is away from it, the robot takes notice of the message only when it returns to the station. While moving, it serves the machines in the sequence in which they are encountered, and then returns to the origin. If any messages are pending at the station when it returns, it repeats the process again. Otherwise, it remains idle at the origin till the next message(s) is/are received.

45. If 09/12/2001 happens to be Sunday, then 09/12/1971 would have been (2001)  
 (a) Wednesday (b) Tuesday (c) Saturday (d) Thursday
46. At his usual rowing rate, Rahul can travel 12 miles downstream in a certain river in six hours less than it takes him to travel the same distance upstream. But if he could double his usual rowing rate for this 24 mile round trip, the downstream 12 miles would then take only one hour less than the upstream 12 miles. What is the speed of the current in miles per hour? (2001)  
 (a)  $\frac{7}{3}$  (b)  $\frac{4}{3}$  (c)  $\frac{5}{3}$  (d)  $\frac{8}{3}$
47. Shyama and Vyom walk up an escalator (moving stairway). The escalator moves at a constant speed. Shyama takes three steps for every two of Vyom's steps. Shyama gets to the top of the escalator after having taken 25 steps, while Vyom (because his slower pace lets the escalator do a little more of the work) takes only 20 steps to reach the top. If the escalator were turned off, how many steps would they have to take to walk up? (2001)  
 (a) 40 (b) 50 (c) 60 (d) 80
48. There's a lot of work in preparing a birthday dinner. Even after the turkey is in the oven, there's still the potatoes and gravy, yams, salad, and cranberries, not to mention setting the table. Three friends, Asit, Arnold, and Afzal, work together to get all of these chores done. The time it takes them to do the work together is six hours less than Asit would have taken working alone, one hour less than Arnold would have taken alone, and half the time Afzal would have taken working alone. How long did it take them to do these chores working together? (2001)  
 (a) 20 minutes (b) 30 minutes (c) 40 minutes (d) 50 minutes
49. A train X departs from station A at 11.00 am for station B, which is 180 km away. Another train Y departs from station B at 11.00 am for station A. Train X travels at an average speed of 70 kms/hr and does not stop anywhere until it arrives at station B. Train Y travels at an average speed of 50 kms/hr, but has to stop for 15 minutes at station C, which is 60 kms away from station B enroute to station A. Ignoring the lengths of the trains, what is the distance, to the nearest km, from station A to the point where the trains cross each other? (2001)  
 (a) 112 (b) 118 (c) 120 (d) None of these
50. Three runners A, B and C run a race, with runner A finishing 12 metres ahead of runner B and 18 metres ahead of runner C, while runner B finishes 8 metres ahead of C. Each runner travels the entire distance at constant speed. What was the length of the race? (2001)  
 (a) 36 metres (b) 48 metres (c) 60 metres (d) 72 metres

**Directions for questions 51 & 52 : Read the information given below and answer the questions that follow :**

The petrol consumption rate of a new model car 'Palto' depends on its speed and may be described by the graph below.



51. Manasa makes the 200 km trip from Mumbai at a steady speed of 60 km per hour. What is the amount of petrol consumed for the journey? (2001)  
 (a) 12.5 litres (b) 13.33 litres (c) 16 litres (d) 19.75 litres
52. Manasa would like to minimize the fuel consumption for the trip by driving at the appropriate speed. How should she change the speed? (2001)  
 (a) Increase the speed (b) Decrease the speed  
 (c) Maintain the speed at 60 km/hour (d) Cannot be determined

53. 6 technicians take total 10 hours to build a new server from Direct Computer, with each working at the same rate. If six technicians start to build the server at 11:00 am, and one technician per hour is added beginning at 5:00 pm, at what time will the server be complete? (2002)  
 (a) 6:40 pm (b) 7:00 pm (c) 7:20 pm (d) 8 pm
54. 3 small pumps and a large pump are filling a tank. Each of the three small pumps works at  $\frac{2}{3}$ rd the rate of the large pump. If all 4 pumps work at the same time, they should fill the tank in what fraction of the time that it would have taken the large pump alone? (2002)  
 (a)  $\frac{4}{7}$  (b)  $\frac{1}{3}$  (c)  $\frac{2}{3}$  (d)  $\frac{3}{4}$
55. On a straight road XY, 100 metres long, five heavy stones are placed two metres apart beginning at the end X. A worker, starting at X, has to transport all the stones to Y, by carrying only one stone at a time. The minimum distance he has to travel (in metres) is (2002)  
 (a) 472 (b) 422 (c) 744 (d) 860
56. Only a single rail track exists between station A and B on a railway line. One hour after the north bound super fast train N leaves station A for station B, a south bound passenger train S reaches station A from station B. The speed of the super fast train is twice that of a normal express train E, while the speed of a passenger train S is half that of E. On a particular day N leaves for station B from Station A, 20 minutes behind the normal schedule. In order to maintain the schedule both N and S increased their speed. If the super fast train doubles its speed, what should be the ratio (approximately) of the speed of passenger train to that of the super fast train so that passenger train S reaches exactly at the scheduled time at station A on that day (2002)  
 (a) 1:3 (b) 1:4 (c) 1:5 (d) 1:6
57. On a 20 km tunnel connecting two cities A and B there are three gutters. The distance between gutter 1 and 2 is half the distance between gutter 2 and 3. The distance from City A to its nearest gutter, gutter 1 is equal to the distance of city B from gutter 3. On a particular day the hospital in city A receives information that an accident has happened at the third gutter. The victim can be saved only if an operation is started within 40 minutes. An ambulance started from city A at 30 km/hr and crossed the first gutter after 5 minutes. If the driver had doubled the speed after that, what is the maximum amount of time the doctor would get to attend the patient at the hospital? Assume 1 minute is elapsed for taking the patient into and out of the ambulance (2002)  
 (a) 4 minutes (b) 2.5 minutes (c) 1.5 minutes (d) Patient died before reaching the hospital
58. A car rental agency has following terms. If a car is rented for 5 hours or less the charge is Rs 60 per hour or Rs 12 per kilometre whichever is more. On the other hand, if the car is rented for more than 5 hours, the charge is Rs 50 per hour or Rs 7.50 per kilometre whichever is more. Akil rented a car from this agency, drove it for 30 kilometers and ended up paying Rs 300. For how many hours did he rented the Car? (2002)  
 (a) 4 (b) 5 (c) 6 (d) None of these
59. A train approaches a tunnel AB. Inside the tunnel is a cat located at a point that is  $\frac{3}{8}$  of the distance AB measured from the entrance A. When the train whistles the cat runs. If the cat moves to the entrance of the tunnel, A, the train catches the cat exactly at the entrance. If the cat moves to the exit, B, the train catches the cat at exactly the exit. The speed of the train is greater than the speed of the cat by what order? (2002)  
 (a) 3:1 (b) 4:1 (c) 5:1 (d) None of these
60. In a 4000 metre race around a circular stadium having a circumference of 1000 metres, the fastest runner and the slowest runner reach the same point at the end of the 5th minute for the first time after the start of the race. All the runners have the same starting point and each runner maintains a uniform speed throughout the race. If the fastest runner runs at twice the speed of the slowest runner, what is the time taken by the fastest runner to finish the race? (2003C)  
 (a) 20 min (b) 15 min (c) 10 min (d) 5 min

**Directions for questions 61 to 63 : Read the information given below and answer the questions that follow :**

A city has two perfectly circular concentric ring roads, the outer ring road (OR) being twice as long as the inner ring road (IR). These are also four (straight line) chord roads from  $E_1$ , the east end point of OR to  $N_2$ , the north end point of IR; from  $N_1$ , the north end point of OR to  $W_2$ , the west end point of IR, from  $W_1$ , the west end point of OR, to  $S_2$ , the south end point of IR; and from  $S_1$ , the south end point of OR to  $E_2$ , the east end point of IR. Traffic moves at a constant speed of  $30\pi$  km/hr on the OR road,  $20\pi$  km/hr on the IR road and  $15\sqrt{5}$  km/hr on all the chord roads.

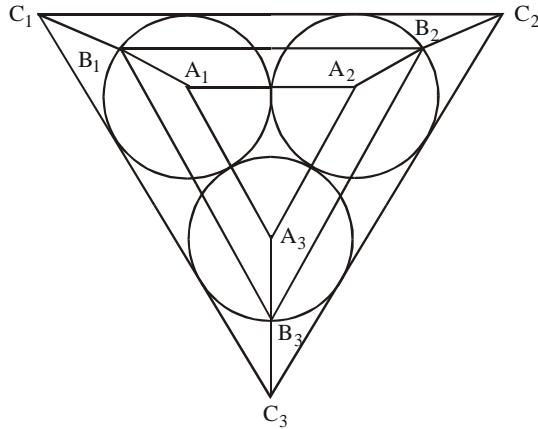
61. Amit wants to reach  $E_2$  from  $N_1$  using first the chord  $N_1-W_2$  and then the inner ring road. What will be his travel time in minutes on the basis of information given in the above question (2003C)  
 (a) 60 (b) 45 (c) 90 (d) 105
62. Amit wants to reach  $N_2$  from  $S_1$ . It would take him 90 minutes if he goes on minor arc  $S_1-E_1$  on OR, and then on the chord road  $E_1-N_2$ . What is the radius of the outer ring road in kms? (2003C)  
 (a) 60 (b) 40 (c) 30 (d) 20
63. The ratio of the sum of the lengths of all chord roads to the length of the outer ring road is (2003C)  
 (a)  $\sqrt{5}:2$  (b)  $\sqrt{5}:2\pi$  (c)  $\sqrt{5}:\pi$  (d) None of the above.

64. A car is being driven, in a straight line and at a uniform speed, towards the base of a vertical tower. The top of the tower is observed from the car and, in the process, it takes 10 minutes for the angle of elevation to change from  $45^\circ$  to  $60^\circ$ . After how much more time will this car reach the base of the tower? (2003)

(a)  $5(\sqrt{3} + 1)$  (b)  $6(\sqrt{3} + \sqrt{2})$  (c)  $7(\sqrt{3} - 1)$  (d)  $8(\sqrt{3} - 2)$

**Directions for questions 65 to 67 :** Read the information given below and answer the questions that follow :

Consider three circular parks of equal size with centers at  $A_1$ ,  $A_2$  and  $A_3$  respectively. The parks touch each other at the edge as shown in the figure (not drawn to scale). There are three paths formed by the triangles  $A_1A_2A_3$ ,  $B_1B_2B_3$  and  $C_1C_2C_3$  as shown. Three sprinters A, B and C begin running from points  $A_1$ ,  $B_1$  and  $C_1$  respectively. Each sprinter traverses her respective triangular path clockwise and returns to her starting point.



65. Let the radius of each circular park be  $r$ , and the distances to be traversed by the sprinters A, B and C be  $a, b$  and  $c$ , respectively. Which of the following is true? (2003)

(a)  $b - a = c - b = 3\sqrt{3}r$  (b)  $b - a = c - b = \sqrt{3}r$  (c)  $b = \frac{a + c}{2} = 2(1 + \sqrt{3})r$  (d)  $c = 2b - a = (2 + \sqrt{3})r$

66. Sprinter A traverses distances  $A_1A_2$ ,  $A_2A_3$  and  $A_3A_1$  at average speeds of 20, 30 and 15, respectively. B traverses her entire path at a uniform speed of  $(10\sqrt{3} + 20)$ . C traverses distances  $C_1C_2$ ,  $C_2C_3$  and  $C_3C_1$  at average speeds of  $\frac{40}{3}(\sqrt{3} + 1)$ ,  $\frac{40}{3}(\sqrt{3} + 1)$  and 120, respectively. All speeds are in the same unit. Where would B and C be respectively when A finishes her sprint? (2003)

(a)  $B_1, C_1$  (b)  $B_3, C_3$   
(c)  $B_1, C_3$  (d)  $B_1$ , somewhere between  $C_3$  &  $C_1$

67. Sprinters A, B and C traverse their respective paths at uniform speeds of  $u$ ,  $v$  and  $w$  respectively. It is known that  $u^2 : v^2 : w^2$  is equal to Area A : Area B : Area C, where Area A, Area B and Area C are the areas of triangles  $A_1A_2A_3$ ,  $B_1B_2B_3$  and  $C_1C_2C_3$ , respectively. Where would A and C be when B reaches point  $B_3$ ? (2003)

(a)  $A_2, C_3$   
(b)  $A_3, C_3$   
(c)  $A_3, C_2$   
(d) Somewhere between  $A_2$  &  $A_3$ , somewhere between  $C_3$  &  $C_1$

68. Two straight roads  $R_1$  and  $R_2$  diverge from a point A at an angle of  $120^\circ$ . Ram starts walking from point A along  $R_1$  at a uniform speed of 3 km/hr. Shyam starts walking at the same time from A along  $R_2$  at a uniform speed of 2 km/h. They continue walking for 4 hours along their respective roads and reach points B and C on  $R_1$  and  $R_2$ , respectively. There is a straight line path connecting B and C. Then Ram returns to point A after walking along the line segments BC and CA. Shyam also returns to A after walking along line segments CB and BA. Their speeds remain unchanged. The time interval (in hours) between Ram's and Shyam's return to the point A is (2003)

(a)  $\frac{10\sqrt{19}}{3} - 26$  (b)  $\frac{2\sqrt{19}}{3} - 10$  (c)  $\frac{\sqrt{19}}{3} - 26$  (d)  $\frac{\sqrt{19}}{3} - 10$

69. Karan and Arjun run a 100-metre race, where Karan beats Arjun by 10 metres. To do a favour to Arjun, Karan starts 10 metres behind the starting line in a second 100-metre race. They both run at their earlier speeds. Which of the following is true in connection with the second race? (2004)
- (a) Karan and Arjun reach the following line simultaneously  
 (b) Arjun beats Karan by 1 metre  
 (c) Arjun beats Karan by 11 metre  
 (d) Karan beats Arjun by 1 metre
70. If a man cycles at 10 km/hr, then he arrives at a certain place at 1 pm. If he cycles at 15 km/hr, he will arrive at the same place at 11 am. At what speed must he cycle to get there at noon? (2004)
- (a) 11 km/hr  
 (b) 12 km/hr  
 (c) 13 km/hr  
 (d) 14 km/hr
71. Two boats, traveling at 5 and 10 kms per hour, head directly towards each other. They begin at a distance 20 kms from each other. How far apart are they (in kms) one minute before they collide? (2004)
- (a)  $\frac{1}{12}$   
 (b)  $\frac{1}{6}$   
 (c)  $\frac{1}{4}$   
 (d)  $\frac{1}{3}$
72. In nuts and bolts factory, one machine produces only nuts at the rate of 100 nuts per minute and needs to be cleaned for 5 minutes after production of every 1000 nuts. Another machine produces only bolts at the rate of 75 bolts per minute and needs to be cleaned for 10 minutes after production of every 1500 bolts. If both the machines start production at the same time, what is the minimum duration required for producing 9000 pairs of nuts and bolts? (2004)
- (a) 130 minutes  
 (b) 135 minutes  
 (c) 170 minutes  
 (d) 180 minutes
73. A chemical plant has four tanks (A, B, C and D) each containing 1000 litres of a chemical. The chemical is being pumped from one tank to another as follows : (2005)
- From A to B @ 20 litres/minute  
 From A to D @ 10 litres/minute  
 From B to C @ 100 litres/minute  
 From C to A @ 90 litres/minute  
 From C to D @ 50 litres/minute  
 From D to B @ 110 litres/minute
- Which tank gets emptied first, and how long does it take (in minutes) to get empty after pumping starts?
- (a) A, 16.66  
 (b) C, 20  
 (c) D, 20  
 (d) D, 25

**Directions for question 74 & 75 : Answer the questions on the basis of the information given below**

Ram and Shyam run a race between points A and B, 5 km apart. Ram starts at 9 a.m. from A at a speed of 5 km/hr, reaches B and returns to A at the same speed. Shyam starts at 9:45 a.m. from A at a speed of 10 km/hr, reaches B and comes back to A at the same speed.

74. At what time do Ram and Shyam first meet each other? (2005)
- (a) 10 a.m.  
 (b) 10:10 a.m.  
 (c) 10:20 a.m.  
 (d) 10:30 a.m.
75. At what time does Shyam overtake Ram? (2005)
- (a) 10:20 a.m.  
 (b) 10:30 a.m.  
 (c) 10:40 a.m.  
 (d) 10:50 a.m.
76. Arun, Barun and Kiranmala start from the same place and travel in the same direction at speeds of 30, 40 and 60 km per hour respectively. Barun starts two hours after Arun. If Barun and Kiranmala overtake Arun at the same instant, how many hours after Arun did Kiranmala start? (2006)
- (a) 3  
 (b) 3.5  
 (c) 4  
 (d) 4.5  
 (e) 5

**Directions for Questions 77 & 78 : Cities A and B are in different time zones. A is located 3000 km east of B. The table below describes the schedule of an airline operating non-stop flights between A and B. All the times indicated are local and on the same day.**

Departure		Arrival	
City	Time	City	Time
B	8:00 AM	A	3:00 PM
A	4:00 PM	B	8:00 PM

Assume that planes cruise at the same speed in both directions. However, the effective speed is influenced by a steady wind blowing from east to west at 50 km per hour.

77. What is the time difference between A and B? (2007)
- (a) 1 hour  
 (b) 1 hour and 30 minutes  
 (c) 2 hours  
 (d) 2 hours and 30 minutes  
 (e) Cannot be determined
78. What is the plane's cruising speed in km per hour? (2007)
- (a) 500  
 (b) 700  
 (c) 550  
 (d) 600  
 (e) Cannot be determined.
79. Rahim plans to drive from city A to station C, at the speed of 70 km per hour, to catch a train arriving there from B. He must reach C at least 15 minutes before the arrival of the train. The train leaves B, located 500 km south of A, at 8:00 am and travels at a speed of 50 km per hour. It is known that C is located between west and north-west of B, with BC at  $60^\circ$  to AB. Also, C is located between south and south-west of A with AC at  $30^\circ$  to AB. The latest time by which Rahim must leave A and still catch the train is closest to (2008)
- (a) 6:15 am  
 (b) 6:30 am  
 (c) 6:45 am  
 (d) 7:00 am  
 (e) 7:15 am

## ANSWERS WITH SOLUTIONS

1. (d) 

Let school be at a distance of  $x$  km from town B. Cost of transport for 130 students  
 $= 30(100-x) \times 1.20 + 100x \times 1.20 = (3000 + 70x) \times 1.20$   
 For cost to be minimum,  $x = 0$ ,  
 Hence, expenditure is least when school is built at town B.

2. (d) One day work of man = 1

$$\text{One day work of woman} = \frac{1}{2}$$

$$\text{One day work of child} = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$$

$$\text{One day work ratio} = 1 : \frac{1}{2} : \frac{1}{6} \text{ or } 6 : 3 : 1$$

Ratio of men, women and children = 6 : 5 : 2

Their wages ratio = 6 : 3 : 1

Let wage per child =  $x$

Then, wage per woman =  $3x$

And wage per man =  $6x$

Let  $y$  = number of children

There are 39 pairs of hands

Therefore,  $6y = 5y + 2y = 39$

$$\text{or } 13y = 39 \Rightarrow y = 3$$

Hence, man = 18, woman = 15 and children = 6

Amount paid,  $(6x)18 + (3x)15 + (x)6 = 1113$

$$108x + 45x + 6x = 1113$$

$$\therefore x = \text{Rs. } 7$$

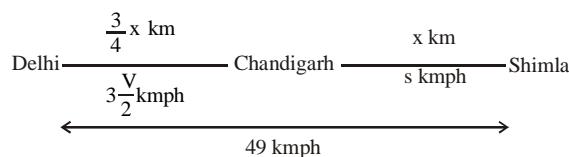
3. (b) Tap A fills 4 buckets ( $4 \times 5 = 20$  litres) in 24 min.

$$\text{In 1 hour tap A fills } \frac{20}{24} \times 60 = 50 \text{ litres}$$

$$\text{In 1 hour tap B fills } = 8 \times 5 = 40 \text{ litres}$$

$$\text{In 1 hour tap C fills } \frac{2 \times 5}{20} \times 60 = 30 \text{ litres}$$

If they open together they would fill 50 + 40 + 30 = 120 litres in one hour but full tank is emptied in 2 hours So, tank capacity would be  $120 \times 2 = 240$  litres.

4. (c) 

Let average speed from Chandigarh to Shimla =  $V$  kmph

$$\text{Time taken from Delhi to Chandigarh} = \frac{3x \times 2}{4 \times 3V} = \frac{x}{2V}$$

$$\text{Time taken from Chandigarh to Shimla} = \frac{x}{V}$$

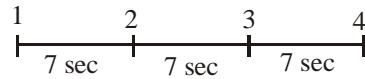
$$\text{Total time} = \frac{x}{2V} + \frac{x}{V} + \frac{3x}{2V}$$

$$\text{Also total time} = \frac{(3/4)x}{49} + \frac{x}{4 \times 49}$$

$$\therefore \text{Total time would be same} = \frac{3x}{2V} + \frac{7x}{4 \times 49}$$

$$\Rightarrow V = 42 \text{ km/h.}$$

5. (d) There are three intervals between four strikes

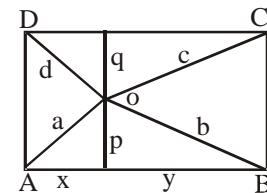


$$\text{In one interval it will take } \frac{7}{3} \text{ sec.}$$

There would be 10 intervals between eleven strikes

$$\text{Pendulum will take } 10 \times \frac{7}{3} = \frac{70}{3} = 23.33 \text{ sec.}$$

6. (a) Suppose A travelled distance  $a$ ,  
 B travelled distance  $b$ ,  
 C travelled distance  $c$ ,  
 and D travelled distance  $d$   
 They meet at a point  $o$  which is at a distance  $x$  from AD,  $y$  from BC,  $p$  from AB and  $q$  from CD.



we get,

$$a^2 = x^2 + p^2; d^2 = q^2 + x^2$$

$$b^2 = p^2 + y^2; c^2 = q^2 + y^2$$

Therefore, we see

$$a^2 = c^2 = b^2 = d^2$$

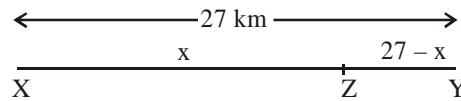
for  $d$  to be maximum

$$50^2 = 60^2 = 40^2 = d^2$$

$$2500 = 3600 = 1600 = d^2$$

$$\text{or } 4500 = d^2 \Rightarrow d = 30\sqrt{5}$$

$$\therefore d = 67 \text{ m (approx.)}$$



Time taken by A from X to Z would be same as time taken by B from X to Y and Y to Z.

Let  $XZ = x$ .

So, time taken by A  $\frac{x}{5}$  and

$$\text{time taken by B } \frac{27}{7} \frac{(27-x)}{7} \frac{54-x}{7}$$

$$\frac{x}{5} \frac{54-x}{7} \Rightarrow 12x = 54 \times 5 = 270$$

$$\therefore x = 22.5 \text{ km}$$

8. (c) Let the capacity of tank be  $x$  litres

$$\text{In one hour tank empties } = \frac{1}{8} \text{ of } x = \frac{x}{8} \text{ litre}$$

In one hour, tap admits 6 litres  
after opening tap tank is emptied in 12 hours.

$$\text{So in one hour tank empties by } \frac{1}{12} \text{ of } x = \frac{x}{12} \text{ litres.}$$

$$\text{Therefore equation becomes } 6 - \frac{x}{8} = \frac{x}{12}$$

$$6 = \frac{x}{8} - \frac{x}{12} = \frac{4x}{96} = \frac{x}{24}$$

$$\therefore x = 144 \text{ litres}$$

9. (c) Time taken by B  $\frac{13.2}{16}$

$$\text{and time taken by D } = \frac{13.2}{18}$$

Required ratio

$$\frac{13.2}{16} : \frac{13.2}{18} \text{ or } \frac{1}{16} : \frac{1}{18} \text{ or } 18:16 = 9:8$$

10. (a) In a 200 m race, A beats S by 20 m and A beats N by 40 m

Then, when S runs 180m, N runs 160 m only

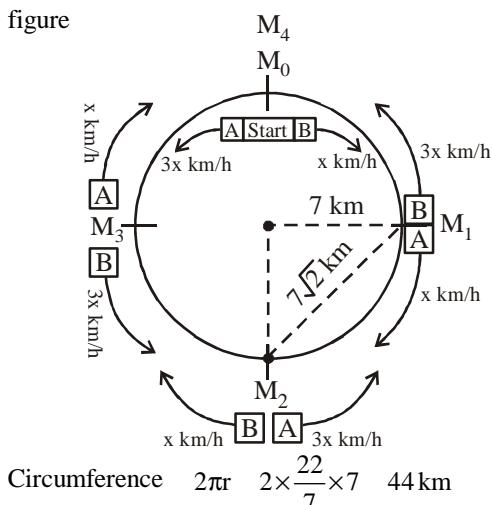
Hence, when S runs 100 m, N runs

$$\frac{160}{180} \times 100 = 88.88 \text{ m}$$

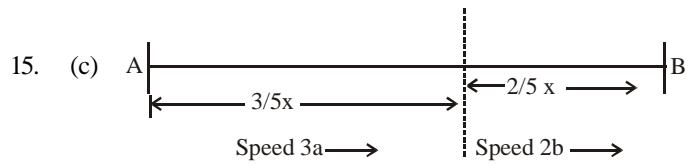
$$\therefore S \text{ beats N by } 100 - 88.88 = 11.11 \text{ m}$$

#### For Qs. 11-14.

The points  $M_1, M_2, M_3$  and  $M_4$  are clearly shown in the figure



11. (b) Hence, shortest distance between  $M_1$  and  $M_2$   
 $= 7\sqrt{2} \text{ km}$
12. (a) Shortest distance between  $M_1$  and  $M_3$  along = 22 km
13. (d)  $M_4$  is the point that coincides with  $M_0$ .
14. (a) Distance travelled by A =  $33 + 11 + 33 = 77 \text{ km}$



$$\text{Speed } \frac{\text{Distance}}{\text{Time}}$$

$$3a = \frac{3/5x}{t_1}$$

$$t_1 = \frac{3x}{5 \times 3a} = \frac{x}{5a} \quad \dots\dots(i)$$

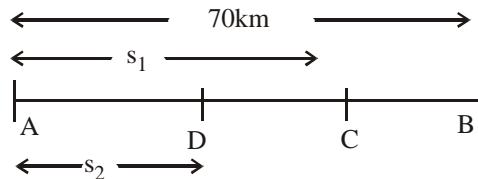
$$t_2 = \frac{2x}{5 \times 2b} = \frac{x}{5b} \quad \dots\dots(ii)$$

$$5c = \frac{2x}{t} \quad \dots\dots(iii)$$

$$t = t_1 + t_2$$

$$\frac{2x}{5c} = \frac{x}{5a} = \frac{x}{5b} \Rightarrow \frac{2}{c} = \frac{1}{a} = \frac{1}{b}$$

#### For Qs. 16-20.



$$\text{Time taken by Y } \frac{s_1}{20} = \frac{(70-s_1)}{5} = \frac{280-3s_1}{20} \quad \dots\dots(i)$$

$$\text{Time taken by Z } \frac{s_2}{5} = \frac{70-s_2}{20} = \frac{3s_2}{20} = \frac{70}{20} \quad \dots\dots(ii)$$

$$\text{Equating (i) \& (ii), } 280-3s_1 = 3s_2 = 70$$

$$\Rightarrow 210 = 3(s_1 - s_2) \Rightarrow s_1 - s_2 = 70$$

$$\text{time taken by X } \frac{s_1 - 2(s_1 - s_2)}{20} = \frac{70 - s_1}{20}$$

$$\frac{2s_1 - 2s_2}{20} = \frac{70}{20} \quad \dots\dots(iii)$$

$$\text{Equating (1) \& (3), } 280 - 3s_1 - 2s_1 - 2s_2 = 70 \\ \Rightarrow 210 = 5s_1 - 2s_2$$

Using  $s_2 = 70 - s_1$ , we get

$$210 = 5s_1 - 2(70 - s_1) = 5s_1 - 140 - 2s_1 \\ \Rightarrow 350 = 7s_1 \Rightarrow s_1 = 50 \text{ and } s_2 = 70 - 50 = 20$$

16. (c) Distance covered by Z on foot =  $s_2 = 20$  km  
17. (a) Total distance travelled by

$$X = s_1 + 2(s_1 - s_2) = 70 - s_1 \\ = 50 + 2(50 - 20) = 70 - 50 \\ = 50 + 60 + 20 = 130 \text{ km}$$

18. (b) Time taken to reach from A to B

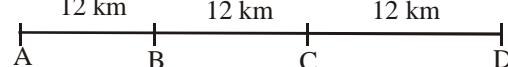
$$\frac{280 - 3s_1}{20} = \frac{280 - 150}{50} = \frac{130}{20} = 6.5 \text{ hours}$$

19. (c) Time when Y was dropped by

$$X = \frac{s_1}{20} = \frac{50}{20} = 2.5 \text{ hours}$$

20. (d) X covers the distance  $s_1 - s_2$  alone, i.e. 30 km at speed

$$\text{of } 20 \text{ kmph in } \frac{30}{20} = 1.5 \text{ hours}$$

21. (a) 

Let total time taken by the man to reach D

$$\Rightarrow \frac{12}{x} + \frac{12}{2x} + 2x + \frac{12}{4x} = 16 \\ \Rightarrow \frac{12}{x} + \frac{3x}{1} + \frac{6}{x} + \frac{3}{x} = 16 \Rightarrow \frac{21}{x} + 3x = 16 \\ \Rightarrow 21 - 3x^2 - 16x = 0 \Rightarrow 3x^2 + 16x - 21 = 0 \\ \Rightarrow 3x^2 - 7x - 9x = 21 = 0 \\ \Rightarrow (x-3)(3x+7) = 0 \text{ or } x = 3 \text{ or } \frac{7}{3}$$

Hence, he rested for 3 hours at B

22. (b) When watch runs correct the minute hand should cross the hour hand once in every  $65 \frac{5}{11}$  minutes.

So, they should ideally cross 3 times once in

$$3 \times \left( \frac{720}{11} \right) = \frac{2160}{11} \text{ minutes} = 196.36 \text{ minutes.}$$

But in the watch under consideration, they meet after every 3 hours, 18 minutes and 15 seconds, i.e.,

$$\left( 3 \times 60 + 18 + \frac{15}{60} \right) = \frac{793}{4} \text{ minutes}$$

In 24 hours a watch has 1440 minutes.

Thus, our watch is actually losing time (as it is slower than the normal watch). Hence, when our watch elapsed

$$\left( 1440 \times \frac{196.36}{198.25} \right) = 1426.27 \text{ minutes.}$$

Hence, the amount of time lost by our watch in one day  $1440 - 1426.27 = 13.73$  i.e., 13 minutes and 50 seconds (approx).

23. (d) When Bhairav covers 1600m, Akshay covers  $(1600 - 128)$  m.  
So, when Bhairav covers  $(1600/16) = 100$  m, Akshay covers  $(128/16) = 8$  m less.  
When Bhairav covers 100m. Chinmay covers  $(100 - 4) = 96$  m.

Thus, the ratio in which Akshay and Chinmay cover distances is 92 : 96.

In 96 m, Chinmay gains  $(96 - 92) = 4$  m over Akshay.  
So in 1.5 miles, Chinmay gains 100 m =  $(1/16)$  miles over Akshay.

24. (a) Let express train be  $l$  km and goods train be  $2l$  km long.  
Then, relative speed of both trains =  $80 - 40 = 40$  kmph

$$\therefore \frac{3l}{40} \times 3600 = 54 \Rightarrow l = \frac{18}{90} \text{ km} = 200 \text{ m}$$

Hence, time taken to cross a station

$$= \frac{(400 - 2 \times 200)}{80 \times 1000} \times 3600 = 36 \text{ sec.}$$

25. (b) Total time for journey =  $12 + 2 + 11 = 25$  hrs.

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$\therefore$  Total Distance =  $180 \times 25 = 4500$  miles

26. (a) Since he will halt at Boston for one hour less than his previous halt there.

Hence, Total time =  $12 + 1 + 11 = 24$  hrs.

27. (b) Average speed of  $= \frac{4500 \times 2}{24 - 25} = 180$  km/hr.

28. (c) Let after  $t$  seconds X catches thief, hence, distance travelled by thief = distance travelled by policeman

$$\Rightarrow 60 \times t = 65 \times \left( t - \frac{1}{4} \right)$$

$$\Rightarrow t = \frac{13}{4} \text{ hrs} = 3 \text{ hrs } 15 \text{ minutes.}$$

$\therefore$  At 3 : 15pm, X will catch thief.

29. (b) Since other policemen started 15 minutes later than the thief with speed of 60 kmph.

So, distance he lagged behind the thief = distance behind policeman when he caught the thief

$$= 60 \times \frac{1}{4} = 15 \text{ km}$$

30. (b) Let work done by A in one day be a, similarly, for B, b and for C, c

So,  $3a = 1$ ,  $4b = 1$ ,  $6c = 1$  [Total work be 1 unit]

So, Total work done by the 3 Machines in one day

$$= \frac{1}{3} + \frac{1}{4} + \frac{1}{6} = \frac{3}{4}$$

Therefore, time taken to complete the work is

$$\frac{1}{3/4} = \frac{4}{3} \text{ days.}$$

31. (d) A ————— 72km ————— B

varrying speed  
(2, 2.5, 3.....)

4 kmph

Speed of man B is in Arithmetic Progression.

Let they meet when A has covered x km

Then, time taken by A for covering x km  $\left(\frac{x}{4}\right)$  hrs

Distance covered by B =  $(72 - x)$  km

Also, Distance covered by B

$2, 2.5, 3, \dots, \left[\left(\frac{x}{4}\right) \text{ times}\right] \text{ no. of terms}$

i.e.,  $72 - x = 2, 2.5, 3, \dots, \left(\frac{x}{4}\right) \text{ times}$

$$+ \left[ \frac{x}{4} - \left( \frac{x}{4} \right) \right] \left[ \frac{x}{4} - \left( \frac{x}{4} \right) - 1 \right]$$

Put the options in above equation we get  $x = 36$  km.

Hence, they meet midway between A & B

32. (c) 1st day he climbing up at 6.00 a.m. and reached at 6.00 p.m.

2nd day he coming down at 6.00 a.m. and reached the foothill 6.00 p.m.

Hence, average speed of both path is same.

At noon it is not necessary that he was at same spot.

There must be a point where he reached at the same time on both the days.

33. (b) Total distance travelled by Rajeev

$$= 35 \times 2 + 45 \times 2 = 160.$$

Aditi travels equal distances with speeds 30, 40, 50.

Thus, she covers a stretch of  $160/3$  km by every speed.

From graph we can say that fuel consumed is given by

$$\frac{160}{3} \div 16 + \frac{160}{3} \div 24 + \frac{160}{3} \div 16 = \frac{80}{9} \approx 9 \text{ litres}$$

34. (a) In order to minimize the petrol consumption mileage has to be maximum from the graph given in the question.

Maximum mileage is 24 kms/ltr and the distance to be travelled is 160 kms so the minimum petrol consumption

$$= \text{distance} / \text{mileage} = 160 / 24 = 6.66 \text{ ltrs.}$$

35. (b)

At 7 : 00 am; Navjeevan Express travels for  $\frac{1}{2}$  hr.

Hence, distance covered =  $50 \times \frac{1}{2} = 25 \text{ km.}$

Now, the relative speed between the two trains is  $50 + 40 = 90 \text{ kmph}$

Relative distance = 75 km. So, the time for collision =  $75 / 90 = 50 \text{ min}$  from 7 : 00 am.

Thus, after 7 : 30 when Mr. Shah notices it, 20 minutes are left.

36. (b) Let  $r$  = reduction in speed and  $w$  = number of wagons

Given that  $r \propto \sqrt{w}$

$$r = 42 - 24 = 18 \text{ and } w = 9$$

Now let us find out how many wagons will be required so that the train stops. For that let's take the speed as 0. For this to happen the reduction has to be 42.

$$\therefore \frac{18}{42} = \frac{\sqrt{9}}{\sqrt{w}} \Rightarrow w = 49$$

With 49 wagons the train will stop. So, we subtract one wagon so that the train will just move.

Hence, the answer is 48.

37. (c) Let  $AD = DC = x$ .

Time taken by Y to cover AC =  $\frac{x}{45} + \frac{x}{55} = \frac{x \times 100}{55 \times 45}$

Average speed of Y between A – C,

$$= \frac{2x \times 55 \times 45}{x \times 100} = 49.5 \text{ kmph}$$

38. (a) X and Y each reaches C at the same time

$$\therefore \frac{AB}{61.875} = \frac{AC}{49.5}$$

$$\Rightarrow \frac{AB}{AC} = \frac{61.875}{49.5} = \frac{5}{4}$$

Using Pythagorean theorem in ABC,

$$100^2 = (5x - 100)^2 + (4x)^2$$

$$\Rightarrow 10000 = 25x^2 + 10000 - 1000x + 16x^2$$

$$\Rightarrow 9x^2 - 1000x + 20000 = 0$$

$$\Rightarrow x = 26.11, BC = 5 \times 26.11 - 100 = 30.55$$

and AC = 104.44

39. (a) From above solution

$$AC \approx 105 \text{ km}$$

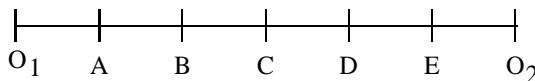
40. (c) Total cost for 10 kg, =  $\frac{80}{10} \times \frac{10}{5} \times 10 = \text{Rs } 160$

$$\text{Total cost for 20 kg,} = \frac{80}{20} \times \frac{10}{2} \times 10 = \text{Rs } 200$$

Hence, minimum cost = Rs 160.

41. (a) The installation and functioning of all the five machines will be as per the following figure.

The robot begins to give material to machine A and then to D, thus it covers 40 m in that time span and takes 4 seconds.



Also it returns to the origin at the same time and takes 4 seconds covering 40 metres again.

When it arrives at the origin the messages of B and C are already present there.

Hence it starts to deliver the material to them taking in all 6 seconds in doing so and covers  $30 + 30 = 60$  metres. Hence the distance travelled by the robot will be  $40\text{m} + 40\text{m} + 60\text{m} = 140\text{m}$ .

42. (a) Once the robot has delivered the material to machines A and D, it shall reach the origin 2 (nearest) taking 6 sec. and covering 60 m. Then it immediately moves to deliver material to machines C and B covering a distance of 40 m and finally back to origin (nearest). Thus it covers a distance of 60 m. Hence, it covers a total distance of 120 metres.

43. (b) The only thing which matters in this problem is mileage or kms per litre of the fuel. At 50 kmph 195 kms can be covered. According to condition 1.3 times the fuel will be required at 75kmph.

Therefore, distance travelled will be  $195/1.3 = 150$  kms.

44. (d) A's 1 day work  $\frac{1}{4}$ ; B's  $\frac{1}{8}$ ; C's  $\frac{1}{16}$ ; D's  $\frac{1}{32}$

Consider pairs A, B and C, D

For A, B combined, 1 day work  $\frac{3}{8}$  per day

For C, D combined, 1 day work  $\frac{3}{32}$  per day

For A, C combined, 1 day work  $\frac{5}{16}$  per day

For B, D combined, 1 day work  $\frac{5}{32}$  per day

For B, C combined, 1 day work  $\frac{3}{16}$  per day

For A, D combined, 1 day work  $\frac{9}{32}$  per day

Hence, we see that A, D is first pair B, C is second

45. (d) We know every year has 1 odd days and leap year has 2 odd days

Total number of years = 30

Here, no. of normal years = 22

And no. of leap years = 8

So, total no. of odd days between 9/ 12/ 71 and 9/ 12/ 2001 =  $22 + 16 = 38$

i.e., 3 odd days (remainder when 38 is divided by 7, i.e., 3)

Hence, it was a Thursday

46. (d) Time taken in downstream

= Time taken in upstream – 6 hr.

Let his speed be  $x$  in normal water and speed of current be  $y$

$$\text{Then, } \left( \frac{12}{x-y} - \frac{12}{x+y} = 6 \right) \quad \dots \dots \text{(i)}$$

$$\left( \frac{12}{2x-y} - \frac{12}{2x+y} = 1 \right) \quad \dots \dots \text{(ii)}$$

$$\text{or } \frac{24y}{x^2-y^2} = 6 \text{ or } 4y = x^2-y^2 \quad [\text{from (i)}]$$

$$24y = 4x^2-y^2 \quad [\text{from (2)}]$$

$$\text{Subtracting, } 3x^2 = 20y \text{ or } x^2 = \frac{20}{3}y$$

$$\text{Putting } x^2 \text{ in } 4y = x^2-y^2$$

$$4y = \frac{20}{3}y - y^2 \text{ or } y = \frac{8}{3}$$

47. (b) If Shyama takes 1 minutes for every 3 steps, then she takes  $1/3$  minutes for every step.

For 25 steps, he takes  $25/3$  minutes = 8.33 minutes.

So, Vyom takes  $\frac{1}{2}$  minutes for every step.

For 20 steps, he takes 10 minutes.

Difference between their times = 1.66 minutes

Escalator takes 5 steps in 1.66 minutes.

Speed of escalator is 1 step for 0.33 minutes = 3 steps per minutes.

If escalator is moving, then Shyam takes 25 steps and escalator also takes 25 steps.

Hence, total number of steps = 50.

48. (c) Let the time taken by Asit, Arnold and Afzal to do the work alone be  $x$ ,  $y$  and  $z$  hrs respectively.

Therefore, time taken to do the work together is

$$\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$$

In one hour, they can together do

$$\frac{1}{x} + \frac{1}{y} + \frac{1}{z} \text{ of the work.}$$

Therefore, total work can be completed by them in

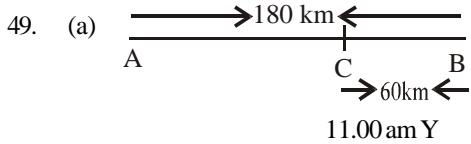
$$\frac{xyz}{xy + yz + zx} \text{ hrs.}$$

$$\Rightarrow \frac{xyz}{xy + yz + zx} = x - 6$$

Now, put  $y = x - 5$  and  $z = 2(x - 6)$  in the above equation and solve for  $x$ . We get  $x = 20/3$  hrs.

Hence, time taken by them to complete the work when working together

$$= \frac{20}{3} - 6 \quad \frac{2}{3} \text{ hrs} \quad 40 \text{ minutes}$$



X 11.00 a.m. →

Time taken by Y for distance cover from B to C with stoppages

$$\left( \frac{6}{5} \quad \frac{1}{4} \right) \text{ hrs} \quad \frac{24}{20} \quad \frac{5}{20} \text{ hrs.}$$

Say they cross each other at  $x$  distance from A

$$\therefore \frac{x}{70} \quad \frac{29}{20} \quad \frac{120-x}{50}$$

$$\therefore \frac{x}{50} \quad \frac{x}{70} \quad \frac{29}{20} \quad \frac{12}{5}$$

$$\Rightarrow \frac{12x}{350} \quad \frac{29}{20} \quad \frac{48}{20} \Rightarrow \frac{12x}{35} \quad \frac{77}{2}$$

$$\therefore x = \frac{77}{2} \times \frac{35}{12} = 112.29 \approx 112 \text{ km}$$

50. (b) Let  $L$  be length in metres of the race which A finishes in  $t$  seconds.

$$\text{Speed of A} = \frac{L}{t} \text{ m/s; speed of B} = \frac{L-12}{t} \text{ m/s and}$$

$$\text{speed of C} = \frac{L-18}{t} \text{ m/s}$$

Time taken by B to finish the race

$$= \frac{L}{(L-12)/t} \left( \frac{L}{L-12} \right) t \text{ seconds}$$

In this time, C covers  $(L-8)$  m.

$$\left( \frac{L-18}{t} \right) \left( \frac{L}{L-12} \right) t = L-8 \quad \therefore L = 48 \text{ m}$$

51. (b) We have been given a graph of fuel consumption versus speed  
At 60 km/hr

time taken  $\frac{200}{60}$  hrs  $\frac{10}{3}$  hrs and fuel consumption is 4 litres / hr. from graph.

$$\text{Petrol consumed} = \frac{10}{3} \times 4 = \frac{40}{3} \text{ litres}$$

52. (b) For consumption to be less say at 40 km/hr, time = 5 hrs.

So, consumption  $= 2.5 \times 5 = 12.5$  litres  
at 80 km/hr, time = 2.5 hr, consumption

$$= 7.4 \times 2.5 \text{ which is high}$$

So for consuming lesser petrol she should decrease the speed.

53. (d) 6 technicians take 10 hours to complete the work  
1 technician take 60 hours to complete work

1 hour work of 1 technician complete  $\frac{1}{60}$  part of work

6 hours (11:00 to 5:00) work of 1 technician complete

$$\frac{1}{60} \times 6 = \frac{1}{10} \text{ part of work}$$

6 hours (11:00 to 5:00) work of 6 technicians

$$\frac{1}{10} \times 6 = \frac{3}{5} \text{ part of work}$$

6 technicians work together 6 hours (11:00 to 5:00),

therefore, they have completed  $\frac{3}{5}$  part of work

Remaining work after 5:00 pm  $1 - \frac{3}{5} = \frac{2}{5}$  part of work

Now, one technician per hour is added beginning at 5:00 pm.

Therefore, 7 technicians.

Work between 5:00 pm to 6:00 pm  $\frac{7}{60}$

8 technicians work between 6:00 to 7:00 pm complete

$$\frac{8}{60} \text{ part of work}$$

Total work after 5:00 pm  $\frac{7}{60} + \frac{8}{60} = \frac{15}{60} \neq \frac{2}{5}$  part of work

$\therefore$  9 technicians work between 7:00 pm to 8:00 pm  $\frac{9}{60}$

Total work up to 8:00 pm  $\frac{15}{60} + \frac{9}{60} = \frac{24}{60} = \frac{2}{5}$

Hence, remaining work after 5:00 pm that is  $\frac{2}{5}$  part is completed up to 8:00 pm

54. (b) Suppose large pump takes  $t$  hours to fill a tank

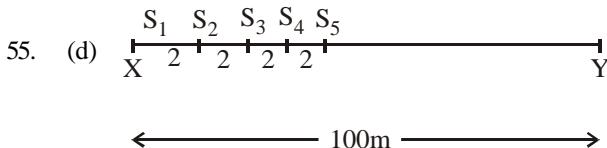
$\therefore$  1 hour work of large pump fills  $\frac{1}{t}$  part

1 hour work of each small pump fills  $\frac{1}{t} \times \frac{2}{3}$

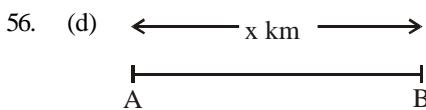
1 hour work of all 4 pumps fill  $\frac{1}{t} + 3 \times \frac{2}{3t} = \frac{3}{t}$

Therefore,  $\frac{3}{t}$  part is filled by all 4 pumps in 1 hour

$\therefore$  Whole tank would be filled in  $1 \times \frac{t}{3} \times \frac{t}{3} h$  this is  $1/3$  of the time taken by large pump i.e.,  $t$  hour



To transport first stone  $S_1$  to Y, worker travel a distance = 100 m, now he returns at  $S_2$   
 To transport  $S_2$  worker travels a distance =  $2 \times 98$  m  
 To transport  $S_3$  worker travels a distance =  $2 \times 96$  m  
 To transport  $S_4$  worker travels a distance =  $2 \times 94$  m  
 To transport  $S_5$  worker travels a distance =  $2 \times 92$  m  
 Total distance covered =  $100 + 2(98 + 96 + 94 + 92)$   
 $= 100 + 2(380) = 100 + 760 = 860$



Let speed of normal express train be  $e$   
 then speed of passenger train will be  $e/2$   
 and speed of super fast train will be  $2e$   
 According to question

$$\frac{x}{e/2} = 1 \Rightarrow x = e/2$$

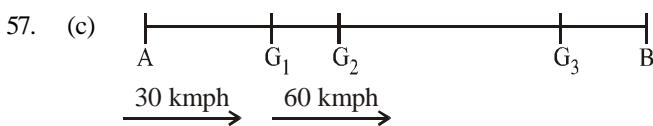
on a particular day speed of super fast train =  $4e$   
 on a particular day speed of passenger train

$$\frac{x}{40/60} = \frac{3}{2}x = \frac{e}{2} \times \frac{3}{2} = \frac{3e}{4}$$

$$\text{Required ratio } \frac{3e}{4} / 4e$$

$$\frac{3}{16} = 0.1875$$

or 1 : 6 (approx) [if ratio be 1 : 5 then train will not reach]



$$AG_1 = 30 \times \frac{5}{60} = 2.5 \text{ km}$$

$$BG_3 = 20 - 5 = 15 \text{ km}$$

Time to reach  $G_3$  from  $G_1 = \frac{15}{60} \times 60 = 15$  minutes

Time from A to  $G_1 = 5$  minutes

Time from  $G_3$  to A =  $\frac{17.5}{60} \times 60 = 17.5$  minutes

Time elapsed at  $G_3 = 1$  minutes

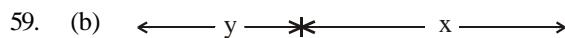
Total time from A to  $G_3$  &  $G_3$  to A

$$= 5 + 1 + 17.5 = 38.5 \text{ minutes}$$

The time for doctor =  $40 - 38.5 = 1.5$  minutes

58. (c) He drove 30 km and paid 300 rupees according to the rate Rs 12 per km rent be  $12 \times 30 =$  Rs 360  
 but he paid Rs 300  
 So, he rented the car according to second condition i.e. Rs 50 per hour

Rent hours  $\frac{300}{50} = 6$  hours



Trains A  $\frac{3}{8}x$  Cat  $\frac{5}{8}x$  B

Let speed of cat be  $s$  and speed of train be  $t$ .

If train catch the cat then, distances would be travelled in the same time

If train catches the cat at A then,  $\frac{y}{t} = \frac{3x}{8s} \Rightarrow y = \frac{3xt}{8s}$

If train catches the cat at B then,  $\frac{x-y}{t} = \frac{5x}{8s}$

$$\text{or } y = \frac{5x}{8s} - x$$

$$\text{or } \frac{3x}{8s} = \frac{5x}{8s} - x$$

$$\frac{3x}{8s} = x \left( \frac{5t-8s}{8s} \right) \Rightarrow 8s = 2t \text{ or } \frac{t}{s} = \frac{4}{1}$$

60. (c) Since the speed is double, the fastest runner will complete 200 m and the slowest runner will complete 100 m. Let  $x$  m/minute be the speed of the slowest runner.

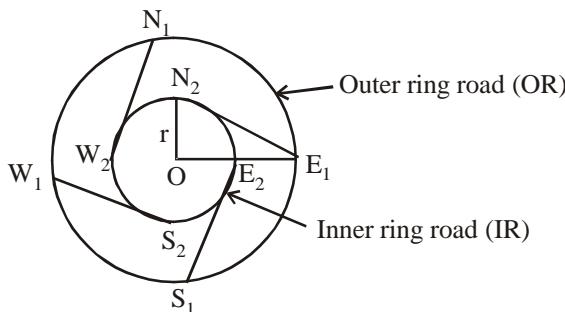
Time taken  $\frac{\text{Distance}}{\text{Relative speed}} = \frac{1000}{2x-x} = 5$  or  $x = 200$ .

Speed of the fastest runner =  $2 \times 200 = 400$  m/min

$\therefore$  Time taken by the fastest runner  
 $= 4000/400 = 10$  min

**Alternatively :** This question can be solved verbally. The first line clearly says that the fastest runner is one round ahead after 5 min. Further he runs at twice the speed, which again means that they have met at the starting point only after 5 min. i.e. the fastest runner runs 2000 m in 5 min hence he would run 4000 m in 10 min.

61. (d)

Let length of each chord be  $x$ Radius of IR =  $r$ . So, radius of OR =  $2r$ 

$$\text{In } \triangle N_2OE_1, N_2E_1^2 = ON_2^2 + OE_1^2$$

$$\Rightarrow r^2 + 4r^2 = x^2 + 5r^2$$

$$\therefore \text{length of chords} = \sqrt{5}r$$

He travels one chord and one semi-circle.

$$\therefore \text{Time} = \frac{\sqrt{5}r}{15\sqrt{5}} \times \frac{\pi r}{20\pi} = 1 \frac{3}{4} \frac{7}{4} \text{ hr} = 105 \text{ Minutes}$$

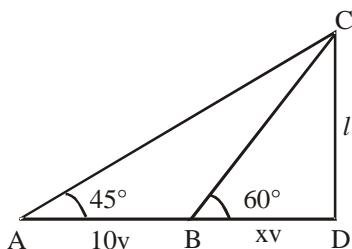
62. (c) Amit travel one quarter circle of OR and one chord. Dividing by speed, we get,

$$\frac{\pi \times 2r}{2 \times 30\pi} = \frac{\sqrt{5}r}{15\sqrt{5}}, \frac{90}{60} = \frac{r}{30}, \frac{r}{15}, \frac{90}{60}$$

Solving, we get  $r = 15$  and  $2r = 30$  kms

$$63. (c) \text{ Required ratio} = \frac{4 \times \sqrt{5}r}{2 \times \pi \times 2r} = \frac{\sqrt{5}}{\pi}$$

64. (a)

Let, CD be the tower of length  $\ell$  and A and B, the two pointsLet velocity be  $v$ , and required time be  $x$ 

$$\text{Then, } \tan 60 = \frac{\ell}{xv}$$

$$\tan 45 = \frac{\ell}{(10-x)v}$$

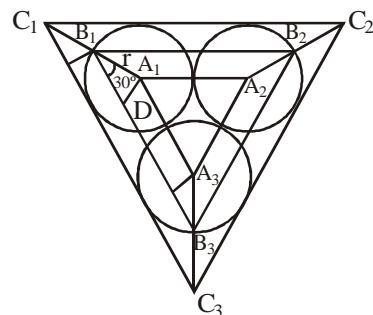
$$\frac{\sqrt{3}}{1} = \frac{\ell}{xv} \frac{(10-x)v}{\ell}$$

$$\sqrt{3} = \frac{10+x}{x} \Rightarrow \frac{\sqrt{3}-1}{1} = \frac{10}{x}$$

$$\Rightarrow x = \frac{10}{\sqrt{3}-1} \Rightarrow x = \frac{10(\sqrt{3}-1)}{2}$$

$$\therefore x = 5(\sqrt{3}-1)$$

65. (a)

Let the sprinters run distances of  $a, b, c$  which are nothing but the perimeter of their respective triangles.

$$A_1A_2 = 2r; B_1B_2 = 2r + r\sqrt{3}; C_1C_2 = 2r + 2r\sqrt{3}$$

$$\Rightarrow a = 3 \times 2r; b = 3 \times (2r + r\sqrt{3});$$

$$c = 3 \times (2r + 2r\sqrt{3})$$

$$\Rightarrow b - a = 3\sqrt{3}r \quad \dots \dots (i)$$

$$\Rightarrow c - a = 6\sqrt{3}r \quad \dots \dots (ii)$$

Subtracting (i) from (ii) we get,  $c - b = 3\sqrt{3}r$ 

$$\therefore b - a = c - b = 3\sqrt{3}r$$

$$66. (c) \text{ Time taken by A} = \frac{2r}{20}, \frac{2r}{30}, \frac{2r}{15} \left( \frac{2r \times 9}{60} \right) = \frac{3}{10}r$$

Therefore, B and C will also travel for time  $\frac{3}{10}r$ Now speed of B =  $10\sqrt{3}$  = 20

Therefore, distance covered

$$10\sqrt{3} = 20 \times \frac{3}{10}r$$

$$\sqrt{3} = 2 \times 10 \times \frac{3}{10}r = 2r = \sqrt{3}r \times 3$$

$$= B_1B_2 + B_2B_3 + B_3B_1$$

Therefore, B will be at  $B_1$ 

Now time taken by C for each distance are

$$\frac{C_1C_2}{40\sqrt{3}}, \frac{C_2C_3}{40\sqrt{3}}, \frac{C_3C_1}{120}$$

$$\equiv \frac{3}{40} \times \frac{2 \times 2\sqrt{3}r}{\sqrt{3}}, \frac{3}{40} \times \frac{2 \times 2\sqrt{3}r}{\sqrt{3}}, \frac{2 \times 2\sqrt{3}r}{120}$$

$$\text{i.e., } \frac{3}{40} \times 2r, \frac{3}{40} \times 2r, \frac{1}{60} \sqrt{3} r$$

$$\text{or } \frac{3}{20} r, \frac{3}{20} r, \frac{1}{60} \sqrt{3} r$$

We can observe that time taken for  $C_1 C_2$  and  $C_2 C_3$

$$\text{combined is } \frac{3}{20} r \quad \frac{3}{20} r \quad \frac{3}{10} r$$

Which is same as time taken by A

Therefore, C will be at  $C_3$ .

67. (b) In similar triangles, ratio of Area = Ratio of squares of corresponding sides.  
Hence, A and C reach  $A_3$  and  $C_3$  respectively.

$$68. \text{ (b) Time difference} = \left( 6\text{hr} - \frac{10}{3}\text{hr} \right) \left( \frac{\text{length of BC}}{6} \right)$$

$$= \frac{10}{3} \quad \frac{\sqrt{304}}{6} \quad \frac{10}{3} \quad \frac{2\sqrt{19}}{3}$$

69. (d) When Karan runs 100m, Arjun runs only 90m  
So, in the new situation,  
Karan has to run 110 m  
Hence, distance covered by Arjun when Karan covers

$$110\text{m} \quad \frac{90}{100} \times 110 \quad 99\text{m}$$

Therefore, Karan beats Arjun by 1m

70. (b) Let distance be d and time taken to cover this distance at speed of 10 km/h be x.

$$\text{Then, } \frac{d}{10} = x \quad \text{or} \quad d = 10x \quad \dots \text{(i)}$$

Similarly,

$$\frac{d}{15} = x - 2 \quad \text{or} \quad d = 15x - 30 \quad \dots \text{(ii)}$$

From (i) and (ii) :

$$10x = 15x - 30 \Rightarrow 5x = 30$$

$$\Rightarrow x = 6 \text{ hrs and } d = 60 \text{ km}$$

To reach at noon (i.e. 12 pm), he should cycle for 5 hrs.

$$\text{So, required speed} \quad \frac{60}{5} \quad 12 \text{km/hr.}$$

71. (c) Relative speed of the boats = 15 km/ hour

$$\frac{15}{60} \quad \frac{1}{4} \text{ km/min}$$

i.e., they cover  $\left( \frac{1}{4} \right)$  km in the last one minute before collision.

72. (c) **Machine I:**

Time to produce 9000 nuts

$$\frac{9000}{100} \quad 8 \times 5 \quad 130 \text{ minutes}$$

### Machine II :

Time to produce 9000 bolts

$$\frac{9000}{75} \quad 5 \times 10 \quad 120 \quad 50 \quad 170 \text{ minutes}$$

So minimum time required for the production of 9000 nuts and bolts = 170 minutes.

73. (c) Water entering (positive sign) or leaving (negative sign) representation :

$$\text{Tank A} = (90 - 20 - 10) = 60 \text{ litres/min.}$$

$$\text{Tank B} = (110 - 100 + 20) = 30 \text{ litres/min.}$$

$$\text{Tank C} = (100 - 90 - 50) = -40 \text{ litres/min.}$$

$$\text{Tank D} = (10 + 50 - 110) = -50 \text{ litres/min.}$$

Hence, Tank D gets emptied first.

$$\text{Time taken by tank D to get empty} = \frac{1000}{50} \quad 20 \text{ min.}$$

74. (b) Ram starts at 9:00 a.m. from A and reaches B in 1 hr. (@ 5 km/hr.) i.e., 10:00 a.m.

$$\text{At 10:00 a.m., Shyam covers } \frac{15}{60} \times 10 \quad \frac{5}{2} \text{ km}$$

∴ Time required for Ram and Shyam to meet

$$= \frac{\frac{5}{2}}{\text{Rel. vel. of approach}}$$

$$\frac{2.5}{10 \quad 5} \quad \frac{1}{6} \text{ hr or 10 min.}$$

Hence, they first meet at 10:00 a.m. + 10 min = 10:10 a.m.

75. (b) Ram reaches at B at 10.00 a.m.

and Shyam reaches at B at 10:15 a.m.

For Ram to overtake Shyam, time required (taking 10:00 a.m. as base)

$$\frac{\text{Distance between them}}{\text{Rel. vel. of separation}} \quad \frac{2.5}{10 - 5}$$

$$\frac{1}{2} \text{ hr. or } 30 \text{ min.}$$

Hence, Shyam overtakes Ram at 10:00 am + 30 min.

$$= 10:30 \text{ am}$$

76. (c) Barun starts 2 hours after Arun in which Arun covers  $30 \times 2 = 60 \text{ km}$

Barun catches up with Arun in  $\frac{60}{40 - 30} = 6$  hours, i.e. after 8 hours from Arun's start.

Now, distance traveled by Arun =  $8 \times 30 = 240$  hours

Further Kiranmala will cover this 240 km in  $\frac{240}{60} = 4$  hours.

So, she shall start 4 hours after Arun starts.

77. (a) Let the speed of the plane =  $x$  km/hr

And time difference between  $A$  and  $B$  =  $y$  hr

[This means that when 4.00 p.m. at  $A$  then  $(4 + y)$ .00 p.m. at  $B$ ]

According to the question,

$$7 - y = \frac{3000}{x - 50} \quad \dots(i)$$

$$\text{and } 4 - y = \frac{3000}{x - 50} \quad \dots(ii)$$

On solving equation (i) and (ii) for  $y$ , we get  $y = 1$

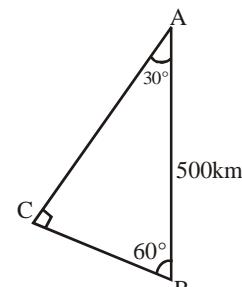
78. (c) From,  $7 - y = \frac{3000}{x - 50} \quad \dots(i)$

$$\text{and } 4 - y = \frac{3000}{x - 50} \quad \dots(ii)$$

On solving equation (i) and (ii) for  $x$ , we get  $x = 550$  and

$$x = -\frac{50}{11} \text{ (not possible)}$$

79. (b)



$\Delta ABC$  is right angled at  $C$ .

$$\sin 60^\circ = \frac{AC}{500} \quad \therefore AC = 250\sqrt{3} \text{ km,}$$

$$\cos 60^\circ = \frac{BC}{500} \quad \therefore BC = 250 \text{ km}$$

Time taken by the train to reach  $C$  from  $B$  =  $\frac{250}{50}$  5hr

So, the train reach the  $C$  at 1 p.m.

Time taken by Rahim to reach  $C$  from

$$A = \frac{250\sqrt{3}}{70} \text{ hr} = 6.18 \text{ hr} = 6 \text{ hr } 11 \text{ min.}$$

So, to reach  $C$  before atleast 15 min. before 1 p.m. i.e., 12.45 pm, Rahim should start at 6.30 a.m.

# 11



# PERMUTATION, COMBINATION & PROBABILITY



1. I. The probability of encountering 54 Sundays in a leap year (1994)  
 II. The probability of encountering 53 Sundays in a non-leap year  
 (a) I>II (b) I<II (c) I=II (d) Nothing can be said

2. A,B,C and D are four towns any three of which are non-collinear. Then the number of ways to construct three roads each joining a pair of towns so that the roads do not form a triangle is (1995)  
 (a) 7 (b) 8 (c) 9 (d) More than 9

3. Boxes numbered 1, 2, 3, 4 and 5 are kept in a row and they are to be filled with either a red or a blue ball, such that no two adjacent boxes can be filled with blue balls. Then how many different arrangements are possible, given that all balls of a given colour are exactly identical in all respects? (1995)  
 (a) 8 (b) 10 (c) 15 (d) 22

4. A man has nine friends – four boys and five girls. In how many ways can he invite them, if there have to be exactly three girls in the invitees? (1996)  
 (a) 320 (b) 160 (c) 80 (d) 200

5. In how many ways can the eight directors, the vice-chairman and the chairman of a firm be seated at a round-table, if the chairman has to sit between the vice-chairman and the director? (1997)  
 (a)  $9! \times 2$  (b)  $2 \times 8!$  (c)  $2 \times 7!$  (d) None of these

6. ABC is a three-digit number in which A > 0. The value of ABC is equal to the sum of the factorials of its three digits. What is the value of B? (1997)  
 (a) 9 (b) 7 (c) 4 (d) 2

7. How many numbers can be formed from 1,2,3,4 and 5 (without repetition), when the digit at the units place must be greater than that in the tenth place? (1998)  
 (a) 54 (b) 60 (c)  $\frac{5!}{3}$  (d)  $2 \times 4!$

8. How many five digit numbers can be formed using 2,3,8,7,5 exactly once such that the number is divisible by 125? (1998)  
 (a) 0 (b) 1 (c) 4 (d) 3

9. A, B, C, D, .....X, Y, Z are the players who participated in a tournament. Everyone played with every other player exactly once. A win scores 2 points, a draw scores 1 point and a loss scores 0 points. None of the matches ended in a draw. No two players scored the same score. At the end of the tournament, the ranking list is published which is in accordance with the alphabetical order. Then (1998)  
 (a) M wins over N (b) N wins over M (c) M does not play with N (d) None of these

10. Five persons A, B, C, D and E along with their wives are seated around a round table such that no two men are adjacent to each other. The wives are three places away from their husbands. Mrs. C is on the left of Mr. A, Mrs. E is two places to the right of Mrs. B. Then, who is on the right hand side of Mr. A? (1999)  
 (a) Mrs.B (b) Mrs.D (c) Mrs. E (d) Either Mrs B or Mrs D

11. There are 10 points on a line and 11 points on another line, which are parallel to each other. How many triangles can be drawn taking the vertices on any of the line? (1999)  
 (a) 1,050 (b) 2,550 (c) 150 (d) 1,045

12. There are three boxes with 2 red, 2 white and one red and one white ball. All of them are mislabelled. You have to correct all the labels by picking only one ball from any one of the boxes. Which is the box that you would like to open (1999)  
 (a) White (b) Red (c) Red & White (d) None of these

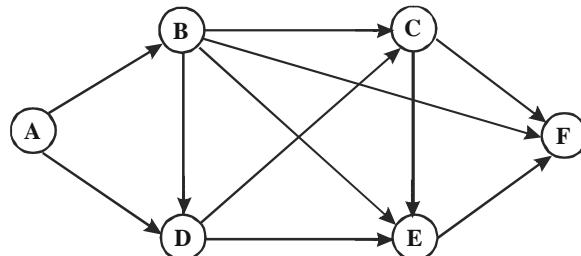
13. Out of  $2n+1$  students,  $n$  students have to be given the scholarships. The number of ways in which at least one student can be given the scholarship is 63. What is the number of students receiving the scholarship? (1999)  
 (a) 5 (b) 7 (c) 3 (d) 9

14. Sameer has to make a telephone call to his friend Harish. Unfortunately he does not remember the 7- digit phone number. But he remembers that the first 3 digits are 635 or 674, the number is odd and there is exactly one 9 in the number. The minimum number of trials that Sameer has to make to be successful is (2000)  
 (a) 10,000 (b) 3,402 (c) 3,200 (d) 5,000
15. There are three books on table A which has to be moved to table B. The order of the book on Table A was 1, 2, 3, with book 1 at the bottom. The order of the book on table B should be with book 2 on top and book 1 on bottom. Note that you can pick up the books in the order they have been arranged. You can't remove the books from the middle of the stack. In how many minimum steps can we place the books on table B in the required order? (2000)  
 (a) 1 (b) 2 (c) 3 (d) 4
16. X is an odd integer such that  $100 < x < 200$  and x is divisible by 3 but not 7. The possible number of values of x is (2000)  
 (a) 16 (b) 15 (c) 14 (d) 13
17. One red, three white and two blue flags are to be arranged in such a way that no two flags of the same colour are adjacent and the flags at the two ends are of different colours. The number of ways in which this can be done is (2000)  
 (a) 6 (b) 8 (c) 4 (d) 12

**Directions for questions 18 to 21 : Read the information given below and answer the questions that follow :**

The tournament for ABC Cup is arranged as per the following rules: in the beginning 16 teams are entered and divided in 2 groups of 8 teams each where the team in any group plays exactly once with all the teams in the same group. At the end of this round top four teams from each group advance to the next round in which two teams play each other and the losing team goes out of the tournament. The rules of the tournament are such that every match can result only in a win or a loss and not in a tie. The winner in the first round takes one point from the win and the loser gets zero. In case of tie on a position the rules are very complex and include a series of deciding measures.

18. What is the total number of matches played in the tournament? (2000)  
 (a) 63 (b) 56 (c) 64 (d) 55
19. The maximum number of matches that a team going out of the tournament in the first round itself can win is (2000)  
 (a) 1 (b) 2 (c) 3 (d) 4
20. The minimum number of matches that a team must win in order to qualify for the second round is (2000)  
 (a) 4 (b) 5 (c) 6 (d) 7
21. Which of the following statements about a team which has already qualified for the second round is true? (2000)  
 (a) To win the cup it has to win exactly 14 matches (b) To win the cup it has to win exactly 3 matches  
 (c) To win the cup it has to win exactly 4 matches (d) To win the cup it has to win exactly 5 matches
22. There are five boxes each of a different weight and none weighing more than 100. Arun weights two boxes at a time and obtains the following readings in grams : 110, 112, 113, 114, 116, 117, 118, 119, 120, 121. What is the weight of the heaviest box? (2000)  
 (a) 60 (b) 61 (c) 64 (d) can't be determined
23. A red light flashes 3 times per minute and a green light flashes 5 times in two minutes at regular intervals. If both lights start flashing at the time, how many times do they flash together in each hour? (2001)  
 (a) 30 (b) 24 (c) 20 (d) 60
24. Ashish is given Rs. 158 in one rupee denominations. He has been asked to allocate them into a number of bags such that any amount required between Re. 1 and Rs. 158 can be given by handing out a certain number of bags without opening them. What is the minimum number of bags required? (2001)  
 (a) 11 (b) 12 (c) 13 (d) None of these
25. The figure below shows the network connecting cities A, B, C, D, E and F. The arrows indicate permissible direction of travel. What is the number of distinct paths from A to F? (2001)



- (a) 9 (b) 10 (c) 11 (d) None of these

**Directions for questions 28 & 29 :** Read the information given below and answer the questions that follow :

Each of the 11 letters A, H, I, M, O, T, U, V, W, X and Z appears same when looked at in a mirror. They are called symmetric letters. Other letters in the alphabet are asymmetric letters.

28. How many four-letter computer passwords can be formed using only the symmetric letters (no repetition allowed)? (2002)  
(a) 7920 (b) 330 (c) 14640 (d) 419430

29. How many three-letter computer passwords can be formed (no repetition allowed) with at least one symmetric letter? (2002)  
(a) 990 (b) 2730 (c) 12870 (d) 15600

30. In how many ways is it possible to choose a white square and a black square on a chess board so that the squares must not lie in the same row or column? (2002)  
(a) 56 (b) 896 (c) 60 (d) 768

31. How many numbers greater than 0 and less than a million can be formed with the digits of 0, 7 and 8? (2002)  
(a) 486 (b) 1086 (c) 728 (d) None of these

32. If there are 10 positive real numbers  $n_1 < n_2 < n_3 \dots < n_{10}$ . How many triplets of these numbers  $(n_1, n_2, n_3), (n_2, n_3, n_4), \dots$  can be generated such that in each triplet the first number is always less than the second number, and the second number is always less than the third number? (2002)  
(a) 45 (b) 90 (c) 120 (d) 180

33. If there are 10 positive real numbers  $n_1 < n_2 < n_3 \dots < n_{10}$ . How many triplets of these numbers  $(n_1, n_2, n_3), (n_2, n_3, n_4), \dots$  can be generated such that in each triplet the first number is always less than the second number and the second number is always less than the third number? (2002)  
(a) 45 (b) 90 (c) 120 (d) 180

34. Twenty-seven persons attend a party. Which one of the following statements can never be true? (2003C)  
(a) There is a person in the party who is acquainted with all the twenty-six others  
(b) Each person in the party has a different number of acquaintances  
(c) There is a person in the party who has an odd number of acquaintances  
(d) In the party, there is no set of three mutual acquaintances

35. How many three digit positive integers, with digits x, y and z in the hundred's, ten's and unit's place respectively, exist such that  $x \neq y, z \neq y$  and  $x \neq 0$ ? (2003C)  
(a) 245 (b) 285 (c) 240 (d) 320

36. There are 6 boxes numbered 1,2,.....6. Each box is to be filled up either with a red or a green ball in such a way that at least 1 box contains a green ball and the boxes containing green balls are consecutively numbered. The total number of ways in which this can be done is (2003C)  
(a) 5 (b) 21 (c) 33 (d) 60

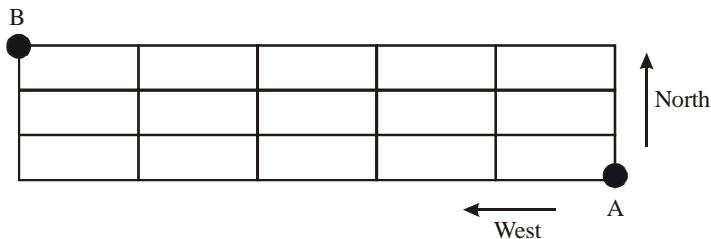
37. A graph may be defined as a set of points connected by lines called edges. Every edge connects a pair of points. Thus, a triangle is a graph with 3 edges and 3 points. The degree of a point is the number of edges connected to it. For example, a triangle is a graph with three points of degree 2 each. Consider a graph with 12 points. It is possible to reach any point from any other point through a sequence of edges. The number of edges, e, in the graph must satisfy the condition (2003C)  
(a)  $11 \leq e \leq 66$  (b)  $10 \leq e \leq 66$  (c)  $11 \leq e \leq 65$  (d)  $0 \leq e \leq 11$

**Directions for questions 38 & 39 :** Read the information given below and answer the questions that follow :

A string of three English letters is formed as per the following rules :

- (a) The first letter is any vowel.
  - (b) The second letter is  $m$ ,  $n$  or  $p$
  - (c) If the second letter is  $m$  then the third letter is any vowel which is different from the first letter
  - (d) If the second letter is  $n$  then the third letter is  $e$  or  $u$ .
  - (e) If second letter is  $p$  then the third letter is the same as the first letter.

38. How many strings of letters can possibly be formed using the above rules? (2003)  
 (a) 40 (b) 45 (c) 30 (d) 35
39. How many strings of letters can possibly be formed using the above rules such that the third letter of the string is e? (2003)  
 (a) 8 (b) 9 (c) 10 (d) 11
40. There are 12 towns grouped into four zones with three towns per zone. It is intended to connect the towns with telephone lines such that every two towns are connected with three direct lines if they belong to the same zone, and with only one direct line otherwise. How many direct telephone lines are required? (2003)  
 (a) 72 (b) 90 (c) 96 (d) 144
41. An intelligence agency forms a code of two distinct digits selected from 0, 1, 2, ..., 9 such that the first digit of the code is nonzero. The code, handwritten on a slip, can however potentially create confusion when read upside down — for example, the code 91 may appear as 16. How many codes are there for which no such confusion can arise? (2003)  
 (a) 80 (b) 78 (c) 71 (d) 69
42.  $N$  persons stand on the circumference of a circle at distinct points. Each possible pair of persons, not standing next to each other, sings a two-minute song one pair after the other. If the total time taken for singing is 28 minutes, what is  $N$ ? (2004)  
 (a) 5 (b) 7 (c) 9 (d) None of the above
43. Suppose  $n$  is an integer such that the sum of the digits of  $n$  is 2, and  $10^{10} < n < 10^{11}$ . The number of different values for  $n$  is (2004)  
 (a) 11 (b) 10 (c) 9 (d) 8
44. Each family in a locality has at most two adults, and no family has fewer than 3 children. Considering all the families together, there are more adults than boys, more boys than girls, and more girls than families. Then the minimum possible number of families in the locality is (2004)  
 (a) 4 (b) 5 (c) 2 (d) 3
45. In the adjoining figure, the lines represent one-way roads allowing travel only northwards or only westwards. Along how many distinct routes can a car reach point B from point A? (2004)



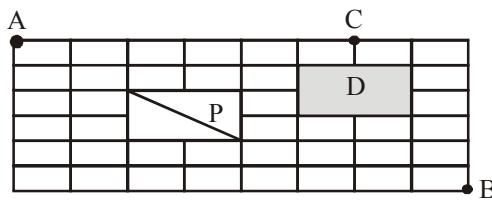
- (a) 15 (b) 56 (c) 120 (d) 336
46. A new flag is to be designed with six vertical stripes using some or all of the colours yellow, green, blue and red. Then, the number of ways this can be done such that no two adjacent stripes have the same colour out is (2004)  
 (a)  $12 \times 81$  (b)  $16 \times 125$  (c)  $20 \times 125$  (d)  $24 \times 216$
47. In a chess competition involving some boys and girls of a school, every student had to play exactly one game with every other student. It was found that in 45 games both the players were girls and in 190 games both were boys. The number of games in which one player was a boy and the other was a girl is (2005)  
 (a) 200 (b) 216 (c) 235 (d) 256
48. Three Englishmen and three Frenchmen work for the same company. Each of them knows a secret not known to others. They need to exchange these secrets over person-to-person phone calls so that eventually each person knows all six secrets. None of the Frenchmen knows English, and only one Englishman knows French. What is the minimum number of phone calls needed for the above purpose? (2005)  
 (a) 5 (b) 10 (c) 9 (d) 15
49. Let  $S$  be the set of five-digit numbers formed by the digits 1, 2, 3, 4 and 5, using each digit exactly once such that exactly two odd positions are occupied by odd digits. What is the sum of the digits in the rightmost position of the numbers in  $S$ ? (2005)  
 (a) 228 (b) 216 (c) 294 (d) 192
50. Let  $n! = 1 \times 2 \times 3 \times \dots \times n$  for integer  $n \geq 1$ . If  $p = 1! + (2 \times 2!) + (3 \times 3!) + \dots + (10 \times 10!)$ , then  $p + 2$  when divided by  $11!$  leaves a remainder of (2005 - 2 marks)  
 (a) 10 (b) 0 (c) 7 (d) 1

51. Let  $S$  be a set of positive integers such that every element  $n$  of  $S$  satisfies the conditions
1.  $1000 \leq n \leq 1200$
  2. every digit of  $n$  is odd
- Then how many elements of  $S$  are divisible by 3? (2005 - 2 marks)
- (a) 9 (b) 10 (c) 11 (d) 12
52. There are 6 tasks and 6 persons. Task 1 cannot be assigned either to person 1 or to person 2; task 2 must be assigned to either person 3 or person 4. Every person is to be assigned one task. In how many ways can the assignment be done? (2006)
- (a) 144 (b) 180 (c) 192 (d) 360 (e) 716

**Directions for Questions 53 & 54 :** Let  $S$  be the set of all pairs  $(i, j)$  where  $1 \leq i < j \leq n$  and  $n \geq 4$ . Any two distinct members of  $S$  are called “friends” if they have one constituent of the pairs in common and “enemies” otherwise. For example, if  $n = 4$ , then  $S = \{(1, 2), (1, 3), (1, 4), (2, 3), (2, 4), (3, 4)\}$ . Here,  $(1, 2)$  and  $(1, 3)$  are friends,  $(1, 2)$  and  $(2, 3)$  are also friends, but  $(1, 4)$  and  $(2, 3)$  are enemies.

53. For general  $n$ , how many enemies will each member of  $S$  have? (2007)
- (a)  $\frac{1}{2}(n^2 - 7n + 14)$  (b)  $n - 3$   
 (c)  $\frac{1}{2}(n^2 - 3n - 2)$  (d)  $2n - 7$   
 (e)  $\frac{1}{2}(n^2 - 5n + 6)$
54. For general  $n$ , consider any two members of  $S$  that are friends. How many other members of  $S$  will be common friends of both these members? (2007)
- (a)  $\frac{1}{2}(n^2 - 7n + 16)$  (b)  $\frac{1}{2}(n^2 - 5n + 8)$  (c)  $2n - 6$  (d)  $\frac{1}{2}n(n - 3)$  (e)  $n - 2$
55. In a tournament, there are  $n$  teams  $T_1, T_2, \dots, T_n$ , with  $n > 5$ . Each team consists of  $k$  players,  $k > 3$ . The following pairs of teams have one player in common:  $T_1 \& T_2, T_2 \& T_3, \dots, T_{n-1} \& T_n$ , and  $T_n \& T_1$ . No other pair of teams has any player in common. How many players are participating in the tournament, considering all the  $n$  teams together? (2007)
- (a)  $(n - 1)(k - 1)$  (b)  $n(k - 1)$  (c)  $k(n - 1)$  (d)  $n(k - 2)$  (e)  $k(n - 2)$
56. Suppose you have a currency, named Miso, in three denominations: 1 Miso, 10 Misos and 50 Misos. In how many ways can you pay a bill of 107 Misos? (2007)
- (a) 19 (b) 17 (c) 16 (d) 18 (e) 15

**Directions for Questions 57 & 58 :** The figure below shows the plan of a town. The streets are at right angles to each other. A rectangular park (P) is situated inside the town with a diagonal road running through it. There is also a prohibited region (D) in the town.



57. Neelam rides her bicycle from her house at A to her office at B, taking the shortest path. Then the number of possible shortest paths that she can choose is (2008)
- (a) 60 (b) 75 (c) 45 (d) 90 (e) 72
58. Neelam rides her bicycle from her house at A to her club at C, via B taking the shortest path. Then the number of possible shortest paths that she can choose is (2008)
- (a) 1170 (b) 630 (c) 792 (d) 1200 (e) 936

## ANSWERS WITH SOLUTIONS

1. (b) There are 5 weeks and 2 days in a leap year. Therefore, 53 Sundays can occur if 1st of Jan is either a Saturday or a Sunday, but 54 Sundays cannot be there in a leap year.
2. (d) To construct 2 roads, three towns can be selected out of 4 in  $4 \times 3 \times 2 = 24$  ways. Now if the third road goes from the third town to the first town, a triangle is formed, and if it goes to the fourth town, a triangle is not formed. So, there are 24 ways to form a triangle and 24 ways of avoiding a triangle.
3. (d) Each box can be filled in 2 ways. Hence, total no. of ways =  $2^5 = 32$  Blue balls cannot be filled in adjacent boxes Total no. of such cases in which blue ball is filled in 2 adjacent boxes is  

$$\begin{aligned} & 2 \text{ blue} + 3 \text{ blue} + 4 \text{ blue} + 5 \text{ blue} \\ & = 4 \text{ ways } (12, 23, 34, 45) + 3 \text{ ways } (123, 234, 345) \\ & \quad + 2 \text{ ways } (1234, 2345) + 1 \text{ way} \\ & = 10 \text{ ways} \end{aligned}$$
Hence, total cases in which blue balls can not be filled in adjacent boxes =  $32 - 10 = 22$
4. (b) Out of five girls, he has to invite exactly 3. This can be done in  ${}^5C_3$  ways. Out of 4 boys he may invite either one or two or three or four or none of them. This may be done in  ${}^4C_1 \quad {}^4C_2 \quad {}^4C_3 \quad {}^4C_4 \quad {}^4C_0$   

$$\begin{aligned} & {}^4C_0 \quad {}^4C_1 \quad {}^4C_2 \quad {}^4C_3 \quad {}^4C_4 \\ & = (1+1)^4 = 2^4 \text{ ways.} \end{aligned}$$
Hence, the total number of ways in which he can invite his friends are  ${}^5C_3 \times 2^4 = 10 \times 16 = 160$  ways
5. (b) Let the vice-chairman and the chairman from 1 unit along with the eight directors, we now have to arrange 9 different units in a circle. This can be done in  $8!$  ways. At the same time, the vice-Chairman & the chairman can be arranged in two different ways. Therefore, the total number of ways =  $2 \times 8!$ .
6. (c) Seeing the options. Since  $7! = 5040$  and  $9! = 362880$  are four and 6 digit numbers respectively, hence, B can't be 7 or 9. 3 digits number will be of the form  $100A + 10B + C$ .  

$$\therefore 100A + 10B + C = A! + B! + C!$$
Now by hit & trial method i.e., with B = 2 and B = 4 find which one is better. Hence, B = 4, A = 1, C = 5
7. (b) The numbers should be formed from 1, 2, 3, 4 and 5 (without repetition), such that the digit at the units place must be greater than in the tenth place. Tenth place has five options. If 5 is at the tenth place then the digit at the unit's place cannot be filled by the digit greater than that at the tenth place.

If 4 is at the tenth place, then the unit's place has only option of 5, while the three places can be filled up in  $3!$  ways.

If 3 is at the tenth place, then the units' place can be filled up by 4 or 5, i.e. in 2 ways. While other three places can be filled up in  $3!$  ways.

If 2 is at the tenth place, then the unit's place can be filled up by 3, 4 or 5 i.e. in 3 ways. While other three places can be filled up in  $3!$  ways.

If 1 is at the tenth place, then any other four places can be filled up in  $4!$  ways.

Thus the total number of numbers satisfying the given conditions is

$$0 + 3! + 2(3!) + 3(3!) + 4! = 60.$$

8. (c) Only those numbers which last 3 digits are divisible by 125 are divisible by 125.

So, those contain 375 & 875 at the end and the remaining two digits at the unit and tenth places can be arranged in two different ways.

Therefore, 4 such numbers can be formed.

9. (a) Each one of the 26 players played 25 matches and none of the matches ended in a draw.

Hence, all the scores must be even. Also each one of them scored different from the other.

The maximum score possible is 50 and minimum score is 0.

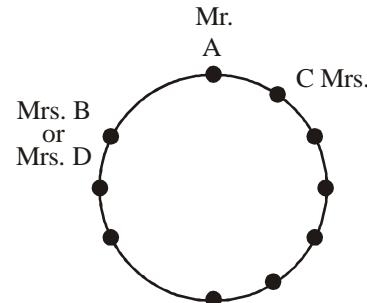
There are exactly 26 possible scores, 50, 48, 46 .....0. The ranking is in alphabetical order means

A scored 50, B = 48, Z = 0.

This is possible if A wins all the matches B loses only to A win against all others etc.

In final rank, every player wins only with all players who are below in final ranking. Since M > N hence M wins over N.

10. (d)



Since no two men are adjacent to each other, therefore no male is on the right of Mr. A.

Since wives are three places away from their husbands, therefore Mrs. A cannot be on the right of Mr. A.

Mrs. E cannot be on the right of Mr. A, since Mrs. B cannot be on the left of Mr. A. Hence, either Mrs. B or Mrs. D can be on the right of Mr. A.

11. (d) For a triangle, two points on one line and one on the other has to be chosen.

$$\text{No. of ways} = {}^{10}C_2 \times {}^{11}C_1 + {}^{11}C_2 \times {}^{10}C_1 = 1,045.$$

12. (c) Since all are mislabeled open red / white.

Now,

if red comes out then both are red in the box. And now change the label, make the box as all red. Now change all white in red / white and all red into all white. Labels are now correct.

If white comes out then both are white in the box. And now change the label, make the box as all white.

Now change all red in red / white and all white into all red. Labels are now correct.

13. (c) No. of ways in which at least one student can be given the scholarship = 63

$$\begin{aligned} &\Rightarrow {}^{2n}C_1 \quad {}^{2n}C_2 \quad \dots \quad {}^{2n}C_n = 63 \\ &\Rightarrow 2 \left[ {}^{2n}C_1 \quad {}^{2n}C_2 \quad \dots \quad {}^{2n}C_n \right] = 2 \times 63 \\ &\Rightarrow {}^{2n}C_0 \quad 2 \left[ {}^{2n}C_1 \quad {}^{2n}C_2 \quad \dots \quad {}^{2n}C_n \right] \\ &\quad \quad \quad {}^{2n}C_{2n-1} = 126 \quad {}^{2n}C_0 \quad {}^{2n}C_{2n-1} \\ &\Rightarrow {}^{2n}C_0 \left[ {}^{2n}C_1 \quad {}^{2n}C_2 \quad \dots \quad {}^{2n}C_n \right] \\ &\quad \quad \quad {}^{2n}C_{n-1} \quad {}^{2n}C_{n-2} \quad \dots \quad {}^{2n}C_{2n-1} \\ &\quad \quad \quad {}^{2n}C_{2n-1} = 126 \quad 1 \quad 1 \end{aligned}$$

[Since coefficients of binomial expansion equidistant from beginning and end are equal]

$$\Rightarrow (1-1)^{2n-1} = 128$$

$$\Rightarrow n = 3$$

14. (b) There are two ways of selecting 635 or 674. If last digit is 9, then there are 9 ways of filling each of the remaining 3 digits.

Thus total no. of this type of numbers =  $2 \times 9^3 = 1,458$ . When last digit is not 9, total no. of this type of numbers =  $2 \times 3 \times 4 \times 9^2 = 1944$ .

[9 can be selected at any of the 4th, 5th or 6th place in 3 ways. Also at the unit place 4 odd nos. except 9 can be used.]

$$\text{Thus required no.} = 1,944 + 1,458 = 3,402$$

15. (d) First step — take book 3 to the table B and, second step — put the book 2 on top of 3. Third step — Transfer the arrangement and keep it over book 1 on table A. The last step is transfer the whole arrangement to the table B which is the fourth step to take. Thus total 4 steps are required.

16. (d) Between 100 and 200 no. of multiple of 3 are 102, 105, ..., 198 these when are counted

We find 33 such numbers

And out of these 16 are odd.

But 105, 126, 147, 168, 189 are multiple of 21.

And three of these are odd.

$$\text{Thus required no.} = 16 - 3 = 13$$

17. (a) There are three white flags and ends having different colours, the only possibility at the ends are red and white or white and blue.

W \_\_\_ W \_\_\_ W \_\_\_ the empty spaces can be filled in 3 ways by one red and two blue flags.

\_\_\_ W \_\_\_ W \_\_\_ W again the empty spaces can be filled in 3 ways so, the total number of ways will be 6.

18. (a) In the first round, total no. of matches =  $2 \times (7 + 6 + 5 + 4 + 3 + 2 + 1) = 56$ .

In the second round total no. of matches = 4

Therefore are 2 semifinals & one final.

Thus total no. of matches played in the tournament = 63

19. (c) Each team will play 7 matches and so any team can win any no. of matches between 0 to 7 (i.e. 0, 1, 2, 3, 4, 5, 6, 7). Four teams will be selected (Who win either 7, 6, 5, or 4 matches).

Thus team which wins maximum 3 matches will be out of the first round

20. (a) From the above question minimum number of matches that a team must win in order to qualify for second round is 4.

21. (b) In second round; it has to win three matches, one in quarter final, one in semifinal and one in final.

22. (b) We will get 10 values because  ${}^5C_2 = 10$ . Let A, B, C, D and E be the boxes in ascending order of their weights.

Then the largest value of 10 weights is 121 and  $D + E = 121$

Similarly, we have  $C + E = 120$ ,  $A + B = 110$  and  $A + C = 112$

$$\Rightarrow 2A + 2C + 2E + B + D = 463 \quad \dots \text{(i)}$$

We know that

$$4(A + B + C + D + E)$$

$$110 + 112 + 113 + 114 + 116 + 117 + 118$$

$$119 + 120 + 121 = 1160$$

$$\Rightarrow A + B + C + D + E = 290$$

$$\therefore \text{From (i), } A + C + E = 463 - 290 = 173$$

$$\text{But } A + C = 112 \Rightarrow E = 61$$

23. (a) Red light flashes 3 times / min. i.e. after every 20 seconds.

Green light flashes 5 times in 2 min. i.e. after every 24 seconds.

So, they flash together after every 2 minutes

$$= 120 \text{ seconds}$$

$$(\text{L.C.M. of } 20 \text{ & } 24 = 120)$$

Hence, in 1 hour they flash together  $60/2 = 30$  times

24. (d) Minimum number of bags we have to allocate them in such a way that we get all the numbers i.e.,  $1 + 2 + 4 + 8 + 16 + 32 + 64 + 128$

Hence, minimum no. of bags required is 8; having number of coins  $2^0, 2^1, 2^2, \dots, 2^7$

25. (b) Paths from A to F are ABCF, ADEF, ABEF, ADCF, ABDEF, ABDCF, ABDCEF, ABCEF, ADCEF and ABF

Hence, 10 possible distinct roots.

26. (c) For a number to be divisible by 4, its last two digits should be divisible by 4.  
i.e., the last two digits should be 12, 16, 24, 32, 36, 52, 56 or 64.  
No. of numbers end with 12 =  ${}^4 C_3 \times 3! = 24$   
Similarly number of numbers end with 16, 24, 32, 36, 52, 56 or 64 each = 24.  
Thus, value of  $n = 24 \times 8 = 192$
27. (a) For 2 such lines, no. of regions formed are 4  
For 3 lines no. of regions formed are 7 ( $= 4 + 3$ )  
For 4 lines, no. of regions formed are 11 ( $= 7 + 4$ )  
For 5 lines no. of regions formed are 16 ( $= 11 + 5$ )  
Similarly for 6, 7, 8, 9 and 10 lines, no. of regions are  

$$\begin{aligned} 16 + 6 &= 22 \\ 22 + 7 &= 29 \\ 29 + 8 &= 37 \\ 37 + 9 &= 46 \\ 46 + 10 &= 56 \end{aligned}$$

$$\therefore \text{For 10 lines no. of regions} = {}^{10}C_2 + 10 + 1 = 45 + 11 = 56$$
28. (a) Four letter passwords have four places of which  
1st place can be filled in 11 ways  
2nd place can be filled in 10 ways  
3rd place can be filled in 9 ways  
4th place can be filled in 8 ways  
Total passwords formed =  $11 \times 10 \times 9 \times 8 = 7920$
29. (c) Total three-letter computer passwords from any of the 26 letters =  $26 \times 25 \times 24$   
Again, three letter passwords from asymmetric letters =  $15 \times 14 \times 13$   

$$\therefore \text{Passwords with atleast one symmetric letter} = 26 \times 25 \times 24 - 15 \times 14 \times 13 = 12870$$
30. (d) There are 32 black and 32 white squares on a chess board. Then no. of ways in choosing one white and one black square on the chess board  

$$= {}^{32}C_1 \times {}^{32}C_1 = 32 \times 32 = 1024$$

There are 8 rows and 8 columns on a chess board.  
In each row or column, there are 4 white and 4 black squares.  
Therefore number of ways to choose a white and a black square from the same row  

$$= {}^4 C_1 \times {}^4 C_1 \times 8 = 128$$

No. of ways to choose a white and a black square from the same column  

$$= {}^4 C_1 \times {}^4 C_1 \times 8 = 128$$

Total ways in which a white and a black squares lie on the same row or same column =  $128 + 128 = 256$   
Hence, required no. of ways =  $1024 - 256 = 768$

31. (c) No. of 1 digit numbers = 2  
No. of 2 digit numbers =  $3 \times 2 = 6$   
No. of 3 digit numbers =  $3 \times 3 \times 2 = 18$   
No. of 4 digit numbers =  $3^3 \times 2 = 54$   
No. of 5 digit numbers =  $3^4 \times 2 = 162$   
No. of 6 digit numbers (less than a million) =  $3^5 \times 2 = 486$   

$$\therefore \text{Required numbers} = 486 + 162 + 54 + 18 + 6 + 2 = 728$$

32. (c) If  $n_1$  at the first place and  $n_2$  at the second place in one triplet, then the number at the third place may be  $n_3, n_4, n_5, n_6, n_7, n_8, n_9$  or  $n_{10}$  (any one number out of the remaining 8 numbers i.e. 8 ways)  
We can represent it as  $(n_1, n_2, n_3)$ .  
In the similar way we can find that:  $(n_1, n_3)7, (n_1, n_4)6, (n_1, n_5)5, (n_1, n_6)4, (n_1, n_7)3, (n_1, n_8)2, (n_1, n_9)1$ .  
Thus when  $n_1$  is at the first place, then number of triplets =  $8 + 7 + 6 + 5 + 4 + 3 + 2 + 1$   
In the same way we can find that, when  $n_2$  at the first place, then total number of triplets =  $7 + 6 + 5 + 4 + 3 + 2 + 1$  and so on.  
Hence, total number of triplets  

$$\begin{aligned} &= (8 + 7 + \dots + 2 + 1) + (7 + 6 + \dots + 2 + 1) + \dots + (2 + 1) + 1 \\ &= 8 \times 1 + 7 \times 2 + 6 \times 3 + 5 \times 4 + 4 \times 5 + 3 \times 6 + 2 \times 7 + 1 \times 8 \\ &= 8 + 14 + 18 + 20 + 20 + 18 + 14 + 8 \\ &= 120 \end{aligned}$$

33. (c) Three numbers can be selected and arranged out of 10 numbers in  ${}^{10}P_3$  ways  

$$\frac{10!}{7!} = 10 \times 9 \times 8.$$

Now this arrangement is restricted to a given condition that first number is always less than the second number and second number is always less than the third number. Hence three numbers can be arranged among themselves in  ${}^3P_3 = 6$  ways.  
Hence, required number of arrangements  

$$\frac{10 \times 9 \times 8}{3 \times 2} = 120 \text{ ways}$$

34. (b) It can be clearly established that the choices (a), (c) and (d) may or may not be true. Statement (b) can never be true because every person cannot have a different number of acquaintances.

35. (c) Consider the number :  $x y z$  where  
 $x < y, z < y$  and  $x \neq 0$ .  
If  $y = 9$ ,  $x$  can be between 1 to 8 and  $z$  can be between 0 to 8.  
Total combinations =  $9 \times 8 = 72$   
If  $y = 8$ ,  $x$  can be between 1 to 7 and  $z$  can be between 0 to 7.  
combinations =  $7 \times 8 = 56$   
Similarly, we add all combinations  

$$8 \times 9 + 7 \times 8 + 6 \times 7 + 5 \times 6 + 4 \times 5 + 3 \times 4 + 2 \times 3 + 1 \times 2 = 240 \text{ ways.}$$

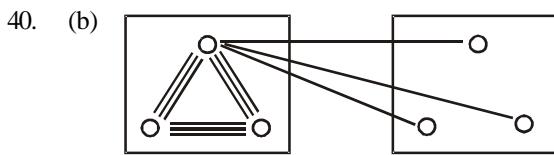
36. (b) As the boxes containing the green balls are consecutively numbered total number of ways will be  $6 + 5 + 4 + 3 + 2 + 1 = 21$  ways

37. (a) There are 12 points. Since they can be reached from any other point, the edges will be  ${}^{12}C_2 = 66$ . Also the minimum number of edges will be 11.

38. (d) 5 vowels = a, e, i, o and u  
If second letter is m then no. of strings =  $5 \times 4 = 20$   
If second letter is n then no. of strings =  $5 \times 2 = 10$   
If second letter is P then no. of strings =  $5 \times 1 = 5$   

$$\therefore \text{Total string of letters can be formed} = 20 + 10 + 5 = 35$$

39. (c) Taking the 3 cases as above no. of strings =
- $4 + 5 + 1 = 10$



Consider zone 1

No. of lines for internal connections in each zone = 9  
 Total number of lines for internal connections in four zones =  $9 \times 4 = 36$

No. of lines for external connections between any two zones =  $3 \times 3 = 9$

(as shown in figure)

∴ Total no. of lines required for connecting towns of different zones =  ${}^4P_2 \times 9 = 6 \times 9 = 54$

∴ Total no. of lines in all =  $54 + 36 = 90$

41. (c) 1 6 8 9 are the digits which cause confusion, when read upside down, since 0 cannot be first digit
- 
- Number of pairs causing problem = (2 digits selected

$$\text{from 4 digits) } {}^4P_2 = \frac{4!}{2!} = 12$$

Out of these numbers, 69 & 96 are the numbers which do not cause any confusion as they remain same when read upside down.

∴ No. of pairs causing problem =  $12 - 2 = 10$

Number of two digit codes =  $9 \times 9 = 81$

Required no. of codes =  $81 - 10 = 71$

42. (b) There are 28 minutes, hence total no. of songs are 14.
- 
- Since each pair sings one song. Hence, total number of pairs is 14.
- 
- Since, in each possible pair persons are not standing next to each other.

$$\therefore {}^nC_2 - n = 14 \Rightarrow n = 7$$

Hence, total number of people = 7.

43. (a) As
- $10^{10} < n < 10^{11}$
- , it means that n has 11 digits. Further sum of digits of n = 2, it means that either there are 2 one's or a 'two' in the whole digit, 2 one's can be obtained by fixing the first digit as 1 and the remaining 10 digits can be organised in 10 ways.
- 
- In case of one '2' there can be only 1 possibility with 2 as the 1st digit.

∴ Hence, total no. of different values for n =  $10 + 1 = 11$ .

44. (d) Given that A > B > G > F. Satisfying this condition, if F = 2, then, G = 3, B = 4, A = 5.

But this violates the condition that adults per family should be atmost 2. Hence, we take the next option : F = 3, then G = 4, B = 5, A = 6.

Here all conditions are satisfied. Hence, the answer is (d).

45. (b) The car requires 3 steps north and 5 steps west so as to reach B.

$$\text{Hence, total no. of ways } \frac{8!}{5! 3!} = \frac{8 \times 7 \times 6}{6} = 56$$

46. (a) There are 6 stripes. The first stripe can be coloured in 4 ways, 2nd in 3, 3rd in 3, and so on. Thus total no. of ways =
- $4 \times 3 \times 3 \times 3 \times 3 \times 3 = 12 \times 81$
- .

47. (a) Let number of girls = x and the number of boys = y
- 
- 45 games in which both the players were girls

$$\Rightarrow {}^xC_2 = 45$$

$$\Rightarrow \frac{x!}{2!(x-2)!} = x(x-1) = 90 \Rightarrow x = 10$$

190 games, where both the players were boys.

$${}^yC_2 = 190 \Rightarrow y(y-1) = 380 \therefore y = 20$$

Hence, the total number of games in which one player was a boy and the other was a girl =  $10 \times 20 = 200$

48. (c) Let E
- <sub>1</sub>
- , E
- <sub>2</sub>
- , E
- <sub>3</sub>
- are three Englishman and F
- <sub>1</sub>
- , F
- <sub>2</sub>
- , F
- <sub>3</sub>
- are three Frenchmen. Also suppose E
- <sub>1</sub>
- is the only Englishman who knows the French and no Frenchman knows the English.

For minimum number of phone calls; (i) E<sub>2</sub> and E<sub>3</sub> both call E<sub>1</sub> and give secret information to E<sub>1</sub>.

(ii) Any two Frenchmen (let F<sub>2</sub> and F<sub>3</sub>) call the third Frenchman F<sub>1</sub> and give secret information to F<sub>1</sub>.

(iii) Englishman E<sub>1</sub> and Frenchman F<sub>1</sub> communicate all the secrets each other.

(iv) E<sub>1</sub> communicates E<sub>2</sub> and E<sub>3</sub> all the secrets received from others.

(v) F<sub>1</sub> communicates F<sub>2</sub> and F<sub>3</sub> all the secrets received from others.

Hence minimum number of phone calls  
 $= 2 + 2 + 1 + 2 + 2 = 9$ .

49. (b) There can be 2 possibilities – last digit is odd or even.
- 
- Case I :**
- Last digit is odd. Fixing one out of 1, 3 & 5 in the last position. Then only one odd number can occupy odd position which can be chosen in
- ${}^2C_1$
- ways = 2.

One of the two odd digits can be selected for this position in again,  ${}^2C_1$  ways = 2.

The other odd number can be put in either of the two even places in 2 ways.

Finally the two even numbers can be arranged in 2! ways.

Hence sum of last digit of these nos. =  $(2 \times 2 \times 2 \times 2) (1 + 3 + 5) = 144$  ways

**Case II :** Last digit is even. Then 2 odd nos. out of 3 can be arranged in  ${}^3P_2 = 3!$  ways.

Again the even nos. can be arranged in 2! ways

∴ Sum =  $(3! \times 2) (2 + 4) = 72$  ways.

Total ways =  $144 + 72 = 216$ .

50. (d)
- $p + 2 = 1! + (2 \times 2!) + (3 \times 3!) + \dots + (10 \times 10!) + 2$
- 
- $= (1! + 2) + (2 \times 2!) + \dots + (10 \times 10!)$
- 
- $= 1 + 2! + (2 \times 2!) + \dots + (10 \times 10!)$
- 
- $= 1 + 2! (1 + 2) + (3 \times 3!) + \dots + (10 \times 10!)$
- 
- $= 1 + 3! + (3 \times 3!) + \dots + (10 \times 10!)$
- 
- $= 1 + 10! + (10 \times 10!) = 1 + 11!$

Hence, p + 2 leaves 1 as remainder when divided by 11!

51. (a) For a number to be divisible by 3, the sum of its digits has to be divisible by 3.

Given :  $1000 \leq n \leq 1200$  ... (1)

Again, for every digit of  $n$  to be odd, the four digits can be selected from 1, 3, 5, 7 and 9. Again with (1), the first two digits of  $n$  can be 1 & 1 only.

So the sum of the remaining two digits has to be divisible by 3. Thus the possible digits can be 19, 73, 79, 13 and 55.

These can be organised in  $2 + 2 + 2 + 2 + 1 = 9$  ways. Hence, 9 elements of  $S$  are divisible by 3.

52. (a) Task 2 can be assigned to 3 or 4

So, there are only 2 options for task 2.

Now, task 1 can not be assigned to 1 or 2 i.e. there are 3 options.

So required no. of ways

$$\begin{aligned} &= (2 \text{ options for task 2}) \times (3 \text{ options for task 1}) \\ &\quad \times (4 \text{ options for task 3}) \times (3 \text{ options for task 4}) \\ &\quad \times (2 \text{ options for task 5}) \times (1 \text{ option for task 6}). \\ &= 2 \times 3 \times 4 \times 3 \times 2 \times 1 = 144. \end{aligned}$$

53. (e) A member, say (a, b) will have an enemy of the form say (c, d) where c, d, a, b are all distinct.

∴ Enemies can be chosen in  $n-2C_2$  ways, as for a general set of  $n$  elements, there will be  $n-2$  elements which will form the pairs of enemies.

Therefore number of enemies

$$= \frac{(n-2)(n-3)}{2} = \frac{1}{2}(n^2 - 5n - 6)$$

54. (e) Consider friends (a, b) and (a, c).

Their common friend can be either (b, c), only one of its kind, or a member of the form (a, d) or (d, a) where d is different from a, b, c.

Now, d can be chosen in  $(n-3)$  ways.

Therefore number of common friends =  $(n-3) + 1 = n-2$

55. (b) Since there are  $k$  players in each of the  $n$  terms, therefore, total number of players in the tournament will be  $nk$ .

Since, one player is common in the pair of teams  $T_1$  and  $T_2$ ,  $T_2$  and  $T_3$ , ...,  $T_{n-1}$  and  $T_n$  and  $T_n$  and  $T_1$

Hence, there are  $n$  common players

Therefore, total number of players, who are participating in the tournament =  $nk - n = n(k-1)$

56. (d) **Case (I):** When number of 50 misos is 0, The

**No. of 10 misos**      **No. of 1 misos**

10	7
9	17
8	27
⋮	⋮
1	97
0	107

Number of ways to pay the bill = 11

**Case (II):** When number of 50 misos is 1, then

**No. of 10 misos**      **No. of 1 misos**

5	7
4	17
3	27
2	37
1	47
0	57

Number of ways to pay the bill = 6

**Case (III) :** When number of 50 misos is 2, then

**No. of 10 misos**

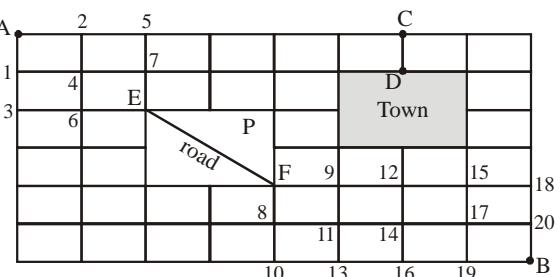
0

**No. of 1 misos**

7

Number of ways to pay the bill = 1. Hence, from all the three cases, we got total numbers of ways to pay a bill of 107 misos =  $11 + 6 + 1 = 18$

57. (d)



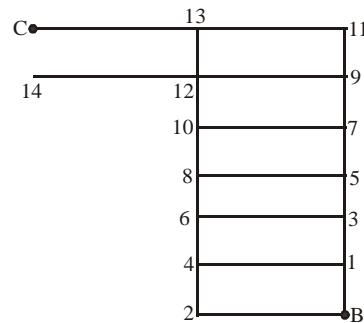
To reach B from A through the shortest possible path, Neelam has to first reach the point E, then cover EF and then reach B from F.

There are 6 different shortest paths to reach F from A. They are (A, 2, 5, 7, E, F), (A, 2, 4, 7, E, F), (A, 2, 4, 6, E, F), (A, 1, 4, 7, E, F), (A, 1, 4, 6, E, F) and (A, 1, 3, 6, E, F). Also there are 15 different shortest paths to reach B from F which are (F, 9, 12, 15, 8, 20, B), (F, 9, 12, 15, 17, 20, B), (F, 9, 12, 15, 17, 19, B), (F, 9, 12, 14, 17, 20, B), (F, 9, 12, 14, 17, 19, B), (F, 9, 12, 14, 16, 19, B), (F, 9, 11, 14, 17, 20, B), (F, 9, 11, 14, 17, 19, B), (F, 9, 11, 14, 16, 19, B), (F, 9, 11, 13, 16, 19, B), (F, 8, 11, 14, 17, 20, B), (F, 8, 11, 14, 19, B), (F, 8, 11, 14, 16, 19, B), (F, 8, 11, 13, 16, 19, B) and (F, 8, 10, 13, 16, 19, B)

Hence, number of different shortest paths to reach B from A =  $6 \times 15 = 90$

58. (a)

From the solution of above question, we get the number of different shortest paths to reach B from A = 90



There are 13 different shortest paths to reach C from B, which are (B, 1, 3, 5, 7, 9, 11, 13, C), (B, 1, 3, 5, 7, 9, 12, 13, C), (B, 1, 3, 5, 7, 9, 12, 14, C), (B, 1, 3, 5, 7, 10, 12, 13, C), (B, 1, 3, 5, 7, 10, 12, 14, C), (B, 1, 3, 5, 8, 10, 12, 13, C), (B, 1, 3, 5, 8, 10, 12, 14, C), (B, 1, 3, 6, 8, 10, 12, 13, C), (B, 1, 3, 6, 8, 10, 12, 14, C), (B, 1, 4, 6, 8, 10, 12, 13, C), (B, 1, 4, 6, 8, 10, 12, 14, C), (B, 1, 2, 4, 6, 8, 10, 12, 13, C) and (B, 1, 2, 4, 6, 8, 10, 12, 14, C)

Hence, number of different shortest paths to reach C from A via B = (No. of different shortest paths to reach B from A)  $\times$  (No. of different shortest paths to reach C from B)

$$= 90 \times 13 = 1170$$

# UNIT - II : DATA INTERPRETATION, DATA SUFFICIENCY & REASONING

## 12

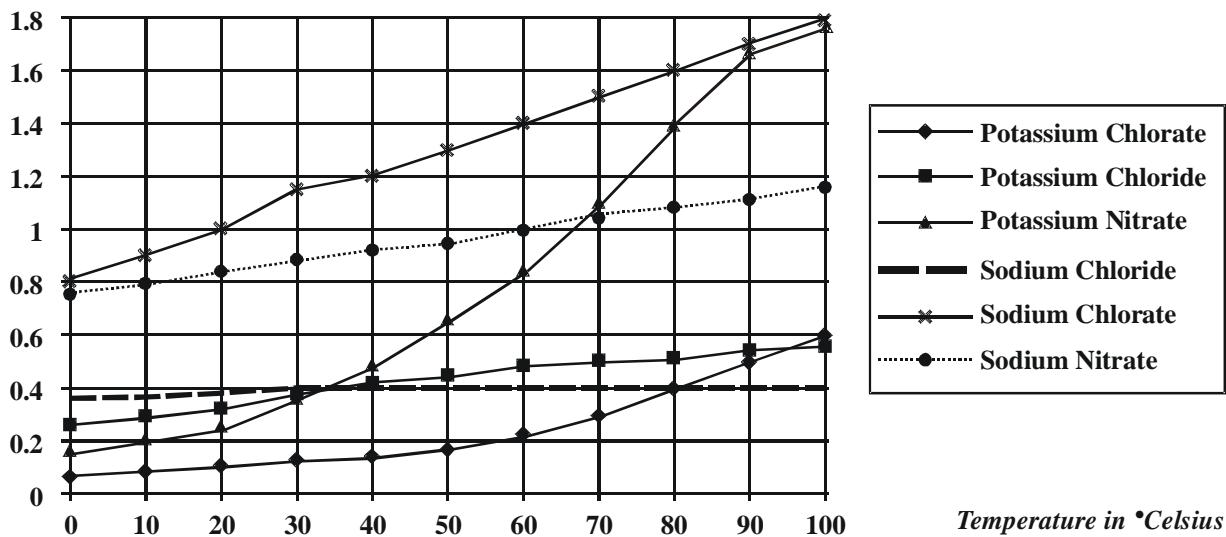
CHAPTER

## LINE & BAR CHARTS

*Directions for Questions 1 to 5 : These questions are based on the graph given below.*

Solubility-Temperature relationships for various salts

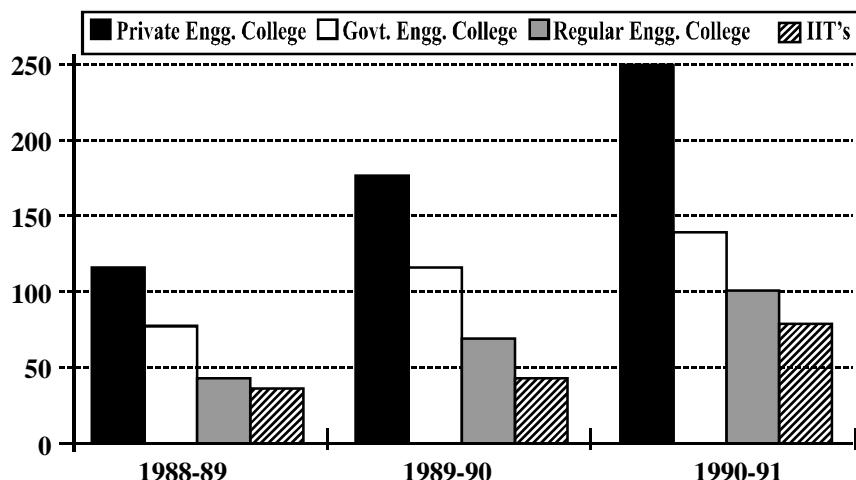
[The Y-axis denotes solubility (kg / litre of water)]



1. Which of the following salts has greatest solubility? (1994)  
(a) Potassium Chlorate at 80°C      (b) Potassium Chloride at 35°C  
(c) Potassium Nitrate at 39°C      (d) Sodium Chloride at 85°C
2. Approximately, how many kg of Potassium Nitrate can be dissolved in 10 litres of water at 30°C? (1994)  
(a) 0.04      (b) 0.4      (c) 4      (d) 0.35
3. By what % is the solubility of Potassium Chlorate in water increased as the water is heated from 30°C to 80°C? (1994)  
(a) 100      (b) 200      (c) 250      (d) 300
4. If 1 mole of Potassium Chloride weighs 0.07456 kg, approximately. How many moles of Potassium Chloride can be dissolved in 100 litres of water at 36°C? (1994)  
(a) 700      (b) 650      (c) 480      (d) 540
5. Which of the salts has greatest change in solubility in kg / litre of water between 15°C and 25°C? (1994)  
(a) Potassium Chlorate      (b) Potassium Nitrate      (c) Sodium Chlorate      (d) Sodium Nitrate

**Directions Questions 6 to 9 :** These questions are based on the graph given below.

### Number of Engineering Students (in hundreds) at Institutions of different kinds



6. What was the total number of engineering students in 1989-90? **(1994)**  
(a) 28500 (b) 4400 (c) 4200 (d) 42000

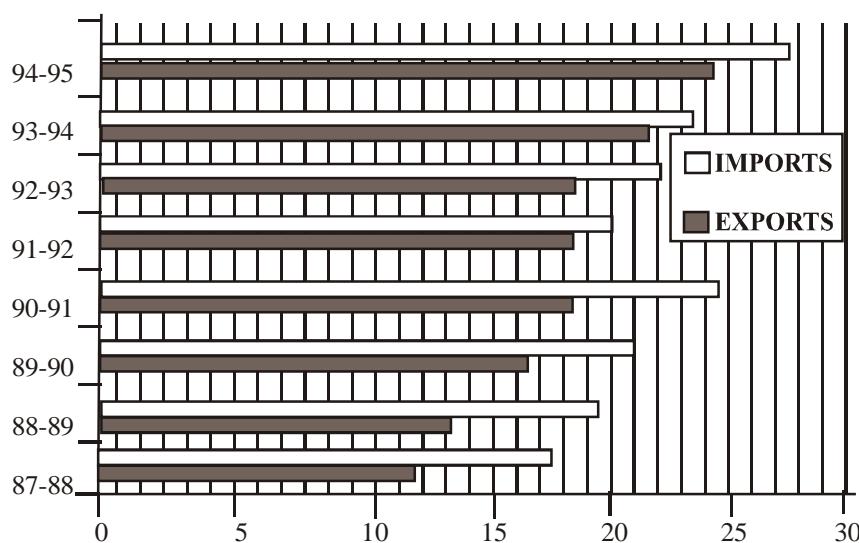
7. The growth rate in students of Govt. Engg. Colleges compared to that of Private Engg. Colleges between 1988-89 and 1989-90 is **(1994)**  
(a) more (b) less (c) almost equal (d)  $3/2$

8. The total number of Engg. Students in 1991-92, assuming a 10% reduction in the number over the previous year, is **(1994)**  
(a) 5700 (b) 57000 (c) 44800 (d) None of these

9. In 1990-91, what percent of Engg. Students were studying at IIT's? **(1994)**  
(a) 16 (b) 15 (c) 14 (d) 12

**Directions for Questions 10 to 14 :** These questions are based on the graph given below.

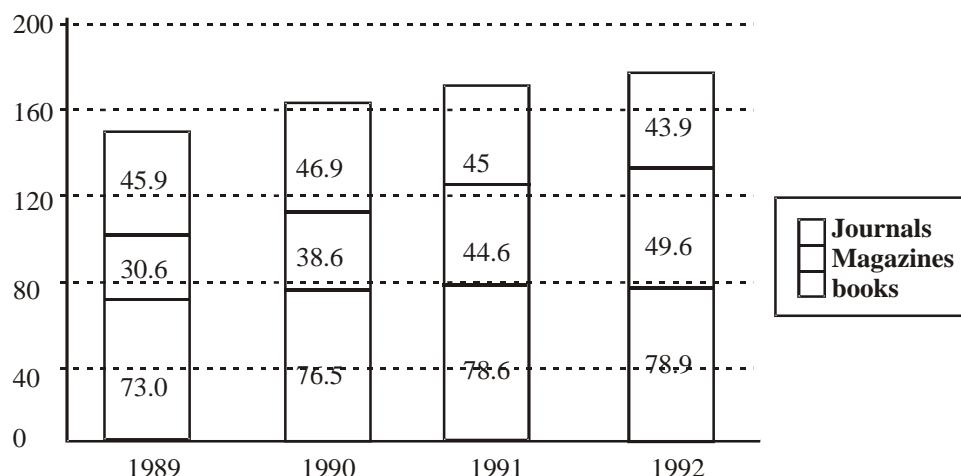
### FOREIGN TRADE (In billion dollars)



10. In which year was the trade deficit greatest ? (1995)  
 (a) 87-88 (b) 88-89 (c) 89-90 (d) 90-91
11. Export earning in 90-91 is how many percent of imports in 91-92 ? (1995)  
 (a) 82 (b) 85 (c) 92 (d) 15
12. In how many years was the trade deficit less than the trade deficit in the succeeding year ? (1995)  
 (a) 1 (b) 2 (c) 3 (d) 4
13. In the last three years the total export earnings have accounted for how many percent of the value of the imports (1995)  
 (a) 80 (b) 83 (c) 95 (d) 89
14. Which of the following statements can be inferred from the graph? (1995)  
 I. In all the years shown in graph, the trade deficit is less than the export earning  
 II. export earnings increased in every year between 89-90 and 91-92.  
 III. In all the years shown in the graph, the earning by exports is less than the expenditure on imports in the preceding year.  
 (a) I only (b) II only (c) III only (d) I and III only

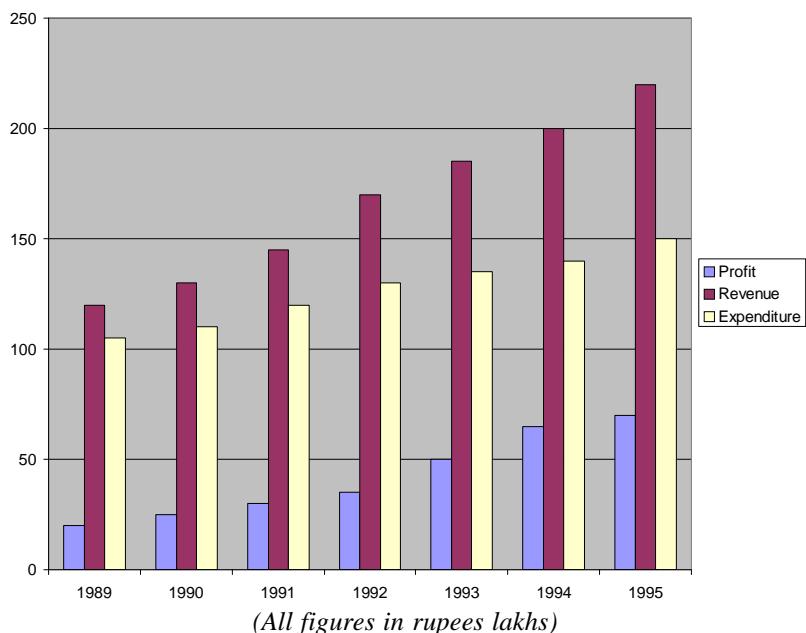
**Directions for Questions 15 to 19 :** These questions are based on the graph given below.

**Revenue obtained by a publishing house by selling books, magazines and journals  
(in rupees lakh)**



15. Which year shows the least change in revenue obtained from journals? (1995)  
 (a) '89 (b) '90 (c) '91 (d) '92
16. The growth in total revenue from '89 to '92 is (1995)  
 (a) 21% (b) 28% (c) 15% (d) 11%
17. In '92 what percent of the total revenue came from books ? (1995)  
 (a) 45% (b) 55% (c) 35% (d) 25%
18. If '93 were to show the same growth as '92 over '91 the revenue in '93 must be (1995)  
 (a) 194.5 (b) 186.6 (c) 172.4 (d) 176.7
19. The number of years in which there was an increase in revenue from at least two categories is (1995)  
 (a) 1 (b) 2 (c) 3 (d) 4

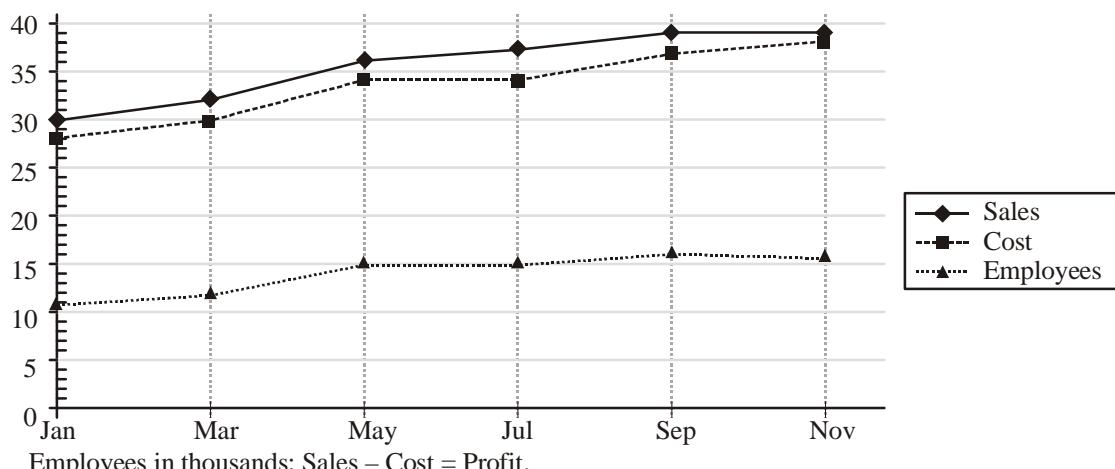
Directions for Questions 20 to 24 : These questions are based on the graph given below.



(All figures in rupees lakhs)

20. Which year showed the greatest percentage increase in profit as compared to the previous year? (1996)  
 (a) 1993 (b) 1994 (c) 1990 (d) 1992
21. The average revenue collected in the given seven years is approximately (1996)  
 (a) Rs. 164 lakh (b) Rs. 168 lakh (c) Rs. 171 lakh (d) Rs. 175 lakh
22. In which year was the growth in expenditure greatest as compared to the previous year? (1996)  
 (a) 1993 (b) 1995 (c) 1991 (d) 1992
23. The expenditures for the seven years together form what percent of the revenues during the same period? (1996)  
 (a) 75% (b) 67% (c) 62% (d) 83%
24. If the profit in 1996 shows the same annual rate of growth as it had shown in 1995 over the previous year, then what approximately will be the profit in 1996 (1996)  
 (a) Rs. 72 lakh (b) Rs. 86 lakh (c) Rs. 93 lakh (d) Rs. 78 lakh

Directions for Questions 25 to 29 : These questions are based on the graph given below.

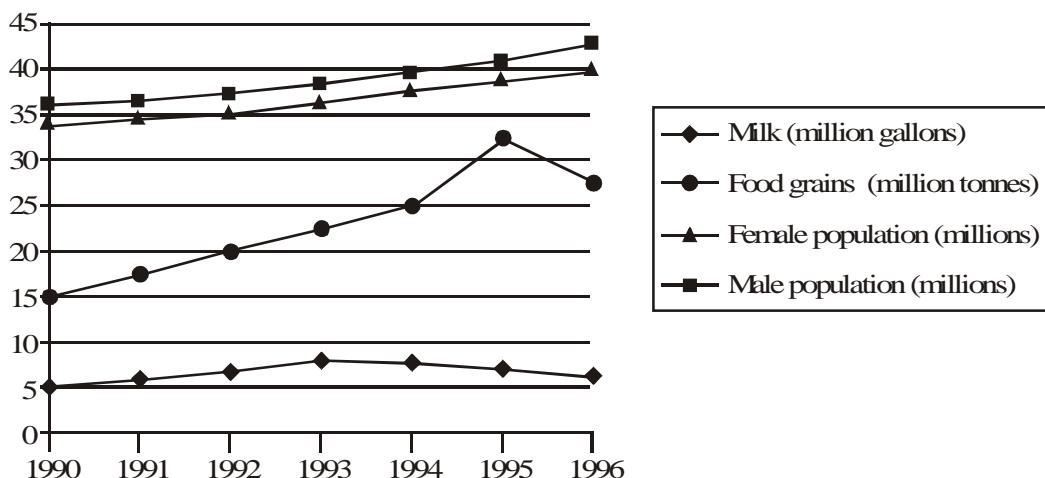


Employees in thousands; Sales - Cost = Profit.

25. Which month has the highest profit per employee? (1996)  
 (a) September (b) July (c) January (d) March
26. Which month records the highest profit? (1996)  
 (a) September (b) July (c) March (d) May
27. In which month is the percentage increase in Sales over the Sales two months before, the highest? (1996)  
 (a) March (b) September (c) July (d) May

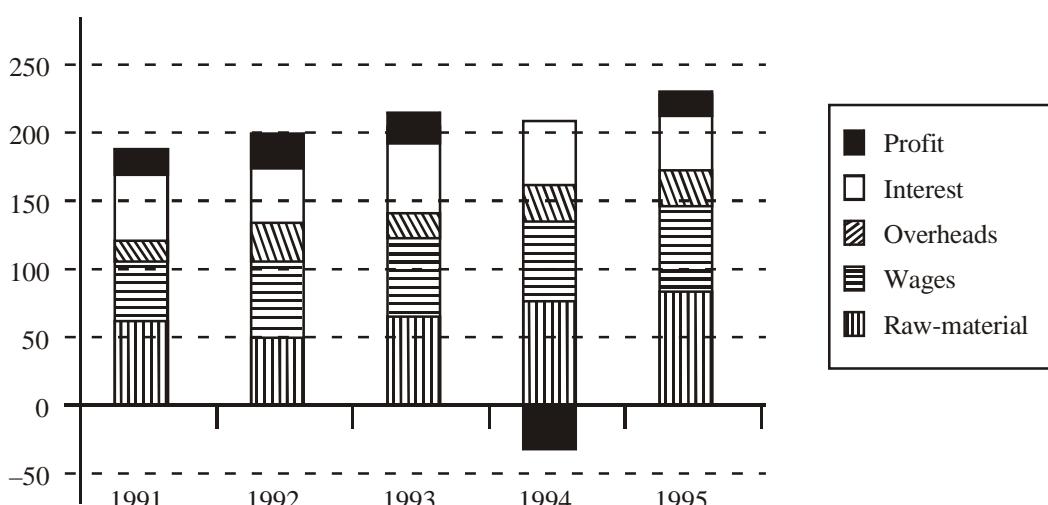
28. In which month is the total increase in the Cost, highest as compared to the Cost two months ago? (1996)  
 (a) March (b) September (c) July (d) May
29. Assuming that no employee left the job, how many more people did the company take on in the given period? (1996)  
 (a) 4,600 (b) 5,100 (c) 5,800 (d) 6,400

*Directions for Questions 30 to 35 : These questions are based on the graph given below.*



30. When was the per capita production of milk the least? (1997)  
 (a) 1990 (b) 1992 (c) 1994 (d) 1996
31. When was the per capita production of foodgrains the most? (1997)  
 (a) 1992 (b) 1993 (c) 1994 (d) 1995
32. In which year was the difference between the increase in the production of foodgrains and milk the maximum? (1997)  
 (a) 1993 (b) 1994 (c) 1995 (d) 1996
33. If milk contains 320 calories and foodgrains contain 160 calories, in which year was the per capita consumption of calories the highest? (1997)  
 (a) 1993 (b) 1994 (c) 1995 (d) 1996
34. If one gallon of milk contains 120 gm of a particular nutrient and one ton of foodgrains contain 80 gm of the same nutrient, in which year was the availability of this nutrient the maximum? (1997)  
 (a) 1993 (b) 1994 (c) 1995 (d) 1996
35. Referring to the above question, in which year was the per capita consumption of this nutrient the highest? (1997)  
 (a) 1993 (b) 1994 (c) 1995 (d) 1996

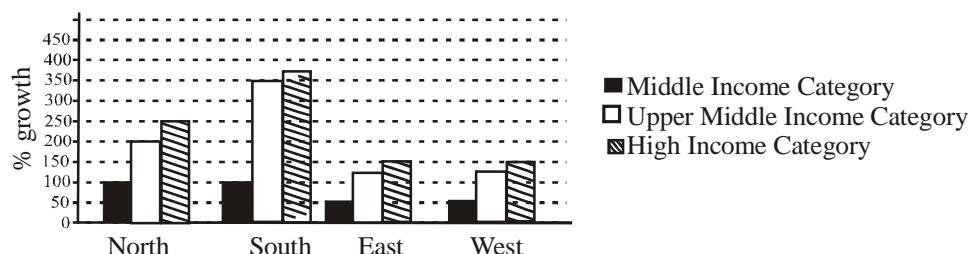
*Directions for Questions 36 to 41 : These questions are based on the graph given below.*



36. In which year was the increase in raw material the maximum? (1997)  
 (a) 1992 (b) 1993 (c) 1994 (d) 1995
37. In which two successive years was the change in profit the maximum? (1997)  
 (a) 1991-92 (b) 1992-93 (c) 1993-94 (d) 1994-95
38. Which component of the cost of production has remained more or less constant over the period? (1997)  
 (a) Interest (b) Overheads (c) Wages (d) Raw material
39. In which year were the overheads, as a percentage of the raw material, the maximum? (1997)  
 (a) 1995 (b) 1994 (c) 1992 (d) 1993
40. Over the period, the profits formed what percent of the costs? (1997)  
 (a) 3% (b) 5% (c) 8% (d) 11%
41. If the interest component is not included in the total cost calculation, which year would show the maximum profit per unit cost? (1997)  
 (a) 1991 (b) 1992 (c) 1993 (d) 1995

**Directions for Questions 42 to 45 :** These questions are based on the information and graph given below.

The following bar chart gives the percentage growth in households in the middle, upper middle and high income categories in the four regions for the period between 87-88 to 94-95.



	Number of Households (87-88) (in thousands)	Avg. Household Income (87-88)	Growth in Avg. Household Income (87-88) to (94-95)
<b>Middle Income</b>	<b>40</b>	<b>30000</b>	<b>50%</b>
<b>Upper Middle</b>	<b>10</b>	<b>50000</b>	<b>60%</b>
<b>High Income</b>	<b>5</b>	<b>75000</b>	<b>90%</b>

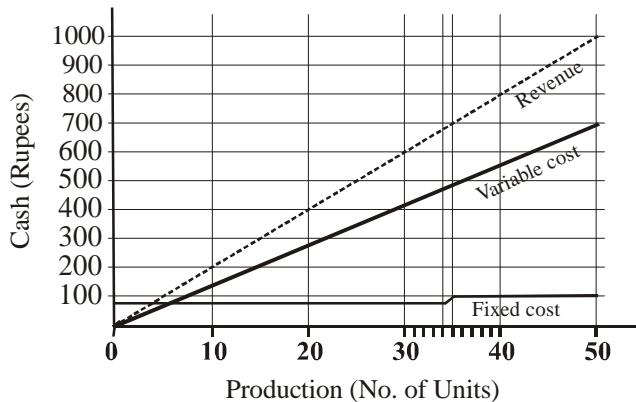
42. Which region showed the highest growth in number of households in all the income categories for the period? (1997)  
 (a) North (b) South (c) West (d) None
43. What was the total household income in Northern Region for upper middle class? (1997)  
 (a) 50 lakhs (b) 500 million (c) 300 million (d) Cannot be determined
44. What is the percentage increase in total number of households for the Northern Region (upper middle) over the given period? (1997)  
 (a) 100 (b) 200 (c) 240 (d) Cannot be determined
45. What is the average income of the high-income group in 87-88? (1997)  
 (a) 75000 (b) 25000 (c) 225000 (d) Cannot be determined

**ADDITIONAL Directions for Questions 46 & 47 :** If the same data as above can be used, with the additional information that the numbers of households in each category were equally distributed in all the regions then

46. If the numbers of households in each category were equally distributed in all the regions then.  
 The ratio of total income for the high-income category to the upper middle class increased by how much percentage in the given period? (1997)  
 (a) 20 (b) 38 (c) 25 (d) Cannot be determined
47. If the numbers of households in each category were equally distributed in all the regions then. (1997)  
 The average income for the northern region in 87-88, was  
 (a) 37727 (b) 37277 (c) 35000 (d) Cannot be determined

**Directions for Questions 48 to 52 :** These questions are based on the information and graph given below.

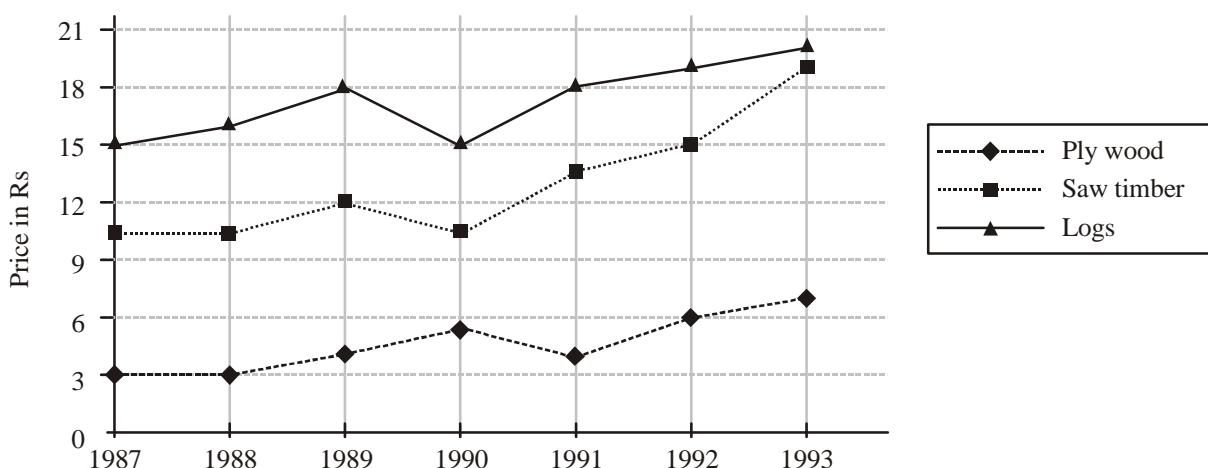
Ghosh Babu has a manufacturing unit. The following graph gives the cost for various number of units. Given the Profit = Revenue - Variable Cost - Fixed Cost. The fixed cost remains constant upto 34 units after which additional investment is to be done in fixed assets. In any case production can not exceed 50 units.



48. What is the minimum number of units that need to be produced to make sure that there was no loss? (1998)  
 (a) 5 (b) 10 (c) 20 (d) indeterminable
49. How many units should be manufactured such that profit was atleast Rs. 50? (1998)  
 (a) 20 (b) 34 (c) 45 (d) 30
50. If at the most 40 units can be manufactured then what is the number of units that can be manufactured to maximize profit? (1998)  
 (a) 40 (b) 34 (c) 35 (d) 25
51. If the production can not exceed 45 units then what is the number of units that can maximise profit per unit? (1998)  
 (a) 40 (b) 34 (c) 415 (d) 35
52. If the fixed cost of production goes up by Rs 40 then what is the minimum number of units that need to be manufactured to make sure that there is no loss? (1998)  
 (a) 10 (b) 19 (c) 15 (d) 20

**Directions for Questions 53 to 58 :** These questions are based on the information and chart given below.

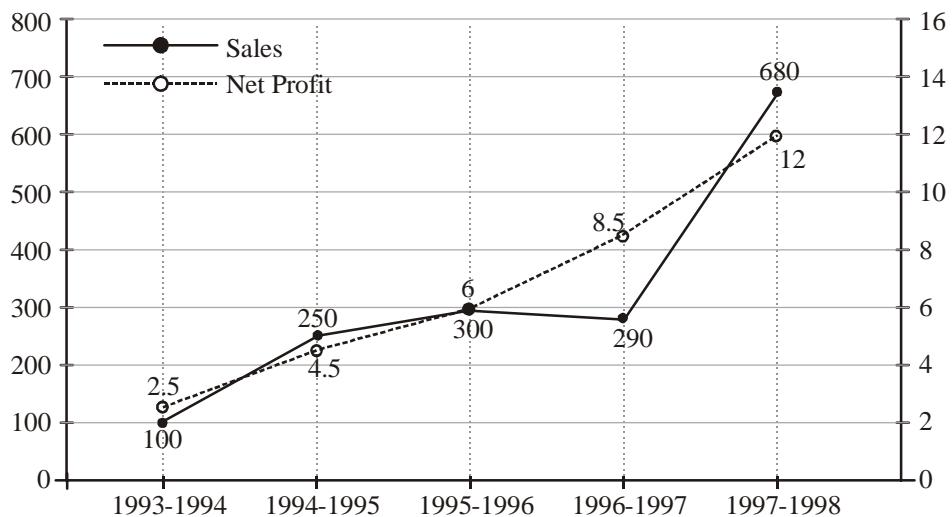
In the following chart, the price of logs shown is per cubic meter and that of plywood and saw timber is per ton. Given that 1 cubic meter of Plywood and Saw Timber = 800 kg. (1 ton = 1000 kg )



53. What is the maximum percentage increase in price per cubic meter or per tonne over the previous year? (1998)  
 (a) 33.33% (b) 85% (c) 50% (d) Can not be determined
54. Which product shows maximum percentage increase in price over the period? (1998)  
 (a) Saw Timber (b) Plywood (c) Logs (d) Can not be determined
55. If 1 cubic meter = 750 kg for saw timber, find in which year was the difference in prices of logs and saw timber the least? (1998)  
 (a) 1989 (b) 1990 (c) 1991 (d) 1992
56. If 1 cubic meter = 700 kg for Plywood and 800 kg for Saw timber find in which year was the difference in prices of plywood and saw timber the least? (1998)  
 (a) 1989 (b) 1990 (c) 1991 (d) 1992
57. If the volume of sales of Plywood, saw timber and Logs were 40%, 30% and 30% respectively then what was the average realisation in 1993 per cubic meter of sales? (One cubic metre of saw timber and plywood both = 800 kg) (1998)  
 (a) 18 (b) 15 (c) 16 (d) 13
58. If in 1994 prices increased by 5%, 1% and 10% while the volume of sales breakup was 40%, 30% and 30% for plywood, Saw Timber and Logs respectively then what was the average realisation per cubic meter of sales? (1998)  
 (a) 18.95 (b) 16.45 (c) 13.55 (d) 10.25

**Directions for Questions 59 to 62 :** These questions are based on the graph given below.

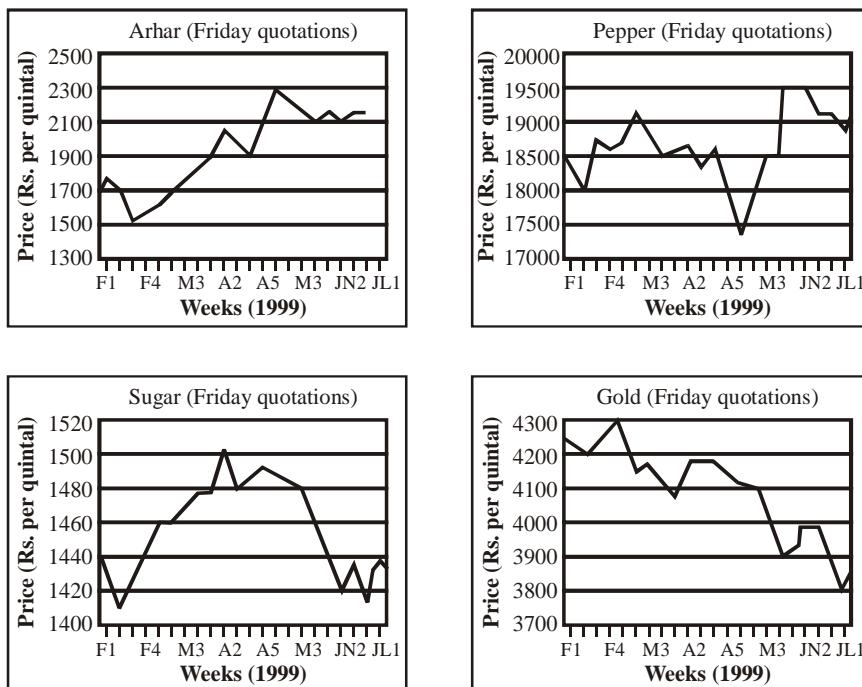
The sales & profits of IVP Ltd. are given for five years from 93 - 94 to 97 - 98



59. For which year had the percentage increase in profit been highest over the previous year (1999)  
 (a) 96-97 (b) 94-95 (c) 95-96 (d) 97-98
60. For which of the following year has the profit per unit sales been highest over the previous year (1999)  
 (a) 93-94 (b) 94-95 (c) 95-96 (d) 97-98
61. For which year has the percentage increase in expenses over the previous year been lowest (1999)  
 (a) 96-97 (b) 94-95 (c) 95-96 (d) 97-98
62. It can be inferred from the given data that profit per unit sales (1999)  
 (a) is non-decreasing over the given period of time (b) is decreasing over the given period of time  
 (c) remains constant over the given period of time (d) none of these

**Directions for Questions 63 to 66 :** These questions are based on the information and graph given below.

These questions are based on the price fluctuations of four commodities - arhar, pepper, sugar, and gold during February - July 1999 as described in the figures below :



63. Price change of a commodity is defined as the absolute difference in ending and beginning prices expressed as a percentage of the beginning. What is the commodity with the highest price changes (1999)

(a) Arhar (b) Pepper (c) Sugar (d) Gold

64. Price volatility (PV) of a commodity is defined as follows (1999)

$PV = (\text{highest price during the period} - \text{lowest price during the period}) / \text{average price during the period}$

$$\text{Average price} = \frac{\text{Highest price} + \text{lowest price} + \text{ending price} + \text{beginning price}}{4}$$

What is the commodity with the lowest price volatility? (1999)

(a) Arhar (b) Pepper (c) Sugar (d) Gold

65. Mr. X, a fund manager with an investment company invested 25% of his funds in each of the four commodities at the beginning of the period. He sold the commodities at the end of the period. His investments in the commodities resulted in (1999)

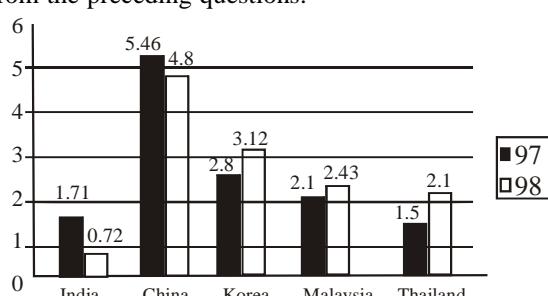
(a) 17% profit (b) 5.5% loss (c) no profit, no loss (d) 5.4% profit

66. The price volatility of the commodity with the highest PV during the February - July period is approximately equal to (1999)

(a) 3% (b) 40% (c) 20% (d) 12%

**Directions for Questions 67 to 71 :** These questions are based on the information and graph given below.

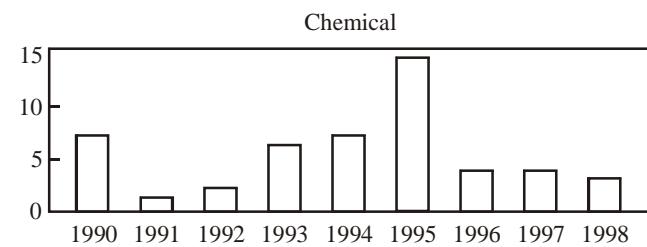
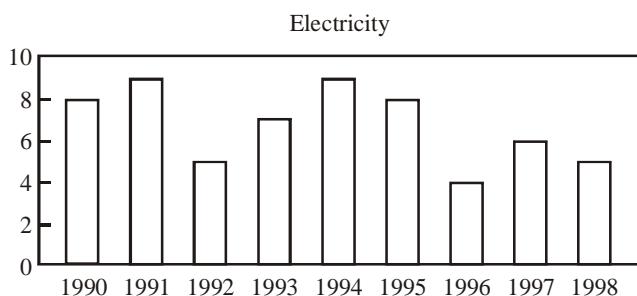
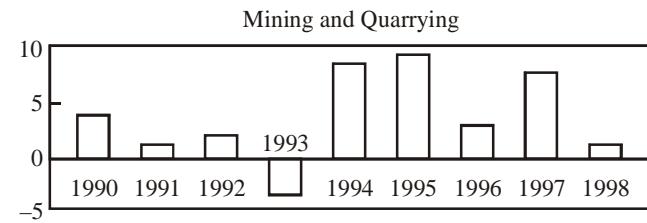
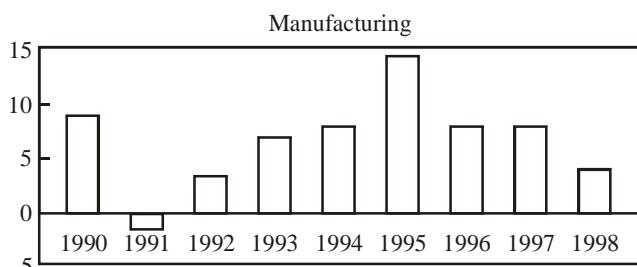
The following graph gives the data about Foreign Equity Inflow Index (FEII) for the four countries for two years 97 and 98. FEII is taken as the ratio of foreign equity inflow (FEI) to the country's GDP, which is expressed as percentage in the graph. For answering you can use the data from the preceding questions.



67. Which country has shown maximum % change in FEII as compared to previous year?  
 (a) India (b) China (c) Korea (d) Malaysia
68. If China's FEI is 10 times that of India in the year 98, which is true?  
 (a) China's GDP is 70% more than India (b) China's GDP is 40% more than India  
 (c) China's GDP is 50% more than India (d) Nothing can be inferred
69. If GDP of India increase by 5%, China increase by 7% and Korea decrease By 2% from year 97 to 98. Which of the following is/are true?  
 I. Net investment in China has increased.  
 III. India's FEI in absolute terms has increased.  
 V. Korea's FEI in absolute terms has increased.  
 (a) I and III (b) II and V (c) II, III and V (d) All of the above
70. Which of following is true?  
 (a) China's GDP is more than India (b) China's GDP is less than India.  
 (c) India's GDP is less than Malaysia (d) Nothing can be deduced
71. In how many countries FEI has been increased from 97 to 98?  
 (a) 1 (b) 2 (c) 3 (d) Cannot be determined

**Directions for Questions 72 to 77 :** These questions are based on the information and graph given below.

The following graph gives the data of four of the commodities produced by a company. Manufacturing constitutes 20% Mining 15%, Electricity 10% and Chemicals 15% of its production. The graph gives the percentage change in production over the previous year's production and 1989 production values have been assigned an index of 100 for each of the four commodities.



72. Which is the sector with the highest growth during the period 1989 to 1998?  
 (a) Manufacturing (b) Mining and quarrying (c) Electricity (d) Chemicals
73. The overall growth rate in 1991 of the four sectors together is approximately :  
 (a) 10% (b) 1% (c) 2.5% (d) 1.5%
74. When was the highest level of production in the manufacturing sector achieved during the 9-year 1990-98?  
 (a) 1998 (b) 1995 (c) 1990 (d) cannot be determined
75. When was the lowest level of production of the mining and quarrying sector achieved during the 9-year period 1990-98?  
 (a) 1996 (b) 1993 (c) 1990 (d) can't be determined
76. The percentage of increase of production in the four sectors, namely, manufacturing, mining and quarrying, electricity and chemicals, taken together in 1994, relative to 1989 is approximately :  
 (a) 25 (b) 20 (c) 50 (d) 40
77. It is known that the index of total industrial production in 1994 was 50% more than in 1989. Then, the percentage increase in production between 1989 and 1994 in sectors other than the four listed above is :  
 (a) 57.5 (b) 87.5 (c) 127.5 (d) 47.5

**Directions for Questions 78 to 83 :** These questions are based on the information and two graphs given below.

Figure 1 shows the amount of work distribution , in man - hours for a software company between offshore and onsite activities. Figure 2 shows the estimated and actual work effort involved in the different offshore activities in the same company during the same period. [Note : onsite refers to work performed at the customer's premise and offshore refers to work performed at the developer's premise.]

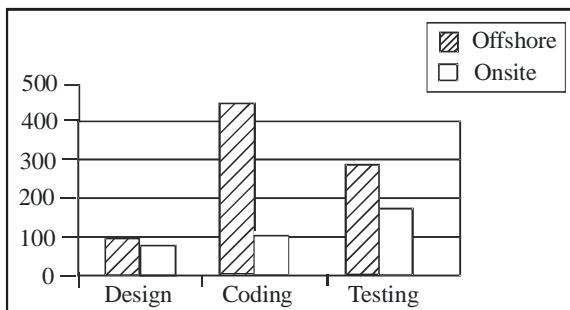


Figure 1

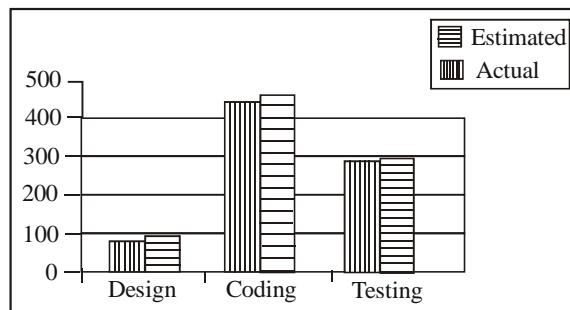
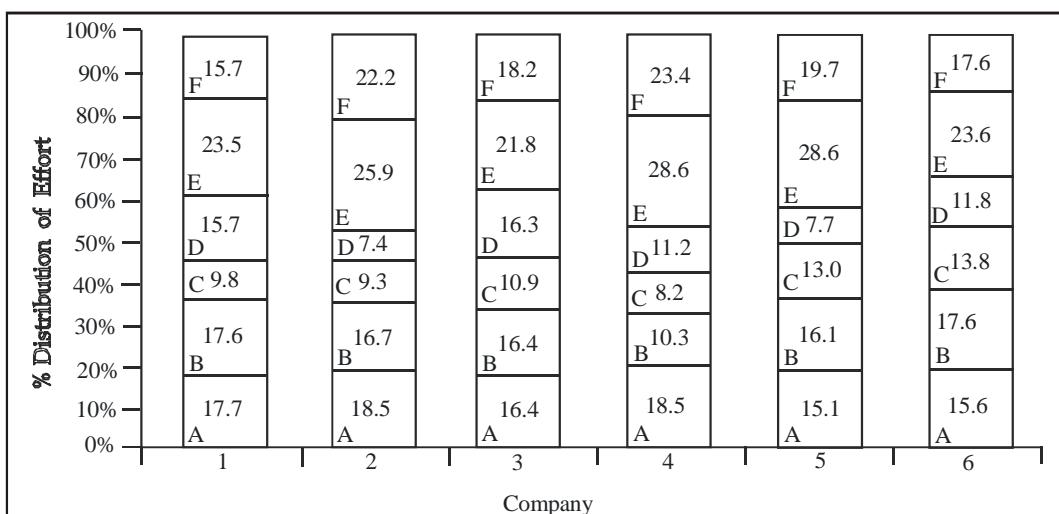


Figure 2

78. Which of the work requires as many man- hours as that spent in coding?  
 (a) Offshore, design and coding      (b) Offshore coding.  
 (c) Testing      (d) Offshore, testing and coding.
79. Roughly what percentage of the total work is carried out onsite?  
 (a) 40 percent      (b) 20 percent      (c) 30 percent      (d) 50 percent
80. The total effort in man- hours spent onsite is nearest to which of the following?  
 (a) The sum of the estimated and actual effort for offshore design  
 (b) The estimated man-hours of offshore coding      (c) The actual man-hours of offshore testing  
 (d) Half of the man-hours of estimated offshore coding
81. If the total working hours were 100 which of the following tasks will account for approximately 50 hours?  
 (a) Coding      (b) Design      (c) Offshore testing      (d) Offshore testing plus design
82. If 50 percent of the offshore work were to be carried out onsite, with the distribution of effort between the tasks remaining the same, the proportion of testing carried out offshore would be  
 (a) 40 Percent      (b) 30 Percent      (c) 50 Percent      (d) 70 Percent
83. If 50 percent of the offshore work were to be carried out onsite, with the distribution of effort between the tasks remaining the same, which of the following is true of all work carried out onsite?  
 (a) The amount of coding done is greater than that of testing.  
 (b) The amount of coding done onsite is less than that of design done onsite  
 (c) The amount of design carried out onsite is greater than that of testing  
 (d) The amount of testing carried out offshore is greater than that of total design

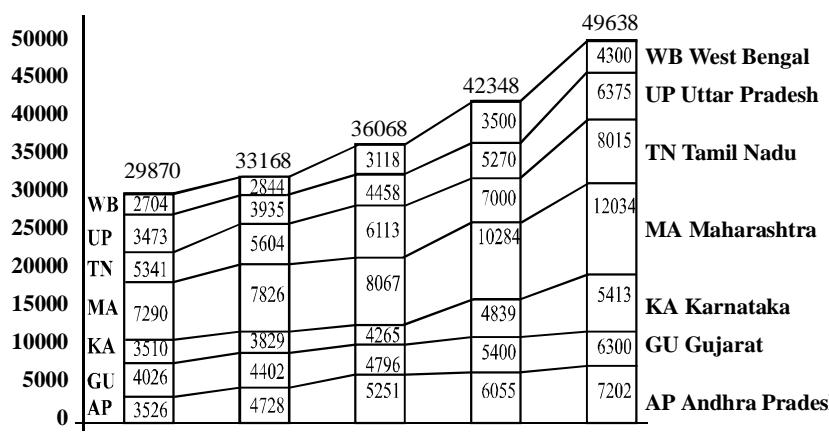
**Directions for Questions 84 to 86 :** These questions are based on the information and graph given below.

There are six companies, 1 through 6. All of these companies use six operations, A through F. The following graph shows the distribution of efforts put in by each company in these six operations.



84. Suppose effort allocations is inter-changed between operations B and C, then C and D, and then D and E. If companies are then ranked in ascending order of effort in E, what will be then rank of company 3? (2001)  
 (a) 2 (b) 3 (c) 4 (d) 5
85. A new technology is introduced in company 4 such that the total effort for operations B through F get evenly distributed among these . What is the change in the percentage of effort in operation E? (2001)  
 (a) Reduction of 12.3 (b) Increase of 12.3 (c) Reduction of 5.6 (d) Increase of 5.6
86. Suppose the companies find that they can remove operations B,C and D re-distribute the effort released equally among the remaining operations. Then, which operation will show the maximum across all companies and all operations? (2001)  
 (a) Operation E in company 1 (b) Operation E in company 4  
 (c) Operation F in company 5 (d) Operation E in company 5

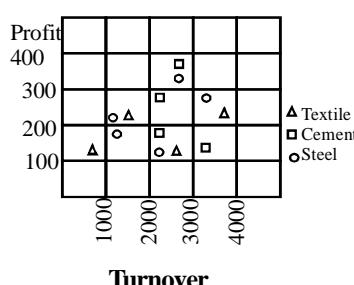
**Directions for Questions 87 to 92 :** These questions are based on the graph given below.



87. If for each year, the states are ranked in terms of the descending order of sales tax collections, how many states don't change the ranking more than once over the five years (2002)  
 (a) 1 (b) 5 (c) 3 (d) 4
88. Which of the following states has changed its relative ranking most number of times when you rank the states in terms of the descending volume of sales tax collections each year? (2002)  
 (a) Andhra Pradesh (b) Uttar Pradesh (c) Karnataka (d) Tamil Nadu
89. The percentage share of sales tax revenue of which state has increased from 1997 to 2001? (2002)  
 (a) Tamil Nadu (b) Karnataka (c) Gujarat (d) Andhra Pradesh
90. Which pair of successive years shows the maximum growth rate of tax revenue in Maharashtra? (2002)  
 (a) 1997 to 1998 (b) 1998 to 1999 (c) 1999 to 2000 (d) 2000 to 2001
91. Identify the state whose tax revenue increased exactly by the same amount in two successive pair of years? (2002)  
 (a) Karnataka (b) West Bengal (c) Uttar Pradesh (d) Tamil Nadu
92. Which state below has been maintaining a constant rank over the years in terms of its contribution to total tax collections? (2002)  
 (a) Andhra Pradesh (b) Karnataka (c) Tamil Nadu (d) Uttar Pradesh

**Directions for Questions 93 to 95 :** These questions are based on the information and graph given below.

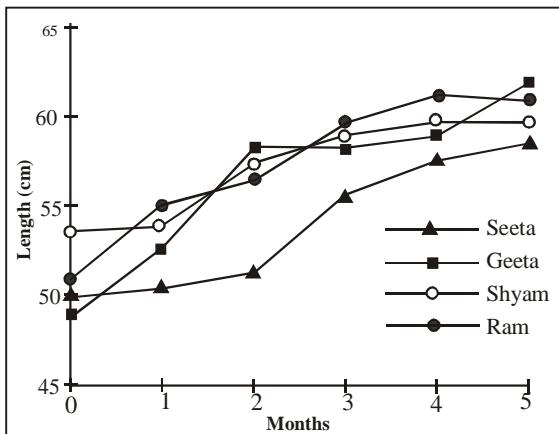
Each point in the graph below shows the profit and turnover data of a company. Each company belongs to one of the three industries: textile, cement and steel.



93. An investor wants to buy stock of only steel or cement companies with a turnover more than 1000 and profit exceeding 10% of turnover. How many choices are available to the investor? (2003C)  
 (a) 6 (b) 7 (c) 8 (d) 9
94. For how many steel companies with a turnover of more than 2000 is the profit less than 300? (2003C)  
 (a) 0 (b) 1 (c) 2 (d) 7
95. For how many companies does the profit exceed 10% of turnover? (2003C)  
 (a) 8 (b) 7 (c) 6 (d) 5

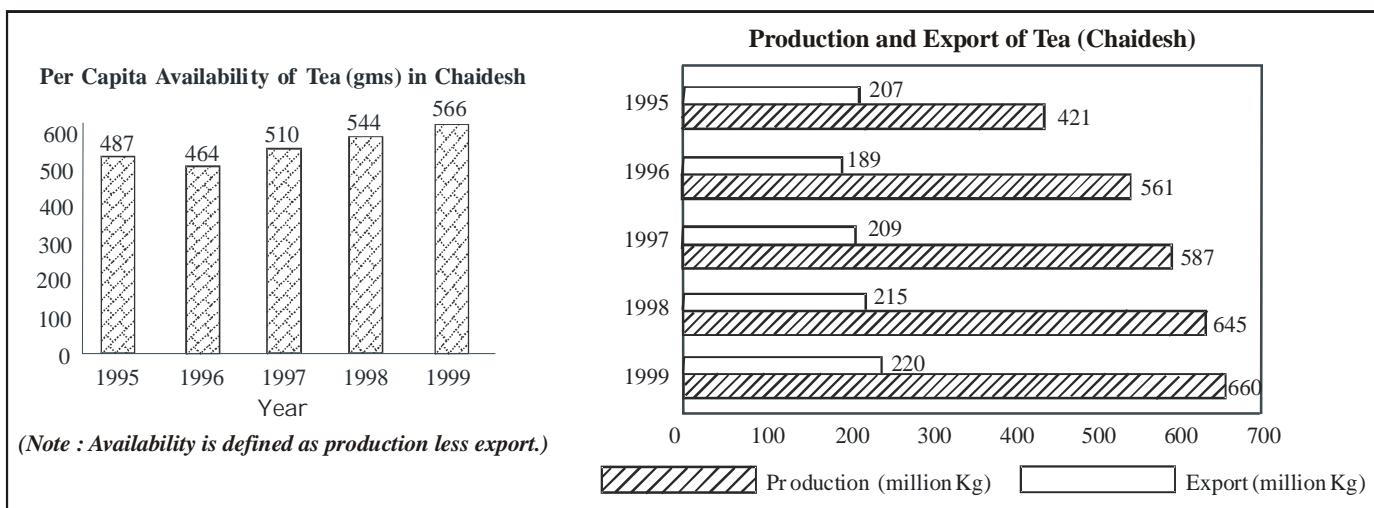
**Directions for Questions 96 to 99 : These questions are based on the information and graph given below.**

The length of an infant is one of the measures of his/her development in the early stages of his /her life. The figure below shows the growth chart of four infants in the five months of life.



96. Among the four infants, who grew the least in the first five months of life? (2003C)  
 (a) Geeta (b) Seeta (c) Ram (d) Shyam
97. The rate of growth during the third month was the lowest for (2003C)  
 (a) Geeta (b) Seeta (c) Ram (d) Shyam
98. Who grew at the fastest rate in the first two months of life ? (2003C)  
 (a) Geeta (b) Seeta (c) Ram (d) Shyam
99. After which month did Seeta's rate of growth start to decline? (2003C)  
 (a) Second month (b) Third month (c) Fourth month (d) Never

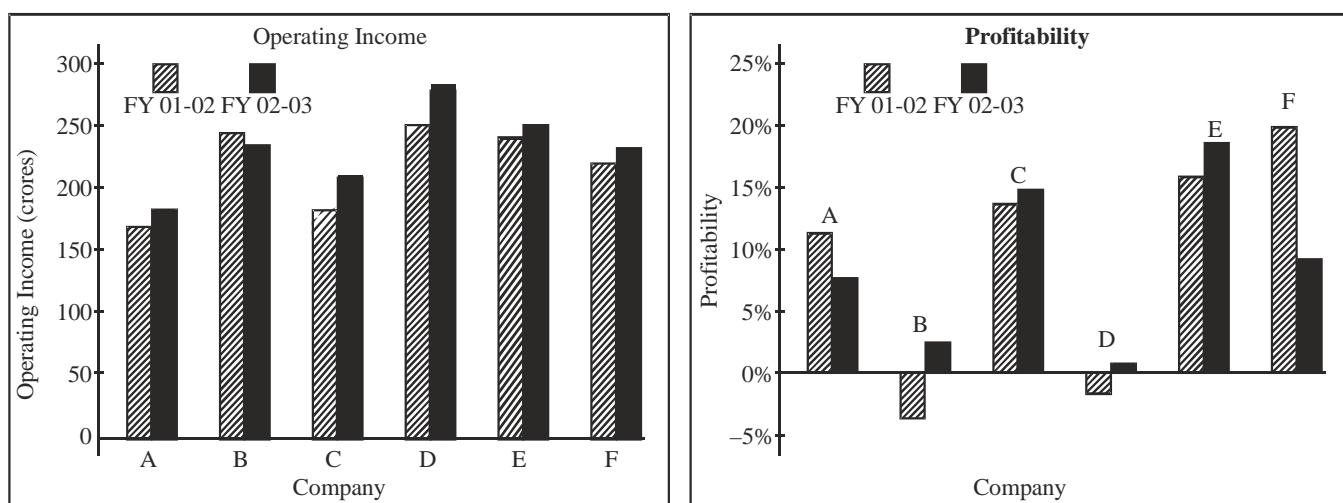
**Directions for Questions 100 to 102 : These questions are based on the charts given below.**



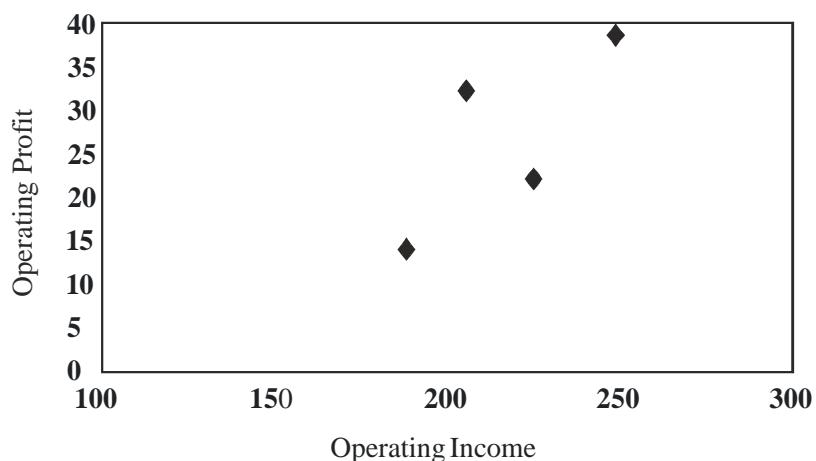
100. In which year during the period 1996-1999 was Chaidesh's export of tea, as a proportion of tea produced, the highest? (2003)  
 (a) 1996 (b) 1997 (c) 1998 (d) 1999
101. In which of the following years was the population of Chaidesh the lowest? (2003)  
 (a) 1995 (b) 1996 (c) 1997 (d) 1999
102. The area under tea cultivation continuously decreased in all four years from 1996 to 1999, by 10%, 7%, 4% and 1%, respectively. In which year was tea productivity (production per unit of area) the highest? (2003)  
 (a) 1999 (b) 1998 (c) 1997 (d) 1996

Directions for Questions 103 to 106 : These questions are based on the information and charts given below.

The profitability of a company is defined as the ratio of its operating profit to its operating income, typically expressed in percentage. The following two charts show the operating income as well as the profitability of six companies in the Financial Years (F.Y.s) 2001-02 and 2002-03.

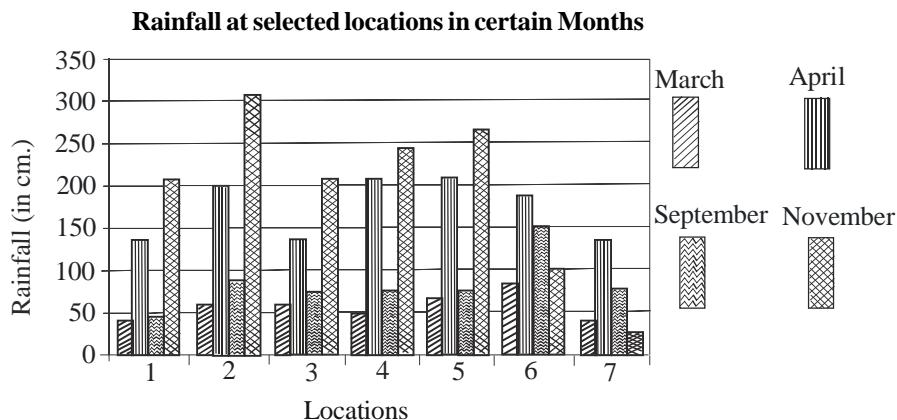


The operating profits of four of these companies are plotted against their respective operating income figures for the F.Y. 2002-03, in the third chart given below.



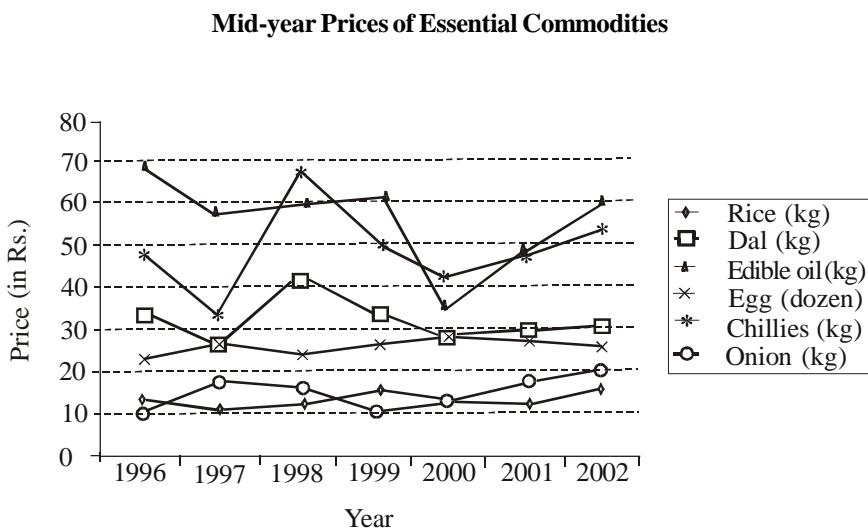
103. What is the approximate average operating profit, in F.Y. 2001 - 2002, of the two companies excluded from the third chart? (2003)
- 7.5 crore
  - 3.5 crore
  - 25 crore
  - Cannot be determined.
104. Which company recorded the highest operating profit in F.Y. 2002-03? (2003)
- A
  - C
  - E
  - F
105. Which of the following statements is NOT true? (2003)
- The company with the third lowest profitability in F.Y. 2001-02 has the lowest operating income in F.Y. 2002-03
  - The company with the highest operating income in the two financial years combined has the lowest operating profit in F.Y. 2002-03
  - Companies with a higher operating income in F.Y. 2001-02 than in F.Y. 2002-03 have higher profitability in F.Y. 2002-03 than in F.Y. 2001-02
  - Companies with profitability between 10% and 20% in F.Y. 2001-02 also have operating incomes between 150 crore and 250 crore in F.Y. 2002-03
106. The average operating profit in F.Y. 2002-03, of companies with profitability exceeding 10% in F.Y. 2002-03, is approximately (2003)
- 17.5 crore
  - 25 crore
  - 27.5 crore
  - 35 crore

**Directions for Questions 107 & 108 :** These questions are based on the figure given below.



107. Which of the following statements is correct? (2003)
- November rainfall exceeds 100 cm. in each location
  - September rainfall exceeds 50 cm. in each location
  - March rainfall is lower than September rainfall in each location
  - None of the above
108. Locations 6 and 7 differ from all the rest because only in these two location, (2003)
- April rainfall exceeds March rainfall
  - Peak rainfall occurs in April.
  - November rainfall is lower than March rainfall
  - April rainfall is less than 200 cm.

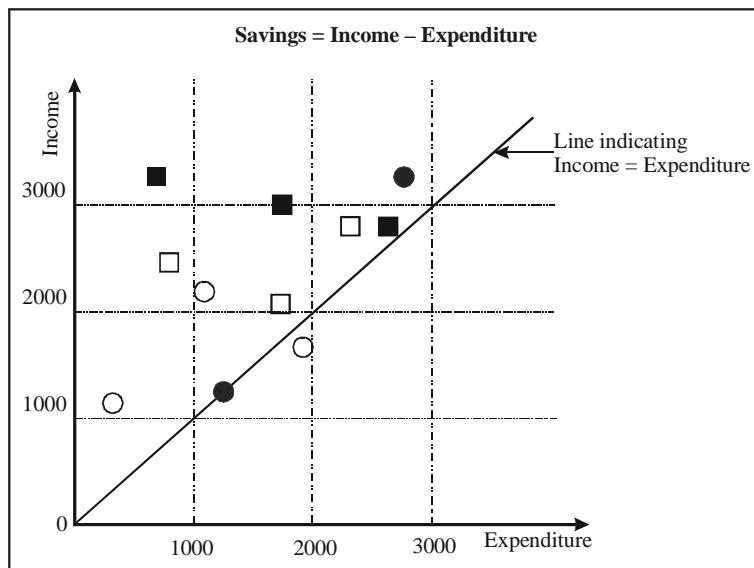
**Directions for Questions 109 to 111 :** These questions are based on the figure given below.



109. During 1996-2002, the number of commodities that exhibited a net overall increase and a net overall decrease, respectively, were (2003)
- 3 and 3
  - 2 and 4
  - 4 and 2
  - 5 and 1
110. The number of commodities that experienced a price decline for two or more consecutive years is (2003)
- 2
  - 3
  - 4
  - 5
111. For which commodities did a price increase immediately follow a price decline only once in this period? (2003)
- Rice, Edible oil & Dal
  - Egg and Dal
  - Onion only
  - Egg and Onion

**Directions for Questions 112 to 115 : Answer the questions on the basis of the information given below.**

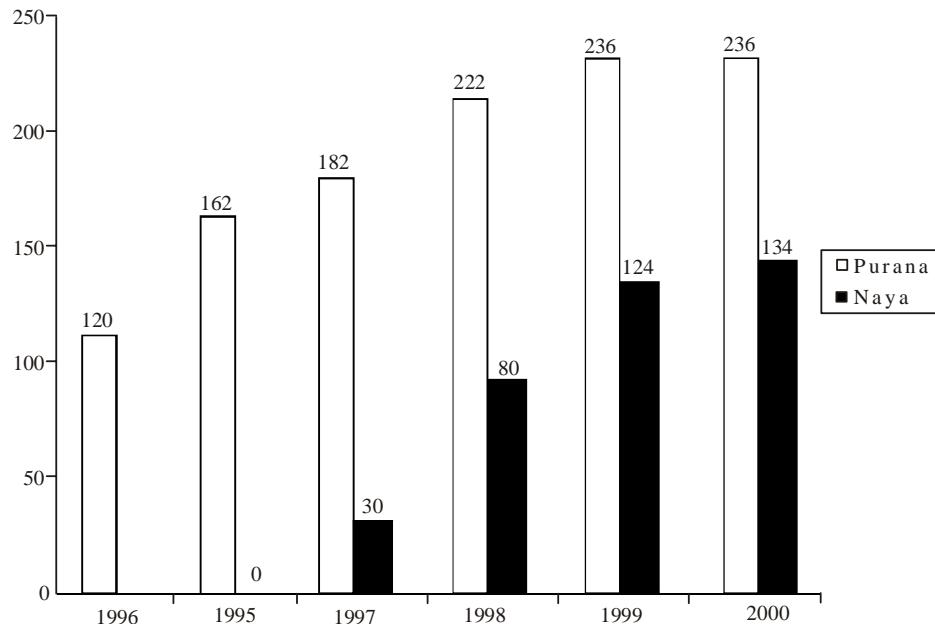
The data points in the below represent monthly income and expenditure data of individual members of the Ahuja family (■), the Bose family (□), the Coomar family (○), and the Dubey family (●). For these questions, saving is defined as



112. Which family has the highest average expenditure? (2004)  
 (a) Ahuja (b) Bose (c) Coomar (d) Dubey
113. Which family has the lowest average income? (2004)  
 (a) Ahuja (b) Bose (c) Coomar (d) Dubey
114. Which highest amount of saving accrues to a member of which family? (2004)  
 (a) Ahuja (b) Bose (c) Coomar (d) Dubey
115. Which family has the lowest average saving? (2004)  
 (a) Ahuja (b) Bose (c) Coomar (d) Dubey

**Directions for Questions 116 to 119 : Answer the questions on the basis of the information given below.**

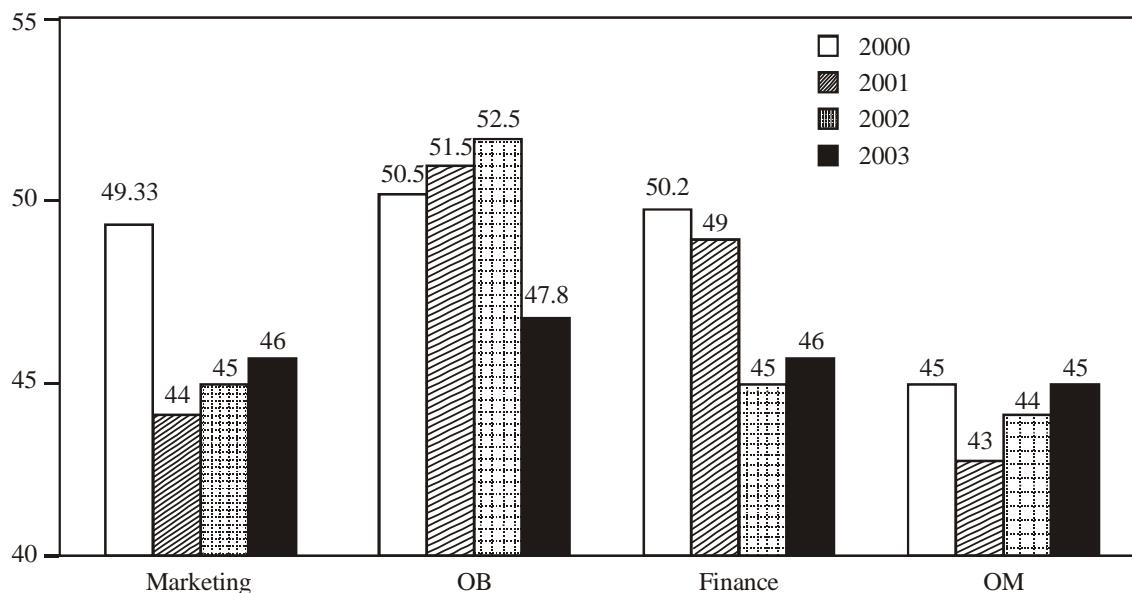
Purana and Naya are two brands of kitchen mixer- grinders available in the local market. Purana is an old brand that was introduced in 1990, while Naya was introduced in 1997. For both these brands, 20% of the mixer-grinders bought in a particular year are disposed off as junk exactly two years later. It is known that 10 Purana mixer-grinders were disposed off in 1997. The following figures show the number of Purana and Naya mixer-grinders in operation from 1995 to 2000, as at the end of the year.



116. How many Naya mixer-grinders were disposed off by the end of 2000? (2004)
- (a) 10 (b) 16  
(c) 22 (d) Cannot be determined from the data
117. How many Naya mixer-grinders were purchased in 1999? (2004)
- (a) 44 (b) 50 (c) 55 (d) 64
118. How many Purana mixer-grinders were purchased in 1999? (2004)
- (a) 20 (b) 23  
(c) 50 (d) Cannot be determined from the data
119. How many Purana mixer-grinders were disposed off in 2000? (2004)
- (a) 0 (b) 5  
(c) 6 (d) Cannot be determined from the data

**Directions for Question 120 to 123 : Answer the question on the basis of the information given below.**

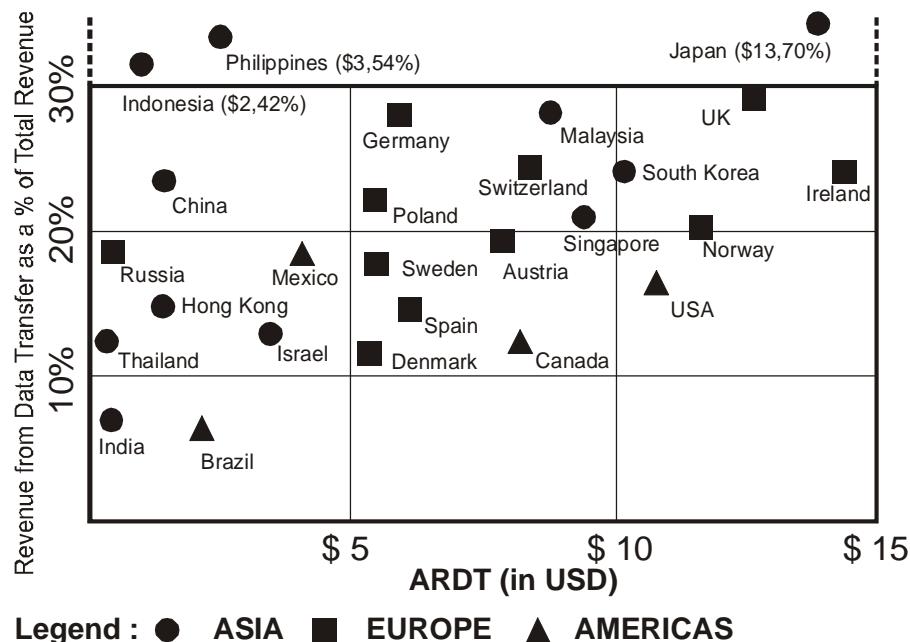
A management institute was established on January 1, 2000 with 3, 4, 5, and 6 faculty members in the Marketing, Organisational Behaviour (OB), Finance, and Operations Management (OM) areas respectively, to start with. No faculty member retired or joined the institute in the first three months of the year 2000. In the next four years, the institute recruited one faculty member in each of the four areas. All these new faculty members, who joined the institute subsequently over the years, were 25 years old at the time of their joining the institute. All of them joined the institute on April 1. During these four years, one of the faculty members retired at the age of 60. The following diagram gives the area-wise average age (in terms of number of completed years) of faculty members as on April 1 of 2000, 2001, 2002 and 2003.



120. In which year did the new faculty member join the Finance area? (2005)
- (a) 2000 (b) 2001 (c) 2002 (d) 2003
121. What was the age of the new faculty member, who joined the OM area, as on April 1, 2003? (2005)
- (a) 25 (b) 26 (c) 27 (d) 28
122. From which area did the faculty member retire? (2005)
- (a) Finance (b) Marketing (c) OB (d) OM
123. Professors Naresh and Devesh, two faculty members in the Marketing area, who have been with the Institute since its inception, share a birthday, which falls on 20th November. One was, born in 1947 and the other one in 1950. On April 1, 2005, what was the age of the third faculty member, who has been in the same area since inception? (2005)
- (a) 47 (b) 50 (c) 51 (d) 52

**Directions for Questions 124 to 126 :** Answer the following questions based on the information given below :

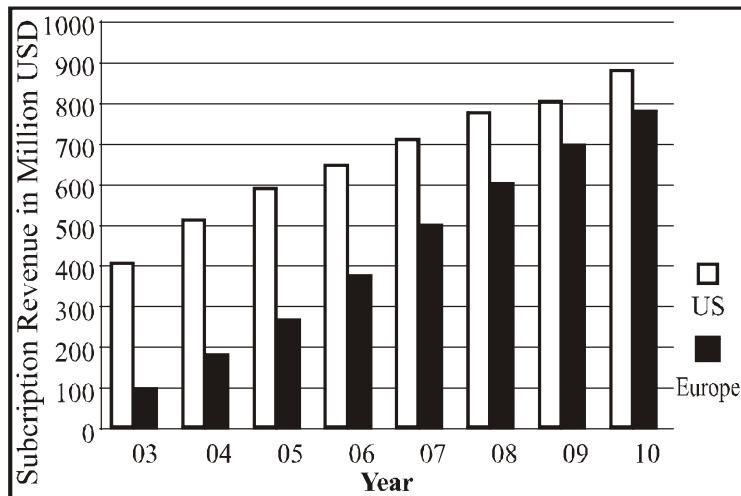
Telecom operators get revenue from transfer of data and voice. Average revenue received from transfer of each unit of data is known as ARDT. In the diagram below, the revenue received from data transfer as percentage of total revenue received and the ARDT in US Dollars (USD) are given for various countries.



124. It is expected that by 2010, revenue from data transfer as a percentage of total revenue will triple for India and double for Sweden. Assume that in 2010, the total revenue in India is twice that of Sweden and that the volume of data transfer is the same in both the countries. What is the percentage increase of ARDT in India if there is no change in ARDT in Sweden? (2008)
- (a) 400 % (b) 550 %  
 (c) 800 % (d) 950 %  
 (e) cannot be determined
125. It was found that the volume of data transfer in India is the same as that of Singapore. Then which of the following statements is true? (2008)
- (a) Total revenue is the same in both countries  
 (b) Total revenue in India is about 2 times that of Singapore  
 (c) Total revenue in India is about 4 times that of Singapore  
 (d) Total revenue in Singapore is about 2 times that of India  
 (e) Total revenue in Singapore is about 4 times that of India
126. If the total revenue received is the same for the pairs of countries listed in the choices below, choose the pair that has approximately the same volume of data transfer. (2008)
- (a) Philippines and Austria (b) Canada and Poland  
 (c) Germany and USA (d) UK and Spain  
 (e) Denmark and Mexico

**Directions for Questions 127 to 130 :** Answer the following questions based on the information given below:

The bar chart below shows the revenue received, in million US Dollars (USD), from subscribers to a particular Internet service. The data covers the period 2003 to 2007 for the United States (US) and Europe. The bar chart also shows the estimated revenues from subscription to this service for the period 2008 to 2010.



127. Consider the annual percent change in the gap between subscription revenues in the US and Europe. what is the year in which the absolute value of this change is the highest? (2008)

(a) 03-04 (b) 05-06  
(c) 06-07 (d) 08-09 (e) 09-10

128. While the subscription in Europe has been growing steadily towards that of the US, the growth rate in Europe seems to be declining. Which of the following is closest to the percent change in growth rate of 2007 (over 2006) relative to the growth rate of 2005 (over 2004)? (2008)

(a) 17 (b) 20  
(c) 35 (d) 60 (e) 100

129. The difference between the estimated subscription in Europe in 2008 and what it would have been if it were computed using the percentage growth rate of 2007 (over 2006), is closest to: (2008)

(a) 50 (b) 80  
(c) 20 (d) 10 (e) 0

130. In 2003, sixty percent of subscribers in Europe were men. Given that women subscribers increase at the rate of 10 percent per annum and men at the rate of 5 percent per annum, what is the approximate percentage growth of subscribers between 2003 and 2010 in Europe? The subscription prices are volatile and may change each year. (2008)

(a) 62 (b) 15  
(c) 78 (d) 84 (e) 50

## ANSWERS WITH SOLUTIONS

1. (c) At  $39^{\circ}\text{C}$  solubility of potassium nitrate =  $0.48 \text{ kg/litre}$  of water  
In other cases solubility is less than or equal to  $0.4 \text{ kg/litre}$  of water
2. (c) Solubility of potassium nitrate at  $30^{\circ}\text{C}$  =  $0.38 \text{ kg/litre}$   
so in 10 litres of water it can be dissolved  
 $10 \times 0.38 = 3.8 \text{ kg} \approx 4 \text{ (approx)}$
3. (d) Solubility of potassium chlorate at  $30^{\circ}\text{C}$  =  $0.1$   
Solubility of potassium chlorate at  $80^{\circ}\text{C}$  =  $0.4$   
 $\% \text{ increase} = \frac{0.4 - 0.1}{0.1} \times 100 = 300\%$
4. (d) Solubility of Potassium chloride at  $36^{\circ}\text{C}$  =  $0.4 \text{ kg/litre}$   
it means in 1 litre it can be dissolved =  $0.4 \text{ kg}$   
In 100 litre it can be dissolved =  $100 \times 0.4 = 40 \text{ kg}$   
 $\therefore 0.07456 \text{ kg weighs 1 mole}$   
 $\therefore 40 \text{ kg weighs } \frac{1}{0.07456} \times 40 = 536 \text{ (approx)}$
5. (c) It is clear from graph that greatest change in solubility between  $15^{\circ}$  and  $25^{\circ}\text{C}$  is of salt sodium chlorate and this change =  $1.1 - 0.95 = 0.15 \text{ kg/litre}$
6. (d) Total no. of students in 1989-90 =  $(185 + 120 + 70 + 45) = 42000$
7. (c) Growth rate of students of govt. college  
 $= \frac{120 - 80}{80} \times 100 = 50\%$   
(since students in 1988-89 = 80 and in 1989-90 = 120)  
growth rate of students of private engg. college from  
1988-89 to 1989-90  $= \frac{180 - 120}{120} \times 100 = 50\%$   
Hence growth rate is equal
8. (d) Total no of students in 1990-91  
 $(250 - 140 - 100 - 80) \times 100 = 57000$   
reduction =  $10\% \text{ of } 57000 = 5700$   
Hence total no. of students in 1991-92  
 $= 57000 - 5700 = 51300$
9. (c) Total no. of students in 1990-91 =  $57000$   
(as calculated above)  
 $\% \text{ students of IIT's} = \frac{8000}{57000} \times 100 = \frac{1}{7} \times 100 \text{ approx.} \approx 14\% \text{ approx.}$
10. (b) Trade deficit in 87-88 =  $17.5 - 11.75 = 5.75$   
Trade deficit in 88-89 =  $19.5 - 13.25 = 6.25$  (greatest)  
Trade deficit in 89-90 =  $21 - 16.5 = 4.5$   
Trade deficit in 90-91 =  $24.5 - 18.5 = 6$
11. (c)  $\frac{\text{Export in } 90-91}{\text{Import in } 91-92} \times 100 = \frac{18.5}{20} \times 100 = 92.5\%$
12. (d) Clearly it is seen that the trade deficit is lower in 87-88, 89-90, 91-92, 93-94

13. (d)  $\frac{\text{Total exports in last 3 years}}{\text{Total imports in last 3 years}} \times 100$   
 $= \frac{24.25}{27.75} \times 100 = \frac{21.75}{23.5} \times 100 = \frac{18.50}{22} \times 100 = \frac{64.50}{73.25} \times 100 \approx 89\%$
14. (a) (i) is clearly true  
(ii) is false as it remained same in 1991-92  
(iii) is false as export earning is more than expenditure on imports in the preceding year in 94-95.
15. (b) Change in revenue from journals:  
1990 1ℓ; 1991 1.9ℓ; 1992 1.1ℓ  
Hence least change is in 1990  
**Note :** Here change is asked so we have to consider both, increase and decrease.
16. (c) Total revenue growth  
 $\frac{78.9}{45.9} \times 100 = 73.0$   
 $\frac{49.6}{30.6} \times 100 = 15\%$   
 $\frac{43.9}{73.0} \times 100 = 59.5\%$   
 $\frac{172.4}{149.5} \times 100 = 15\%$   
 $\frac{149.5}{149.5} \times 100 = 100\%$
17. (a) Revenue of books from total in 1992  
 $= \frac{78.9}{172.4} \times 100 = 45\%$
18. (d) Growth in 92, over 91  
 $\frac{172.4 - 168.2}{45 - 44.6} \times 100 = \frac{4.2 \times 100}{168.2} = 2.5\%$   
Revenue in 93 =  $172.4 \times 1.025 = 176.7$
19. (c) Increase in revenue from atleast 2 categories was in 1990, 1991, 1992
- For Qs. 20-24.**  
Corresponding values according to the graph are
- | Year        | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | Total |
|-------------|------|------|------|------|------|------|------|-------|
| Profit      | 20   | 25   | 30   | 40   | 50   | 60   | 72   | 297   |
| Revenue     | 122  | 130  | 145  | 170  | 185  | 200  | 222  | 1174  |
| Expenditure | 102  | 105  | 115  | 130  | 135  | 140  | 150  | 877   |
20. (a) Percentage Increase = [final value - initial value] using this formula, we can find about % age increase for all the years, the maximum being for year 1992  
 $\frac{40 - 30}{30} \times 100 = 33.33\%$
21. (b) Average revenue =  $\frac{\text{Total Revenue}}{\text{No. of years}}$   
 $\frac{1174}{7} = 168 \text{ (approx.)}$
22. (d) From the above table, it can be seen that the growth in expenditure was maximum in 1992.
23. (a) Total Revenue = 1174. Total expenditure = 877  
% formed by the revenue =  $877 / 1174 = 74.7\% \approx 75\%$

24. (b) % growth in profit in 1995 =  $(72 - 60) / 60 = 1/5 = 20\%$   
 As per the given conditions % age profit in 1996 = 20%  
 $\therefore$  profit in 1996 =  $72 \left(1 + \frac{20}{100}\right) = 1.2 \times 72 = 86$  lakhs

25. (d) In May number of employees suddenly increases but the profit is increasing at much slower rate so, profit per employee must be highest either in Jan. or in March. Looking at the graph, we find March to be correct.
26. (a)  $P = (S - C)$  which is maximum in July. From the graph only 26 is near to July in profit.
27. (d) The graph clearly shows that highest growth in sales is in May.  
 So, all other months following May have less growth in Sales. But for percentage increase in sales we need to consider March also.

$$\% \text{ increase in March} = \frac{32 - 30}{30} \times 100 = 6.67\%$$

$$\% \text{ increase in May} = \frac{36 - 32}{32} \times 100 = 12.5\%$$

28. (d) Increase in cost is maximum for May i.e.  $34 - 30 = 4$  on this line graph.
29. (b) No. of persons employed = No. of employees in Nov. – No. of employees in Jan. =  $15800 - 10800 = 5000$  (approx.)  
 Closest answer is 5100 and so (b) is correct answer.

30. (a) Per capita production of milk
- |               |         |
|---------------|---------|
| Milk produced |         |
| Males         | Females |
- Looking at the graph it is clear that per capita production of milk was least in 1990

$$\frac{5}{34} \quad \frac{5}{36} \quad \frac{5}{70} \quad 0.071$$

Increase in milk production is much higher as compared to population.

31. (d) Food grains per capita production was maximum in 1995 i.e. 30. It is clear from the graph.
32. (c) Clearly from the graph, the increase in the production of food grain is far more than production of milk in 1995.  
 Note the drastic increase in production of food grains and fall in production of milk.
33. (c) Milk  $\rightarrow$  320 Calories  
 Food grain  $\rightarrow$  160 Calories  
 Let  $X$  = Required consumption

$$\frac{\text{Food grains} \times 320 + \text{Milk} \times 160}{\text{Population}}$$

	Population	Food grains	Milk	X
1993	74	22.5	8	83.24
1994	77	25	7.5	83.11
1995	79	32.5	7	94.18
1996	83	27.5	6	76.14

Hence it is found to be maximum in 1995

34. (c)  $X = (\text{Food grain} \times 80 + \text{Milk} \times 120) \text{ gm}$
- |      |      |
|------|------|
| X    |      |
| 1993 | 2760 |
| 1994 | 3600 |
| 1995 | 3440 |
| 1996 | 2920 |
35. (c) This is similar to the above question no. 33
36. (b) In 1992, there was a decrease. Increase in raw material for the years 1993, 1994 and 1995 can be calculated as 30%, 15.38% and 0.66% respectively so the increase is the maximum in 1993.  
 We can also see the length of the bars and can compare.
37. (c) The change in profit in 1991-92 is  $\frac{10}{15} = 66.66\%$   
 The change in profit in 1992-93 is  $\frac{-5}{25} = -20\%$   
 The change in profit in 1993-94 is  $\frac{-50}{20} = -250\%$   
 The change in profit in 1994-95 is  $\frac{45}{-30} = -150\%$   
 Therefore, the change in profit is maximum in 1993-94.
38. (a) Comparing the lengths of the graphs we can include that the interest has remained more or less constant over the given period.
39. (c) The overheads, as a percentage of the raw material, in the years 1992, 1993, 1994 and 1995 can be calculated as 36%, 23.07%, 30.66% and 26.25% respectively. This was maximum in 1992
40. (b) The total profit over period  $\approx 47$   
 Total cost  $\approx 970$   
 So profit  $\approx 5\%$
41. (b) If interest is not part of the total cost, the total costs for the year 1991, 1992, 1993 and 1995 are 115, 123, 140 and 166 respectively. The profits per unit cost in these years are 0.1304, 0.2032, 0.1428, 0.0903. Hence the maximum profit per unit cost is in 1992.
42. (b) From the bar graph we could see that southern region had shown the highest growth for all the income categories for all the region.
43. (d) The no. of households have not been given regionwise so it cannot be determined.
44. (b) % increase for northern region, upper middle class for the given period is 200% [from the bar graph]
45. (a) Again, from the given data, average income of the high-income group in 87-88 was **75000**.
46. (b) Ratio of total incomes for high income category to that of upper-middle category in 87-88

$$75 \times 5 : 50 \times 10 = 3 : 4 = 0.75$$

During this period, the income of higher-income category increased by 90% and that for the upper middle category increased by 60%

No. of households in high-income in 94-95

$$= 1250(3.5 \quad 5.25 \quad 2.75 \quad 2.5) = 17,500$$

No. of households in upper middle-income in 94-95

$$= 2500(3 \quad 4.5 \quad 2.25 \quad 2.25) = 30,000$$

So ratio of incomes at the end of period

$$= \frac{75,000 \times 1.9}{50,000 \times 1.6} \times \frac{17500}{30000} = 1.04$$

$$\text{Percentage increase} = \frac{1.04 - 0.75}{0.75} \times 100 = 38.6\%$$

47. (a) Number of households are equally distributed in all the regions.

Hence in Northern region households in

middle  $\rightarrow$  10,000

Upper income  $\rightarrow$  2500

High  $\rightarrow$  1250

Hence total number of households = 13750

Total income  $(10,000 \times 30,000) + (2500 \times 50,000) +$

$$(1250 \times 75,000) = 5.1875 \times 10^8$$

$$\text{So, average income} = \frac{51875 \times 10^4}{13750} \approx 37727 \text{ approx.}$$

#### 48-52.

Profit = Revenue – variable cost – fixed cost

Fixed cost remains constant upto 34 units after which additional investment is to be done in fixed assets. Maximum production = 50 units.

48. (b) For no loss

Revenue = variable cost + Fixed cost and we can see from the graph that when production is equal to 10 units.

Revenue = variable cost + Fixed cost and before this point there are losses and after this point, there are profits. Hence minimum number of units that must be produced to make sure that there are no losses is 10.

At 10 units, Profit = 200 – 130 – 70 = 0.

49. (d) For 20 units,

Profit = 400 – 280 – 70 = 50

Below 20 units the profit will be less than 50. So a minimum of 20 units is to be manufactured.

50. (b) 

Units	Revenue	Variable Cost	Fixed Cost	Profit	Profit / Unit
25	500	350	70	80	3.8
34	680	475	70	135	3.97
35	700	490	100	110	3.14
40	800	560	100	140	3.5

So, 34 units shall be manufactured to maximise profit/unit.

51. (b) 

Units	Revenue	Variable Cost	Fixed Cost	Profit	Profit / Unit
45	900	630	100	170	3.77

So, from previous question it is clear that 34 units shall be manufactured.

52. (b) As per the question, Fixed Cost = 70 + 40 = 110 till 34 units.

We know previously that there is no profit/loss at 10 units.

Units	Revenue	Variable Cost	Fixed Cost	Profit
15	300	210	110	-20
19	390	275	110	5
20	400	280	110	10

Hence, for no loss 19 units need to be manufactured. From the figure it is clear that the highest increase in price is shown by Saw timber in 1992-93, 1990-91, by Logs in 1990-91 and by Plywood in 1991-92.

$$\text{Logs} \quad 1990-91 \quad \frac{18-15}{15} \times 100 = 20\%$$

$$\text{Plywood} \quad 1991-92 \quad \frac{6-4}{4} \times 100 = 50\%$$

$$\text{Saw timber} \quad 1992-93 \quad \frac{19-15}{15} \times 100 = 26.7\%$$

Saw timber 1990-91

$$\frac{13.15-10.5}{10.5} \times 100 = 28.6\%$$

54. (a) Increase in price of Plywood = 7 – 3 = 4

$$\text{or } \frac{4}{3} \times 100 = 133.33\%$$

Increase in price of Saw Timber = 19 – 10.5 = 8.5

$$\text{or } \frac{8.5}{10.5} \times 100 = 81\%$$

Increase in price of Log = 20 – 15 = 5

$$\text{or } \frac{5}{15} \times 100 = 33.3\%$$

Year	Saw Timber in Rs/tonne	Saw Timber in Rs/m <sup>3</sup>	Logs in Rs/m <sup>3</sup>	Difference
1989	12	9	18	9
1990	10.5	7.875	15	7.125
1991	13.5	10.125	18	7.875
1992	15	11.25	19	7.75

$$\text{Use 1 ton} = \frac{4}{3} = 1.33 \text{ m}^3.$$

Year	Saw Timber in Rs/tonne	Saw Timber in Rs/m <sup>3</sup>	Plywood in Rs/m <sup>3</sup>	Plywood in Rs/m <sup>3</sup>	Difference
/tonne	/m <sup>3</sup>	/m <sup>3</sup>	/m <sup>3</sup>	/m <sup>3</sup>	
1989	12	9.6	4	2.8	6.8
1990	10.5	8.4	5	3.5	4.9
1991	13.5	10.8	4	2.8	8
1992	15	12	6	4.2	7.8

Use 1 ton =  $\frac{10}{7} \text{ m}^3$  for Plywood and 1 ton =  $\frac{10}{8} \text{ m}^3$  for Saw Timber.

Logs	Saw Timber	Plywood
Price/m <sup>3</sup> in 1993	20	$19 \times \frac{8}{10} = 15.2$

$$\text{Average realisation/m}^3 \text{ of sales} = 0.4 \times 5.6 = 0.3(20 + 15.2) = 2.24 = 10.56 = 12.8.$$

58. (c)	Logs	Saw Timber	Plywood
Prices in 1994	22	$19 \times 1.01 = 19.19$	$7 \times 1.05 = 7.35$
Prices in m <sup>3</sup>	22	$19.19 \times \frac{8}{10} = 15.35$	5.88
Average Realisation = $0.4 \times 5.88 + 0.3(22 + 15.35)$ 2.352 11.205 13.557.			

59. (b) % increase in profit =  $\frac{\text{Change in profit}}{\text{Profit in previous year}}$

% increase in the year 1994-95

$$= \frac{4.5 - 2.5}{2.5} \times 100 = 80\%$$

% increase in the year 1995-96

$$= \frac{6 - 4.5}{4.5} \times 100 = 33.33\%$$

% increase in the year 1996-97

$$= \frac{8.5 - 6}{6} \times 100 = 41.67\%$$

% increase in the year 1997-98

$$= \frac{12 - 8.5}{8.5} \times 100 = 41.2\%$$

Comparing the fractions we can say that % increase in profit is highest over the previous year in the year 1994-95.

60. (a) Profit per unit sales =  $\frac{\text{profit}}{\text{sales}}$

$$\text{Profit per unit sale for year 1993-94} = \frac{2.5}{100} = 0.025$$

$$\text{Profit per unit sale for year 1994-95} = \frac{4.5}{100} = 0.016$$

$$\text{Profit per unit sale for year 1995-96} = \frac{6}{300} = 0.02$$

$$\text{Profit per unit sale for year 1997-98} = \frac{12}{680} = 0.0176$$

Hence, profit per unit sales was highest in 1993-94 over previous year.

	Expense	% increase
1996-1997	$290 - 8.5 = 281.5$	shows decrease
1994-1995	$250 - 4.5 = 245.5$	
	$\frac{245.5 - 97.5}{97.5} = 1.52$	
1995-1996	$300 - 6 = 294$	
	$\frac{294 - 245.5}{245.5} = 0.19$	
1997-1998	$680 - 12 = 668$	
	$\frac{668 - 281.5}{281.5} = 1.37$	
1993-1994	$100 - 2.5 = 97.5$	—

62. (d) Profit/Unit sale for 1996-1997 =  $\frac{8.5}{290} = 0.029$ .

So, it is clear from the above data and solution of question 32, that the data is very fluctuating.

63. (a) Price change of each commodity is as follows :

$$\text{Arhar} = \left| \frac{2150 - 1700}{1700} \right| = 26.5\%$$

$$\text{Pepper} = \left| \frac{19250 - 18500}{18500} \right| = 4\%$$

$$\text{Sugar} = \left| \frac{1435 - 1440}{1440} \right| = 0.3\%$$

$$\text{Gold} = \left| \frac{3840 - 4240}{4240} \right| = 9.43\%$$

64. (c) Price Volatility is defined in the question PV

$$= \frac{\text{H.P.} - \text{L.P.}}{\text{A.P.}}$$

	H.P.	L.P.	A.P.	PV
Arhar	2300	1500	1912.50	0.42
Pepper	19500	17400	18622.50	0.112
Sugar	1500	1410	1446.25	0.06
Gold	4300	3800	4045	0.124

So the lowest price volatility is for sugar.

65. (d) Price change which we have calculated previously is nothing but profit percent or loss percent depending upon the sign. In the first two we have profit percentage which is  $26.5 + 4\% = 29.5\%$  and the loss percentage is  $0.3 + 9.4 = 9.7\%$  then net profit % comes out to be  $20.8\%$  and then the average of which gives i.e.

$$\frac{20.8}{4} = 5.2\% \text{ so the closest answer is (d).}$$

66. (b) From the table in earlier question the highest price volatility is 0.42 which in terms of % is 42%.

67. (a) It is clearly visible from the graph that (a) Indian shows maximum % change in FEII.

$$\text{Change} = \frac{(1.71 - 0.72)}{1.72} \times 100$$

68. (c)  $C_{\text{FEI}} = 10 I_{\text{FEI}}$

$$\therefore C_{\text{GDP}} = \frac{10 I_{\text{FEI}}}{4.8} = \frac{C_{\text{FEI}}}{4.8} I_{\text{GDP}} = \frac{I_{\text{FEI}}}{0.72}$$

$$\therefore C_{\text{GDP}} = \frac{0.72}{4.8} I_{\text{GDP}} = \frac{3}{2} I_{\text{GDP}} = 1.5 I_{\text{GDP}} \text{ or } 50\%$$

more than India.

69. (b) (i) Let net investment in china in 1997 =  $x_c$  & GDP =  $G_c$

$$\therefore \frac{x_c}{G_c} = 5.46 \text{ or } G_c = \frac{x_c}{5.46}$$

$$\text{As } G_c \text{ increases by } 7\%, \text{ hence } G_c = \frac{1.07x}{5.46}$$

$$\therefore \text{FII in 1998} = \frac{4.8 \times 1.07}{5.46} x = 0.94x_c$$

∴ Net investment in china has decreased from  $x$  to  $0.94x$

(ii) Similarly for India,  $G_I = \frac{x_I}{1.71}$

In 1998,  $G_I = \frac{1.05}{1.71} x_I$

& FII  $\frac{0.72 \times 1.05}{1.71} x_I = 0.442 x_I$  i.e. reduced.

(iii) Korea, FEI in 1998  $\frac{3.12 \times 0.98}{2.8} x_k = 1.092 x_t$  i.e.

increased

- (iv) Nothing can be said about Malaysia as GDP change is not known.  
 $\therefore$  only II & V are correct

70. (d) Nothing can be said about the GDP as all the values given are a ratio of FEI & GDP.

71. (d) Again this can not be determined as we have no information about the GDP of the countries.

72. (c) It is clear from the given graph.

73. (d) First find out the growth in 1990 of the all four sectors. Manufacturing 9% of 20 = 1.8. Hence,  $20 + 1.8 = 21.8$ . Similarly, for mining and quarrying it is 15.6. For electrical, it is 10.81 and for chemical it is 16.1. Now in 1991, there is 1% negative growth in manufacturing. So 1% of 21.8 becomes 0.218. Thus,  $21.8 - 0.218 = 21.582$ . Similarly, for mining and quarrying it is 15.75. For electrical it is 11.77 and for chemical it is 16.26.  
 $\therefore$  Total growth  $21.582 + 15.75 + 11.77 + 16.26 = 65.36$ .

Now, growth rate  $\frac{65.42 - 64.35}{64.35} \times 100 \approx 1.5\%$

74. (a) Clear from the graph.

Year	Production	..
1990	4% of 15 = 0.6	..
Production = 15.6		
1991	15.76	
1992	16.1	
1993	15.46	
1994	16.69	

Hence, it can be seen that the lowest level of production was in 1993.

76. (a) **Sectors** **Production in 1994**

Manufacturing	25.68
Mining & Quarrying	16.69
Electrical	14.41
Chemical	18.79
Total	75.57

Total production in 1989 = 60

$\therefore$  % increase  $\frac{5.57 - 60}{60} \times 100 \approx 25\%$

77. (b) Since the index of total industrial production in 1994 is 50 percent more than in 1989, it becomes 150.

Total weightage for manufacturing, mining and quarrying, electrical and chemical in 1994 is approximately 75.57. So

Production of other sectors =  $150 - 75.57 = 74.43$ .

In 1989, it was  $100 - 60 = 40$ .

$\therefore$  % increase  $\frac{4.43 - 40}{40} \times 100 \approx 87.5\%$

78. (a) Man hours spent in coding =  $430 + 100 = 530$   
 Man hours spent in offshore design and coding =  $100 + 430 = 530$ .

Man hours spent in Testing =  $290 + 180 = 570$ .

79. (c) Total work onsite  $\approx 80 \ 100 \ 170 \ 350$   
 Total work done =  $350 + 100 + 430 + 290 = 1170$ .  
 Hence approximately 30% of the work is carried out onsite.

$\therefore$  % work =  $\frac{350}{1170} \ 29.9\%$ .

80. (c) Man hours spent onsite = 350.  
 Sum of estimated and actual effort for offshore design =  $100 + 80 = 180$ .  
 Estimated man-hours of offshore coding = 430  
 Actual man hours of offshore testing = 290.

Half of estimated offshore coding =  $\frac{440}{2} = 220$ .

So, (c) is correct.

81. (a) Total hours spent = 1170 (as calculated in Q. 27)  
 Hours in coding =  $430 + 100 = 530 = 45.3\%$   
 House in Design =  $190 = 16.2\%$   
 House in Offshore testing =  $290 = 24.8\%$   
 House in Offshore testing + Design =  $290 + 190 = 480 = 41\%$ .

Hence (a) is the closest option.

82. (b) Total offshore work =  $100 + 430 + 290 = 820$  man hours.  
 50% of offshore work is carried out on-site = 410.  
 Distribution of effort is in ratio,  $180 : 530 : 430 = 18 : 53 : 43$ .

Effort distributed to testing will be

$\frac{43}{18 \ 53 \ 43} \times 410 \approx 154$  man-hours.

Offshore testing work is  $\frac{290}{2} = 145$ .

$\therefore$  Proportion of testing carried out offshore is

$\frac{145}{140 \ 140 \ 154} \times 100 = 33\% \approx 30\%$ .

83. (a) **Design** **Coding** **Testing**

Offshore	50	215	145
On-site	$80 + \left( \frac{18}{114} \times 410 \right)$	$100 + \left( \frac{53}{114} \times 410 \right)$	$140 + \left( \frac{43}{114} \times 410 \right)$
	$= 80 + 65 = 145$	$= 100 + 191 = 291$	$= 140 + 154 = 294$
			Amount of coding done = $215 + 291 = 506$ .
			Amount of testing done = $145 + 291 = 436$ . Hence (a) is true.

84. (b) Effort allocation of  $B \rightarrow C$ ,  $C \rightarrow D$ ,  $D \rightarrow E$   
Hence we can say that new values of E are older values of B  
So, rank of company 3, in order of effort of E is 3.
85. (a) In company 4, total effort for equations through B to F get evenly distributed.

So each gets the value of  $\left(\frac{81.5}{5}\right)$

Initial percentage of E = 28.6

New percentage = 16.3

i.e Reduction of 12.3

86. (d) So B, C & D efforts will be removed & redistributed equally among any A, E and F.  
It is clearly seen from the chart that E will show the maximum distribution of effort as E already shows the maximum distribution.

State	Rank				
	1	1	1	1	1
MA	1	1	1	1	1
TN	2	2	2	2	2
GU	3	4	4	4	5
AP	4	3	3	3	3
KA	5	6	6	6	6
UP	6	5	5	5	4
WB	7	7	7	7	7

We see from table the required states are five MA, TN, AP, KA, WB

State	Rank				
	1	1	1	1	1
MA	1	1	1	1	1
TN	2	2	2	2	2
GU	3	4	4	4	5
AP	4	3	3	3	3
KA	5	6	6	6	6
UP	6	5	5	5	4
WB	7	7	7	7	7

From above table we see that GU & UP are the states who change their relative rank two times but GU is not given in the options hence U.P will be the required state

89. (d) For Tamil Nadu,

$$\text{required \% } \frac{8015 - 5604}{5604} \times 100 = 43\%$$

For Karnataka,

$$\text{required \% } \frac{5413 - 3829}{3829} \times 100 = 41\%$$

$$\text{For Gujarat, required \% } \frac{6300 - 4402}{4402} \times 100 = 43\%$$

% share of A.P from 1997 - 2001 increased by

$$= \frac{7202 - 4728}{4728} \times 100 = 52\%$$

which is most among TN, KA, GU

90. (c) Growth rate in 1999-2000

$$\frac{10,284 - 8067}{8067} \times 100 = 27.5\% \text{ approx.}$$

which is maximum in comparison to other pair of years

91. (a) In KA revenue increased from 1998 to 2000

$$= 4839 - 4265 = 574$$

& revenue increase from 2000 to 2001

$$= 5413 - 4839 = 574$$

92. (c)

State	Rank				
	1	2	3	4	5
MA	1	1	1	1	1
TN	2	2	2	2	2
GU	3	4	4	4	5
AP	4	3	3	3	3
KA	5	6	6	6	6
UP	6	5	5	5	4
WB	7	7	7	7	7

From the table we see TN's rank is constant (MA and WB are not in options). Therefore its contribution to total tax collections will also have constant rank

93. (d) Visual question. Simply count the circles and squares above the line for profit 100 crores and right of turnover = 1000 crores.

94. (d) Visual question. Simply count the number of circles between the line for turnover 2000 (right of this line) and profit 300 (below this line).

95. (b) Draw the line  $y = 10\% \text{ of } x$ . The number of points above this line are the required companies (7).

96. (d) Find the range for each person. We see that for Shyam the range is the lowest.

97. (a) Geeta's graph is flat in the second to third month.

98. (a) Visual question. Geeta starts at the lowest but is at the maximum at month 2.

99. (b) Seeta grows maximum in 2-3 month but grows at a slower rate after 3rd month.

100. (b) Chaidesh's export of tea, as a proportion of tea produced is given below :

Year	Required Proportion
1996	189/561
1997	209/587
1998	215/645
1999	1/3

Hence it would be highest in 1997.

101. (a) Chaidesh's population for different years is calculated as follows :

$$\text{population} \quad \frac{\text{domestic consumption}}{\text{per capita availability}}$$

$$\frac{\text{Production export}}{\text{per capita availability}}$$

$$\therefore \text{For 1995, population} \quad \frac{214}{487}$$

$$\text{For 1997, population} \quad \frac{378}{510}$$

$$\text{For 1996, population} \quad \frac{372}{464}$$

$$\text{For 1999, population} \quad \frac{440}{566}$$

Hence it would be lowest in 1995.

102. (a) Productivity is rising continuously and area under cultivation is decreasing throughout. Hence productivity also increases continuously. So highest in 1999.

103. (a) Comparing the operating income for 2002-03 in the 1st and the 3rd graph we can find that companies B and D are excluded from the graph 3.

As both B and D make loss in 2001-02, so the only possible answer is (a).

104. (c) This can be found out from the third chart as it gives the ratio of operating profit to operating income for the companies A, C, E and F. Clearly the highest point is the answer. On comparing the operating income from chart 1 we find it to be E.

105. (a) Option (a) talks about C (from chart 2) whose operating income is not lowest in 2002-03 (from chart 1)

Option (b) talks about D

Option (c) talks about B

Option (d) talks about A, C, E and F. Their operating incomes lies between 150 to 250 crore in 2002-03.

106. (d) Companies exceeding 10% profitability in 2002-03 are C and E. The operating profits (from chart 3) of C and E are 38 and 32.

Hence, the average operating profit

$$\frac{(38 + 32)}{2} = 35 \text{ crores.}$$

107. (c) (a) November rainfall < 100 cm in location 7

(b) September rainfall < 50 cm in location 1

(c) True

108. (b) April rainfall exceeds March rainfall at all locations so (a) is not true. Peak rainfall is in April in both the locations is true.

November rainfall exceeds March in location 6.

109. (c) The graph shows that Rice, Onion, Egg and Chillies increase and Dal & Edible Oil decrease.

110. (d) Commodities showing price decline for 2 or more years consecutively – Rice, Dal, Chillies, Egg, Onion.

111. (d) The graph shows that only for Egg & onion, the price decline is followed by an increase in price, only once in the entire period.

112. (d) In this question we have to see the relative position of the markers with respect to the X-axis (expenditure). We find that the Dubeys are on the extreme right.

113. (c) To find the lowest average income, we have to see the relative position of the markers with respect to Y-axis. We find that the circles representing Coomars are the lowest on the vertical scale.

114. (a) Highest saving will be of a person who is highest on Y-axis and lowest on X-axis. This is represented by a black square representing Ahuja.

115. (d) The family having lowest saving will be the one who lies on the line indicating income = expenditure. The closest is black circle, or Dubey.

116. (b) No. of Naya mixer grinders disposed off in 1999  
 $= 0.2 \times 30 = 6$

No. of Naya mixer grinders disposed off in 2000  
 $= 0.2 \times (80 - 30) = 10$

$\therefore \text{Total naya mixer grinders disposed} = 6 + 10 = 16$

117. (b) Naya mixer grinders purchased in 1999 = 124 – 80 + 6  
 $= 50$

Note 6 were disposed in 1994.

118. (d) Purana mixer grinders purchased in 1999  
 $= 236 - 222 + \text{purana mixers disposed in 1999}$   
 $= 14 + 20\% \text{ of purana mixers introduced in 1997}$   
 $= 14 + 0.2 \times (182 - 162 + 10) = 14 + 6 = 20$

119. (d) Purana mixer grinders disposed off in 2000 can not be calculated as we do not know the grinders disposed off in 1996, and 1998.

120. (c) Looking carefully at the four bars in finance, we clearly understand that a faculty retired in 2001.

**CHECK:**  $\frac{50.2 \times 5 - 60}{4} = \frac{195}{4} \cong 49$

Again the dip in average age clearly shows that the new faculty joined in 2002.

**CHECK:**  $\frac{49 \times 4}{5} = \frac{4}{5} = \frac{25}{5} = 45$

121. (c) Clearly the dip in 2001 shows that the faculty joined on April 1, 2001. So age on April 1, 2003 is  $25 + 2 = 27$  years

122. (a) From Q. 64, we clearly see that the faculty member retired from Finance.

**NOTE :** The area (from which a faculty retires) will show two drops in the average ages.

123. (d) As in 2000,

Age of the faculty born in 1947 = 52 yrs

Age of the faculty born in 1950 = 49 yrs

Average age on April 1, 2000 = 49.33

$\therefore$  Age of the 3rd faculty =  $49.33 \times 3 - (52 + 49) = 47$  yrs

So his age in 2005 is  $47 + 5 = 52$  yrs

124. (c)

	Percentage		ARDT
	Current year	2010	
India	8%	24%	1

Let revenue from data transfer and total revenue of India are  $R_1$  and  $T_1$  respectively. Also suppose that revenue from data transfer and total revenue of Sweden are  $R_2$  and  $T_2$  respectively.

Volume of data transfer in India is the same as that of Sweden. Let it be  $V$ .

**In 2010,**

$$\frac{R_1}{T_1} = 24, \frac{R_2}{T_2} = 38, \frac{R_2}{V} = 6, \therefore R_2 = 6V$$

$$\text{Now, } T_1 = 2T_2,$$

$$\therefore \frac{T_2}{T_1} = \frac{1}{2}$$

$$\text{Now, } \frac{\frac{R_1}{T_1}}{\frac{R_2}{T_2}} = \frac{24}{38} \Rightarrow \frac{R_1}{R_2} \times \frac{T_2}{T_1} = \frac{24}{38}$$

$$\Rightarrow \frac{R_1}{R_2} \times \frac{1}{2} = \frac{24}{38}, \quad \therefore \frac{R_1}{R_2} = \frac{48}{38}$$

$$\Rightarrow \frac{R_1}{6V} = \frac{48}{38}, \quad \therefore \frac{R_1}{V} = 7.58$$

Hence, required percentage increase

$$= \frac{7.58 - 1}{1} \times 100 = 658\%$$

Since ARDT for India is less than 1, hence required percentage increase will be more than 658%.

125. (e)

	Percentage	ARDT
India	8%	1
Singapore	20%	9

Let revenue from data transfer and total revenue of India are  $R_1$  and  $T_1$  respectively.

Also suppose that revenue from data transfer and total revenue of Singapore are  $R_2$  and  $T_2$  respectively.

Volume of data transfer in India is the same as that of Singapore. Let it be  $V$ .

$$\text{Then, } \frac{R_1}{V} = 1, \frac{R_1}{T_1} = 8$$

$$\text{and } \frac{R_2}{V} = 9, \frac{R_2}{T_2} = 20$$

$$\therefore \frac{\frac{R_1}{V}}{\frac{R_2}{V}} = \frac{1}{9}, \quad \Rightarrow \frac{R_1}{R_2} = \frac{1}{9}$$

$$\text{and } \frac{\frac{R_1}{T_1}}{\frac{R_2}{T_2}} = \frac{8}{20} \Rightarrow \frac{R_1}{R_2} \times \frac{T_2}{T_1} = \frac{2}{5}$$

$$\Rightarrow \frac{1}{9} \times \frac{T_2}{T_1} = \frac{2}{5}$$

$$\Rightarrow \frac{T_2}{T_1} = \frac{18}{5} = 4 \text{ (approx.)}$$

Hence, total revenue of Singapore is 4 times that of India.

126. (d) **For option (a),**

	Percentage	ARDT
Philippines	31%	3
Austria	19%	7

Let revenue from data transfer and volume of data transfer for Philippines are  $R_1$  and  $V_1$  respectively.

Also suppose that revenue from data transfer and volume of data transfer for Austria are  $R_2$  and  $V_2$  respectively.

Total revenue of Philippines is the same as that of Austria. Let it be  $T$ .

$$\text{Now, } \frac{x_1}{T} = 31, \frac{x_1}{V_1} = 3$$

$$\text{and } \frac{x_2}{T} = 19, \frac{x_2}{V_2} = 7$$

$$\therefore \frac{\frac{x_1}{T}}{\frac{x_2}{T}} = \frac{31}{19} \Rightarrow \frac{x_1}{x_2} = \frac{31}{19}$$

$$\text{And, } \frac{\frac{x_1}{V_1}}{\frac{x_2}{V_2}} = \frac{3}{7}, \Rightarrow \frac{x_1}{x_2} \times \frac{V_2}{V_1} = \frac{3}{7}$$

$$\Rightarrow \frac{V_2}{V_1} = \frac{3}{7} \times \frac{19}{31} = \frac{57}{217}$$

$$\therefore V_1 \neq V_2$$

**For option (b),**

	Percentage	ARDT
Canada	12%	8
Poland	21%	6

$$\frac{V_2}{V_1} = \frac{8 \times 21}{6 \times 12}$$

$$\therefore V_1 \neq V_2$$

**For option (c),**

	Percentage	ARDT
Germany	25%	7
USA	17%	11

$$\frac{V_2}{V_1} = \frac{7 \times 17}{11 \times 25}$$

$$\therefore V_1 \neq V_2$$

**For option (d),**

	Percentage	ARDT
UK	30%	13
Spain	16%	7

$$\frac{V_2}{V_1} = \frac{13 \times 16}{7 \times 30} = \frac{208}{210}$$

$$\therefore V_1 \approx V_2$$

Similarly, we can check the **option (e)** which will not be true.

127. (d) Absolute value of the annual percent change in the following years ;

**Year 03 - 04**

$$\frac{|340 - 300| \times 100}{300} = 13\%$$

**Year 05- 06**

$$\frac{|320 - 270| \times 100}{320} = 15.6\%$$

**Year 06-07**

$$\frac{|270 - 210| \times 100}{270} = 22\%$$

**Year 08-09**

$$\frac{|190 - 105| \times 100}{190} = 44\%$$

**Year 09-10**

$$\frac{|110 - 90| \times 100}{110} = 18\%$$

128. (c) Growth rate in Europe in 2007 (over 2006)

$$\frac{(500 - 380) \times 100}{380} = 31.5\%$$

Growth rate in Europe in 2005 (over 2004)

$$\frac{(270 - 180) \times 100}{180} = 50\%$$

Therefore, required percentage change in growth

$$\frac{(50 - 31.5) \times 100}{50} = 37\% \text{ (approx.)}$$

129. (a) Estimated subscription in Europe in 2008  
= 605 million USD.

The percentage growth of 2007 in subscription in Europe (over 2006)

$$\frac{(500 - 380) \times 100}{380} = 31.5$$

Estimated subscription in Europe if it would have been computed using the percentage growth rate of 2007 (over 2006)

$$\frac{500 \times (100 + 31.5)}{100} = 657.5 \text{ million USD (approx.)}$$

Hence, required difference = 657.5 - 605  
= 52.5 million USD (approx.)

130. (a) Let total number of subscribers in 2003 in Europe = 100

Hence, number of men subscribers in 2003 = 60

And number of women subscribers in 2003 = 40

No. of men subscribers in 2010

$$\frac{60 \times (100 + 5)^7}{100} = 84.40$$

No. of women subscribers in 2010

$$\frac{40 \times (100 + 10)^7}{100} = 77.94$$

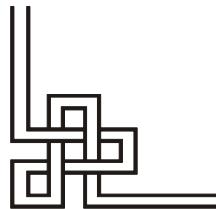
Hence, total number of subscribers in 2010

$$= 84.40 + 77.94 = 162.34$$

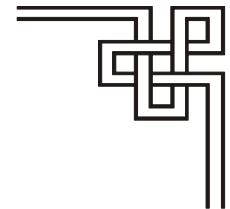
Therefore, required percentage growth = 162.34 - 100  
= 62% (approx.).

# 13

CHAPTER

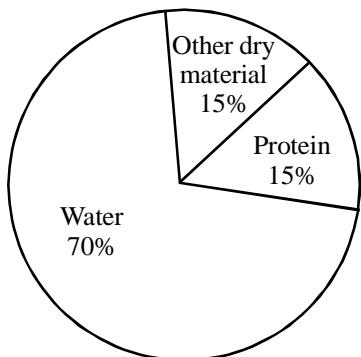


# PIE CHART

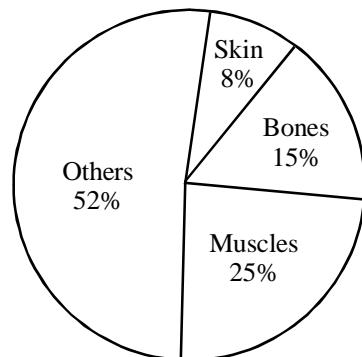


*Directions for Questions 1 to 4 : Refer to the pie-chart given below and answer the questions that follow :*

**Distribution of materials in Ghoshbabu's body  
(as % of total body weight)**



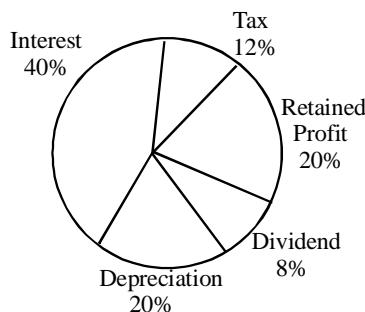
**Occurrence of proteins in different organs  
in Ghoshbabu's body**



- What fraction of Ghoshbabu's weight consists of muscular and skin proteins? (1994)  
 (a)  $1/13$       (b)  $1/30$       (c)  $1/20$       (d) Can't be determined
- Ratio of distribution of protein in muscle to the distribution of protein in skin is (1994)  
 (a)  $3:1$       (b)  $3:10$       (c)  $1:3$       (d)  $3\frac{1}{2}:1$
- What percent of Ghoshbabu's body weight is made up of skin? (1994)  
 (a) 0.15      (b) 10      (c) 1.2      (d) Can't be determined
- In terms of total body weight, the portion of material other than water and protein is closest to (1994)  
 (a)  $3/20$       (b)  $1/15$       (c)  $85/100$       (d)  $1/20$

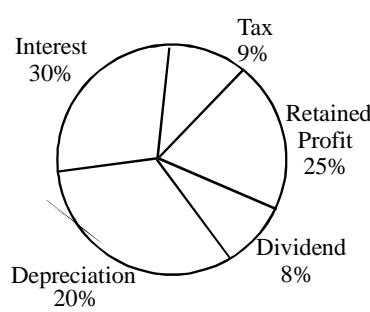
*Directions for Questions 5 to 9 : Refer to the pie-chart given below and answer the questions that follow :*

**Operating Profit 160 lakh.**



**1991-92**

**Operating Profit 130 lakh.**



**1990-91**

- The operating profit in 1991-92 increased over that in 1990-91 by (1995)  
 (a) 23%      (b) 22%      (c) 25%      (d) 24%

6. The Interest burden in 1991-92 was higher than that in 1990-91 by (1995)  
 (a) 50% (b) 25 lakh (c) 90% (d) 41 lakh
7. If, on an average, 20% rate of interest was charged on borrowed funds, then the total borrowed funds used by this company in the given two years amounted to .... (1995)  
 (a) 221 lakh (b) 195 lakh (c) 368 lakh (d) 515 lakh
8. The retained profit in 1991-92, as compared to that in 1990-91 was (1995)  
 (a) higher by 2.5% (b) higher by 1.5% (c) lower by 2.5% (d) lower by 1.5%
9. The equity base of these companies remained unchanged. Then the total dividend earning (in lakh rupees) by the share holders in 1991-92 is (1995)  
 (a) 10.4 lakh (b) 9 lakh (c) 12.8 lakh (d) 15.6 lakh

**Directions for Questions 10 to 13 : Refer to the information and pie-charts given below and answer the questions that follow :**

Consider the information provided in the figure below relating to India's foreign trade in 1997-98 and the first eight months of 1998-99. Total trade with a region is defined as the sum of exports to and imports from that region. Trade deficit is defined as the excess of imports over exports. Trade deficit may be negative.

A : U.S.A

B: Germany

C: Other E.U.

D: U.K.

E: Japan

F: Russia

G: Other East Europe

H: OPEC

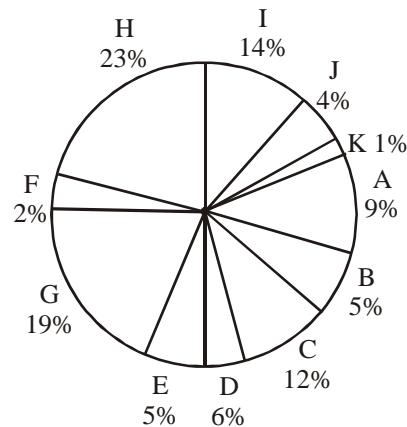
I: Asia

J: Other L.D. Cs

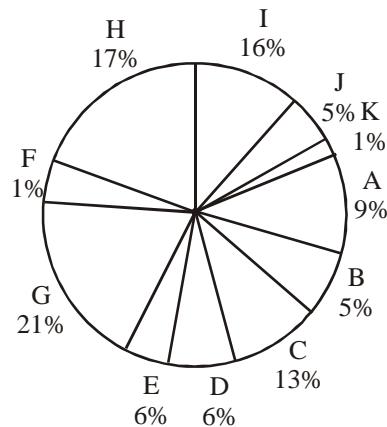
K: Others

#### SOURCES OF IMPORTS

1997-98; Imports into India : \$ 40779 million

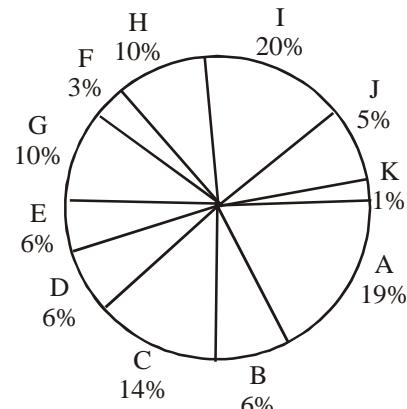


1998-99; Imports into India (April-November) : \$ 28126 million

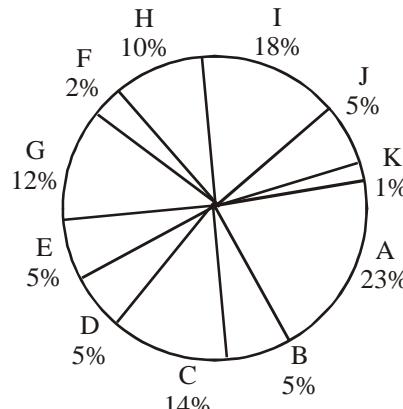


#### DESTINATION OF EXPORTS

1997-98; Exports from India : \$ 33979 million



1998-99; Exports from India (April-November) : \$ 21436 million



10. What is the region with which India had the highest total trade in 1997-98?

(1999)

- (a) USA (b) Other E.U. (c) OPEC (d) Other

11. In 1997-98, the amount of Indian exports, in million US \$, to the region with which India had the lowest total trade, is approximately (1999)
- (a) 750 (b) 340 (c) 220 (d) 440
12. In 1997-98, the trade deficit with respect to India, in billion US \$, for the region with the highest trade deficit with respect to India, is approximately equal to (1999)
- (a) 6.0 (b) 3.0 (c) 4.5 (d) 7.5
13. India had maximum trade surplus vis-a-vis which region in 1997-98 (1999)
- (a) USA (b) Asia (c) Others (d) Other E.U.

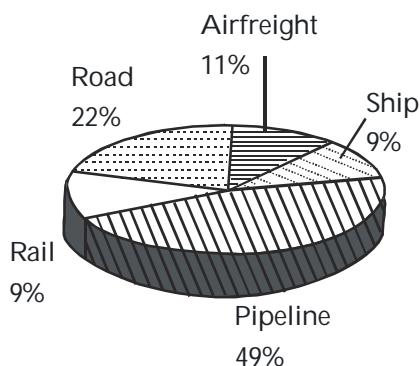
***ADDITIONAL Directions for Questions 14 & 15 : Refer to the information given below and answer the questions that follow :***

Assume that the average monthly exports from India and imports to India during the remaining four months of 1998-99 would be the same as that for the first eight months of the year.

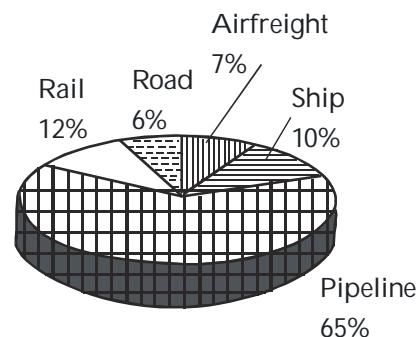
14. What is the region to which Indian exports registered the highest percentage growth between 1997-98 and 1998-99 (1999)
- (a) Other East Europe (b) USA  
(c) Asia (d) exports have declined, no growth
15. What is the percentage growth rate in India's total trade deficit between 1997-98 and 1998-99? (1999)
- (a) 43 (b) 47 (c) 50 (d) 40

***Directions for Questions 16 to 18 : Refer to the pie-charts given below and answer the questions that follow :***

Chart 1 shows distribution of twelve million tonnes of crude oil transported through different modes over a specific period of time. Chart 2 shows the distribution of the cost of transporting this crude oil. The total cost was Rs. 30 million.



**Chart 1: Volume Transported**



**Chart 2: Cost of Transportation**

16. The cost in rupees per tonne of oil moved by rail and road happens to be roughly (2001)
- (a) 3 (b) 1.5 (c) 4.5 (d) 8
17. From the charts given, it appears that the cheapest mode of transport is (2001)
- (a) Road (b) Rail (c) Pipeline (d) Ship
18. If the costs per tonne of transport by ship, air and road are represented by P, Q and R respectively, which of the following is true? (2001)
- (a) R > Q > P (b) P > R > Q (c) P > Q > R (d) R > P > Q

Directions for Questions 19 & 20 : Refer to the pie-charts given below and answer the questions that follow :

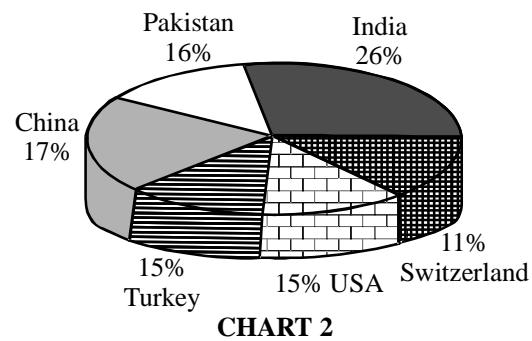
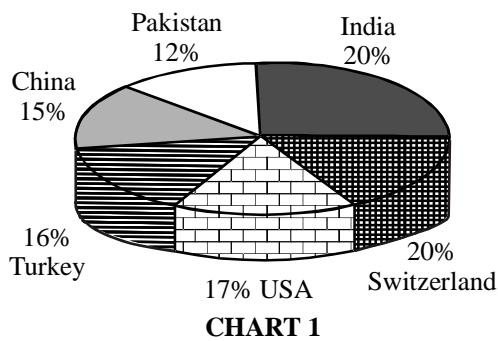


Chart 1 shows the distribution by value of top 6 suppliers of MFA Textiles in 1995. Chart 2 shows the distribution by quantity of top 6 suppliers of MFA Textiles in 1995. The total value is 5760 million Euro (European currency). The total quantity is 1.055 million tonnes.

19. The country, which has the highest average price, is (2002)  
 (a) USA (b) Switzerland (c) Turkey (d) India
20. The average price in Euro/Kg for Turkey is roughly (2002)  
 (a) 6.20 (b) 5.60 (c) 4.20 (d) 4.80

## ANSWERS WITH SOLUTIONS

1. (c) Required fraction  
 $(25 - 8)\% \text{ of } 15\% = 33\% \text{ of } 15\%$   

$$\frac{33}{100} \times \frac{15}{100} = \frac{1}{3} \times \frac{3}{20} = \frac{1}{20}$$
2. (a) Ratio of protein in muscles to protein in skin  
 $25 : 8 \equiv 3 : 1$
3. (d) We have only protein % in skin, therefore we would have weight of protein in skin but we can not determine the total weight of skin
4. (a) In terms of body weight, other dry material = 15%  
that is  $\frac{15}{100} = \frac{3}{20}$
5. (a) Increase in operating profit  
 $\frac{160 - 130}{130} \times 100 = \frac{300}{13} = 23\%$
6. (b) Interest burden increase  
 $0.4 \times 160 - 0.3 \times 130 = 64 - 39 = 25 \text{ lakh}$
7. (d) Borrowed funds in 1990-91  $\frac{0.3 \times 130}{0.2} = 195 \text{ lakhs}$   
Borrowed funds in 1991-92  $\frac{0.4 \times 160}{0.2} = 320 \text{ lakhs}$   
Total 320 195 515.
8. (d) Retained Profit in 1990 - 91 =  $0.25 \times 130 = 32.5$   
Retained Profit in 1991 - 92 =  $0.2 \times 160 = 32$   
Reduction  $\frac{0.5}{32.5} \times 100 = \frac{100}{65} = 1.5\%$
9. (c) Dividend earning in 1991-92 =  $0.08 \times 160 = 12.8$
10. (c) Total trade is export + import by options we see  
U.S.A. Import 9% of 40779 + Export 19% of 33979  
=  $3670.11 + 6456.01 = 10126.12$   
Other E.U. Import 12% of 40779 + Export 14% of 33979  
=  $4893.8 + 4757.06 = 9650.86$   
OPEC Import 23% of 40779 + Export 10% of 33979  
=  $9379.17 + 3397.9 = 12777.07$   
OTHERS Import 1% of 40779 + Export 1% of 33979  
=  $407.79 + 339.79 = 747.58$
- Note :** This question can also be answered by observing the two pie-charts of 1997-98 for the four countries.  
USA = 9% + 19% ; Other EU = 12% + 14%  
OPEC = 23% + 10% ; Others = 1% + 1%  
As the first percentage is from a higher total (\$40779 million) it is clear that OPEC is the right answer.
11. (b) Lowest total trade is in the region K and the export is 1% of 33979 = 33.979.
12. (a) Trade deficit is excess of imports over exports. From the pie-charts it is clear that H (23% imports and only 10% exports) has the highest trade deficit.  
Deficit = 23% of 40779 - 10% of 33979  
=  $9379.17 - 3397.9 = 5981.27 \text{ million USD}$   
= 5.98 billion USD  $\cong$  6 billion USD
13. (a) Maximum trade surplus means lowest trade deficit. From the charts it is clear that USA (9% imports and 19% exports) is the right choice.
14. (b) In 1998-99 the total export and import for the whole year is 3/2 times of trade given  
Total export in 1998-99 will be  $1.5 \times 21436 = 32154$   
Total import in 1998-99 will be  $1.5 \times 28126 = 42189$   
Highest % growth in the exports can be interpreted from the graph either in the region A (19% to 23%) or in the region G (10% to 12%).  
Region A :  

$$\frac{23\% \text{ of } 32154 - 19\% \text{ of } 33979}{19\% \text{ of } 33979} \times 100 = 14\%$$
- Region B :  

$$\frac{12\% \text{ of } 32154 - 10\% \text{ of } 33979}{10\% \text{ of } 33979} \times 100 = 13.5\%$$
- So, Region A or USA is the answer.
15. (b) Trade deficit in 1997-98 =  $40779 - 33979 = 6800$   
Trade deficit in 1998-99 =  $42189 - 32154 = 10035$   
% growth in trade deficit =  $\frac{3235}{6800} \times 100 = 47\%$
16. (b) Total cost = Rs 30 million  
Total volume = 12 million ton  
Vol. transported by Rail & Road = 31% of 12 = 3.72 mT  
Cost by Rail & Road = 18% of 30 = 5.4 million  
Cost per tonne =  $\frac{5.4}{3.72} \approx 1.5$
17. (a) Since cost of transportation through road is minimum with a significant volume transported. Hence it is the cheapest mode of transport
18. (c) Cost per tonne, P  $\frac{\frac{10}{100} \times 30}{\frac{9}{100} \times 12} = \frac{300}{12 \times 9}$   
Q  $\frac{7\% \text{ of } 30}{11\% \text{ of } 12} = \frac{30 \times 7}{12 \times 11}$ ; R  $\frac{6\% \text{ of } 30}{22\% \text{ of } 12} = \frac{6 \times 30}{22 \times 12}$   
hence P Q R

19. (b) Distribution (value) for USA  $5760 \times \frac{17}{100} = 979.2$ ;

Distribution (qty.) for USA  $1.055 \times \frac{15}{100} \text{ kg} = .1583$

Distribution (value) Switzerland  $5760 \times \frac{20}{100} = 1152$ ;

Distribution (qty.) Switzerland  $1.055 \times \frac{11}{100} = .11605$

Distribution (value) for Turkey  $5760 \times \frac{16}{100} = 921.6$ ;

Distribution (qty.) for Turkey  $1.055 \times \frac{15}{100} = .15825$

Distribution (value) for India = 1152;

Distribution (qty.) for India  $1.055 \times \frac{26}{100} = .2743$

**Per Kg price in**

USA  $\frac{979.2}{.15825} = 6187$ ;

Switzerland  $\frac{1152}{.11605} = 9926$ ;

Turkey  $\frac{921.6}{.15830} = 5823.6$ ;

India  $\frac{1152}{.2743} = 4199$

Highest price in Switzerland

**ALTERNATIVELY:**

Average price is  $\frac{\text{Value}}{\text{Quantity}}$

So on carefully observing the pie-charts, we can find the highest average price for which the value is maximum and quantity is minimum. Among the given options, Switzerland (20% value and 11% quantity) is the correct choice.

20. (b) Average price in Euro/ kg for turkey

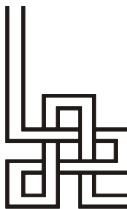
$$\frac{\text{distribution by value}}{\text{distribution by quantity in kg}} = \frac{5760 \times 16/100}{1055 \times 15/100}$$

5.60 (roughly)

[Note : 1.055 m ton = 1055 m kg]

# 14

CHAPTER



# DATA TABULATION



**Directions for Questions 1 to 4 :** These questions are based on the table and information given below.

1. In 1984-85 value of exports of manufactured articles exceeds over the value of exports of raw materials by 100%.
2. In 1985-86 the ratio of % of exports of raw material to that of exports of manufactured articles is 3 : 4.
3. Exports of food in 1985-86 exceeds the 1984-85 figure by Rs. 1006 crore.

Item	1984-85	1985-86
Food	23%	
Manufactured Articles		
Raw Material		
Total Value of Exports in Crore of Rs.	22400	25800

1. In 1984-85 what percentage of total values of exports accounts for items related to food (1994)  
(a) 23% (b) 29.2% (c) 32% (d) 22%
2. During 1984-85, how much more raw material than food was exported? (1994)  
(a) Rs.2580 crore (b) Rs. 896 crore (c) Rs. 1986 crore (d) Rs. 1852 crore
3. Value of exports of raw material during 84-85 was how much percent less than that for 85-86? (1994)  
(a) 39 (b) 42.5 (c) 7 (d) 31.6
4. The change in value of exports of manufactured articles from 1984-85 to 1985-86 is (1994)  
(a) 296 crore (b) 629 crore (c) 2064 crore (d) 1792 crore

**Directions for Questions 5 to 8 :** These questions are based on the table given below.

The following table gives the sales details for text books and reference books at Primary / Secondary / Higher Secondary / Graduate levels

Year	Primary	Secondary	Higher Secondary	Graduate Level
1975	42137	8820	65303	25343
1976	53568	10285	71602	27930
1977	58770	16437	73667	28687
1978	56872	15475	71668	30057
1979	66213	17500	78697	33682
1980	68718	20177	82175	36697

5. What is the growth rate of sales of books at primary school level from 1975 to 1980? (1994)  
(a) 29% (b) 51% (c) 63% (d) 163%
6. Which of the categories shows the lowest growth rate from 1975 to 1980? (1994)  
(a) Primary (b) Secondary (c) Higher Secondary (d) Graduate level
7. Which category had the highest growth rate in the period? (1994)  
(a) Primary (b) Secondary (c) Higher Secondary (d) Graduate level
8. Which of the categories had either a consistent growth or a consistent decline in the period shown? (1994)  
(a) Primary (b) Secondary (c) Higher Secondary (d) Graduate level

**Directions for Questions 9 to 13 :** These questions are based on the table and information given below.

Ghosh Babu surveyed his companies and obtained the following data. Income tax is paid from Profit Before Tax and the remaining amount is apportioned to Dividend and Retained Earnings. The Retained earnings were accumulated into Reserves. The reserves at the beginning of 1991 were Rs. 80 lakh.

(Fig. In Rs. Lakh)	1994	1993	1992	1991
Share Capital	310	205	98	98
Sales	6435	4725	2620	3270
Profit Before Tax	790	525	170	315
Dividends	110	60	30	30
Retained Earnings	400	245	70	140

9. In which year was the sales per rupee of share capital highest ? (1995)  
 (a) 1991 (b) 1992 (c) 1993 (d) 1994
10. In which year was the percentage addition to reserves over previous year reserves the highest ? (1995)  
 (a) 1991 (b) 1992 (c) 1993 (d) 1994
11. In which year was the tax per rupee of profit before tax lowest ? (1995)  
 (a) 1991 (b) 1992 (c) 1993 (d) 1994
12. In which year the profit before tax per rupee of sales was the highest ? (1995)  
 (a) 1991 (b) 1992 (c) 1993 (d) 1994
13. Amount of the reserves (in Rs. Lakh) at the end of 1994 is (1995)  
 (a) 935 (b) 915 (c) 230 (d) None of these

**Directions for Questions 14 to 18 :** These questions are based on the table given below.

Market Shares in four Metropolitan Cities

Period Products	Bombay 1993-94	Calcutta 1993-94	Delhi 1993-94	Madras 1993-94
HD	20-15	35-30	20-15	20-30
CO	20-25	30-15	30-15	20-15
BN	45-40	25-35	35-35	10-10.
MT	15-20	10-20.	10-10.	50-45

14. The market of which products did not decrease between 1993-94 in any city? (1995)  
 (a) HD (b) CO (c) BN (d) None of these
15. The number of products which doubled their market shares in one or more cities is (1995)  
 (a) 0 (b) 1 (c) 2 (d) 3
16. The largest percentage drop in market shares is (1995)  
 (a) 60% (b) 50% (c) 53.3 % (d) 20 %
17. The number of products which had 100% market share in four metropolitan cities is (1995)  
 (a) 0 (b) 1 (c) 2 (d) 3
18. The city in which the minimum number of products increased their market shares in 1993-94 was (1995)  
 (a) Bombay (b) Delhi (c) Calcutta (d) Madras

**Directions for Questions 19 to 23 : These questions are based on the table and information given below.**

A company produces five types of shirts - A, B, C, D, E, - using cloth of three qualities - High, Medium and Low -, using dyes of three qualities - High, Medium, and Low, The following tables give, respectively :

1. The number of shirts (of each category ) produced, in thousands.
2. The percentage distribution of cloth quality in each type of shirt, and
3. The percentage distribution of dye quality in each type of shirt.

**Note:** Each shirt requires 1.5 metres of cloth.

Shirt Type	Number (000)	Shirt Type	Distribution of cloth (%)			Shirt Type	Distribution of dye (%)		
			High	Medium	Low		High	Medium	Low
A	20	A	80	20	—	A	70	15	15
B	30	B	30	40	30	B	20	50	30
C	30	C	—	70	30	C	—	60	40
D	10	D	—	60	40	D	—	40	60
E	10	E	—	10	90	E	—	20	80

19. What is the total requirement of cloth? (1995)
  - (a) 150,000 m
  - (b) 200,000 m
  - (c) 225,000 m
  - (d) 250,000 m
20. How many metres of high quality cloth is consumed by A- shirts? (1995)
  - (a) 8,000 m
  - (b) 112,000 m
  - (c) 24,000 m
  - (d) 30,000 m
21. What is the ratio of low quality type dye used for C-shirts to that used for D-shirts? (1995)
  - (a) 3 : 2
  - (b) 2 : 1
  - (c) 1 : 2
  - (d) 2 : 3
22. How many metres of low- quality cloth is consumed? (1995)
  - (a) 22,500
  - (b) 46,500
  - (c) 60,000
  - (d) 40,000
23. What is the ratio of the three qualities of dyes in high- quality cloth? (1995)
  - (a) 2 : 3 : 5
  - (b) 1 : 2 : 5
  - (c) 7 : 9 : 10
  - (d) Cannot be determined

**Directions for Questions 24 to 28 : These questions are based on the table given below.**

**Data about certain coffee producers in India**

Total (incl. Others)	Production ('000 tonnes)	Capacity Utilisation(% )	Sales ('000 tonnes)	Total Sales Value (Rs. Cr.)
Brooke Bond	2.97	76.5	2.55	31.15
Nestle	2.48	71.2	2.03	26.75
Lipton	1.64	64.8	1.26	15.25
MAC	1.54	59.35	1.47	17.45
Total (incl. Others)	11.6	61.3	10.67	132.8

24. What is the maximum production capacity (in '000 tonnes ) of Lipton for coffee? (1996)
  - (a) 2.53
  - (b) 2.85
  - (c) 2.24
  - (d) 2.07
25. The highest price of coffee per kg is for (1996)
  - (a) Nestle
  - (b) MAC
  - (c) Lipton
  - (d) Insufficient data
26. What percent of the total market share (by Sales value) is controlled by “others”? (1996)
  - (a) 60%
  - (b) 32%
  - (c) 67%
  - (d) Insufficient data
27. What approximately is the total production capacity (in tonnes) for coffee in India? (1996)
  - (a) 18
  - (b) 20
  - (c) 18.9
  - (d) Insufficient data
28. Which company out of the four companies mentioned above has the maximum unutilized capacity (in '000 tonnes)? (1996)
  - (a) Lipton
  - (b) Nestle
  - (c) Brooke Bond
  - (d) MAC

**Directions for Questions 29 to 33 :** These questions are based on the tables and information given below.

**Mulayam Software Co.**, before selling a package to its clients, follows the given schedule :

Month	Stage	Cost (Rs.'000 per man-month)
1 - 2	Specification	40
3 - 4	Design	20
5 - 8	Coding	10
9 - 10	Testing	15
11 - 15	Maintenance	10

**The number of people employed in each month is:**

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No.of people employed	2	3	4	3	4	5	5	4	4	1	3	3	1	1	1

29. Due to overrun in “Design”, the Design stage took 3 months, i.e. months 3, 4 and 5 . The number of people working on Design in the fifth month was 5. Calculate the percentage change in the cost incurred in the fifth month.(Due to improvement in “Coding” technique, this stage was completed in months 6 - 8 only) **(1996)**
- (a) 225% (b) 150% (c) 275% (d) 240%
30. With reference to the above question, what is the cost incurred in the new “coding” stage ? (Under the new technique, 4 people work in the sixth month and 5 in the eighth) **(1996)**
- (a) Rs. 1,40,000 (b) Rs. 1,50,000 (c) Rs. 1,60,000 (d) Rs. 1,70,000
31. Under the new technique, which stage of Software development is most expensive for Mulayam Software company? **(1996)**
- (a) Testing (b) Specification (c) Coding (d) Design
32. Which five consecutive months have the lowest average cost per man-month under the new technique? **(1996)**
- (a) 1-5 (b) 9 - 13 (c) 11 - 15 (d) None of these
33. What is the difference in the cost between the old and the new techniques? **(1996)**
- (a) Rs.30,000 (b) Rs.60,000 (c) Rs.70,000 (d) Rs.40,000

**Directions for Questions 34 to 38 :** These questions are based on the table and information given below.

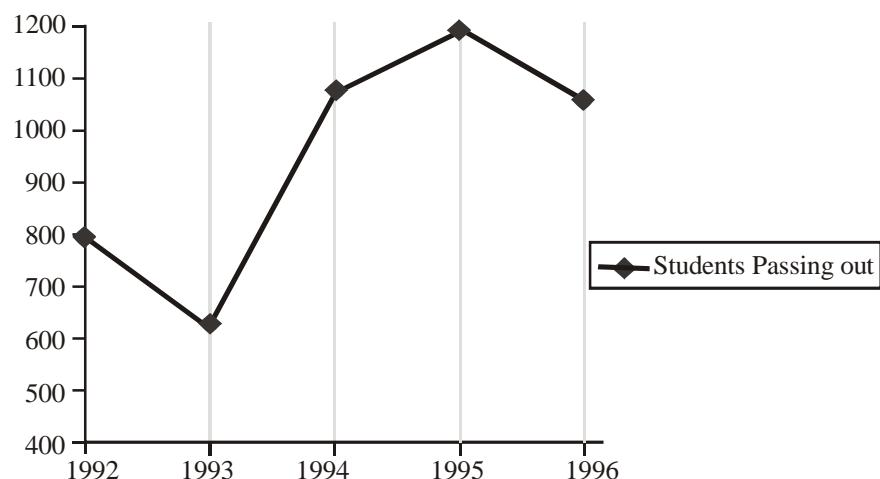
The amount of money invested (in rupees crore) in the core infrastructure areas of two districts, Chittoor and Khammam, in Andhra Pradesh, is as follows :

Chittoor District			Khammam District		
Core Area	1995	1996	Core Area	1995	1996
Electricity	815.2	1054.2	Electricity	2065.8	2365.1
Chemical	389.5	476.7	Chemical	745.3	986.4
Thermal	632.4	565.9	Thermal	1232.7	1026.3
Solar	468.1	589.6	Solar	1363.5	1792.1
Nuclear	617.9	803.1	Nuclear	1674.3	2182.1
<b>Total</b>	<b>2923.1</b>	<b>3489.5</b>	<b>Total</b>	<b>7081.6</b>	<b>8352</b>

34. By what percent was the total investment in the two districts more in 1996 as compared to that in 1995? **(1996)**
- (a) 14% (b) 21% (c) 24% (d) 18%
35. Approximately how many times the total investment in Chittoor was the total investment in Khammam? **(1996)**
- (a) 2.8 (b) 2.0 (c) 2.4 (d) 1.7
36. The investment in Electricity and Thermal Energy in 1995 in these two districts formed what percent of the total investment made in that year ? **(1996)**
- (a) 41% (b) 47% (c) 52% (d) 55%

**Directions for Questions 39 to 43 :** These questions are based on the table and information given below.

The first table gives the percentage of students in the class of M.B.A who sought employment in the areas of Finance, Marketing and Software. The second table gives the average starting salaries of the students per month, in these areas.



	Finance	Marketing	Software	Others
1992	22	36	19	23
1993	17	48	23	12
1994	23	43	21	13
1995	19	37	16	28
1996	32	32	20	16

	<b>Finance</b>	<b>Marketing</b>	<b>Software</b>
1992	5,450	5,170	5,290
1993	6,380	6,390	6,440
1994	7,550	7,630	7,050
1995	8,920	8,960	7,760
1996	9,810	10,220	8,640

39. The number of students who got jobs in finance is less than the number of students getting marketing jobs, in the five years, by **(1996)**  
(a) 826 (b) 650 (c) 735 (d) 548

40. In 1994, students seeking jobs in finance earned Rs.....more than those opting for software (in lakhs) **(1996)**  
(a) 43 (b) 33.8 (c) 28.4 (d) 38.8

41. What is the percent increase in the average salary of Finance from 1992 to 1996? **(1996)**  
(a) 60 (b) 32 (c) 96 (d) 80

42. What is the average monthly salary offered to a management graduate in the year 1993? **(1996)**  
(a) 6433 (b) 6330 (c) 6333 (d) Can't be determined

43. The average annual rate at which the initial salary offered in Software, increases **(1996)**  
(a) 21% (b) 33% (c) 16.3% (d) 65%

**Directions for Questions 44 & 45 :** These questions are based on the table given below.

**HOTELS IN MUMBAI**

Project	No. of rooms	Cost (in Rs. crore)	Year of completion	Company
Windsor Manor	600	275	1999	IHCL
Leela Hotels	310	235	1999	Leela Hotels
Mumbai Heights	250	250	1998	Bombay Hotels
Royal Holidays	536	225	1998	Lokhandwala Group
Majestic Holiday	500	250	1999	Raheja Group
Supremo Hotel	300	300	1999	ITC
Hyatt Regency	500	250	2000	Asian Hotels

44. Which of the following had the least cost per room? (1997)  
 (a) Lokhandwala (b) Raheja (c) IHCL (d) ITC
45. Which of the following has the maximum number of rooms per crore of rupees? (1997)  
 (a) IHCL (b) Raheja (c) Lokhandwala (d) ITC

**ADDITIONAL Directions for Questions 46 to 48 :** For these questions, assume that the cost of the project is incurred in the year of completion. Interest is charged @10% per annum.

46. What is the cost incurred (in Rs. crore) for projects completed in 1998? (1997)  
 (a) 475 (b) 500 (c) 522.5 (d) 502.5
47. What is the cost incurred (in Rs. crore) for projects completed in 1999? (1997)  
 (a) 1282.6 (b) 1270.0 (c) 1805.1 (d) 1535.0
48. What approximately is the cost incurred (in Rs. crore) for projects completed by 2000? (1997)  
 (a) 1785 (b) 2140 (c) 2320 (d) None of these

**Directions for Questions 49 & 50 :** These questions are based on the table and information given below.

The following table gives the tariff (in paise per kilo-watt-hour) levied by the UPSEB in 1994-95, in the four sectors and the regions within them. The table also gives the percentage change in the tariff as compared to 1991-92.

	Region 1		Region 2		Region 3		Region 4		Region 5	
	p/kwh	% incr.								
Sector 1	425	+15	472	+5	420	-4	415	+8	440	+10
Sector 2	430	+12	468	+8	448	+7	423	-3	427	+11
Sector 3	428	+8	478	-4	432	+6	441	+10	439	+8
Sector 4	434	+5	470	+15	456	+10	451	+12	446	-12

49. If the amount of power consumed by the various Regions in Sector 1 is the same, then, as compared to 1991-92, the net tariff in 1994-95 ... (1997)  
 (a) increases by 6.5% (b) decreases by 3.5% (c) increases by 10.2% (d) decreases by 7.3%
50. What approximately was the average tariff in Region 3 in 1991-92? (1997)  
 (a) 407 (b) 420 (c) 429 (d) None of these

**ADDITIONAL Directions for Questions 51 to 53 :** The UPSEB supplies power under four categories, Urban (25%), Domestic (20%), Industrial (40%) and Rural (15%). In 1994-95, the total power produced by the UPSEB was 7875 Mega-watts.

51. If in 1994-95, there was a 10% decrease in the Domestic consumption of power as compared to that in 1991-92, what was the consumption of power in the rural sector in 1991-92? (1997)
- (a) 1312 (b) 1422 (c) 1750 (d) None of these
52. In the given two years, what is the total tariff paid by the Urban sector (in Rs. lakh)? (1997)
- (a) 22.4 (b) 21.6 (c) 27.2 (d) Can't be determined
53. Which of the following is true? (1997)
- (a) The average tariff in Region 4 is 437.5 p/kwh.  
 (b) The average tariff in Region 2 is greater than the average tariff in Region 5  
 (c) In 1991-92, the industrial sector contributed to about 42% of the total revenue from power  
 (d) None of these

**Directions for Questions 54 to 59 :** These questions are based on the table given below :

Year	No. of Rural banks	Average no. of loans	Average size (Rs.)	Agricultural Loans		Consumer Price Index
				No. ('000)	Value (Rs. mn.)	
1970	90	28	109	18.3	2.00	43
1971	115	39	133	20.4	3.58	49
1972	130	52	178	25.1	6.26	55
1974	260	98	243	41.2	34.54	70
1975	318	121	283	51.4	52.21	78
1980	605	288	567	135.7	498.4	131
1981	665	312	622	152.8	612.4	137
1983	840	380	711	211.6	915.7	149

54. In 1974, the Agricultural loans formed what percent of the Total loans? (1997)
- (a) 85% (b) 71% (c) 77% (d) Can't be determined
55. From the given data, the number of rural loans upto 1980 formed approximately what percent of those in 1983? (1997)
- (a) 112% (b) 80% (c) 97% (d) Can't be determined
56. Which of the following pairs of years showed the maximum increase in the number of loans? (1997)
- (a) 1971-72 (b) 1974-75 (c) 1970-71 (d) 1980-81
57. What is the value (in Rs. mm) of the Agricultural loans in 1983 at 1970 prices? (1997)
- (a) 326 (b) 264 (c) 305 (d) None of these
58. In which year was the number of loans per rural bank the least? (1997)
- (a) 1974 (b) 1971 (c) 1970 (d) 1975
59. What is the simple annual rate of increase in the number of Agricultural loans from 1970 to 1983? (1997)
- (a) 132% (b) 81% (c) 75% (d) 1056%

**ADDITIONAL Directions for Questions 60 & 61 :** The Consumer Price Index for 1970 is to be taken as 105 and the Indices for the subsequent years are to be corrected accordingly.

60. By roughly how many points do the Indices for the years 1983 and 1975 differ? (1997)
- (a) 174 (b) 180 (c) 188 (d) 195
61. What is the value of loans in 1980 at 1983 prices? (1997)
- (a) 570 (b) 675 (c) 525 (d) 440

**Directions for Questions 62 to 67 :** These questions are based on the table and information given below.

The following table gives the quantity of Apples (in tons) arriving in the New Delhi market from various states in a particular year. The month in which demand was more than supply, the additional demand was met by the stock from cold storage.

Month	HP	UP	J&K	Cold Storage	Total
April	7	0	7	59	73
May	12	1	0	0	13
June	9741	257	8017	0	18015
July	71497	0	18750	0	90247
August	77675	0	20286	0	97961
September	53912	0	56602	0	110514
October	12604	0	79591	24	92219
November	3499	0	41872	42	45413
December	1741	0	14822	15	16578
January	315	0	10922	201	11438
February	25	0	11183	77	11285
March	0	0	683	86	769

62. What was the maximum percentage of Apples supplied by any state in any of the months? (1998)  
 (a) 99% (b) 95% (c) 88% (d) 100%
63. Who supplied the maximum Apples? (1998)  
 (a) UP (b) HP (c) J&K (d) Cold Storage
64. Which state supplied the highest percentage of Apples from the total Apples supplied ? (1998)  
 (a) HP (b) UP (c) J&K (d) Can not be determined
65. In which of the following periods supply was greater than the demand? (1998)  
 (a) Aug-Mar (b) June-Oct (c) May-Sep (d) Nov-April
66. If the yield per tree was 40 kg then from how many trees were the apples supplied to Delhi (in million )? (1998)  
 (a) 11.5 (b) 12.36 (c) 13.5 (d) Can not be determined
67. Using data in previous question, if there were 250 trees per hectare then how many hectare of land was used? (1998)  
 (a) 9400 (b) 49900 (c) 50000 (d) 49453

**Directions for Questions 68 & 69 :** These questions are based on the table given below.

**RELATIVES SWEETNESS OF DIFFERENT SUBSTANCES**

Lactose	0.16
Glucose	0.74
Fructose	1.7
Sucrose	1
Saccharine	675
Maltose	0.32

68. How many grams of sucrose must be added to one gram of saccharin to make a mixture hundred times as sweet as glucose (1999)  
 (a) 7 (b) 8 (c) 9 (d) 23
69. How many times sweeter than sucrose is a mixture of glucose, sucrose and fructose in the ratio 1:2:3 (1999)  
 (a) 0.6 (b) 1.0 (c) 1.3 (d) 2.3

**Directions for Questions 70 to 74 :** These questions are based on the table and information given below.

BT group of water facility and sanitation for different countries conducted a survey. The following table gives (in percentage), water and sanitation facilities available to the people in different countries.

Country	Water Facilities			Sanitation Facilities		
	Urban	Rural	Total	Urban	Rural	Total
India	82	74	77	72	56	62
China	86	78	82	94	82	88
Pakistan	80	76	77	66	58	60
Indonesia	83	78	80	70	65	67
Malaysia	84	80	81	92	88	89
Nepal	81	72	74	74	65	67
Japan	92	86	90	94	79	89
Bangladesh	88	83	84	84	72	76

- i. A > B or A dominates B when the total coverage of both water and sanitation facilities of A are individually more than that of B. Or B < A that is, B is dominated by A if the coverage of both water and sanitation facilities (total) of B are individually less than that of A.
- ii. A country is listed on the 'Coverage frontier' if the country is not dominated by more than one country.
- iii. A country is listed on the 'Water Survey Report' if the country has greater coverage in the water supply (total) than at least two other countries and it doesn't have coverage of less than 80% in either region
70. Which of the following is true? (1999)
- (a) India < China < Japan (b) Nepal > Bangladesh (c) Indonesia > Nepal (d) Pakistan < India
71. Which are the countries listed on the coverage Frontier? (1999)
- (a) Bangladesh, Japan, China, Malaysia (b) China, Nepal  
(c) Japan, India (d) Japan, Nepal, Bangladesh
72. The following countries are listed on the Water Supply Report (1999)
- (a) Japna, Bangladesh, China (b) China, India, Nepal  
(c) China, Japan India (d) Japan, Malaysia, China
73. If the water supply coverage in the rural region of Nepal goes up to 86% then which of the following is false (1999)
- (a) Nepal gets listed on the Coverage Frontier (b) China gets off the water survey report list  
(c) Nepal will dominate India (d) Bangladesh will not dominate Nepal.
74. China, Japan and India's rural population percentage, in the ascending order will be registered as (1999)
- (a) China, India, Japan (b) Japan, China, India (c) Japan, India, China (d) India, China, Japan

**Directions for Questions 75 to 79 :** These questions are based on the table and information given below.

The following table gives the break-up of the revenues earned by the company Soft-Soft for five different years. Figures are in Rs. Crores.

	94-95	95-96	96-97	97-98	98-99
Hardware					
(a) Domestic	68	54	52	66	35
(b) Exports	540	600	730	1770	1827
Software					
(a) Domestic	142	127	150	320	422
(b) Exports	1100	1200	1339	2500	2215
Peripherals	25	10	25	20	37
Training	140	106	160	240	161
Maintenance	21	19	25	92	126
Others	12	10	19	40	24
Total	2048	2126	2500	5048	4947

75. In which year hardware exports has been between 35-40% of total? (2000)
- (a) 97 - 98 and 98 - 99 (b) 98 - 99 and 95 - 96 (c) 97 - 98 and 94 - 95 (d) 95 - 96 and 96 - 97

76. Which of the following is true? (2000)
- The revenues from training consistently increases over a period of time
  - Hardware exports consistently increase over a period of time
  - Software exports consistently increase over a period of time
  - None of the above
77. In how many years the total revenue of training and maintenance is less than ten percent of the total revenues? (2000)
- 2
  - 3
  - 4
  - all
78. In which of the following years the total hardware revenue is more than 50% of that of the software revenue in the same year? (2000)
- 94 - 95
  - 95 - 96 and 96 - 97
  - 97 - 98 and 94 - 95
  - None of the above
79. If in 99-00 total revenue decrease by five percent over previous year and software revenue decreases to 2437 crores what is the approximate percentage decrease in rest of the heads considering uniform decrease (2000)
- 1.0%
  - 1.8%
  - 2.0%
  - 3.3%

**ADDITIONAL Directions for Questions 80 & 81 : Refer the information given below and answer the questions that follow :**

Taking a field (say A), year X is said to dominate over year Y if the revenues from field A in year X is greater than that in year Y. Taking two years, 1 and 2, into consideration, for two fields A and B,

- A is said to dominate over B, if  $A \geq B$  in one year and  $A > B$  in the other.
  - Year 1 is said to dominate over year 2, if  $A_1 \geq A_2$ ,  $B_1 \geq B_2$ . There should be strict inequality in atleast one year.
80. Which of the following is true? (2000)
- Hardware and training dominate software throughout the period
  - Hardware dominated the peripherals throughout the period
  - Peripherals and Others dominate training in the year 94 - 95 and 98 - 99
  - None of the above
81. Taking Peripherals, Exports and Training together which of the following is true? (2000)
- 96 - 97 dominates 97 - 98
  - 97 - 98 dominates 98 - 99
  - 98 - 99 dominates 97 - 98
  - None of the above

**Directions for Questions 82 to 87 : These questions are based on the table given below.**

**Factory Sector by type of Ownership**

Sector	Factories	Employment	Fixed Capital	Variable Cost	Value Added
Government	18	15	14	22	25
Central	8	6	5	7	10
State	4	6	4	8	3
Central/State	6	3	5	7	12
Public	12	8	6	19	8
Private	55	65	72	54	62
Joint	15	12	8	5	5
Total	100	100	100	100	100

All figures in the table are in percent of the total for the corresponding column.

82. If the total work force was 76 million whereas the total value added was 225 million, then which of the following had the maximum value addition per worker? (2000)
- Central
  - State
  - Central/State
  - Public
83. Which of the following sectors has the maximum fixed capital invested per factory? (2000)
- Central
  - State
  - Central/State
  - Public
84. If the variable cost is proportional to the number of employees and the production per employee, then for which of the following is the production highest? (2000)
- Government
  - Private
  - Joint
  - Public
85. If the government has a fixed capital of \$200 million in the Iron & Steel industry, which corresponds to 20.012% of its total investment as fixed capital, then how much, did the government invest (in Rs. Million) in Maruti Udyog Ltd. which forms 25% of the investment in the joint sector? (1 US\$ - Rs .45) (2000)
- 6500
  - 2500
  - 143
  - 145

86. Maruti Udyog Ltd. is a joint project of the Indian Government and Suzuki Motors Japan, each having equal stake. One fine day, the Indian government decides to disinvest from the venture due to losses occurring from labour problems. How much money will be disinvested ? (Refer to previous question, if required) (2000)
- (a) Rs.246 million (b) Rs. 6500 million (c) \$246 million (d) \$6500 million
87. Which of the following statement is true (2000)
- (a) the number of govt employees are more than that of the number of factories in joint sector
- (b) The number of employees in the public sector is same as fixed capital of joint sector
- (c) Both a and b
- (d) Cannot say

**Directions for Questions 88 to 91 : These questions are based on the table and information given below.**

The following is a table describing garments manufactured based upon the colour and size for each lay. There are four sizes : M - Medium, L-Large, XL-Extra Large and XXL-Extra-Extra Large. There are three colours: Yellow, Red and White.

Lay	Number of Garments											
	Yellow				Red				White			
Lay No.	M	L	XL	XXL	M	L	XL	XXL	M	L	XL	XXL
1	14	14	7	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	42	42	21	0
3	20	20	10	0	18	18	9	0	0	0	0	0
4	20	20	10	0	0	0	0	0	30	30	15	0
5	0	0	0	0	24	24	12	0	30	30	15	0
6	22	22	11	0	24	24	12	0	32	32	16	0
7	0	24	24	12	0	0	0	0	0	0	0	0
8	0	20	20	10	0	2	2	1	0	0	0	0
9	0	20	20	10	0	0	0	0	0	22	22	11
10	0	0	0	0	0	26	26	13	0	20	20	10
11	0	22	22	11	0	26	26	13	0	22	22	11
12	0	0	2	2	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	20	20	20
14	0	0	0	0	0	0	0	0	0	0	22	22
15	0	0	10	10	0	0	2	2	0	0	22	22
16	0	0	0	0	1	0	0	0	1	0	0	0
17	0	0	0	0	0	5	0	0	0	0	0	0
18	0	0	0	0	0	32	0	0	0	0	0	0
19	0	0	0	0	0	32	0	0	0	0	0	0
20	0	0	0	0	0	5	0	0	0	0	0	0
21	0	0	0	18	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	26	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	22
24	0	0	0	8	0	0	0	1	0	0	0	0
25	0	0	0	8	0	0	0	0	0	0	0	12
26	0	0	0	0	0	0	0	1	0	0	0	14
27	0	0	0	8	0	0	0	2	0	0	0	12
Production	76	162	136	97	67	194	89	59	135	198	195	156
Order	75	162	135	97	67	194	89	59	135	197	195	155
Surplus	1	0	1	0	0	0	0	0	0	1	0	1

88. How many lays are used to produce yellow coloured fabrics? (2001)
- (a) 10 (b) 11 (c) 12 (d) 14
89. How many lays are used to produce Extra- Extra Large fabrics? (2001)
- (a) 15 (b) 16 (c) 17 (d) 18
90. How many lays are used to produce Extra-Extra Large Yellow or Extra-Extra Large White fabrics? (2001)
- (a) 8 (b) 9 (c) 10 (d) 15
91. How many varieties of fabrics, which exceed the order, have been produced? (2001)
- (a) 3 (b) 4 (c) 5 (d) 6

**Directions for Questions 92 to 95 :** These questions are based on the table and information given below.

#### THE BUSIEST TWENTY INTERNATIONAL AIRPORTS IN THE WORLD

No.	Name	International Airport Type	Code	Location	Passengers
1	Hartsfield	A	ATL	Atlanta, Georgia, USA	77939536
2	Chicago-O'Hare	A	ORD	Chicago, Illinois, USA	72568076
3	Los Angeles	A	LAX	Los Angeles, California, USA	63876561
4	Heathrow Airport	E	LHR	London, United Kingdom	62263710
5	DFW	A	DFW	Dallas/Ft. Worth, Texas, USA	60000125
6	Haneda Airport	F	HND	Tokyo, Japan	54338212
7	Frankfurt Airport	E	FRA	Frankfurt, Germany	45858315
8	Roissy-Charles de Gaulle	E	CDG	Paris, France	43596943
9	San Francisco	A	SFO	San Francisco, California, USA	40387422
10	Denver	A	DIA	Denver, Colorado, USA	38034231
11	Amsterdam Schiphol	E	AMS	Amsterdam, Netherlands	36781015
12	Minneapolis-St. Paul	A	MSP	Minneapolis-St. Paul, USA	34216331
13	Detroit Metropolitan	A	DTW	Detroit, Michigan, USA	34038381
14	Miami	A	MIA	Miami, Florida, USA	33899246
15	Newark	A	EWR	Newark, New Jersey, USA	33814000
16	McCarran	A	LAS	Las Vegas, Nevada, USA	33669185
17	Phoenix Sky Harbor	A	PHX	Phoenix, Arizona, USA	33533353
18	Kimpo	FE	SEL	Seoul, Korea	33371074
19	George Bush	A	IAH	Houston, Texas, USA	33089333
20	John F. Kennedy	A	JFK	New York, New York, USA	32003000

92. How many international airports of type 'A' account for more than 40 million passengers? (2001)  
(a) 4 (b) 5 (c) 6 (d) 7

93. What percentage of top ten busiest airports is in the United States of America? (2001)  
(a) 60 (b) 80 (c) 70 (d) 90

94. Of the five busiest airports, roughly what percentage of passengers is handled by Heathrow airport? (2001)  
(a) 30 (b) 40 (c) 20 (d) 50

95. How many international airports not located in the USA handle more than 30 million passengers? (2001)  
(a) 5 (b) 6 (c) 10 (b) 14

**Directions for Questions 96 to 98 :** These questions are based on the table and information given below.

The following table provides data on the different countries and location of their capitals. (the data may not match the actual Latitude, Longitudes) Answer the following questions on the basis of the table.

<b>Sl. No.</b>	<b>Country</b>	<b>Capital</b>	<b>Latitude</b>	<b>Longitude</b>
1.	Argentina	Buenes Aires	34.30S	58.20E
2.	Australia	Canberra	35.15S	149.08E
3.	Austria	Vienna	48.12N	16.22E
4.	Bulgaria	Sofia	42.45N	23.20E
5.	Brazil	Brasilia	15.47S	47.55E
6.	Canada	Ottawa	45.27N	75.42E
7.	Cambodia	Phnom Penh	11.33N	104.55E
8.	Ecuador	Quito	0.15S	78.35E

Sl. No.	Country	Capital	Latitude	Longitude
9.	Ghana	Accra	5.35 N	0.6 E
10.	Iran	Teheran	35.44 N	51.30 E
11.	Ireland	Dublin	53.20 N	6.18 E
12.	Libya	Tripoli	32.49 N	13.07 E
13.	Malaysia	Kuala Lumpur	3.9 N	101.41 E
14.	Peru	Lima	12.05 S	77.0 E
15.	Poland	Warsaw	52.13 N	21.0 E
16.	New Zealand	Wellington	41.17 S	174.47 E
17.	Saudi Arabia	Riyadh	24.41 N	46.42 E
18.	Spain	Madrid	40.25 N	3.45 W
19.	Sri Lanka	Colomba	6.56 N	79.58 E
20.	Zambia	Lusaka	15.28 S	28.16 E

96. What percentage of cities located within 10°E and 40°E (10-degree East and 40 degree East) lie in the Southern Hemisphere? (2002)
- (a) 15% (b) 20% (c) 25% (d) 30%
97. The number of cities whose names begin with a consonant and are in the Northern Hemisphere in the table (2002)
- (a) exceeds the number of cities whose names begin with a consonant and are in the southern hemisphere by 1  
 (b) exceeds the number of cities whose names begin with a consonant and are in the southern hemisphere by 2  
 (c) is less than the number of cities whose names begin with a consonant and are in the meridian by 1  
 (d) is less than the number of countries whose name begins with a consonant and are in the meridian by 3
98. The ratio of the number of countries whose name starts with vowels and located in the southern hemisphere, to the number of countries, the name of whose capital cities starts with a vowel in the table above is (2002)
- (a) 3:2 (b) 3:3 (c) 3:1 (d) 4:3

**Directions for Questions 99 to 102 : These questions are based on the table and information given below.**

The following table gives details regarding the total earnings of 15 employees and the number of days they have worked on complex, medium and simple operations in the month of June 2002. Even though the employees might have worked on an operation, they would be eligible for earnings only if they have minimum level of efficiency.

Emp. No.	Total Earnings			Total Days		
	Complex	Medium	Simple	Total	Complex	Medium
2001147	82.98	636.53	719.51	3.00	0.00	23.00
2001148	51.53		461.73	513.26	3.33	1.67
2001149	171.71		79.10	250.81	5.50	4.00
2001150	100.47		497.47	597.95	6.00	4.67
2001151	594.43	159.64		754.06	9.67	13.33
2001156	89.70			89.70	8.00	0.00
2001158	472.31	109.73		582.04	1.39	9.61
2001164	402.25	735.22	213.67	1351.14	5.27	12.07
2001170	576.57			576.57	21.00	0.00
2001171	286.48	6.10		292.57	8.38	4.25
2001172	512.10	117.46		629.56	10.00	8.50
2001173	1303.88			1303.88	25.50	0.00
2001174	1017.94			1017.94	26.00	0.00
2001179	46.56	776.19		822.75	2.00	19.00
2001180	116.40	1262.79		1379.19	5.00	19.00
						0.00
						24.00

99. The number of employees who have earned more than 50 rupees per day in complex operations is (2002)  
 (a) 4 (b) 3 (c) 5 (d) 6
100. The number of employees who have earned more than 600 rupees and having more than 80% attendance (there are 25 regular working days in June 2002; some might be coming on overtime too) is (2002)  
 (a) 4 (b) 5 (c) 6 (d) 7
101. The employee number of the person who has earned the maximum earnings per day in medium operation is (2002)  
 (a) 2001180 (b) 2001164 (c) 2001172 (d) 2001179
102. Among the employees who were engaged in complex and medium operations, the number of employees whose average earning per day in complex operations is more than average earning per day in medium operations is (2002)  
 (a) 2 (b) 3 (c) 5 (d) 7

**Directions for Questions 103 to 110 :** These questions are based on the table and information given below.

The following table shows the revenue and expenses in **millions of Euros** (European currency) associated with REPSOL YPF company's oil and gas producing activities in operations in different parts of the world for the years 1998-2000.

**REPSOL YPF'S Operations of Oil and Gas Producing Activities**

S.No.	Item	Year	Total World	North Africa & Middle East		Argentina	Rest of Latin America	Far East	North Sea	Rest of the world
				Spain						
1	Revenue	1998	916	70	366	281	34	82	78	5
		1999	3374	55	666	2006	115	301	140	91
		2000	8328	394	1290	5539	482	603	0	20
2	Expenses	1998	668	39	255	187	57	63	52	15
		1999	1999	48	325	1168	131	204	65	58
		2000	3709	43	530	2540	252	311	0	33
3	Income before Taxes & Charges (Revenue - Expenses = [(1) - (2)])	1998	248	31	111	94	-23	19	26	-10
		1999	1375	7	341	838	-16	97	75	33
		2000	4619	351	760	2999	230	292	0	-13
4	Taxes & Charges	1998	152	6	104	33	-3	9	6	-3
		1999	561	3	169	338	-6	39	21	-3
		2000	1845	126	404	1150	61	103	0	1
5	Net Income after Taxes & Charges [=(3) - (4)]	1998	96	25	7	61	-20	10	20	-7
		1999	814	4	172	500	-10	58	54	36
		2000	2774	225	356	1849	169	189	0	-14

103. How many operations (Spain, North Africa and Middle East, ....) of the company accounted for less than 5% of the total revenue earned in the year 1999? (2002)  
 (a) 2 (b) 3 (c) 4 (d) None of these
104. How many operations (Spain, North Africa and Middle East, ....) of the company witnessed more than 200% increase in revenue from the year 1999 to 2000? (2002)  
 (a) 1 (b) 2 (c) 3 (d) None of these
105. How many operations registered a sustained yearly increase in income before taxes and charges from 1998 to 2000? (2002)  
 (a) 3 (b) 4 (c) 5 (d) None of these
106. Ignoring the loss making operations of the company in 1998, for how many operations was the percentage increase in net income before taxes and charges higher than the average from 1998 to 1999? (2002)  
 (a) 0 (b) 1 (c) 2 (d) None of these
107. If profitability is defined as the ratio of net income after taxes and charges to expenses, which of the following statements is true? (2002)  
 (a) The Far East operations witnessed its highest profitability in 1998  
 (b) The North Sea operations increased its profitability from 1998 to 1999  
 (c) The operations in Argentina witnessed a decrease in profitability from 1998 to 1999  
 (d) Both (b) and (c) are true
108. In the year 2000, which among the following countries had the best profitability? (2002)  
 (a) North Africa & Middle East (b) Spain (c) Rest of Latin America (d) Far East

109. If Efficiency is defined as the ratio of revenue to expenses, which operation was the least efficient in the year 2000? (2002)  
 (a) Spain (b) Argentina (c) Far East (d) None of these
110. Of the following statements, which one is not true? (2002)  
 (a) The operations in Spain had the best efficiency in 2000  
 (b) The Far East operations witnessed an efficiency improvement from 1999 to 2000  
 (c) The North Sea operations witnessed an efficiency improvement from 1998 to 1999  
 (d) In the year 1998, the operations in Rest of Latin America were the least efficient.

**Directions for Questions 111 to 116 :** These questions are based on the table and information given below.

There are 6 refineries, 7 depots and 9 districts. The refineries are BB, BC, BD, BE, BF and BG. The depots are AA, AB, AC, AD, AE, AF and AG. The districts are AAA, AAB, AAC, AAD, AAE, AAF, AAG, AAH and AAI. Table A gives the cost of transporting one unit from refinery to depot. Table B gives the cost of transporting one unit from depot to a district.

Table A						
	BB	BC	BD	BE	BF	BG
AA	928.2	537.2	567.8	589.9	589.9	800.1
AB	311.1	596.7	885.7	759.9	759.9	793.9
AC	451.1	0	320.1	780.1	720.7	1000
AD	371.1	150.1	350.1	750.1	650.4	980.1
AE	1137.3	314.5	0	1158	1158	1023
AF	617.1	516.8	756.5	1066	1066	406.3
AG	644.3	299.2	537.2	1093	1093	623.9

Table B							
	AA	AB	AC	AD	AE	AF	AG
AAA	562.7	843.2	314.5	889.1	0	754.8	537.2
AAB	532.7	803.2	284.5	790.5	95.2	659.6	442
AAC	500.7	780.2	0	457.3	205.7	549.1	331.5
AAD	232.9	362.1	286.2	275.4	523.6	525.3	673.2
AAE	345.1	268.6	316.2	163.2	555.9	413.1	227.8
AAF	450.1	644.3	346.2	372.3	933.3	402.9	379.1
AAG	654.5	0	596.7	222.7	885.7	387.6	348.5
AAH	804.1	149.6	627.2	360.4	1035.3	537.2	498.1
AAI	646	255	433.5	137.7	698.7	112.2	161.5

111. What is the least cost of sending one unit from any refinery to any district? (2002)  
 (a) 95.2 (b) 0 (c) 205.7 (d) 284.5
112. What is the least cost of sending one unit from any refinery to the district AAB? (2002)  
 (a) 0 (b) 284.5 (c) 95.2 (d) None of these
113. What is the least cost of sending one unit from refinery BB to any district? (2002)  
 (a) 284.5 (b) 311.1 (c) 451.1 (d) None of these
114. What is the least cost of sending petrol from refinery BB to district AAA? (2002)  
 (a) 765.6 (b) 1137.3 (c) 1154.3 (d) None of these
115. How many possible ways are there for sending petrol from any refinery to any district? (2002)  
 (a) 63 (b) 42 (c) 54 (d) 378
116. The largest cost of sending petrol from any refinery to any district is (2002)  
 (a) 2172.6 (b) 2193.0 (c) 2091.0 (d) None of these

**Directions for Questions 117 to 119 :** These questions are based on the table and information given below.

The table below gives information about four different crops, their different quality categories and the regions where they are cultivated. Based on the information given in the table answer the questions below.

Type of Crop	Quality	Region
Crop - 1	High	R1, R2, R3, R4, R5
	Medium	R6, R7, R8
	Low	R9, R10, R11
Crop - 2	High	R5, R8, R12
	Medium	R9, R13
	Low	R6
Crop - 3	High	R2, R6, R7, R13
	Medium	R3, R9, R11
	Low	R1, R4
Crop - 4	High	R3, R10, R11
	Medium	R1, R2, R4
	Low	R5, R9

117. How many regions produce medium qualities of Crop-1 or Crop-2 and also produce low quality of Crop-3 or Crop 4 (2002)  
 (a) Zero (b) One (c) Two (d) Three
118. Which of the following statements is true? (2002)  
 (a) All Medium quality Crop-2 producing regions are also high quality Crop-3 producing regions  
 (b) All High quality Crop-1 producing regions are also medium and low Crop-4 producing regions  
 (c) There are exactly four Crop-3 producing regions, which also produce Crop-4 but not Crop-2  
 (d) Some Crop-3 producing regions produce Crop-1, but not high quality Crop-2
119. How many low quality Crop-1 producing regions are either high quality Crop-4 producing regions or medium quality Crop-3 producing regions? (2002)  
 (a) One (b) Two (c) Three (d) Zero

**Directions for Questions 120 to 122 : These questions are based on the table and information given below.**

One of the functions of the Reserve Bank of India is to mobilize funds for the Government of India by issuing securities. The following table shows details of funds mobilized during the period July 2002 - July 2003. Notice that on each date there were two rounds of issues, each with a different maturity.

Date of issue	Notified amount	Maturity	Competitive bids received	Non-competitive bids received	Competitive bids accepted		Non-competitive bids accepted		Total amount	Coupon	Implicit
	Rs. Cr.	Years	No.	No.	No.	Value	No.	Value	Rs. (Cr.)		
17-July -02	40	15	229	23	66	15.21	23	0.37	16	8.07	7.8
17-July -02	30	10	145	12	90	29.88	12	0.12	30	6.72	6.72
5-Aug -02	50	9	324	13	105	49.68	13	0.33	50	9.39	7.24
5-Aug -02	20	54	163	9	34	19.81	9	0.19	20	10.18	7.93
28-Aug -02	50	15	260	26	157	48.92	26	1.08	50	7.46	7.46
28-Aug -02	20	30	119	15	67	19.61	15	0.39	20	7.95	7.95
11-Sep -02	40	15	261	22	152	38.93	22	1.07	40	7.46	7.44
11-Sep -02	30	20	131	20	98	29.34	20	0.56	30	8.35	7.7
9-Oct -02	40	11	631	26	119	39.22	26	0.78	40	7.27	7.14
9-Oct -02	30	30	91	15	39	29.52	15	0.48	30	7.95	7.89
7-Nov. -02	40	17	245	14	20	39.71	14	0.29	40	10.03	7.26
7-Nov. -02	30	24	166	11	49	29.7	11	0.31	30	10.18	7.48
9-April -03	40	20	245	25	65	39.53	25	1.47	40	6.3	6.3
9-April -03	50	11	236	24	201	49.4	24	0.6	50	7.37	5.98
23-April -03	50	15	319	26	134	48.98	26	1.02	50	6.25	6.1
23-April -03	20	29	131	19	9	19.39	19	0.61	20	7.95	6.33
5-May -03	60	10	314	14	98	59.69	14	0.31	60	7.27	5.97
5-May -03	30	20	143	14	118	29.58	14	0.42	30	6.3	6.35
4-June -03	30	25	187	19	15	28.5	19	1.05	30	6.19	6.13
4-June -03	60	9	378	21	151	59.09	21	0.91	60	6.85	5.76
2-July -03	50	11	298	20	116	49.09	20	0.95	50	7.37	5.76
2-July -03	30	25	114	20	45	29.64	20	1.36	30	6.31	6.1
16-July -03	60	17	371	29	115	57	29	3.1	60	6.35	5.97
16-July -03	30	29	134	22	12	29.32	22	0.68	30	7.98	6.2
Total	930								906		

120. Which of the following statements is not true? (2003C)  
 (a) Competitive bids received always exceed non-competitive bids received.  
 (b) The number of competitive bids accepted does not always exceed the number of non-competitive bids accepted.  
 (c) The value of competitive bids accepted on any particular date is never higher for higher maturity.  
 (d) The value of non-competitive bids accepted in the first round is always greater than that in the second round.

121. Which of the following is true? (2003C)

  - (a) The second round issues have a higher maturity than the first round for all dates.
  - (b) The second round issue of any date has a lower maturity only when the first round notified amount exceeds that of the second round.
  - (c) On at least one occasion, the second round issue having lower maturity received a higher number of competitive bids.
  - (d) None of the above three statements is true.

122. How many times was the issue of securities subscribed, i.e., how often did the total amount mobilized fall short of the amount notified? (2003C)

  - (a) 0
  - (b) 1
  - (c) 2
  - (d) 3

**Directions for Questions 123 to 125 :** These questions are based on the table and information given below.

*In each question, there are two statements : A and B, either of which can be true or false on the basis of the information given below.*  
*A research agency collected the following data regarding the admission process of a reputed management school in India.*

Year	Gender	Number bought application forms	Number appeared for written test	Number called for interviews	Number selected for the course
2002	Male	61205	59981	684	171
	Female	19236	15389	138	48
2003	Male	63298	60133	637	115
	Female	45292	40763	399	84

Choose (a) if only A is true

Choose (b) if only B is true

Choose (c) if both A and B are true

Choose (d) if neither A nor B is true

123. Statement A: The percentage of absentees in the written test among females decreased from 2002 to 2003 (2003C)  
Statement B: The percentage of absentees in the written test among males was larger than among females in 2003.

124. Statement A : In 2002 the number of females selected for the course as a proportion of the number of females who bought application forms, was higher than the corresponding proportion for males (2003C)  
Statement B: In 2002 among those called for interview, males had a greater success rate than females.

125. Statement A : The success rate of moving from written test to interview stage for males was worse than for females in 2003 (2003C)  
Statement B: The success rate of moving from written test to interview stage for females was better in 2002 than in 2003

**Directions for Questions 126 to 128 :** These questions are based on the table and information given below.

Table A below provides data about ages of children in a school. For the age given in the first column, the second column gives the number of children not exceeding that age. For example, first entry indicates that there are 9 children aged 4 years or less. Tables B and C provide data on the heights and weights respectively of the same group of children in a similar format. Assuming that an older child is always taller and weighs more than a younger child, answer the following questions.

Table A		Table B		Table C	
Age (Year)	No.	Height (cm)	No.	Weight (kg.)	No.
4	9	115	6	30	8
5	12	120	11	32	13
6	22	125	24	34	17
7	35	130	36	36	28
8	42	135	45	38	33
9	48	140	53	40	46
10	60	145	62	42	54
11	69	150	75	44	67
12	77	155	81	46	79
13	86	160	93	48	91
14	100	165	100	50	100

126. Among the children older than 6 years but not exceeding 12 years, how many weigh more than 38 kg? (2003C)  
 (a) 34 (b) 52 (c) 44 (d) Cannot be determined
127. How many children of age more than 10 years are taller than 150 cm. and do not weigh more than 48 kg? (2003C)  
 (a) 16 (b) 40 (c) 9 (d) Cannot be determined
128. What is the number of children of age 9 years or less whose height does not exceed 135 cm? (2003C)  
 (a) 48 (b) 45 (c) 3 (d) Cannot be determined

**Directions for Questions 129 & 130 :** These questions are based on the table and information given below.

An industry comprises four firms ( A, B, C, and D). Financial details of these firms and of the industry as a whole for a particular year are given below. Profitability of a firm is defined as profit as a percentage of sales .

Figures in Rs.	A	B	C	D	Total
Sales	24568	25468	23752	15782	89570
Operating costs	17198	19101	16151	10258	62708
Interest costs	2457	2292	2850	1578	9177
Profit	4917	4075	4750	3946	17684

129. Which firm has the highest profitability (2003C)  
 (a) A (b) B (c) C (d) D
130. If Firm A acquires Firm B, approximately what percentage of the total market (total sales ) will they corner together (2003C)  
 (a) 55% (b) 45% (c) 35% (d) 50%

**Directions for Questions 131 to 133 :** These questions are based on the table and information given below.

**Details of the top 20 MBA schools in the US as ranked by US News and World Report, 1997**

School	Overall ranking	ranking by Academics	Ranking by recruiters	Ranking by placement	Median starting salary	% employed	Annual tuition fee
Stanford university	1	1	3	1	\$82,000	98.9	\$23, 100
Harvard University	2	1	2	4	\$80,000	96.4	\$23, 840
University of Pennsylvania	3	1	4	2	\$79,000	100	\$24, 956
MIT	4	1	4	3	\$78,000	98.8	\$23, 990
University of Chicago	5	1	8	10	\$65,000	98.4	\$23, 930
Northwestern University	6	1	1	11	\$70,000	93.6	\$23, 025
Columbia University	7	9	10	5	\$83,000	96.2	\$23, 830
Dartmouth College	8	12	11	6	\$70,000	98.3	\$23, 700
Duke University	9	9	7	8	\$67,000	98.5	\$24, 380
University of California, Berkeley	10	7	12	12	\$70,000	93.7	\$18, 788
University of Virginia	11	12	9	9	\$66,000	98.1	\$19, 627
University of Michigan, Ann Arbor	12	7	6	14	\$65,000	99.1	\$23, 178
Carnegie Mellon University	14	12	18	13	\$67,200	96.6	\$22, 200
Yale University	15	18	17	22	\$65,000	91.5	\$23, 220
University of North Carolina, Chapel Hill	16	16	16	16	\$60,000	96.8	\$14, 333
University of California, Los Angeles	17	9	13	38	\$65,000	82.2	\$19, 431
University of Texas - Austin	18	18	13	24	\$60,000	97.3	\$11, 614
Indiana University - Bloomington	19	18	20	17	\$61,500	95.2	\$15, 613
Cornell University	20	12	15	36	\$64,000	85.1	\$23, 151

131. How many schools in the list above have single digit rankings on at least 3 of the 4 parameters (overall ranking, ranking by academics, ranking by recruiters and ranking by placement) (2003C)
- (a) 10 (b) 5 (c) 7 (d) 8
132. In terms of starting salary and tuition fee, how many schools are uniformly better (higher median starting salary AND lower annual tuition fee) than Dartmouth College? (2003C)
- (a) 1 (b) 2 (c) 3 (d) 4
133. Madhu has received admission in all schools listed above. She wishes to select the highest overall ranked school whose a) annual tuition fee does not exceed \$ 23,000 and b) median starting salary is at least \$ 70,000. Which school will she select? (2003C)
- (a) University of Virginia (b) University of Pennsylvania  
(c) Northwestern University (d) University of California -Berkeley.

**Directions for Questions 134 to 136 :** These questions are based on the table and information given below.

The table below provides certain demographic details of 30 respondents who were part of a survey. The demographic characteristics are : gender, number of children and age of respondents. The first number in each cell is the number of respondents in that group. The minimum and maximum age of respondents in each group is given in brackets. For example, there are five female respondents with no children and among these five, the youngest is 34 years old, while the oldest is 49.

No. of Children	Male	Female	Total
0	1(38, 38)	5(34, 49)	6
1	1(32, 32)	8(35, 57)	9
2	8(21, 65)	5(37, 63)	11
3	2(32, 33)	2(27, 40)	4
Total	12	18	30

134. The percentage of respondents that fall into the 35 to 40 years age group (both inclusive) is at least (2003C)
- (a) 6.67% (b) 10% (c) 13.33% (d) 26.67%
135. Given the information above, the percentage of respondents older than 35 can be at most (2003C)
- (a) 30% (b) 83.33% (c) 76.67% (d) 90%
136. The percentage of respondents aged less than 40 years is at least (2003C)
- (a) 10% (b) 16.67% (c) 20.0% (d) 30%

**Directions for Questions 137 to 139 :** These questions are based on the table and information given below.

Spam that enters our electronic mailboxes can be classified under several spam heads. The following table shows the distribution of such spam worldwide over time. The total number of spam emails received during December 2002 was larger than the number received in June 2003. The Figures in the table represent the percentage of all spam emails received during that period, falling into respective categories

Category	Sep. 02	Dec. 02	Mar 03	3-Jun
Adult	38	33	19	17
Financial	25	30	37	45
Health	11	19	5	18
Internet	5	3	10	6
Products	3	7	10	11
Scams	5	6	11	2
Others	13	2	8	1

137. In the financial category, the number of spam emails received in September 2002 as compared to March (2003C)
- (a) was larger (b) was smaller (c) was equal (d) Can not be determined
138. In the health category, the number of spam emails received in December 2002 as compared to June 2003 (2003C)
- (a) was larger (b) was smaller (c) was equal (d) Cannot be determined
139. In which category was the percentage of spam emails increasing but at a decreasing rate? (2003C)
- (a) Financial (b) Scams (c) Products (d) None of the above

**Directions for Questions 140 to 143 :** These questions are based on the table and information given below.

Below is a table that lists countries region - wise. Each region - wise list is sorted, first by birth rate and then alphabetically by name of country. We now wish to merge the region - wise list into one consolidated list and provide overall rankings to each country based first on birth rate and then on death rate. Thus, if some countries have the same birth rate, then the country with a lower death rate will be ranked higher. Further, countries having identical birth and death rates will get the same rank. For example, if two countries are tied for the third position, then both will be given rank 3, while the next country (in the ordered list) will be ranked 5.

Rank	Country	Birth Rate	Death Rate	Region	Rank	Country	Birth Rate	Death Rate	Region
1	South Africa	36	12	Africa	1	Germany (FRG)	10	12	Europe
2	Egypt	39	13	Africa	2	Austria	12	13	Europe
3	Cameroon	42	22	Africa	3	Belgium	12	12	Europe
4	Mozambique	45	18	Africa	4	Germany (DRG)	12	14	Europe
5	Zaire	45	18	Africa	5	Sweden	12	11	Europe
6	Ghana	46	14	Africa	6	Switzerland	12	9	Europe
7	Angola	47	23	Africa	7	U.K.	12	12	Europe
8	Madagascar	47	22	Africa	8	Netherlands	13	8	Europe
9	Morocco	47	16	Africa	9	France	14	11	Europe
10	Tanzania	47	17	Africa	10	Italy	14	10	Europe
11	Ethiopia	48	23	Africa	11	Greece	16	9	Europe
12	Ivory coast	48	23	Africa	12	Bulgaria	17	10	Europe
13	Rhodesia	48	14	Africa	13	Hungary	18	12	Europe
14	Uganda	48	17	Africa	14	Spain	18	8	Europe
15	Nigeria	49	22	Africa	15	USSR	18	9	Europe
16	Saudi Arabia	49	19	Africa	16	Yugoslavia	18	8	Europe
17	Sudan	49	17	Africa	17	Czech. Rep.	19	11	Europe
18	Algeria	50	16	Africa	18	Portugal	19	10	Europe
19	Kenya	50	14	Africa	19	Romania	19	10	Europe
20	Upper Volta	50	28	Africa	20	Poland	20	9	Europe
1	Japan	16	6	Asia	1	U.S.A.	15	9	N. America
2	Korea (ROK)	26	6	Asia	2	Canada	16	7	N. America
3	Sri Lanka	26	9	Asia	3	Cuba	20	6	N. America
4	Taiwan	26	5	Asia	4	Mexico	40	7	N. America
5	Malaysia	30	6	Asia	1	Australia	16	8	Pacific
6	China	31	11	Asia	2	Philippines	34	10	Pacific
7	Thailand	34	10	Asia	3	Indonesia	38	16	Pacific
8	Turkey	34	12	Asia	1	Argentina	22	10	S. America
9	India	36	15	Asia	2	Chile	22	7	S. America
10	Burma	38	15	Asia	3	Colombia	34	10	S. America
11	Iran	42	12	Asia	4	Brazil	36	10	S. America
12	Vietnam	42	17	Asia	5	Venezuela	36	6	S. America
13	Korea (DPRK)	43	12	Asia	6	Guatemala	40	14	S. America
14	Pakistan	44	14	Asia	7	Peru	40	13	S. America
15	Nepal	46	20	Asia	8	Ecuador	42	11	S. America
16	Bangladesh	47	19	Asia					
17	Syria	47	14	Asia					
18	Iraq	48	14	Asia					
19	Afghanistan	52	30	Asia					

140. In the consolidated list, what would be the overall rank of the Philippines? (2003)  
(a) 32 (b) 33 (c) 34 (d) 35

141. In the consolidated list, how many countries would rank below Spain and above Taiwan? (2003)  
(a) 9 (b) 8 (c) 7 (d) 6

142. In the consolidated list, which country ranks 37th? (2003)  
 (a) South Africa (b) Brazil (c) Turkey (d) Venezuela
143. In the consolidated list, how many countries in Asia will rank lower than every country in South America, but higher than at least one country in Africa? (2003)  
 (a) 8 (b) 7 (c) 6 (d) 5

**Directions for Questions 144 to 146 :** These questions are based on the table and information given below.

In a Decathlon, the events are 100m, 400m, 100m hurdles, 1500m, High jump, Pole-vault, Long jump, Discus, Shot Put and Javelin. The performance in the first four of these events is consolidated into Score-1, the next three into Score-2, and the last three into Score-3. Each such consolidation is obtained by giving appropriate positive weights to individual events. The final score is simply the total of these three scores. The athletes with the highest, second highest and the third highest final scores receive the gold, silver and bronze medals, respectively. The table below gives the scores and performances of nineteen top athletes in this event.

Name	Country	Final Score	Score-1	Score-2	Score-3	100m	High Jump	Pole-vault
Eduard Hämäläinen	BLS	8802	491	5322	2989	10.74	2.1	4.8
Michael Smith	CAN	8855	174	5274	3407	11.23	2.0	4.9
Tomas Dvorak	CZE	8796	499	5169	3128	10.63	1.9	4.7
Uwe Freimuth	DDR	8799	441	5491	3124	11.06	2.0	4.8
Torsten Voss	DDR	8880	521	5234	2868	10.69	2.1	5.1
Erki Nool	EST	8768	408	5553	2808	10.71	2.0	5.4
Christian Plaziat	FRA	8775	563	5430	2781	10.72	2.1	5.0
Jürgen Hingsen	FRG	8792	451	5223	3033	10.95	2.0	4.9
Siegfried Wentz	FRG	8856	470	5250	3137	10.85	2.1	4.8
Guido Kratschmer	FRG	8861	575	5308	3064	10.58	2.0	4.6
Daley Thompson	GBR		582		3003	10.55	2.1	4.6
Frank Busemann	GER	8905	568	5392	2945	10.6	2.0	4.8
Alexandr Apaichev	SOV	8803	492	5370	3115	10.92	2.0	4.8
Grigory Degtyarov	SOV	8823	339	5196	3114	11.05	2.1	4.9
Robert Zmelik	TCH	8832	494	5455	2883	10.78	2.1	5.1
Dave Johnson	USA	8811	366	5370	3114	10.78	2.1	5.0
Steve Fritz	USA	8827	427	5163	3119	10.75	2.0	5.0
Bruce Jenner	USA	8846	483	5280	3200	10.94	2.0	4.8
Dan O'Brien	USA	8897	408	5331	3120	10.36	2.1	4.8

144. The athletes from FRG and USA decided to run a  $4 \times 100$  m relay race for their respective countries with the country having three athletes borrowing the athlete from CZE. Assume that all the athletes ran their stretch of the relay race at the same speed as in Decathlon event. How much more time did the FRG relay team take as compared to the USA team? (2003)  
 (a) 0.18 (b) 0.28 (c) 0.78 (d) 0.00
145. What is the least Daley Thompson must get in Score-2 that ensures him a bronze medal? (2003)  
 (a) 5309 (b) 5296 (c) 5271 (d) 5270
146. At least how many competitors (excluding Daley Thompson) must Michael Smith have out-jumped in the long jump event? (2003)  
 (a) 1 (b) 2 (c) 3 (d) 4

**Directions for Questions 147 to 150 :** These questions are based on the table and information given below.

The following is the wholesale price index (WPI) of a select list of items with the base year of 1993-94. In other words, all the item prices are made 100 in that year (1993-94). Prices in all other years for an item are measured with respect to its price in the base year. For instance, the price of cement went up by 1% in 1994-95 as compared to 1993-94. Similarly, the price of power went up by 3% in 1996-97 as compared to 1993-94.

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
All Items	100	102.0	102.5	104.00	103.00	105.00	106.0	108.00	107.0	106.0
Cement	100	101.0	100.5	103.00	102.50	103.50	103.1	103.80	103.7	104.0
Limestone	100	102.0	102.5	102.75	102.25	103.00	104.0	105.00	104.5	105.0
Power	100	101.5	102.5	103.00	103.50	104.00	106.0	107.00	107.5	108.0
Steel	100	101.5	101.0	103.50	104.00	104.25	105.0	105.50	106.0	105.5
Timber	100	100.5	101.5	102.00	102.50	102.00	103.0	103.50	104.0	104.5
Wages	100	101.5	103.0	103.50	104.00	104.25	104.0	104.75	104.9	105.3

147. Let us suppose that one bag of cement (50 kgs) consumes 100 kgs of limestone and 10 units of power. The only other cost item in producing cement is in the form of wages. During 1993-94, limestone, power and wages contributed, respectively, 20%, 25%, and 15% to the cement price per bag. The average operating profit (% of price per cement bag) earned by a cement manufacturer during 2002-03 is closest to (2003)
- (a) 40% (b) 39.5% (c) 38.5% (d) 37.5%
148. Steel manufacturing requires the use of iron ore, power and manpower. The cost of iron ore has followed the All Items index. During 1993-94 power accounted for 30% of the selling price of steel, iron ore for 25%, and wages for 10% of the selling price of steel. Assuming the cost and price data for cement as given in the previous question, the operating profit (% of selling price) of an average steel manufacturer in 2002-03 (2003)
- (a) is more than that of a cement manufacturer (b) is less than that of a cement manufacturer  
(c) is the same as that of a cement manufacturer (d) cannot be determined
149. Which item experienced continuous price rise during the ten-year period? (2003)
- (a) power (b) Cement (c) Wages (d) Limestone
150. Which item(s) experienced only one decline in price during the ten-year period? (2003)
- (a) Steel and Limestone (b) Steel and Timber (c) Timber (d) Timber and Wages

**Directions for Questions 151 to 153 : These questions are based on the table and information given below.**

**Sex Ratio (Number of females per 1000 males) of Selected States in India : 1901-2001**

	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991	2001
AP	985	992	993	987	980	986	981	977	975	972	978
Assam	919	915	896	874	875	868	869	896	910	923	932
Bihar	1061	1051	1020	995	1002	1000	1005	957	948	907	921
Goa	1091	1108	1120	1088	1084	1128	1066	981	975	967	960
Gujarat	954	946	944	945	941	952	940	934	942	934	921
Haryana	867	835	844	844	869	871	868	867	870	865	861
HP	884	889	890	897	890	912	938	958	973	976	970
J & K	882	876	870	865	869	873	878	878	892	896	900
Karnataka	983	981	969	965	960	966	959	957	963	960	964
Kerala	1004	1008	1011	1022	1027	1028	1022	1016	1032	1036	1058
MP	972	967	949	947	946	945	932	920	921	912	920
Maharashtra	978	966	950	947	949	941	936	930	937	934	922
Orissa	1037	1056	1086	1067	1053	1022	1001	988	981	971	972
Punjab	832	780	799	815	836	844	854	865	879	882	874
Rajasthan	905	908	896	907	906	921	908	911	919	910	922
TN	1044	1042	1029	1027	1012	1007	992	978	977	974	986
UP	938	916	908	903	907	998	907	876	882	876	898
WB	945	925	905	890	852	865	878	891	911	917	934
<b>India</b>	<b>972</b>	<b>964</b>	<b>955</b>	<b>950</b>	<b>945</b>	<b>946</b>	<b>941</b>	<b>930</b>	<b>934</b>	<b>927</b>	<b>933</b>

151. Each of the following statements pertains to the **number** of states with females outnumbering males in a given census year. Which of these statements is NOT correct? (2003)
- (a) This number never exceeded 5 in any census year.  
(b) This number registered its sharpest decline in the year 1971.  
(c) The number of consecutive censuses in which this number remained unchanged never exceeded 3.  
(d) Prior to the 1971 census, this number was never less than 4.
152. The two states which achieved the largest increases in sex ratio over the period 1901-2001 are (2003)
- (a) Punjab and HP (b) HP and Kerala (c) Assam and J & K (d) Kerala and J & K
153. Among the states which have a sex ratio exceeding 1000 in 1901, the sharpest decline over the period 1901-2001 was registered in the state of (2003)
- (a) Goa (b) TN (c) Bihar (d) Orissa

**Directions for Question 154 to 157 :** These questions are based on the table and information given below.

Answer the Question on the basis of the information given below. Prof. Singh has been tracking the number of visitors to his homepage. His service provider has provided him with the following data on the country of origin of the visitors and the university they belong to :

Number of visitors			Number of visitors		
COUNTRY	DAY		UNIVERSITY	DAY	
	1	2		1	2
Canada	2	0	0	1	0
Netherlands	1	1	0	2	0
India	1	2	0	0	1
UK	2	0	2	0	2
USA	1	0	1	1	0
			University 6	1	0
			University 7	2	0
			University 8	0	2
					0

154. University 1 can belong to (2004)  
 (a) UK (b) Canada (c) Netherlands (d) USA
155. To which country does University 5 belong? (2004)  
 (a) India or Netherlands but not USA (b) Netherlands or USA but not India  
 (c) India or USA but not Netherlands (d) India or USA but not UK
156. Visitors from how many universities from UK visited Prof. Singh's homepage in the three days? (2004)  
 (a) 1 (b) 2 (c) 3 (d) 4
157. Which among the listed countries can possibly host three of the eight listed universities? (2004)  
 (a) None (b) Only UK (c) Only India (d) Both India and UK

**Directions for Question 158 to 161 :** Answer the question on the basis of the information given below.

A study was conducted to ascertain the relative importance that employees in five different countries assigned to five different traits in their Chief Executive Officers. The traits were compassion (C), decisiveness (D), negotiation skills (N), public visibility (P), and vision (V). The level of dissimilarity between two countries is the maximum difference in the ranks allotted by the two countries to any of the five traits. The following table indicates the rank order of the five traits for each country.

Rank	Country				
	India	China	Japan	Malaysia	Thailand
1	C	N	D	V	V
2	P	C	N	D	C
3	N	P	C	P	N
4	V	D	V	C	P
5	D	V	P	N	D

158. Three of the following four pairs of countries have identical levels of dissimilarity. Which pair is the odd one out? (2004)  
 (a) Malaysia & China (b) China & Thailand (c) Thailand & Japan (d) Japan & Malaysia
159. Which amongst the following countries is most dissimilar to India? (2004)  
 (a) China (b) Japan (c) Malaysia (d) Thailand
160. Which of the following countries is least dissimilar to India? (2004)  
 (a) China (b) Japan (c) Malaysia (d) Thailand
161. Which of the following pairs of countries are most dissimilar? (2004)  
 (a) China & Japan (b) India & China (c) Malaysia & Japan (d) Thailand & Japan

**Directions for Question 162 to 165 :** Answer the question on the basis of the information given below.

The Dean's office recently scanned student results into the central computer system. When their character reading software cannot read something, it leaves that space blank. The scanner output reads as follows :

Name	Finance	Marketing	Statistics	Strategy	Operation	GPA
Aparna		B	F			1.4
Bikas	D	D	F	F		
Chandra		D	A	F	F	2.4
Deepak	A	B		D	D	3.2
Fazal	D	F	B		D	2.4
Gowri	C	C	A		B	3.8
Hari		B	A		D	2.8
Ismet			B		A	
Jagdeep	A	A	B		C	3.8
Kunal	F		A	F	F	1.8
Leena	B	A		B	F	3.2
Manab			A	B	B	
Nisha	A	D	B	A	F	3.6
Osman	C		B	B	A	4.6
Preeti	F	D		D		3.2
Rahul	A	C	A		F	4.2
Sameer		C	F	B		
Tara	B					2.4
Utkarsh			F	C	A	3.0
Vipul	A		C	C	F	2.4

In the grading system, A, B, C, D, and F grades fetch 6, 4, 3, 2 and 0 grade points respectively. The Grade Point Average (GPA) is the arithmetic mean of the grade points obtained in the five subjects. For example Nisha's GPA is  $(6 + 2 + 4 + 6 + 0) / 5 = 3.6$ .

Some additional facts are also known about the students' grades. These are

- (a) Vipul obtained the same grade in marketing as Aparna obtained in Finance and Strategy.
- (b) Fazal obtained the same grade in Strategy as Utkarsh did in Marketing.
- (c) Tara received the same grade in exactly three courses.

162. In Operation, Tara could have received the same grade as

(2004)

- (a) Ismet
- (b) Hari
- (c) Jagdeep
- (d) Manab

163. What grade did Preeti obtain in Statistics?

(2004)

- (a) A
- (b) B
- (c) C
- (d) D

164. What grade did Utkarsh obtain in Finance?

(2004)

- (a) B
- (b) C
- (c) D
- (d) F

165. In Strategy, Gowri's grade point was higher than that obtain by

(2004)

- (a) Fazal
- (b) Hari
- (c) Nisha
- (d) Rahul

**Directions for Question 166 to 168 :** Answer the question on the basis of the information given below.

The table below reports the gender, designation and age-group of the employees in an organization. It also provides information on their commitment to projects coming up in the months of January (Jan), February (Feb), March (Mar) and April (Apr), as well as their interest in attending workshops on: Business Opportunities (BO), Communication Skills (CS), and E-Governance (EG).

Sl. NO.	Name	Gender	Designation	Age group	Committed to projects during	Interested in workshop on
1.	Anshul	M	Mgr	Y	Jan, Mar	CS, EG
2.	Bushkant	M	Dir	I	Feb, Mar	BO, EG
3.	Charu	F	Mgr	I	Jan, Feb	BO, CS
4.	Dinesh	M	Exe	O	Jan, Apr	BO, CS, EG
5.	Eashwaran	M	Dir	O	Feb, Apr	BO
6.	Fatima	F	Mgr	Y	Jan, Mar	BO, CS
7.	Gayatri	F	Exe	Y	Feb, Mar	EG
8.	Hari	M	Mgr	I	Feb, Mar	BO, CS, EG
9.	Indira	F	Dir	O	Feb, Apr	BO, EG
10.	John	M	Dir	Y	Jan, Mar	BO
11.	Kalindi	F	Exe	I	Jan, Apr	BO, CS, EG
12.	Lavanya	F	Mgr	O	Feb, Apr	CS, EG
13.	Mandeep	M	Mgr	O	Mar, Apr	BO, EG
14.	Nandlal	M	Dir	I	Jan, Feb	BO, EG
15.	Parul	F	Exe	Y	Feb, Apr	CS, EG
16.	Rahul	M	Mgr	Y	Mar, Apr	CS, EG
17.	Sunita	F	Dir	Y	Jan, Feb	BO, EG
18.	Urvashi	F	Exe	I	Feb, Mar	EG
19.	Yamini	F	Mgr	O	Mar, Apr	CS, EG
20.	Zeena	F	Exe	Y	Jan, Mar	BO, CS, EG

M=Male, F=Female; Exe=Executive, Mgr=Manager, Dir=Director; Y=Young, I=In-between, O=Old

For each workshop, exactly  $k$  (our employees are to be sent, of which at least two should be Females and at least one should be Young. No employee can be sent to a workshop in which he/she is not interested in. An employee cannot attend the workshop on

- Communication Skills, if he/she is committed to internal projects in the month of January;
  - Business Opportunities, if he/she is committed to internal projects in the month of February;
  - E-governance, if he/she is committed to internal projects in the month of March.

166. Assuming that Parul and Hari are attending the workshop on Communication Skills (CS), then which of the following employees can possibly attend the CS workshop? (2005)

(a) Rahul and Yamini (b) Dinesh and Lavanya  
(c) Anshul and Yamini (d) Fatima and Zeena

167. How many Executives (Exe) cannot attend more than one workshop? (2005)

(a) 2 (b) 3  
(c) 15 (d) 16

168. Which set of employees cannot attend any of the workshops? (2005)

(a) Anshul, Charu, Eashwaran and Lavanya (b) Anshul, Bushkant, Gayatri and Urvashi  
(c) Charu, Urvashi, Bushkant and Mandeep (d) Anshul, Gayatri, Eashwaran and Mandeep

**Directions for Question 169 to 171 : Answer the question on the basis of the information given below.**

The table below reports annual statistics to rice production in select states of India for a particular year.

State	Total Area (in million hectares)	% of Area Under Rice Cultivation	Production (in million tons)	Population (in millions)
Himachal Pradesh	6	20	1.2	6
Kerala	4	60	4.8	32
Rajasthan	34	20	6.8	56
Bihar	10	60	12	83
Karnataka	19	50	19	53
Haryana	4	80	19.2	21
West Bengal	9	80	21.6	80
Gujarat	20	60	24	51
Punjab	5	80	24	24
Madhya Pradesh	31	40	24.8	60
Tamilnadu	13	70	27.3	62
Maharashtra	31	50	48	97
Uttar Pradesh	24	70	67.2	166
Andhra Pradesh	28	80	112	76

169. How many states have a per capita production of rice (defined as total rice production divided by its population) greater than Gujarat? (2005)

(a) 3 (b) 4 (c) 5 (d) 6

170. An intensive rice producing state is defined as one whose annual rice production per million of population is at least 400,000 tons. How many states are intensive rice producing states? (2005)

(a) 5 (b) 6 (c) 7 (d) 8

171. Which two states account for the highest productivity of rice (tons produced per hectare of rice cultivation)? (2005)

(a) Haryana and Punjab (b) Punjab and Andhra Pradesh  
(c) Andhra Pradesh and Haryana (d) Uttar Pradesh and Haryana

**Directions for Question 172 to 176 : Answer the question on the basis of the information given below.**

In a Class X Board examination, ten papers are distributed over five Groups - PCB, Mathematics, Social Science, Vernacular and English. Each of the ten papers is evaluated out of 100. The final score of a student is calculated in the following manner. First, the Group Scores are obtained by averaging marks in the papers within the Group. The final score is the simple average of the Group Scores. The data for the top ten students are presented below. (Dipan's score in English Paper II has been intentionally removed in the table.)

Name of the student	PCB Group			Mathematics Group	Social Science Group		Vernacular Group		English Group		Final Score
	Phy	Chem.	Bio.		Hist.	Geo.	Paper I	Paper II	Paper I	Paper II	
Ayesha (G)	98	96	97	98	95	93	94	96	96	98	96.2
Ram (B)	97	99	95	97	95	96	94	94	96	98	96.1
Dipan (B)	98	98	98	95	96	95	96	94	96	?	96.0
Sagnik (B)	97	98	99	96	96	98	94	97	92	94	95.9
Sanjiv (B)	95	96	97	98	97	96	92	93	95	96	95.7
Shreya (G)	96	89	85	100	97	98	94	95	96	95	95.5
Joseph (B)	90	94	98	100	94	97	90	92	94	95	95.0
Agni (B)	96	99	96	99	95	96	82	93	92	93	94.3
Pritam (B)	98	98	95	98	83	95	90	93	94	94	93.9
Tirna (G)	96	98	97	99	85	94	92	91	87	96	93.7

**Note :** B or G against the name of a student respectively indicates whether the student is a boy or a girl.

172. How much did Dipan get in English Paper II? (2006)  
 (a) 94 (b) 96.5 (c) 97 (d) 98 (e) 99
173. Had Joseph, Agni, Pritam and Tirna each obtained Group Score of 100 in the Social Science Group, then their standing in decreasing order of final score would be: (2006)  
 (a) Pritam, Joseph, Tirna, Agni (b) Joseph, Tirna, Agni, Pritam  
 (c) Pritam, Agni, Tirna, Joseph (d) Joseph, Tirna, Pritam, Agni  
 (e) Pritam, Tirna, Agni, Joseph
174. Each of the ten students was allowed to improve his/her score in exactly one paper of choice with the objective of maximizing his/her final score. Everyone scored 100 in the paper in which he or she chose to improve. After that, the topper among the ten students was: (2006)  
 (a) Ram (b) Agni (c) Pritam (d) Ayesha  
 (e) Dipan
175. Among the top ten students, how many boys scored at least 95 in at least one paper from each of the groups? (2006)  
 (a) 1 (b) 2 (c) 3 (d) 4 (e) 5
176. Students who obtained Group Scores of at least 95 in every group are eligible to apply for a prize. Among those who are eligible, the student obtaining the highest Group Score in Social Science Group is awarded this prize. The prize was awarded to : (2006)  
 (a) Shreya (b) Ram (c) Ayesha (d) Dipan  
 (e) no one from the top ten

**Directions for Question 177 to 180 : Answer the question on the basis of the information given below.**

The following table shows the break-up of actual costs incurred by a company in last five years (year 2002 to year 2006) to produce a particular product:

	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006
Volume of production and sale (units)	1000	900	1100	1200	1200
<b>Costs (Rs.)</b>					
Material	50,000	45,100	55,200	59,900	60,000
Labour	20,000	18,000	22,100	24,150	24,000
Consumables	2,000	2,200	1,800	1,600	1,400
Rent of building	1,000	1,000	1,100	1,100	1,200
Rates and taxes	400	400	400	400	400
Repair and maintenance expenses	800	820	780	790	800
Operating cost of machines	30,000	27,000	33,500	36,020	36,000
Selling and marketing expenses	5,750	5,800	5,800	5,750	5,800

The production capacity of the company is 2000 units. The selling price for the year 2006 was Rs. 125 per unit. Some costs change almost in direct proportion to the change in volume of production, while others do not follow any obvious pattern of change with respect to the volume of production and hence are considered fixed. Using the information provided for the year 2006 as the basis for projecting the figures for the year 2007, answer the following questions :

177. What is the approximate cost per unit in rupees, if the company produces and sells 1400 units in the year 2007? (2007)  
 (a) 104 (b) 107 (c) 110 (d) 115 (e) 116
178. What is the minimum number of units that the company needs to produce and sell to avoid any loss? (2007)  
 (a) 313 (b) 350 (c) 384 (d) 747 (e) 928
179. Given that the company cannot sell more than 1700 units, and it will have to reduce the price by Rs.5 for all units, if it wants to sell more than 1400 units, what is the maximum profit, in rupees, that the company can earn? (2007)  
 (a) 25,400 (b) 24,400 (c) 31,400 (d) 32,900 (e) 32,000

180. If the company reduces the price by 5%, it can produce and sell as many units as it desires. How many units the company should produce to maximize its profit?  
 (a) 1400 (b) 1600 (c) 1800 (d) 1900 (e) 2000 (2007)

**Directions for Question 181 to 184 : Answer the question on the basis of the information given below.**

The Table shows the comparative costs, in US Dollars, of major surgeries in USA and a select few Asian countries.

Procedure	Comparative Costs in USA and some Asian countries (in US Dollars)				
	USA	India	Thailand	Singapore	Malaysia
Heart Bypass	130000	10000	11000	18500	9000
Heart Valve Replacement	160000	9000	10000	12500	9000
Angioplasty	57000	11000	13000	13000	11000
Hip Replacement	43000	9000	12000	12000	10000
Hysterectomy	20000	3000	4500	6000	3000
Knee Replacement	40000	8500	10000	13000	8000
Spinal Fusion	62000	5500	7000	9000	6000

The equivalent of one US Dollar in the local currencies is given below :

1 US Dollar equivalent		
India	40.928	Rupees
Malaysia	3.51	Ringits
Thailand	32.89	Bahts
Singapore	1.53	S Dollars

A consulting firm found that the quality of the health services were not the same in all the countries above. A poor quality of a surgery may have significant repercussions in future, resulting in more cost in correcting mistakes. The cost of poor quality of surgery is given in the table below:

Procedure	Comparative Costs in USA and some Asian countries (in US Dollars)				
	USA	India	Thailand	Singapore	Malaysia
Heart Bypass	0	3	3	2	4
Heart Valve Replacement	0	5	4	5	5
Angioplasty	0	5	5	4	6
Hip Replacement	0	7	5	5	8
Hysterectomy	0	5	6	5	4
Knee Replacement	0	9	6	4	4
Spinal Fusion	0	5	6	5	6

181. The rupee value increases to Rs. 35 for a US Dollar, and all other things including quality, remain the same. What is the approximate difference in cost, in US Dollars, between Singapore and India for a Spinal Fusion, taking this change into account?  
 (a) 700 (b) 2500 (c) 4500 (d) 8000 (e) No difference (2007)
182. Approximately, what difference in amount in Bahts will it make to a Thai citizen if she were to get a hysterectomy done in India instead of in her native country, taking into account the cost of poor quality? It costs 7500 Bahts for one-way travel between Thailand and India.  
 (a) 23500 (b) 40500 (c) 57500 (d) 67500 (e) 75000 (2007)

183. A US citizen is hurt in an accident and requires an angioplasty, hip replacement and a knee replacement. Cost of foreign travel and stay is not a consideration since the government will take care of it. Which country will result in the cheapest package, taking cost of poor quality into account? (2007)
- (a) India (b) Thailand (c) Malaysia (d) Singapore (e) USA
184. Taking the cost of poor quality into account, which country/countries will be the most expensive for knee replacement? (2007)
- (a) India (b) Thailand (c) Malaysia (d) Singapore  
(e) India and Singapore

**Directions for Question 185 to 189 : Answer the question on the basis of the information given below.**

A low-cost airline company connects ten Indian cities, A to J. The table below gives the distance between a pair of airports and the corresponding price charged by the company. Travel is permitted only from a departure airport to an arrival airport. The customers do not travel by a route where they have to stop at more than two intermediate airports.

Sector No.	Airport of Departure	Airport of Arrival	Distance between the Airports (km)	Price (Rs.)
1	A	B	560	670
2	A	C	790	1350
3	A	D	850	1250
4	A	E	1245	1600
5	A	F	1345	1700
6	A	G	1350	2450
7	A	H	1950	1850
8	B	C	1650	2000
9	B	H	1750	1900
10	B	I	2100	2450
11	B	J	2300	2275
12	C	D	460	450
13	C	F	410	430
14	C	G	910	1100
15	D	E	540	590
16	D	F	625	700
17	D	G	640	750
18	D	H	950	1250
19	D	J	1650	2450
20	E	F	1250	1700
21	E	G	970	1150
22	E	H	850	875
23	F	G	900	1050
24	F	I	875	950
25	F	J	970	1150
26	G	I	510	550
27	G	J	830	890
28	H	I	790	970
29	H	J	400	425
30	I	J	460	540

185. What is the lowest price, in rupees, a passenger has to pay for travelling by the shortest route from A to J? (2007)  
 (a) 2275 (b) 2850 (c) 2890 (d) 2930 (e) 3340
186. The company plans to introduce a direct flight between A and J. The market research results indicate that all its existing passengers travelling between A and J will use this direct flight if it is priced 5% below the minimum price that they pay at present. What should the company charge approximately, in rupees, for this direct flight? (2007)  
 (a) 1991 (b) 2161 (c) 2707 (d) 2745 (e) 2783
187. If the airports C, D and H are closed down owing to security reasons, what would be the minimum price, in rupees, to be paid by a passenger travelling from A to J? (2007)  
 (a) 2275 (b) 2615 (c) 2850 (d) 2945 (e) 3190
188. If the prices include a margin of 10% over the total cost that the company incurs, what is the minimum cost per kilometer that the company incurs in flying from A to J? (2007)  
 (a) 0.77 (b) 0.88 (c) 0.99 (d) 1.06 (e) 1.08
189. If the prices include a margin of 15% over the total cost that the company incurs, which among the following is the distance to be covered in flying from A to J that minimizes the total cost per kilometer for the company? (2007)  
 (a) 2170 (b) 2180 (c) 2315 (d) 2350 (e) 2390

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**Directions for Questions 190 to 192 : Answer the questions on the basis of the information given below.**

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There are 100 employees in an organization across five departments. The following table gives the department-wise distribution of average age, average basic pay and allowances. The gross pay of an employee is the sum of his/her basic pay and allowances.

Department	Number of Employees	Average Age (Years)	Average Basic Pay (Rs.)	Allowances (% of Basic Pay)
HR	5	45	5000	70
Marketing	30	35	6000	80
Finance	20	30	6500	60
Business Development	35	42	7500	75
Maintenance	10	35	5500	50

There are limited numbers of employees considered for transfer/promotion across departments. Whenever a person is transferred/promoted from a department of lower average age to a department of higher average age, he/she will get an additional allowance of 10% of basic pay over and above his/her current allowance. There will not be any change in pay structure if a person is transferred/promoted from a department with higher average age to a department with lower average age.

Questions below are independent of each other.

190. What is the approximate percentage change in the average gross pay of the HR department due to transfer of a 40-year old person with basic pay of Rs. 8000 from the Marketing department? (2008)  
 (a) 9% (b) 11% (c) 13% (d) 15% (e) 17%
191. There was a mutual transfer of an employee between Marketing and Finance departments and transfer of one employee from Marketing to HR. As a result, the average age of Finance department increased by one year and that of Marketing department remained the same. What is the new average age of HR department? (2008)  
 (a) 30 (b) 35 (c) 40  
 (d) 45 (e) cannot be determined
192. If two employees (each with a basic pay of Rs. 6000) are transferred from Maintenance department to HR department and one person (with a basic pay of Rs. 8000) was transferred from Marketing department to HR department, what will be the percentage change in average basic pay of HR department? (2008)  
 (a) 10.5% (b) 12.5% (c) 15% (d) 30% (e) 40%

## ANSWERS WITH SOLUTIONS

1. (d) Since exports of food in 1985 - 86 exceeds the 1984 - 85 figure by Rs. 1006 crore  
 Exports of food in 1984 - 85  
 = Exports of food in 1985 - 86 - 1006 = 23% of 25800 - 1006  

$$= \frac{23 \times 25800}{100} - 1006 = 4928 \text{ crores}$$

$$\% \text{ food exports in } 1984 - 85 = \frac{4928}{22400} \times 100 = 22\%$$

2. (b) From table we have  
 (Exports of food) + (Exports of manufactured articles) + (Raw materials exports) = 22400 .....(i)  
 From previous question, we have food exports = 4928,  
 Also we have,  
 Exports of manufactured articles = 2 (exports of raw materials) = 2x (say x)  
 Therefore by (i) we get  

$$4928 + 2x = 22400$$

$$x = \frac{22400 - 4928}{3} = 5824$$

$$\text{Difference of export of raw material and food export} = 5824 - 4928 = 906 \text{ crore}$$

3. (d) In 1985 - 86 manufactured articles % and raw materials % = 100 - 23 = 77%  
 In 1985 - 86, raw materials %  $\frac{3}{7} \times 77 = 33\%$

In 1985 - 86 raw materials manufactured

$$= \frac{4}{7} \times 77 = 44\%$$

Value of raw material in 1985 - 86 = 33% of 25800 = 8514  
 Difference of exp. of raw materials = 8514 - 5824 = 2690

$$\% = \frac{2690}{8514} \times 100 = 31.6\% \text{ approx}$$

4. (a) Value of exports of manufactured articles in 1984 - 85 = 2 (exports of raw materials in 1984 - 85)  

$$2(5824) = 11648 \text{ crores}$$

Value of exports of manufactured articles in 1985 - 86  
 44% of 25800 = 11352 crore

Required difference = 11648 - 11352 = 296 crores

5. (c) Growth rate % at primary level =  $\frac{68718 - 42137}{42137} \times 100$   

$$= 63\% \text{ approx}$$

6. (c) At primary level = 63%  
 At secondary level,

$$\text{G.R. } \frac{201 - 88}{88} \times 100 = \frac{113}{88} \times 100 = 126\% \text{ approx.}$$

(using approximations)

At higher secondary level,

$$\text{G.R. } \frac{82 - 65}{65} \times 100 = \frac{1700}{65} = 26\% \text{ approx.}$$

$$\text{At graduate level, G.R. } \frac{36 - 25}{25} \times 100 = \frac{1100}{25} = 44\%$$

growth rate % is least at higher secondary level.

7. (b) Growth rate % is highest at secondary level (126% approx) (from Q. 6)

8. (d) It is obvious from the table that at graduate level there is consistent growth as indicated by the figures in ascending order.

9. (a) Sales per rupee of share capital is highest for 1991

$$\frac{3270}{98} \approx 33$$

$$\text{For } 1993 \equiv \frac{4725}{205} \approx 24; \text{ For } 1994 \equiv \frac{6435}{310} \approx 21$$

10. (a) Reserves at the start of 1991 = 80 lakh

$$\% \text{ addition to reserves in } 1991 = \frac{140}{80} = \frac{7}{4}$$

$$\% \text{ addition to reserves in } 1992 = \frac{70}{140} = \frac{7}{22}$$

$$\% \text{ addition to reserves in } 1993 = \frac{245}{220} = \frac{245}{290} = \frac{49}{58}$$

% addition to reserves in 1994

$$\frac{400}{290} = \frac{400}{535} = \frac{80}{107}$$

Clearly % addition in 1991 is highest.

11. (d) Tax = Profit before Tax - Dividends - Retained Earnings  
 Tax per rupee of PBT,

$$1991 \quad \frac{315 - 30 - 140}{315} = \frac{145}{315} = \frac{1}{2.2}$$

Tax per rupee of PBT,

$$1992 \quad \frac{170 - 30 - 70}{170} = \frac{70}{170} = \frac{1}{2.4}$$

Tax per rupee of PBT,

$$1993 \quad \frac{525 - 60 - 245}{525} = \frac{220}{525} = \frac{1}{2.4}$$

Tax per rupee of PBT,

$$1994 \quad \frac{790 - 110 - 400}{790} = \frac{280}{790} \approx \frac{1}{3}$$

(Lowest)

12. (d) PBT / Sales, 1991  $\frac{315}{3270} = \frac{1}{10}$

$$\text{PBT / Sales, 1992} = \frac{170}{2620} = \frac{1}{15}$$

- PBT / Sales, 1993  $\frac{525}{4725} \frac{1}{9}$
- PBT / Sales, 1994  $\frac{790}{6435} \frac{1}{8}$  (Highest)
13. (a) Reserves after 1994 =  $80 + 140 + 70 + 245 + 400 = 935$  lakhs
14. (d) It is clearly seen that all the products decrease in one city or the other in 1993 - 94
15. (b) MT doubles its share in Calcutta. Only one product
16. (b) The largest % age drop in market share is in CO  
In Calcutta (30 - 15)  $\frac{30-15}{30} \frac{15}{30}$  or 50%
17. (a) None of the products have 100% market share
18. (b) Delhi, where none of the products increased their market share
19. (a) Cloth required  
 $(20 \ 30 \ 30 \ 10 \ 10) \times 1000 \times 1.5 \ 1,50,000$ m
20. (c) High quality of cloth consumed by A shirts  
 $20000 \times 1.5 \times 0.8 \ 24000$ m
21. (b) Reqd. Ratio  $\frac{0.4 \times 30000}{0.6 \times 10000} \frac{2}{1}$
22. (b) Low Quality cloth  
 $= (0.3 \times 30 + 0.3 \times 30 + 0.4 \times 10 + 0.9 \times 10) \times 1000 \times 1.5$   
 $(9 \ 9 \ 4 \ 9) \times 1500 \ 46500$ m
23. (d) Can not be determined  
There is no relationship between cloth type and dye quality.
24. (a) Lipton production is 1.64 ( in '000 tonnes) which corresponds to 64.8% capacity. Maximum capacity will be 100%.  
For 64.8% it is 1.64.  
 $\therefore$  For 100% it will be  $\frac{100}{64.8} \times 1.64 \approx 2.53$  (in 000 tonnes)
25. (d) Data insufficient, because different varieties of coffee of the same brand may have different prices. We can not assume that there will be only one variety of coffee of each brand.
26. (b) Total sales of the 4 brands =  $(31.15 + 26.75 + 15.25 + 17.45) =$  Rs 90.6 corers.  
Total sales value of others =  $132.8 - 90.6 =$  Rs. 42.2 crore  
 $\therefore$  required% =  $\frac{42.2}{132.8} \times 100 \ 32\% \text{ (approx.)}$
27. (c) Total production capacity (in tonnes)  
 $\frac{11.6}{0.613} \ 18.92$  tonnes
28. (d)

	Production ('000 tonnes)	Capacity utilisation (%)	Total capacity (c)	Unutilized capacity
	A	B	C=A/B×100	C-A
Brooke Bond	2.97	76.50	3.88	0.912
Nestle	2.48	71.20	3.48	1.003
Lipton	1.64	64.80	2.53	0.89
MAC	1.54	59.35	2.59	1.05

Hence, we find that the maximum unutilized capacity is for MAC, viz. 1050 tonnes.

29. (b) As per the plan, number of men working in 5<sup>th</sup> month was 4 and these 4 men were supposed to do coding. Cost per man- month for coding = Rs 10,000.  
Total cost in 5th month  $4 \times 10,000 \text{ Rs.} 40,000/-$ . Number of people actually working in 5<sup>th</sup> month is 5 & these 5 men are doing the design part of the project. Cost per man - month for design = Rs,20,000  
Total cost in 5<sup>th</sup> month  $5 \times 20,000 \text{ Rs.} 1,00,000$ ,  
 $\% \text{ change} = \frac{1,00,000 - 40,000}{40,000} \times 100 \ 150\%$
30. (a) Total man months required for coding  
(4 5 5) 14  
Cost per man month coding = Rs. 10,000  
Total cost incurred in new coding stage  
 $14 \times 10,000 \text{ Rs.} 1,40,000/-$
31. (d) Total cost in a stage = ( No. of man months)  $\times$  ( cost per man month in that stage )  
Total cost in specification =  $(2 + 3)40,000 =$  Rs 2,00,000  
Total cost in design (4 3 5)20,000 Rs.2,40,000  
Total cost in coding = Rs 1,40,000 (from previous Q.)  
Total cost in testing = (4 1)15000 Rs75000  
Hence design is the most expensive stage.
32. (c) Average cost /man month  $\frac{\text{total cost in that period}}{\text{No. of man months taken}}$   
Average cost per man month will be minimum for 11-15 month = Rs 10,000.
33. (b)
- | Month | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|---|---|---|---|---|---|
| Old   | 4 | 3 | 4 | 5 | 5 | 4 |
| New   | 4 | 3 | 5 | 4 | 5 | 5 |
- The difference is in the 5th, 6th and the 8th month  
Cost under old technique in these months  
 $= (4 + 5 + 4) \times 10,000 = 1,30,000/-$   
Cost under new technique =  $5 \times 20,000 + (4 + 5) \times 10,000$   
 $= \text{Rs.} 1,90,000/-$   
Hence the difference =  $1,90,000 - 1,30,000 =$  Rs 60,000/-
34. (d) Total investment in 1995 =  $2923.1 + 7081.6 = 10004.7$   
Total investment in 1996 =  $3489.5 + 8352.0 = 11,841.5$   
 $\therefore$  % increase  $\frac{11841.5 - 10,004.7}{10,004.7} \times 100 = 18.36\%$
35. (c) Total investment in Chittor = 6412.6  
Total investment in Khammam = 15433.6  
 $\therefore$   $\frac{\text{Total investment in Khammam}}{\text{Total investment in Chittor}} \frac{15433.6}{6412.6} \ 2.40$
36. (b) Investment in electricity & thermal energy in 1995 in two districts  $815.2 \ 632.4 \ 2065.8 \ 1232.7 = 4746.1$   
% in terms of total investment  
 $\frac{4746.1}{10,004.7} \times 100 = 47.43\%$

37. (b) % increase in Khammam district in the area of

$$\text{Electricity } \frac{2365.1 - 2065.8}{2065.8} \times 100 = 14.5\%$$

$$\text{Chemical } \frac{986.4 - 745.3}{745.3} \times 100 = 32.34\%$$

$$\text{Solar } \frac{1792.1 - 1363.5}{1363.5} \times 100 = 31.43\%$$

$$\text{Nuclear } \frac{2182.1 - 1674.3}{1674.3} \times 100 = 30.32$$

38. (a) Hence highest increase is in the area of chemical  
% increase in investment from 1995 to 1996

$$\frac{8352 - 7081.6}{7081.6} = 17.93\%$$

$$\therefore \text{Total investment in 1997} = 1.1793 \times 8352 = \text{Rs 9850 crores}$$

39. (a) Difference in number of students employed from finance and marketing  
(36 - 22)%  $\times$  800 + (48 - 17)%  $\times$  730 + (43 - 23)%  $\times$  1100 = 112 + 226 + 220 = 558

40. (b) In 1994, students seeking jobs in finance earned in one month =  $7550 \times 0.23 \times 1100$  = Rs. 1,910,150  
In 1994, students seeking jobs in software earned in one month =  $7050 \times 0.2\% \times 11100$  = Rs. 1,628,550  
 $\therefore$  in the whole year, the difference between the two is = Rs (1910150 - 1628550)  $\times$  12  
 $\Rightarrow$  Rs 3379200  $\approx$  Rs 33.79 lakhs.

41. (d) % increase in the average salary of finance from 1992 to 1996 =  $\frac{9810 - 5450}{5450} \times 100 = \frac{8700}{109} = 80\%$  (approx.)

42. (d) Average monthly salary offered to a management graduate in 1993 cannot be determined because values for 'others category have not been given'.

43. (c) Average annual rate at which the initial salary offered in software, increases

$$\frac{1}{4} \left( \frac{8640 - 5290}{5290} \times 100 \right) = 15.83 \approx 15.9\%$$

44. (a) Cost per room Lokhandwala = Rs  $\frac{225}{536} = 0.419$ ;

$$\text{Raheja} = \text{Rs } \frac{250}{500} = 0.5; \text{IHCL} = \text{Rs } \frac{275}{600} = 0.456;$$

$$\text{ITC } \frac{300}{300} = \text{Rs } 1$$

Hence Lokhandwala has minimum cost per room.

45. (c) This is another way of asking the previous question.  
Hence Lokhandwala has maximum number of rooms per crore of rupees.

46. (c) Cost incurred in projects completed in 1998 = Rs 225 + Rs 250 = Rs 475 crore

$$\text{Total cost including interest} = \text{Rs } 475 + \text{Rs } 47.5 = \text{Rs } 522.5$$

47. (a) For projects completed in 1999 cost incurred = Rs 275 + Rs 235 + Rs. 250 + Rs 300 = Rs 1060

$$\text{Total cost including interest} = \text{Rs } 1060 \times \left(1 + \frac{10}{100}\right)^2 = \text{Rs } 1282.6 \text{ crores}$$

(Because, interest is for 1998 and 1999)

48. (b) For projects completed in 2000, cost = Rs 250 crore  
Total cost (with tax) = Rs 250  $\times$  (1.1)<sup>3</sup> = Rs 332.75

$$\text{Total cost incurred for projects completed by 2000} = \text{Rs } 522.5 + \text{Rs } 1282.6 + \text{Rs } 332.75 = \text{Rs } 2140 \text{ crores}$$

49. (a) Let the power consumed by each sector be 1 kwh

Region	Tariff	Tariff
	1994 - 95	1991 - 92
1	425	369.5
2	472	449.5
3	420	437.5
4	415	384
5	440	403.5
Total	2172	2044

Hence % age increase

$$\frac{2172 - 2044}{2044} = 6.26\% \approx 6.5\%$$

Sector	Tariff	Tariff
	1994 - 95	1991 - 92
1	420	437.5
2	448	418.7
3	432	407.5
4	456	414.5
Total		1678.2

$$\text{Hence average tariff } \frac{1678.2}{4} = 419.55$$

51. (a) Power consumption in 1994-95

$$\text{Domestic (20\%)} = 1575 \text{ MW}$$

$$\text{Urban (25\%)} = 1968.75 \text{ MW}$$

$$\text{Industrial (40\%)} = 3150 \text{ MW}$$

$$\text{Rural (15\%)} = 1181.25 \text{ MW}$$

Domestic Consumption in 94 - 95 is 1575 MW

$$\text{so domestic consumption 91-92 } \frac{1575}{0.9} = 1750 \text{ MW}$$

so consumption of the power in Rural sector in 91 - 92

$$\frac{15}{20} \times 1750 = 1312.5 \text{ MW}$$

52. (d) Since for 91-92 and 94-95, we do not know the consumption of power by the various region sectors. Hence total tariff cannot be determined using the given data.

53. (b) Total tariff for 1K wh of power in, total tariff 4 sectors in region 4 is 1730. So avg = 432.5. For region 2 total tariff is 1888 so avg = 472. For Region 5 total = 1752 so avg is 438. Hence, average tariff in Region 2 is greater than the average tariff in region 5

54. (a) Agriculture loans = Rs 34.54 million  
 Loans from Rural Banks =  $260 \times 98 \times 243 =$  Rs 6.19 millions  
 Total =  $34.54 + 6.19 =$  Rs 40.73 million

$$\therefore \text{Agricultural loans formed} = \frac{34.54}{40.73} \times 100 = 84.8\%$$

55. (b) Total number of rural loans = (Avg No. of loans)  $\times$  (Number of Banks)  
 $\therefore$  Total loans upto 1980  
 $= 90 \times 28 + 115 \times 39 + 130 \times 52 + 260 \times 98 + 318 \times 121 + 605 \times 288 = 2520 + 4485 + 6760 + 25480 + 38478 + 174240 = 251963.$   
 Total in 1983 =  $840 \times 380 = 319200$

$$\therefore \text{Loans upto 1980} = \frac{251963}{319200} \times 100 \approx 80\%$$

56. (d) This question can be answered by carefully observing the data in the table. Among the given years the maximum increase in number of loans is for 1980-81. Note that Agricultural loans showed maximum increase from 1980 to 1981 (i.e., 152800 – 135700). Further for rural loans, both the increase in no. of rural banks (665 – 605 = 60) and average loans (312 – 288 = 24) are highest for 1980-81.

57. (b) CPI in 1983 = 149  
 Agricultural loans in 1983 = 915.7 mn  
 CPI in 1970 = 43  
 $\therefore$  The value of the agricultural loans in 1983 at 1970 prices was  $915.7 \times \frac{43}{49} = 264.26$

		Rural Loan	Agricultural Loan	Loan
		Rural Bank	Rural Bank	Rural Bank
1970	28	$\frac{18300}{90}$	203.3	231.3
1971	39	$\frac{20400}{115}$	177.4	216.4
1974	98	$\frac{41200}{260}$	158.5	256.5
1975	121	$\frac{51400}{318}$	161.6	282.6

Hence least for 1971.

59. (b) From 1970 - 1983,  
 Agricultural loans increased from 18300 to 211600, i.e., an increase of  $211600 - 18300 = 193300$   
 $\text{Annul rate of increase} = \frac{193300}{13 \times 18300} \times 100 = 81.25\%$

60. (a) Change in CPI from 1975 to 1983, (when CPI for 1970 = 43) =  $149 - 78 = 71$   
 $\therefore$  Required difference (with CPI for 1970 = 105) =  $\frac{71}{43} \times 105 = 173.3 \cong 174$

61. (b) Value of the loans in 1980  
 $= (605 \times 288 \times 567) + 498 \times 10^6 = 5.98 \times 10^8$   
 Loans in 1980 at 1983 prices

$$\frac{5.98 \times 10^8}{131} \times 149 = 679.2 \times 10^8 \approx 675 \text{ million}$$

**Note :** This value remains same irrespective of the change in CPI.

62. (a) To see the maximum percentage by any states in any month, we should see such a month, such that apples stored in cold storage and apples supplied by other two states in that month are relatively very small (i.e., one state is dominant).

Hence we could see that in the month of Feb

$$\text{Percentage supplied} = \frac{11183}{11285} \times 100 \approx 99\%$$

63. (c) We can see from the table that J & K supplied very high number of apples as compared to UP & HP.

64. (c) This is similar as the above question. Again J & K had the highest contribution to percentage of apples supplied.

65. (c) We can see from the data, that in the period of May-September, the cold storage had zero contribution. Hence we can say that in this period supply was greater than the demand

66. (b) Yield per tree = 40 kg  
 total apples supplied = 494.525 million  
 [from the sum of total column]

$$\text{Hence time reqd.} = \frac{494.525}{40} = 12.36 \approx 12.5 \text{ million}$$

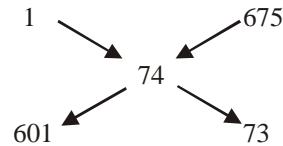
67. (d) From the data above.

No. of trees  $\approx 12.36$  million

Trees per hectare = 250

$$\text{so land used} \cong \frac{12.36 \text{ million}}{250} = 49440$$

68. (b) Mean mixture is required to be 100 times as sweet as glucose. So the mean rate of sweetness per unit of the mixture must be  $100 \times 0.74$  or 74. Then using alligation.



$$\frac{\text{Qty. of sucrose}}{\text{Qty. of saccharine}} = \frac{\text{Mean Rate} - \text{Rate of saccharine}}{\text{Rate of sucrose} - \text{Mean Rate}}$$

$$\frac{74 - 675}{1 - 74} = \frac{601}{73}$$

So, we can say, we have to mix glucose and lactose in the ratio of 601 : 73 or for every 1 gram of saccharine,

sucrose to be added will be  $\frac{601}{73} = 8.2$  grams.

69. (c) Sweetness per unit of the mixture of Glucose, Sucrose & Fructose in the ratio of 1 : 2 : 3 is equal to the ratio of total sweetness (sum of the sweetness of one unit of Glucose, two units of Sucrose and three units of Fructose) and total number of units. So sweetness per unit of mixture

$$= \frac{1 \times 0.74 \quad 2 \times 1.0 \quad 3 \times 1.7}{1 \quad 2 \quad 3} \quad 1.3$$

Sweetness of sucrose is 1.0 per unit so sweetness per unit of mixture is  $\frac{1.3}{1.0}$  or 1.3 times that of sucrose.

70. (a) From the data it is obvious that (a) is the correct option.  
 71. (a) Japan, with values of 90 & 89 is obviously there. Bangladesh, which has the second highest in water (total), has to be there too. China has only Japan dominating it, and hence is there too. Lastly, Malaysia is also there as nobody, not even Japan is dominating it. (Malaysia has similar sanitation figures as Japan.)  
 72. (d) Japan, Malaysia and Bangladesh are the only 3 countries having  $\geq 80\%$  coverage in urban & rural regions. Further these three countries have more than two countries with lesser coverage in total water supply.

73. (a) The values of urban, rural and total, on alligation gives the demographic structure of the countries. The ratio of Ur: Ru for Nepal is 2:7, which gives the new total value, when rural coverage becomes 86%, as 84.9%. With this Nepal becomes the country with second highest total water facilities. Hence it will get listing on the coverage frontier.

74. (b) Let the percent rural population be  $x$

**For India :**

$$0.74x + 0.82(100-x) = 77 \\ \Rightarrow 82 - 77 = 0.08x \text{ or } x = 62.5\%$$

**For China :**

$$0.78x + 0.86(100-x) = 82 \\ \Rightarrow 86 - 82 = 0.08x \text{ or } x = 50\%$$

**For Japan :**

$$0.86x + 0.92(100-x) = 90 \\ \Rightarrow 92 - 90 = 0.06x \text{ or } x = 33.3\%$$

Hence the correct ascending order is :

Japan, China, India

**Note :** The rural population (percent) can also be calculated using the figures in sanitation facilities as well.

75. (a) Hardware exports in percentages will be given as

$$94-95 \Rightarrow [540/2048] \times 100 \quad 26.3\%$$

$$95-96 \Rightarrow [600/2126] \times 100 \quad 28.2\%$$

$$96-97 \Rightarrow [730/2500] \times 100 \quad 29\%$$

$$97-98 \Rightarrow [1770/5048] \times 100 \quad 35.06\%$$

$$98-99 \Rightarrow [1927/4947] \times 100 \quad 38.95\%$$

76. (b) Checking the values from the table, we find that (b) is true.

77. (d) Again checking from the table we find that the combined cost of training and Maintenance is never greater than 10% of the total.  
 Hence answer option is (d).

78. (d)

	Software Revenue	Hardware Revenue
94-95	$1242 \times 0.5 = 621$	608
95-96	$1327 \times 0.5 = 663$	654
96-97	$1484 \times 0.5 = 744$	782
97-98	$2820 \times 0.5 = 1410$	1836

From the above table we find that none of the above is the right answer.

79. (c) Total revenue in 99-2000 =  $0.95 \times 4947 \approx 4700$   
 Software revenue = 2437  
 Remaining revenue =  $4700 - 2437 = 2263$   
 For the year 98-99  
 Revenue from other than software =  $4947 - 2637 = 2310$   
 % decrease over last year =  $[(2310 - 2263) / 2310] \times 100 = 2.03\%$

80. (b) This problem has to be solved by option elimination  
 Lets take option (a)

$$\text{In 94-95 Hardware + Training} = 68 + 540 + 140 = 748 \\ \text{Where as software} = 1242$$

So here software dominates hardware + training  
 Hence statement (a) is false.

Similarly if we check for option (b) hardware dominates the peripherals throughout the period, so it is true. While if you check for the peripherals and others over training, training dominates the peripherals and others so statement (c) is false. Hence, answer is (b).

81. (b) The total revenue of peripherals, exports and training when taken together come out to be :

Year	Total
94-95	$540 + 1100 + 25 + 140 = 1805$
95-96	$600 + 1200 + 10 + 106 = 1916$
96-97	$730 + 1339 + 160 + 25 = 2254$
97-98	$1770 + 2500 + 240 + 20 = 4530$
98-99	$1827 + 2215 + 37 + 261 = 4340$

After comparing these values you can come to know i.e 97-98 > 98-99 or 97-98 dominates 98-99.

82. (c) The value added per worker for the various sectors will be

Central	$[(225 \times 10)/100] / [(76 \times 6)/100] = 4.9$
State	$[(225 \times 3)/100] / [(76 \times 6)/100] = 1.48$
Central / State	$[(225 \times 12)/100] / [(76 \times 3)/100] = 11.84$
Public	$[(225 \times 8)/100] / [(76 \times 8)/100] = 2.96$

Hence the answer is (c).

83. (b) Fixed capital per factory will be given by ratio of the respective sectors. It will be as follows:

Central	5/8
State	4/4 (maximum)
Central / State	5/6
Public	6/12

84. (b) If the variable cost is proportional to the number of employees and the production per employee, then we can say that the variable cost is directly proportional to the production. Since the variable cost is maximum for private sector, it will also have the maximum production.  
Hence the answer is (b).
85. (a) \$200 mm  $\equiv$  20% of Govt. Fixed Capital  
 $\Rightarrow$  Govt. F.C.  $\frac{200}{0.2}$  \$1000 mn = 14% of total F.C.  
 $\Rightarrow$  Total. F.C.  $\frac{1000}{0.14}$  \$7143 mn  
 F.C. invested in joint sector  
 $= 8\% \text{ of total F.C.} = 0.08 \times 7143$   
 Govt. investment in MUL  
 $= 25\% \text{ of investment in joint sector}$   
 $= 0.25 \times 0.08 \times 7143 = \$143 \text{ mn}$   
 $= 143 \times 45 \equiv \text{Rs } 6435 \text{ mn}$
86. (b) From the above question the money invested by the Govt. in MUL is Rs 6435 mn.  
Hence the answer option is (b).
87. (d) Neither of the statements (a) or (b) can be inferred as we know only the percentages and not the actual values of the employees, factories and fixed capital.  
Hence the answer option is (d).
88. (d) Since we have to find number of lays which produced yellow colored fabrics, we can easily count the number of lays which have not produced any size of yellow garments i.e. counting lays with production 0,0,0,0 for all sizes than we get, 13 such numbers. Hence lays used to produce yellow fabrics = 27 – 13 = 14
89. (b) Similarly, as done in last question, we will find the number of lays which have not produced any X X L size of garments (of any colour). Hence we found lays with no XXL fabrics = 11. Hence lays used to produce extra- extra large fabrics = 27 – 11 = 16
90. (d) Again, we will just have to first find lays which don't produce XXL yellow and X XL white fabrics i.e with count 0 & 0 in XXL yellow and XXL white. So counting such lays we get 12 number of lays. Hence lays used to produce XXL yellow or XXL white fabrics = 27 – 12 = 15
91. (b) Easily seen from the given table, number of fabrics which exceeded production is 4. They're Yellow (M & XL one each), white (L & XXL one each).
92. (b) Counting number of 'A' type airports with more than 40 million passengers there are 5 such airports
93. (a) We can see that of the top 10 airports. i.e top in the order of passengers, 6 are from USA. Hence 60% of top ten busiest airports are from U.S.A

94. (c) For the five busiest airports :  
 Total passengers = 77939536 + 72568076 +....+60000125  
 $= 336648008$   
 Heathrow airport passenger = 62263710  

$$\frac{62263710}{\text{Total passenger}} \times 100$$
  

$$\frac{62263710}{336648008} \times 100 \approx 18.5\% \approx 20\%$$
95. (b) We can easily find the number of international airports that are not located in USA and handle more than 30 million passenger is 6.  
**Note :** All airports mentioned in the table handle more than 30 million passengers.
96. (b) The cities located between  $10^\circ$  &  $40^\circ$  E are Austria, Bulgaria, Libya, Poland and Zambia. Out of these only Zambia is in Southern hemisphere.  
 $\therefore$  Required percentage  $\frac{1}{5} \times 100 = 20\%$
97. (d) The cities whose name begins with a consonant and are in Northern Hemisphere are Sri Lanka, Spain, Saudi Arabia, Poland, Malaysia, Libya, Ghana, Cambodia, Canada, Bulgaria, i.e. 10. No. of countries whose name begins with consonant and are in east of meridian = 13
98. (a) Countries whose name start with vowels and are located in southern hemisphere = 3  
 (Argentina, Australia, Ecuador)  
 Countries whose capital cities starts with a vowel = 2  
 (Ottawa & Accra)  
 Hence required ratio  $\frac{3}{2}$
99. (c) For Emp. no. 2001151:  $\frac{594.43}{9.67} = 50$   
 For Emp no. 2001158:  $\frac{472.31}{1.39} = 50$   
 For Emp no. 2001164:  $\frac{402.25}{5.27} = 50$   
 For Emp no. 2001172:  $\frac{512.10}{10} = 50$   
 For Emp no. 2001173:  $\frac{1303.88}{25.50} = 50$   
 Therefore there are five such employees
100. (d) 80% of 25 =  $\frac{80}{100} \times 25 = 20$   
 or 80% attendance = 20 days  
 Employees with total earnings more than 600 and having attendance more than 20 days, are :  
 Emp No. 2001147, 2001151, 2001172, 201173, 2001174, 2001179, 2001180. Hence, there are seven employees.

101. (a)

Emp No.	Earnings (medium)	Days(D) (medium)	E/D (medium)	Earnings Complex
2001164	735.22	12.07	60.91	76.3
2001172	117.46	8.50	13.82	51.2
2001179	776.46	19.00	40.85	23.3
2001180	1262.79	19.00	66.46	23.3

From above it is obvious that emp. No. 2001180 has max. Earning per day in medium operation.

102. (c) In all there are 7 employees who are engaged in both complex and medium operations. Among them, average earnings per day is more for complex operations in case of 2001151, 2001158, 2001164, 2001171 and 2001172. Hence 5.

103. (c) 5% of 3374  $3374 \times \frac{5}{100} = 168.7$

$$\begin{array}{ll} \text{Spain} & = 55 < 168.7 \\ \text{North Africa & Middle east} & = 666 > 168.7 \\ \text{Argentina} & = 2006 > 168.7 \\ \text{Rest of Latin America} & = 115 < 168.7 \\ \text{Far East} & = 301 > 168.7 \\ \text{North Sea} & = 140 < 168.7 \\ \text{Rest of world} & = 91 < 168.7 \end{array}$$

Therefore operations less than 168.7 are 4

104. (b) Change in revenue from 1999-2000

Spain : 55 to 394 = more than 200%;

Rest of Latin America : 115 to 482 more than 200%  
Hence, there are two operations.

105. (b)

	years		
Operations	1998	1999	2000
North Africa & middle east	111	341	760
Argentina	94	838	2999
Rest of Latin America	-23	-16	230
Far east	19	97	292

Hence four operations show sustained increase in income.

106. (b) % increase in net income (average) from 1998 - 99

$$= \frac{1375 - 248}{248} \times 100 = 454\%$$

Only Argentina is here for which,

$$\frac{838 - 94}{94} \times 100 = 792\%$$

Hence only 1 operation.

107. (b) In 1998, profitability of North sea  $\frac{20}{52}$

In 1999, profitability of North sea  $\frac{54}{65}$

$\frac{20}{52} < \frac{54}{65}$ , hence the profitability of North Sea increases.

108. (b) Profitability of North Africa & middle east in

$$2000 \frac{356}{530}$$

$$\text{Profitability of Spain in 2000} \frac{225}{43}$$

$$\text{Profitability of Rest of Latin America in 2000} \frac{169}{252}$$

$$\text{Profitability of Far East in 2000} \frac{189}{311}$$

These ratios clearly show that Spain has highest profitability.

109. (d) Efficiency of Spain  $\frac{394}{43}$

$$\text{Efficiency of Argentina} \frac{5539}{2540}$$

$$\text{Efficiency of Far east} \frac{603}{311}$$

$$\text{Efficiency of Rest of world} \frac{20}{33}$$

Rest of world is least.

110. (d) In 2000, Efficiency of Spain  $\frac{394}{43}$

which is higher than 1998 & 1999.

$$\text{Efficiency of N. Sea in 1998} \frac{78}{52} = 1.5$$

$$\text{Efficiency of N Sea in 1999} \frac{140}{65} = 2.2$$

Hence efficiency increases from 1998 to 1999. (c) is true

Efficiency of Rest of Latin in 1998  $\frac{34}{57}$ ; which was

more efficient than Rest of the world  $\left(\frac{5}{15}\right)$ . Hence it is not true.

Efficiency of Far East in 2000  $\frac{603}{311} = 1.9$ ; which shows

an improvement from efficiency in 1999 which was  $\frac{301}{201} = 1.4$ ; hence (b) is true.

111. (b) The least cost of sending one unit is 0 as it is obvious from table A & B that

$$\text{BC} \xrightarrow{\cos t 0} \text{AC} \xrightarrow{\cos t 0} \text{AAC}$$

$$\text{or BD} \xrightarrow{\cos t 0} \text{AE} \xrightarrow{\cos t 0} \text{AAA}$$

112. (c) From table A & table B

$BC \rightarrow AC$ , Cost = 0 which is minimum &

$AC \rightarrow AAB$ , Cost = 284.5

$BC \rightarrow AAB$ , Cost = 0 + 284.5 = 284.5

also we have

$BD \rightarrow AE$ , Cost = 0 which is minimum

$AE \rightarrow AAB$ , Cost = 95.2 which is least

$BD \rightarrow AAB$ , Cost = 0 + 95.2 = 95.2

Hence least cost from any refinery to AAB = 95.2

113. (b) Cost from BB  $\rightarrow$  AB = 311.1 which is least

Cost from AB  $\rightarrow$  AAG = 0 which is also least

so least cost from BB  $\rightarrow$  AAG = 311.1 = 311.1

114. (a) Least cost from BB to AAA would be on the route BB  $\rightarrow$  AC  $\rightarrow$  AAA = 451.1 + 314.5 = 765.6

115. (d) There are 6 refineries, 7 depot, 9 districts. So total ways from refinery to district =  $6 \times 7 \times 9 = 378$

116. (b) Largest cost from table A ( $AE \rightarrow AAH$ ) = 1157.7  
( $BE \rightarrow AE$  or  $BF \rightarrow AE$ )

Largest cost from table B = 1035.3

Largest cost from refinery to any district = 1157.7 + 1035.3 = 2193.0

117. (b) Medium quality R6, R7, R8, R9, R13  
Low quality R1, R4, R5, R9

Here R9 is the common region

118. (d) Crop - 3 regions R2, R6, R7, R13, R3, R9, R11, R1, R4  
Crop - 1 regions R1, R2, R3, R3, R4, R5, R6, R7, R8, R9, R10, R11

Common regions R2, R3, R6, R7, R9, R10, R11

None of these regions produce high quality crop - 2 (R5, R8, R12)

119. (c) Low quality Crop - 1 regions - R9, R10, R11  
high quality Crop - 4 regions - R3, R10, R11  
medium quality Crop - 3 regions - R3, R9, R11

Therefore we see that the required regions are three.

120. (d) Check the figures for 5 May 03. The value of non-comprehensive bids accepted in the 2 rounds is 0.31 and 0.41. Further 7 Nov. 2002 and 2 July 2003 also show similar figures. Hence statement (d) is not true.

121. (c) Check the figures for 4 June 03. We find maturity in second round is 9 while the bids are more = 378.

122. (b) Compare the columns of Notified amount with total amount realised. Only on 17 July 02 notified amount is 40 crore while amount mobilised is 16 crore.

123. (a) **Statement A:**

Female absentees in 2002 = (19236 - 15389) = 3847

$$\text{Percentage} = \frac{3847}{19236} \times 100 = 20\%$$

$$\text{Figure for 2003: } \frac{(45292 - 40763)}{45292} \times 100$$

$$= \frac{452900}{45292} = 10\% \text{ Hence (a) is correct}$$

**Statement B:**

Absentees among males in 2003

$$= \frac{63298 - 60133}{63298} \times 100 = \frac{316500}{63298} = 5\%.$$

Hence (b) is not true.

124. (d) **Statement A:** Females Selected

$$= \frac{48}{19236} \times 100 = 0.24\%.$$

$$\text{Males selected} = \frac{171}{61205} \times 100 = 0.28\%. \text{ Hence false.}$$

**Statement B :** Success rate of Males

$$= \frac{17}{684} \times 100 = 25\%$$

$$\text{Success rate of Females} = \frac{48}{138} \times 100 = 34.8\%.$$

Hence statement B is false.

125. (d) **Statement A:** Success rate for males in 2003

$$= \frac{637}{60133} \times 100 = 1.05\%.$$

$$\text{Success rate for females in 2003} = \frac{399}{40763} \times 100 = \text{less than } 1\%$$

Success rate for males was more. Hence A is false.

**Statement B :**

$$\text{Success rate of females in 2002} = \frac{138}{15389} \times 100 = 0.9\%$$

Success rate of females in 2003

$$= \frac{399}{40763} \times 100 = 0.98\%$$

Hence B is false.

126. (c) Children between age 6-12 years = 77 - 22 = 55.

Children older than 12 years = 100 - 77 = 23.

Children with weight more than 38 kg = 100 - 33 = 67.

Children satisfying given condition = 67 - 23 = 44.

127. (a) Children with age higher than 10 years = 100 - 60 = 40

Children taller than 150 cm = 100 - 75 = 25

Children more than 48 kg = 100 - 91 = 9

To find children not more than 48 kg, we get 25 - 9 = 16.

128. (b) Table A gives children of age 9 or less as 48.

Table B give children of height 135 cm or less as 45.

Hence 45 children satisfy both conditions.

129. (d) For D, profitability =  $\frac{3946}{15782} \times 100 = 25\%$  which is the highest.

130. (a) 
$$\frac{(A+B)}{\text{Total}} = \frac{(24568 + 25468)}{89570} = \frac{50,036}{89,570} = 55\% \text{ approx.}$$
131. (d) Simple digit rankings in 3 of 4 parameters are for universities with overall ranking as 1 to 7 and 9 or 8 universities in all.
132. (b) Universities with salary higher than \$770,000 and fees less than \$23,700 are Stanford and New York University.
133. (d) Only University of California, Berkeley has median starting salary of \$70, 000 with fees of \$ 18,788 (less than \$ 23,000).
134. (c) Male in 35-40 category =  $1 + 0 + 0 + 0 = 1$ .  
Females =  $0 + 1 + 1 + 1 = 3$ .

$$\text{Required percentage} = \frac{4}{30} \times 100 = 13.33\%$$

Note : The figure in bracket (age limits - upper & lower) shows that a male or female of the upper limit age and the other of the lower limit age are part of the survey. But nothing can be said about the age of the other respondents between these age limits.

135. (b) Male =  $1 + 0 + 7 + 0 = 8$ . Female =  $4 + 7 + 5 + 1 = 17$ , total 25.

$$\text{Required percentage} = \frac{25}{30} \times 100 = 83.33\%$$

136. (d) Number of respondents less than 40 years can be :  
Male  $1 + 1 + 1 + 2 = 5$   
Female  $1 + 1 + 1 + 1 = 4$ ; Total =  $5 + 4 = 9$ .

$$\text{Required percentage} = \frac{9}{30} \times 100 = 30\%$$

137. (d) Since we do not know the total spam emails for the period, it is not possible to say which figure is greater.
138. (a) December 2002 = 19%, June 2003 = 18%. It is also given that December 2002 has higher spam mails than June 2003. Hence first figure is greater than second.
139. (c) Only for products is the percentage of spam increasing at a decreasing rate. In other categories it is either declining or increasing at a faster rate. Scams declined on 3rd June.
140. (b) Countries from the various continents which would rank above Philippines are:  
Africa = 0, Europe = 20, Asia = 6, N America = 3, Pacific = 1, S America = 2  
Note : Countries with same birth & death rate get the same rank.

Hence Philippines is ranked 33.

141. (a) Spain — 18, 8; Taiwan — 26, 5  
Countries featuring between Spain & Taiwan would be country No. 15 to 20 from Europe, i.e. 6 in number, Cuba, Argentina, Chile i.e., 9 in all.  
Note : Sri Lanka and Korea (ROK) have higher death rate than Taiwan.

142. (d) Philippines (34, 10) ranks 33 (from above question) Colombia, Thailand are at the same position Turkey would rank 36 and Venezuela would rank above S. Africa & Brazil because of lower death rate. So Venezuela is 37<sup>th</sup> rank.
143. (a) Countries below Burma would rank lower than every country in S. America, i.e., 9 countries.  
Out of these, Afghanistan would not rank higher than any country in Africa  
 $\therefore$  Required countries =  $9 - 1 = 8$
144. (a) Time taken by the US athletes  
 $= 10.78 + 10.75 + 10.94 + 10.36 = 42.83$   
Time taken by the FRG + 1 CZE athlete  
 $= 10.95 + 10.85 + 10.58 + 10.63 = 43.01$   
 $\therefore$  Excess time taken by the FRG relay team  
 $= 43.01 - 42.83 = 0.18 \text{ sec.}$
145. (b) From the final score it is clear that Frank Busemann got the Gold and Dan O'Brien got the Silver medal. The third highest score is of Trosten Voss, 8880.  
Hence for a bronze, Daley Thompson must have a final score of 8881  
 $\therefore$  He must score,  $8881 - 582 - 3003 = 5296$
146. (d) From score-2, it is clear that Michael Smith is ranked 12th in a mix of three events, viz. High Jump, Pole-vault and Long jump (Daley Thompson is excluded). So in all, there are 6 athletes ( $18 - 12 = 6$ ) below Smith. Let us have a look at their scores.
- |           | Score-2 | HJ  | PV  |           |
|-----------|---------|-----|-----|-----------|
| Smith     | 5274    | 2.0 | 4.9 | take base |
| Tomas     | 5169    | 1.9 | 4.7 | lower     |
| Torsten   | 5234    | 2.1 | 5.1 | higher    |
| Jurgen    | 5223    | 2.0 | 4.9 | equal     |
| Siegfried | 5250    | 2.1 | 4.8 | ?         |
| Grigory   | 5196    | 2.1 | 4.9 | higher    |
| Steve     | 5163    | 2.0 | 5.0 | higher    |
- So from the above table we can clearly say that Smith, to maintain his position, has to at-least out-perform (ones with a equal or higher scores) Torsten Voss, Jurgen Hingsen, Grigory Degtyarov and Steve Fritz.
- Note :** He need not defeat Siegfried as the weightage of pole-vault might be high (where his score is higher) and inspite of scoring less in long jump his final score-2 might out class Siegfried's. As the question asks atleast so we can exclude Siegfried.
147. (c) New price of materials  
 $= 20 \times 1.05 + 25 \times 1.08 + 15 \times 1.053 = \text{Rs } 63.79$   
New selling price =  $\text{Rs } 104$

$$\text{Profit} \quad \frac{104 - 63.795}{104} \quad \frac{40.205}{104} \quad 38.5\%$$

148. (b) Steel = 100 Rs; Power = 30 Rs; Iron-ore = 25 Rs  
wages = 10 Rs  
Costprice in 2002-03 =  $30 \times 1.08 + 25 \times 1.06 + 10 \times 1.053 = 32.4 + 26.5 + 10.53 = 69.43$

New selling price = Rs. 105.5

$$\text{Operating profit } \frac{105.5 - 69.43}{105.5} = 34.2\%$$

Which is lesser than cement.

149. (a) The table clearly shows that the price of power increases continuously  
150. (d) The table clearly shows that the price of timber & wages decline only once in 1998-99 and 1999-00 respectively.  
151. (c) Statement (c) is false, as this number remain same from 1971 to 2001, i.e. 4 years.  
152. (b) HP & Kerela shows largest increase in sex ratio of 86 & 54 respectively.  
153. (c) The five states which exceeded the sex ratio of 1000 in 1901 are Bihar, Goa, Kerala, Orissa and TN. Among them Bihar registered the sharpest decline of 140.

#### 154-157.

From the tables given, following information can be directly inferred :

University 8 is from India

University 7 is from UK/ Canada

University 6 is from USA

University 5 can be from India / Netherland

University 4 is from UK

University 3 is from Netherland

University 2 is from Canada / UK

University 1 is from Netherland / India

154. (c) 155. (a) 156. (b) 157. (a)

158. (d) Clearly the level of dissimilarity between Malaysia and China is 4 (for N or V)  
Level of dissimilarity for China and Thailand is 4 (for V)  
Level of dissimilarity for Thailand and Japan is 4 (for D)  
But level of dissimilarity for Japan and Malaysia is 3 (for V or N)

159. (b) Dissimilarity of India with China = 2 (for N)  
Dissimilarity of India with Japan = 4 (for D)  
Dissimilarity of India with Malaysia = 3 (C, N or D)  
Dissimilarity of India with Thailand = 3 (V)

160. (a) From above least dissimilar is China

161. (d) China - Japan = 3, Malaysia - Japan = 3  
India - China = 2, Thailand - Japan = 4

$$162. (d) \frac{4 \text{ sum of rest 4 courses}}{5} = 2.4$$

or sum of rest 4 courses =  $12 - 4 = 8$

As Tara received same grades in exactly 3 courses

∴ Tara received 3 B's and 2 F's

Ismet's grade in operations = A

Hari's grade in operations = D

Jagdeep's grade in operations = C

Manab's grade in operations = B

The only grade which matches is B.

163. (a) For Preeti,  $\frac{0 \ 2 \ x \ 2 \ y}{5} = 3.2$

$$\text{or } x + y = 16 - 4 = 12$$

This can only happen when she gets A in both the subjects.

164. (b) From (b) statement, in question

$$\text{For Fazal, } \frac{2 \ 0 \ 4 \ x \ 2}{5} = 2.4$$

$$\text{or } x = 12 - 8 = 4 \text{ or B in strategy}$$

Hence Utkarsh gets B in Marketing

For Utkarsh

$$x + 4 + 0 + 3 + 6 = 3 \times 5 = 15$$

$$\text{or } x = 2 \text{ i.e., a C in finance.}$$

165. (b) For Gowri,  $3 + 3 + 6 + x + 4 = 3.8 \times 5 = 19$

$$\text{or } x = 19 - 16 = 3 \text{ or C grade}$$

Fazal gets B in strategy (from Q 15)

$$\text{For Hari, } x + 4 + 6 + y + 2 = 2.8 \times 5 = 14$$

$$\text{or } x + y = 2$$

i.e., maximum Hari can get a D in Strategy. Nisha get a A.

$$\text{For Rahul, } 6 + 3 + 6 + x + 0 = 4.2 \times 5 = 21$$

$$\text{or } x = 6 \text{ or A in strategy.}$$

Hence Gowri's grade is higher than Hari.

166. (a) Parul (F, Y) and Hari (M, I) are attending the CS workshop.

So atleast one female has to be present. Further there should be no commitment in January.

Dinesh, Anshul and Zeena have a project in Jan, so option (b), (c) and (d) are ruled out.

167. (b) Three executives Gayatri, Zeena and Urvashi can not attend more than one workshop. Gayatri and Urvashi can not attend even one workshop because of their project commitments. Zeena can attend only BO.

168. (d) Anshul can not attend any workshop because of projects in Jan (CS) and March (EG).

Similarly, Charu, Eashwari, Bushkant, Gayatri and Urvashi cannot attend any of the workshops. Lavanya can attend 2, CS & EG, Mandeep can attend only BO.

169. (b) See the following table :

State	Total Area (in million hectares)	% of Area Under Rice Cultivation	Production (in million tons)	Population (in millions)	Productivity	Per capita production
Himachal Pradesh	6	20	1.2	6	1.00	0.20
Kerala	4	60	4.8	32	2.00	0.15
Rajasthan	34	20	6.8	56	1.00	0.12
Bihar	10	60	12	83	2.00	0.14
Karnataka	19	50	19	53	2.00	0.36
Haryana	4	80	19.2	21	6.00	0.91
West Bengal	9	80	21.6	80	3.00	0.27
Gujarat	20	60	24	51	2.00	0.47
Punjab	5	80	24	24	6.00	1.00
Madhya Pradesh	31	40	24.8	60	2.00	0.41
Tamilnadu	13	70	27.3	62	3.00	0.44
Maharashtra	31	50	48	97	3.10	0.49
Uttar Pradesh	24	70	67.2	166	4.00	0.40
Andhra Pradesh	28	80	112	76	5.00	1.47

So clearly 4 states — Haryana, Punjab, Maharashtra and Andhra Pradesh — have higher per capita production as compared to Gujarat (0.47)

170. (d) The per capita production in the table is given in million tons/million

$$400,000 \text{ tons} \equiv 0.4 \text{ million tons}$$

So intensive producing state are 8 in number, who have higher than this production.

171. (a) The productivities can be seen from the given table.  
So Haryana and Punjab have the highest productivity.

172. (c) Dipan's score = 96

$$\begin{array}{r} 98 \quad 98 \quad 98 \quad 95 \quad 96 \quad 95 \quad 96 \quad 94 \quad 96 \quad x \\ \hline 3 \quad \quad \quad \quad 2 \quad \quad \quad 2 \quad \quad \quad 2 \end{array}$$

$$\Rightarrow 98 + 95 + 95.5 + 95 + y = 96 \times 5 = 480$$

$$\text{Here } y = \frac{96 - x}{2}$$

$$\Rightarrow y = 480 - 383.5 = 96.5$$

$$\Rightarrow 96 + x = 2 \times 96.5 \text{ or } x = 97.$$

	Old SS	New SS	Score	Add <sup>n</sup> .	New	Score
J	95.5	100	95	$\frac{4.5}{5}$	0.9	95.9
A	95.5	100	94.3	$\frac{4.5}{5}$	0.9	95.2
P	89	100	93.9	$\frac{11}{5}$	2.2	96.1
T	89.5	100	93.7	$\frac{10.5}{5}$	2.1	95.8

So the order is P > J > T > A.

Score Imp.in	Inc.	Imp.	Old	New	Score
			Score	Score	
R	Maths	3	$3/5 = 0.6$	96.1	96.7
Ag	Ver.	$18/2 = 9$	$9/5 = 1.8$	94.3	96.1
P	SS	$17/2 = 8.5$	$8.5/5 = 1.7$	93.9	95.6
Ay	Geo.	$7/2 = 3.5$	$3.5/5 = 0.7$	96.2	96.9
D	Maths	5	$5/5 = 1$	96.0	97

Note : The score is improved in a subject which maximises the final score. Remember the scores of individual groups are averaged.

So the topper is Dipan.

175. (a) From the table, among the boys (7 in the table marked by B), its only Dipan who has scored atleast 95 in at least one paper from each of the groups.

Ram, Sanjiv, Joseph, Agni, Pritam could not do so in Vernacular group. Sagnik could not do so in English group.

176. (d) As per the given condition, the students eligible for the prize is only Dipan; Rest of the nine student fail to qualify the cut-off of 95 in one or the other group.

Year	2006	2007
Units	1200	1400
Material	60000	70000
Labour	24000	28000
Consumables	1400	1200
Rent	1200	1200
Rates & Taxes	400	400
Maintenance	800	820
Operating costs	36000	42000
Marketing Expenses	5800	5750
<b>TOTAL</b>	129600	149370

$$\text{Cost per unit} = 149370 / 1400 = \text{Rs } 106.7$$

Units	1400	313	350	384
Material	70000	15650	17500	19200
Labour	28000	6260	7000	7680
Consumables	1200	1200	1200	1200
Rent	1200	1200	1200	1200
Rates & Taxes	400	400	400	400
Maintenance	820	820	820	820
Operating costs	42000	9390	10500	11520
Marketing Expenses	5750	5750	5750	5750
<b>Total Cost</b>	149370	40670	44370	47770
<b>Revenue (Units <math>\times</math> 125)</b>		<b>39125</b>	<b>43750</b>	<b>48000</b>

From the table it is clear that the company needs to produce 384 for break even.

179. (a)

Year	2006	2007
<b>Units</b>	1200	1400
		1700
<b>Material</b>	60000	70000
<b>Labour</b>	24000	28000
<b>Consumables</b>	1400	1200
<b>Rent</b>	1200	1200
<b>Rates &amp; Taxes</b>	400	400
<b>Maintenance</b>	800	820
<b>Operating costs</b>	36000	42000
<b>Marketing Expenses</b>	5800	5750
<b>TOTAL COST</b>	129600	149370
<b>Selling Price</b>		125
<b>SALES</b>		175000
<b>PROFIT</b>		25630
		24630

180. (e)

Units	1400	1700	2000
<b>Material</b>	70000	85000	100000
<b>Labour</b>	28000	34000	40000
<b>Consumables</b>	1200	1200	1200
<b>Rent</b>	1200	1200	1200
<b>Rates &amp; Taxes</b>	400	400	400
<b>Maintenance</b>	820	820	820
<b>Operating costs</b>	42000	51000	60000
<b>Marketing Expenses</b>	5750	5750	5750
<b>TOTAL</b>	149370	179370	209370
<b>Selling Price</b>	125	118.75	118.75
<b>SALES</b>	175000	201875	237500
<b>PROFIT</b>	25630	22505	28130

The profit increases with the number of units initially, then decreases and finally it increases again.

181. (b) New cost of spinal fusion in India =  $\frac{5500 \times 40.928}{35}$   
= \$ 6431.5

$\therefore$  Difference in cost between India and Singapore  
=  $9000 - 6431.5 = \$ 2568.5 \approx \$ 2500$

[Note cost of poor quality is same in both the countries]

182. (d) Cost of hysterectomy in Thailand (considering poor quality) =  $4500 + 6000 = \$ 10500 = 10500 \times 32.89$  Bahts  
Cost of hysterectomy in India = Surgery cost + travel cost + poor quality cost  
=  $\$ 3000 + \$ 5000 + (7500 \times 2)$  Bahts  
=  $8000 \times 32.89 + 15000$  Bahts  
Difference =  $(10500 - 8000) 32.89 - 15000$   
=  $82225 - 15000 = 67225$

183. (c) Cost of Angioplasty, his replacement and knee replacement in different countries:  
USA =  $57000 + 43000 + 40000 = \$ 1,40,000$   
India =  $(11000 + 5000) + (9000 + 7000) + 17500 = \$ 49,500$   
Thailand =  $(13000 + 5000) + (12000 + 5000) + 16000$   
=  $\$ 51,000/-$   
Singapore =  $(13000 + 4000) + (12000 + 5000) + 17000$   
=  $\$ 51,000/-$   
Malaysia =  $(11000 + 6000) + (10000 + 8000) + 12000$   
=  $\$ 47,000/-$

184. (a) Cost of knee replacement in various countries:  
India =  $8500 + 9000 = \$ 17,500/-$   
Thailand =  $10000 + 6000 = \$ 16,000/-$   
Singapore =  $13000 + 4000 = \$ 17,000/-$   
Malaysia =  $8000 + 4000 = \$ 12,000/-$

185. (d)	Route	Distance	Price
	ABJ	2860	2945
	ADJ	2500	3700
	AFJ	2315	2850
	AGJ	2180	3340
	AHJ	2350	2275
	ACFJ	2170	2930

186. (b) From above question the route with the lowest price is AHJ. The lowest price = Rs. 2275/-

So, the company shall charge =  $0.95 \times 2275 = \text{Rs. } 2161$ .  
187. (c) Route ABJ AFJ AGJ  
Price 2945 2850 3340

So, AFJ is the best route and the best price is Rs. 2850.  
188. (b) The minimum cost = Rs. 2275

Remaining the margin, the net price =  $\frac{2275}{1.1} = 2068$

Cost/kilometre =  $\frac{2068}{1950 \text{ km}} = 0.88$

189. (d) From above it is clear that the price : distance ratio is less than 1 only in case of AHJ route. In rest of the cases, it is above 1. So, in all the cases the cost/km is going to be minimum for AHJ route (even after considering 15% margin). So the distance covered = Rs. 2350/-

190. (c) Initial gross average salary of HR department

$$5000 \times \frac{70}{100} \times 5000 = \text{Rs. } 8500$$

When the person from the marketing department transfer to HR department, then new average salary of

$$\text{HR department} = \frac{8500 \times 5 + 8000}{6} = \frac{8000 \times (80 - 10)\%}{6}$$

$$\frac{42500 + 8000 + 7200}{6} = \text{Rs. } 9600 \text{ (approx.)}$$

Hence, approximate percentage change in the average gross pay of the HR department

$$= \frac{(\text{Change in avg. gross salary of HR dept.})}{(\text{Initial gross avg. salary of HR dept.})} \times 100$$

$$= \frac{9600 - 8500}{8500} \times 100 = 13\% .$$

191. (c) Let the age of the person who goes from marketing to finance be x years.

The age of the person who goes from finance to marketing be y years. And the age of the persons who goes from marketing to HR be z years.

$$\text{New avg. age of marketing dept.} = \frac{1050 - x}{29} = 35$$

$$\Rightarrow y - x - z = -35 \quad \dots \text{(i)}$$

$$\text{New avg. age of finance department} = \frac{600 - y}{20} = 31$$

$$\Rightarrow y - x = -20 \quad \dots \text{(ii)}$$

From equation (i) and (ii), z = 15

$$\text{New average age of HR} = \frac{5 \times 45 - 15}{6} = 40 \text{ years.}$$

192. (b) New average basic pay of HR department

$$\frac{5000 \times 5 + 2 \times 6000 + 8000}{5 + 2 + 1} = \text{Rs. } 5625$$

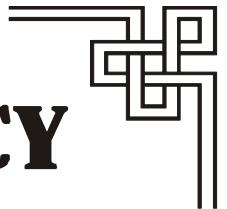
$$\text{Percentage change in avg.} = \frac{(5625 - 5000) \times 100}{5000} = 12.5\% .$$

# 15

CHAPTER



# DATA SUFFICIENCY



**Directions for Questions 1 to 10 :** These questions are based on the information given below.

Each item has a question followed by two statements,

Mark 'a', if the question can be answered with the help of I alone,

Mark 'b', if the question can be answered with the help of II alone,

Mark 'c', if the question can be answered with the help of both, I and II,

Mark 'd', if the question cannot be answered even with the help of both statements.

1. Is the distance from the office to home less than the distance from the cinema hall to home? (1994)  
I. The time taken to travel from home to office is as much as the time taken from home to the cinema hall, both distances being covered without stopping.  
II. The road from the cinema hall to home is bad and speed reduces, as compared to that on the road from home to the office.
2. A and B work at digging a ditch alternately for a day each. If A can dig a ditch in 'a' days, and B can dig it in 'b' days, will work get done faster if A begins the work? (1994)  
I.  $n$  is a positive integer such that  $n\left(\frac{1}{a} - \frac{1}{b}\right) > 1$   
II.  $b > a$
3. If twenty sweets are distributed among some boys and girls such that each girl gets two sweets and each boy gets three sweets, what is the number of boys and girls? (1994)  
I. The number of girls is not more than five.  
II. If each girl gets 3 sweets and each boy gets 2 sweets, the number of sweets required for the children will still be the same
4. If the selling price were to be increased by 10%, the sales would reduce by 10%. In what ratio would profits change? (1994)  
I. The cost price remains constant  
II. The cost price increased by 10%
5. What is the average weight of the 3 new team members who are recently included in the team? (1994)  
I. The average weight of the team increases by 20 kg.  
II. The 3 new men substitute 3 earlier members whose weights are 64 kg, 75 kg and 66 kg
6. Is segment PQ greater than segment RS? (1994)  
I.  $PB > RE$ ,  $BQ = ES$   
II. B is a point on PQ, E is a point on RS.
7. Three boys had a few Coffee Bite toffees with them. The number of toffees with the second were four more than those with the first and the number of toffees with the third were four more than those with the second. How many toffees were there in all? (1994)  
I. The number of toffees with each of them is a multiple of 2  
II. The first boy ate up four toffees from what he had and the second boy ate up six toffees from what he had and the third boy gave them two toffees each from what he had and the number of toffees remaining with each of them formed a geometric progression.
8. Little Beau Peep she lost her sheep, she couldn't remember how many were there, (1994)  
She knew she would have 400 more next year, than the number of sheep she had last year.  
How many sheep were there?  
I. The number of sheep last year was 20% more than the year before that and this simple rate of increase continues to be the same for the next 10 years.  
II. The increase is compounded annually.
9. What will be the total cost of creating a 1-foot border of tiles along the inside edges of a room? (1994)  
I. The room is 48 feet in length and 50 feet in breadth.  
II. Every tile costs Rs. 10.
10. Ten boys go to a neighbouring orchard. Each boy steals a few mangoes. What is the total number of mangoes they steal? (1994)  
I. The first boy steals 4 mangoes and the fourth boy steals 16 mangoes and the eighth boy 32 mangoes and the tenth boy steals 40 mangoes.  
II. The first boy stole the minimum number of mangoes and the tenth boy stole the maximum number of mangoes.

**Directions for Questions 11 to 19 : These questions are based on the information given below.**

Each item has a question followed by two statements, Mark

- (a) If the question can be answered with the help of both the statements but not with the help of either statement itself.
  - (b) If the question can not be answered even with the help of both the statements.
  - (c) If the question can be answered with the help of statement II alone
  - (d) If the question can be answered with the help of statement I alone
11. What is the number  $x$  if (1995)  
 I. The LCM of  $x$  and 18 is 36      II. The HCF of  $x$  and 18 is 2
12. If  $x$ ,  $y$  and  $z$  are real numbers. Is  $z-x$  even or odd? (1995)  
 I.  $xyz$  is odd      II.  $xy + yz + zx$  is even
13. What is value of  $x$ , if  $x$  and  $y$  are consecutive positive even integers? (1995)  
 I.  $(x-y)^2 = 4$       II.  $(x-y)^2 = 100$
14. What is the profit percent? (1995)  
 I. The cost price is 80% of the selling price      II. The profit is Rs 50
15. What is the length of the rectangle ABCD? (1995)  
 I. Area of the rectangle is 48 square units      II. Length of the diagonal is 10 units
16. What is the price of bananas? (1995)  
 I. With Rs. 84 I can buy 14 bananas and 35 oranges  
 II. If price of bananas by 50% then we can buy 48 bananas in Rs 12
17. What is the first term of an arithmetic progression of positive integers? (1995)  
 I. Sum of the squares of the first and second term is 116      II. The fifth term is divisible by 7.
18. Is  $x + y - z + t$  even? (1995)  
 I.  $x + y + t$  is even      II.  $tz$  is odd
19. What is the area of the triangle? (1995)  
 I. Two sides are 41 cm. each      II. The altitude to the third side is 9 cm. long

**Directions for Questions 20 to 29 : These questions are based on the information given below.**

In each question, you are given certain data followed by two statements. For answering the questions ,

Mark **(a)**, if even both the statements together are insufficient to answer the question.

Mark **(b)**, if any one of the two statements is sufficient to answer the question.

Mark **(c)**, if each statement alone is sufficient to answer the question.

Mark **(d)**, if both the statements together are sufficient to answer the question, but neither statement alone is sufficient.

20. What is the Cost Price of the article? (1996)  
 (i) After selling the article, a loss of 25% on Cost Price is incurred  
 (ii) The Selling price is three- fourths of the Cost Price
21. If  $a$ ,  $b$ ,  $c$  are integers, is  $(a-b-c) (a-b-c) < 0$ ? (1996)  
 (i)  $b$  is negative      (ii)  $c$  is positive
22. What is the Selling Price of the article? (1996)  
 (i) The profit on Sales is 20%      (ii) The profit on each unit is 25% and the Cost Price is Rs. 250
23. A tractor travelled a distance of 5m. What is the radius of the rear wheel? (1996)  
 (i) The front wheel rotates "N" times more than the rear wheel over this distance  
 (ii) The circumference of the rear wheel is "t" times that of the front wheel
24. What is the ratio of the two liquids A and B in the mixture finally, if these two liquids kept in three vessels are mixed together?  
 (The containers are of equal volume.) (1996)  
 (i) The ratio of liquid A to liquid B in the first and second vessel is, respectively, 3 : 5, 2 : 3  
 (ii) The ratio of liquid A to liquid B in vessel 3 is 4 : 3

*Directions for Questions 30 to 39 : These questions are based on the information given below.*

Mark **(a)**, if the question can be answered with the help of statement 1 alone,

Mark (b), if the question can be answered with the help of any one statement independently,

Mark (c), if the question can be answered with the help of both statements together.

Mark (d), if the question cannot be answered even with the help of both statements together.

- Mark (a), if the question cannot be answered even with the help of both statements together.

30. What is the value of  $a^3 + b^3$ ? (1997)  
 I.  $a^2 + b^2 = 22$   
 II.  $ab = 3$

31. Is the number completely divisible by 99? (1997)  
 I. The number is divisible by 9 and 11 simultaneously  
 II. If the digits of the number are reversed, the number is divisible by 9 and 11

32. A person is walking from Mali to Pali, which lies to its North-East. What is the distance between Mali and Pali? (1997)  
 I. When the person has covered 1/3rd the distance, he is 3 km East and 1 km North of Mali  
 II. When the person has covered 2/3rd the distance, he is 6 km East and 2 km North of Mali

33. What are the values of  $x$  and  $y$ ? (1997)  
 I.  $3x + 2y = 45$   
 II.  $10.5x + 7y = 157.5$

34. Three friends, P, Q and R are wearing hats, either black or white. Each person can see the hats of the other two persons. What is the colour of P's hat? (1997)  
 I. P says that he can see one black hat and one white hat  
 II. Q says that he can see one white hat and one black hat

35. What is the speed of the car? (1997)  
 I. The speed of the car is 10 more than that of a motor-cycle  
 II. The motor-cycle takes 2 hours more than the car to cover 100 kms

36. What is the ratio of the volume of the given right circular cone to the one obtained from it? (1997)  
 I. The smaller cone is obtained by passing a plane parallel to the base and dividing the original height in the ratio 1 : 2  
 II. The height and the base of the new cone are one-third those of the original cone

37. What is the area bounded by the two lines and the co-ordinate axes in the first quadrant? (1997)  
 I. The lines intersect at a point which also lies on the lines  $3x - 4y = 1$  and  $7x - 8y = 5$   
 II. The lines are perpendicular, and one of them intersects the y-axis at an intercept of 4

38. What is the cost price of the chair? (1997)  
 I. The chair and the table are sold, respectively, at profits of 15% and 20%  
 II. If the cost price of the chair is increased by 10% and that of the table is increased by 20%, the profit reduces by Rs. 20

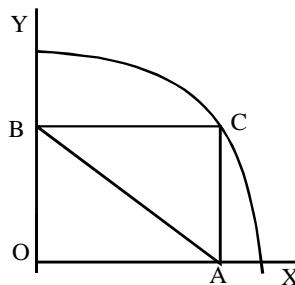
39. After what time will the two persons, Tez and Gati, meet while moving around the circular track? Both of them start from the same point and at the same time. (1997)  
 I. Tez moves at a constant speed of 5 m/s, while Gati starts at a speed of 2 m/s and increases his speed by 0.5 m/s at the end of every second thereafter.  
 II. Gati can complete one entire lap in exactly 10 seconds.

**Directions for Questions 40 to 51 :** These questions are based on the information given below.

Read the following directions carefully and answer the questions. You should tick

- (a) If any one of the statements alone is sufficient to answer the question
- (b) If both statements individually are sufficient to answer the question
- (c) If both statements together are required to answer the question
- (d) If both statements are not sufficient to answer the question

40. Find the length of AB? If  $\angle YBC = \angle CAX = \angle YOX = 90^\circ$  (1998)



- (i) Radius of the Arc is given (ii)  $OA = 5$  (1998)
41. Is  $n$  odd?  
 (i)  $n$  is divisible by 3, 5, 7 and 9 (ii)  $0 < n < 400$
42. Find  $2 \otimes 3$ , where  $2 \otimes 3$  need not be equal to  $3 \otimes 2$  (1998)  
 (i)  $1 \otimes 2 = 3$  (ii)  $a \otimes b = (a+b)/a$ , where  $a$  and  $b$  are positive
43. Radha and Rani appeared in an examination. What was the total number of questions? (1998)  
 (i) Radha & Rani together solved 20% of the paper (ii) Radha alone solved  $3/5$  th of the paper solved by Rani.
44. What is the price of tea?  
 (i) Price of coffee is Rs.5 more than that of tea  
 (ii) Price of coffee was Rs 5 less than the price of a cold drink which cost three times the price of tea
45. What is value of  $a$ ? (1998)  
 (i) Ratio of  $a$  &  $b$  is 3:5 where  $b$  is positive (ii) Ratio of  $2a$  and  $b$  is 12/10 where  $a$  is positive
46. In a group of 150 students, find the number of girls? (1998)  
 (i) Each girl was given 50 paise, while each boy was given 25 paise to purchase goods totalling Rs 49  
 (ii) Girls and boys were given 30 paise each to buy goods totaling Rs 45
47. There are four envelopes  $E_1, E_2, E_3, E_4$  in which one was supposed to put letters  $L_1, L_2, L_3, L_4$  meant for persons  $C_1, C_2, C_3, C_4$  respectively but by mistake the letters got jumbled up and went in wrong envelopes. Now if  $C_2$  is allowed to open an envelope at random, then how will he identify the envelope containing the letter for him? (1998)  
 (i)  $L_2$  has been put in  $E_1$  (ii) The letter belonging to  $C_3$  has gone in the correct envelope
48. There are four racks numbered 1,2,3,4 and four books numbered 1,2,3,4. If an even rack has to contain an odd numbered book and an odd rack contains an even numbered book then what is the position of book 4? (1998)  
 (i) Second book has been put in third rack (ii) Third book has been put in second rack
49. Find the value of  $X$  in terms of  $a$ ? (1998)  
 (i) Arithmetic mean of  $X$  and  $Y$  is 'a' while the geometric mean is also 'a'  
 (ii)  $X/Y = R; X - Y = D$
50. Two concentric circles  $C_1$  and  $C_2$  with radii  $r_1$  and  $r_2$ . The circles are such that  $C_1$  fully encloses  $C_2$ , then what is the radius of  $C_1$ ? (1998)  
 (i) The difference of their circumference is  $k$  cm (ii) The difference of their areas is  $m$  sq. cm
51. A circle circumscribes a square. What is the area of the square? (1998)  
 (i) Radius of the circle is given  
 (ii) Length of the tangent from a point 5-cm away from the center of the circle is given

**Directions for Questions 52 to 61 : These questions are based on the information given below.**

- In each question, you are given certain data followed by two statements, for answering the question
- Mark (a), if the question can be answered with the help of one of the statements, but not with the help of the other statement.
- Mark (b), if the question can be answered with the help of either of the statements alone.
- Mark (c), if the question can be answered only with the help of both the statements
- Mark (d), if the question can not be answered even with the help of both the statements together.
52. Mr Mendel grew one hundred flowering plants from black seeds and white seeds, each seed giving rise to one plant. A plant gives flowers of only one colour. From a black seed comes a plant giving red or blue flowers. From a white seed comes a plant giving red or white flowers. How many black seeds were used by Mr. Mendel (1999)  
 I. The number of plants with white flowers was 10      II. The number of plants with red flowers was 70
53. What is the volume of the spherical tank? (1999)  
 I. The thickness of the wall is 1 cm      II. When immersed in water it displaces 20 litres of it.
54. 3 persons were given certain calculations to perform. The calculations were  $1 + 1$ ,  $1 + 1 + 2$ , and  $1 + 2$ . Their respective answers were 3, 3 and 2. How many of them are mathematicians (1999)  
 I. Mathematicians can never add two numbers correctly, but they add three numbers correctly  
 II. Whenever the mathematicians add two numbers there is a mistake of +1 or -1
55. What is the value of  $x$  (1999)  
 I.  $\log_2 x = \sqrt{x}$       II.  $x = 10$
56. Mr. X starts walking northwards along the boundary of a field from point A on the boundary. After walking for 150 metres, he reaches B and then walks westwards, again along the boundary, for another 100 metres when he reaches C. What is the maximum distance between any pair of points on the boundary of the field ? (1999)  
 I. The field is rectangular in shape.  
 II. The field is a polygon, with C as one of its vertices and A the mid point of a side
57. A circle has radius  $r$  and origin as its centre. Two tangents are drawn from an external point D,  $d$  distance away from the origin. what are the angles made by the tangents with the positive X-axis (1999)  
 I. The co-ordinates of the point D are given      II. The X-axis bisects one of the tangents
58. A line graph on a graph sheet shows the revenue for each year from 1990 through 1998 by points and joins the successive points by straight line segments. The point for revenue of 1990 is labelled A, that for 1991 as B, and that for 1992 as C. What is the ratio of growth in revenue between 91-92 and 90-91? (1999)  
 I. The angle between AB and X-axis when measured with a protractor is 40 degrees, and the angle between CB and X-axis is 80 degrees  
 II. The scale of Y-axis is cm = 1000 Rs.
59. What is the number of students in the class if the average weight of the students is 50 kg (1999)  
 I. The heaviest & lightest students in the class weigh 60 & 40 kg respectively  
 II. If the heaviest & the lightest students are taken away from the group the average weight remains the same
60. How many sets of positive integers  $(x,y)$  satisfy the following equations  $ax + by = c$ ;  $dx + ey = f$  where  $a, b, c, d, e, f$  are non- zero (1999)  
 I.  $a \equiv kd, b \equiv ke, c \equiv kf; k \neq 0$       II.  $a \equiv b \equiv d \equiv e \equiv 1$  and  $c \neq f$ .  
 61. A, B, C, D, are four students. How many of them have passed? (1999)  
 I. Following statement is true: A & B have passed      II. Following statement is false : at least one of C & D has passed

**Directions for Questions 62 to 71 : These questions are based on the information given below.**

- Mark,
- (a) If one of the statements is sufficient to answer the question and another is not.
- (b) If both the statements can answer the question independently.
- (c) Both statements are required to answer the question.
- (d) Question cannot be answered.
62. In a triangle PQR, in which angle PQR is  $90^\circ$ . What is  $PQ + RQ$ ? (2000)  
 (I) The diameter of the circle is 10 cm      (II) The diameter of the circumcircle is 18 cm
63. X, Y, Z are real numbers, is Z smallest? (2000)  
 (I) X is greater than at least one of the Y to Z      (II) Y is greater than at least one of the X or Z

64. Today a person purchases some share and the next day he sells them. In both the transactions, he paid a brokerage of 1% per share. What is the profit per rupee invested? (2000)  
 (I) The selling price of a share is 1.05 times cost price      (II) The no of share he sells is 100
65. Is modulus of  $x$  always less than 3? (2000)  
 (I)  $x(x+3) < 0$       (II)  $x(x-3) > 0$
66. A line cuts 2 concentric circles in points a, e and b, d. Is  $ac/ce = 1$ ? Point c lies on line are (2000)  
 (I)  $bc = cd$   
 (II) If a third circle cuts in same points b and d, points c lies on line joining the centres of circle.
67. If  $x$  and  $y$  are positive integer in the function  $f(x, y)$ , find  $(0, 1)$ . (2000)  
 (a)  $f(a, b) = f(b, a)$       (b)  $f(a, b) = 0$  if  $b = 0$
68. In a group, 100 people drink coffee only, how many drink tea only? (2000)  
 (a) 100 drink both tea and coffee      (b) Number of people having tea or coffee or both is 1500
69. The equation of two lines are  $ax + by = c$  and  $dx + ey = f$ , are lines intersecting? (2000)  
 (a) a, b, c, d, e, f are distinct real no's      (b) c and f are non zero's no's
70. A person leaves for No man Island in North America from Mumbai at 5.00 pm. Local time and flies non stop. At what time he reaches No man Island (local time)? (2000)  
 (a) He flies with an average speed of 150 kmph      (b) The distance between Mumbai and No man Island is 1500 km
71. Ghosh Babu wanted to cordon off a triangular piece from a corner of his square piece of land of perimeter 400 meters. What was the length of the longest side of the cordoned off area? (2000)  
 (a) The cordoned off area is an isosceles triangle      (b) Each of the smaller sides of the triangle is 20 m

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**Directions for Questions 72 to 78 : These questions are based on the information given below.**

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Each item is followed by two statements, A and B. Answer each questions using the following instructions.

Choose (a) if the question can be answered by one of the statements alone and not by the other.

Choose (b) if the questions can be answered by using either statement alone.

Choose (c) if the question can be answered by using both the statements together, but cannot be answered by using either statement alone.

Choose (d) if the question cannot be answered even by using both statements together.

72. What are the values of  $m$  and  $n$ ? (2001)  
 A.  $n$  is an even integer,  $m$  is an odd integer, and  $m$  is greater than  $n$   
 B. Product of  $m$  and  $n$  is 30
73. Is Country X's GDP higher than country Y's GDP? (2001)  
 A. GDPs of the countries X and Y have grown over the past five years at compounded annual rate of 5% and 6% respectively  
 B. Five years ago, GDP of country X was higher than that of country Y
74. What is the value of  $X$ ? (2001)  
 A.  $X$  and  $Y$  are unequal even integers, less than 10, and  $X/Y$  is an odd integer  
 B.  $X$  and  $Y$  are even integers, each less than 10, and product of  $X$  and  $Y$  is 12
75. On a given day a boat ferried 1500 passengers across the river in twelve hours. How many round trips did it make? (2001)  
 A. The boat can carry two hundred passengers at any time  
 B. It takes 40 minutes each way and 20 minutes of waiting time at each terminal
76. What will be the time for downloading software? (2001)  
 A. Transfer rate is 6 Kilobytes per second      B. The size of the software is 4.5 megabytes
77. A square is inscribed in a circle. What is the difference between the area of the circle and that of the square? (2001)  
 A. The diameter of the circle is  $25\sqrt{2}$  cm      B. The side of the square is 25 cm
78. Two friends, Ram and Gopal, bought apples from a wholesale dealer. How many apples did they buy? (2001)  
 A. Ram bought one half the number of apples that Gopal bought  
 B. The wholesale dealer had a stock of 500 apples

*Directions for Questions 79 to 86 : These questions are based on the information given below.*

Each item is followed by two statements, A and B. Answer each questions using the following instructions.

Choose (a), if the question can be answered by one of the statements alone but not by the other.

Choose (b), if the question can be answered by using either statement alone.

Choose (c), if the question can be answered by using both the statements together, but cannot be answered by using either statement alone.

Choose (d), if the question cannot be answered by either of the statements.

79. In a hockey match, the Indian team was behind by 2 goals with 5 minutes remaining. Did they win the match? (2002)  
A : Deepak Thakur, the Indian striker, scored 3 goals in the last five minutes of the match  
B : Korea scored a total of 3 goals in the match

80. Four students were added to a dance class. Would the teacher be able to divide her students evenly into a dance team (or teams) of 8? (2002)  
A : If 12 students were added, the teacher could put everyone in teams of 8 without any leftovers.  
B : The number of students in the class is currently not divisible by 8.

81. Is  $x = y$ ? (2002)

$$A: (x - y) \begin{pmatrix} \frac{1}{x} & \frac{1}{y} \end{pmatrix} \quad 4 \qquad \qquad B: (x - 50)^2 \quad (y - 50)^2$$



**Directions for Questions 87 to 91 :** These questions are based on the information given below.

Each question is followed by two statements I and II. Answer each question using the following instructions.

Choose (a) if the question can be answered by one of the statements alone but not by the other.

Choose (b) if the question can be answered by using either statement alone.

Choose (c) if the question can be answered by using both the statements together but cannot be answered by using either statement alone.

Choose (d) if the question can not be answered even by using both the statements together.

90.  $\left( \frac{1}{a^2} \quad \frac{1}{a^4} \quad \frac{1}{a^6} \quad \dots \right) \quad \left( \frac{1}{a} \quad \frac{1}{a^3} \quad \frac{1}{a^5} \quad \dots \right)$  (2003C)
- I.  $-3 \leq a \leq 3$
- II. One of the roots of the equation  $4x^2 - 4x - 1 = 0$  is a
91. D, E, F are the mid points of the side AB, BC and CA of triangle ABC respectively. What is the area of DEF in square centimeters (2003C)
- I. AD = 1 cm, DF = 1 cm and perimeter of DEF = 3 cm
- II. Perimeter of ABC = 6 cm, AB = 2 cm, and AC = 2 cm

**Directions for Questions 92 to 95 : These questions are based on the information given below.**

In each question there are two statements A and B

Choose (a) if the question can be answered by one of the statements alone but not by other

Choose (b) if the question can be answered by using either statement alone.

Choose (c) if the question can be answered by using both the statements together but cannot be answered using either statement alone

Choose (d) if the question cannot be answered even by using both the statements A and B.

92. F and M are father and mother of S, respectively. S has four uncles and three aunts. F has two siblings. The siblings of F and M are unmarried. How many brothers does M have. (2003C)

A. F has two brothers B. M has five siblings

93. A game consists of tossing a coin successively. There is an entry fee of Rs. 10 and an additional fee of Rs. 1 for each toss of the coin. The game is considered to have ended normally when the coin turns heads on two consecutive throws. In this case the player is paid Rs. 100. Alternatively, the player can choose to terminate the game prematurely after any of the tosses. Ram has incurred a loss of Rs. 50 by playing this game. How many times did he toss the coin? (2003C)

A. The game ended normally B. The total number of tails obtained in the game was 138

94. Each packet of Soap costs Rs. 10. Inside each packet is a gift coupon labelled with one of the letters S, O, A and P. If a customer submits four such coupons that make up the word Soap the customer gets a free Soap packet. Ms X kept buying packets after packet of Soap till she could get one set of coupons that formed the word Soap. How many coupons with label P did she get in the above process (2003C)

A. The last label obtained by her was S and the total amount spent was Rs. 210

B. The total number of vowels obtained was 18

95. If A and B run a race, then A wins by 60 seconds.

If B and C run the same race, then B wins by 30 seconds. Assuming that C maintains a uniform speed, what is the time taken by C to finish the race (2003C)

A. A and C run the same race and A wins by 375 meters B. The length of the race is 1 km

**Directions for Questions 96 to 99 : These questions are based on the information given below.**

Each question is followed by two statements, A and B. Answer each question using the following instructions :

Choose (a), if the question can be answered by using statement A alone but not by using B alone.

Choose (b), if the question can be answered by using statement B alone but not by using A alone.

Choose (c), if the question can be answered by using any one of the two statements alone.

Choose (d), if the question can be answered by using both the statements together but not by either statement alone.

96. In a cricket match, the 'man of the match' award is given to the player scoring the highest number of runs. In case of a tie, the player (out of those locked in the tie) who has taken the higher number of catches is chosen. Even thereafter if there is a tie, the player (out of those locked in the tie) who has dropped fewer catches is selected. Aakash, Biplab, and Chirag who were contenders for the award dropped at least one catch each. Biplab dropped 2 catches more than Aakash did, scored 50, and took 2 catches. Chirag got two chances to catch and dropped both. Who was the 'man of the match'? (2003)

A. Chirag made 15 runs less than both Aakash and Biplab

B. The catches dropped by Biplab are 1 more than the catches taken by Aakash

97. Four friends A, B, C and D got the top four ranks in a competitive examination, but A did not get the first, B did not get the second, C did not get the third, and D did not get the fourth rank. Who secured which rank? (2003)
- A. Neither A nor D were among the first 2      B. Neither B nor C was third or fourth
98. The members of a local club contribute equally to pay Rs. 600 towards a donation. How much did each one pay? (2003)
- A. If there had been five fewer members, each one would have paid an additional Rs. 10  
B. There were at least 20 members in the club, and each one paid no more than Rs. 30
99. A family has only one kid. The father says “after ‘n’ years my age will be 4 times the age of my kid”. The mother says “after ‘n’ years, my age will be 3 times that of my kid”. What will be the combined ages of the parents after ‘n’ years? (2003)
- A. The age difference between the parents is 10 years      B. After ‘n’ years the kid is going to be twice as old as she is now

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**Directions for Questions 100 to 105 : These questions are based on the information given below.**

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Each question is followed by two statements, A and B. Answer each question using the following instructions :

Choose (a), if the question can be answered by using one of the statement alone but not by using the other statement alone.

Choose (b), if the question can be answered by using either of the statement alone.

Choose (c), if the question can be answered by using both statements together but not by either statement alone.

Choose (d), if the question cannot be answered on the basis of the two statements.

100. Ravi spent less than Rs. 75 to buy one kilogram each of potato, onion, and gourd. Which one of the three vegetables bought was the costliest? (2004)
- A: 2 kg potato and 1 kg gourd cost less than 1 kg potato and 2 kg gourd.  
B: 1 kg potato and 2 kg onion together cost the same as 1 kg onion and 2 kg gourd.
101. Tarak is standing 2 steps to the left of a red mark and 3 steps to the right of a blue mark. He tosses a coin. If it comes up heads, he moves one step to the right; otherwise he moves one step to the left. He keeps doing this until he reaches one of the two marks, and then he stops. At which mark does he stop? (2004)
- A: He stops after 21 coin tosses.  
B: He obtains three more tails than heads.
102. Nandini paid for an article using currency notes of denomination Re. 1, Rs. 2, Rs. 5, and Rs. 10 using at least one note of each denomination. The total number of five and ten rupee notes used was one more than the total number of one and two rupee notes used. What was the price of the article? (2004)
- A: Nandini used a total of 13 currency notes.  
B: The price of the article was a multiple of Rs. 10.
103. Four candidates for an award obtain distinct scores in a test. Each of the four casts a vote to choose the winner of the award. The candidate who gets the largest number of votes wins the award. In case of a tie in the voting process, the candidate with the highest score wins the award. Who wins the award? (2004)
- A: The candidates with top three scores each vote for the top scorer amongst the other three.  
B: The candidate with the lowest score votes for the player with the second highest score.
104. In a class of 30 students, Rashmi secured the third rank among the girls, while her brother Kumar studying in the same class secured the sixth rank in the whole class. Between the two, who had a better overall rank? (2004)
- A: Kumar was among the top 25% of the boys merit list in the class in which 60% were boys.  
B: There were three boys among the top five rank holders, and three girls among the top ten rank holders.
105. Zakib spends 30% of his income on his children’s education, 20% on recreation and 10% on healthcare. The corresponding percentages for Supriyo are 40%, 25%, and 13%. Who spends more on children’s education? (2004)
- A: Zakib spends more on recreation than Supriyo.      B: Supriyo spends more on healthcare than Zakib.

**Directions for Questions 106 through 109 :** Each question is followed by two statements A and B. Indicate your responses based on the following directives:

- (1) if the question can be answered using A alone but not using B alone.
- (2) if the question can be answered using B alone but not using A alone.
- (3) if the question can be answered using A and B together, but not using either A or B alone.
- (4) if the question cannot be answered even using A and B together.

106. The average weight of a class of 100 students is 45 kg. The class consists of two sections, I and II, each with 50 students. The average weight,  $W_I$ , of Section I is smaller than the average weight,  $W_{II}$ , of Section II. If the heaviest student, say Deepak, of Section II is moved to Section I, and the lightest student, say Poonam, of Section I is moved to Section II, then the average weights of the two sections are switched, i.e., the average weight of Section I becomes  $W_{II}$  and that of Section II becomes  $W_I$ . What is the weight of Poonam? (2007)

- A:  $W_{II} - W_I = 1.0$   
 B: Moving Deepak from Section II to I (without any move from I to II) makes the average weights of the two sections equal.
107. Consider integers x, y and z. What is the minimum possible value of  $x^2 + y^2 + z^2$ ?  
 A:  $x + y + z = 89$   
 B: Among x, y, z two are equal. (2007)
108. Rahim plans to draw a square JKLM with a point O on the side JK but is not successful. Why is Rahim unable to draw the square?  
 A: The length of OM is twice that of OL.  
 B: The length of OM is 4 cm. (2007)
109. ABC Corporation is required to maintain at least 400 Kilolitres of water at all times in its factory, in order to meet safety and regulatory requirements. ABC is considering the suitability of a spherical tank with uniform wall thickness for the purpose. The outer diameter of the tank is 10 meters. Is the tank capacity adequate to meet ABC's requirements?  
 A: The inner diameter of the tank is at least 8 meters.  
 B: The tank weights 30,000 kg when empty, and is made of a material with density of 3gm/cc. (2007)

**Directions for Questions 110 to 113 :** Each question is followed by two statements, A and B. Answer each question using the following instructions :

- (a) if the question can be answered by using the statement A alone but not by using the statement B alone.
- (b) if the question can be answered by using the statement B alone but not by using the statement A alone.
- (c) if the question can be answered by using either of the statements alone.
- (d) if the question can be answered by using both the statements together but not by either of the statements alone.
- (e) if the question cannot be answered on the basis of the two statements.

110. In a football match, at the half-time, Mahindra and Mahindra Club was trailing by three goals. Did it win the match? (2007)
- A: In the second-half Mahindra and Mahindra Club scored four goals.  
 B: The opponent scored four goals in the match.
111. In a particular school, sixty students were athletes. Ten among them were also among the top academic performers. How many top academic performers were in the school? (2007)
- A: Sixty per cent of the top academic performers were not athletes.  
 B: All the top academic performers were not necessarily athletes.
112. Five students Atul, Bala, Chetan, Dev and Ernesto were the only ones who participated in a quiz contest. They were ranked based on their scores in the contest. Dev got a higher rank as compared to Ernesto, while Bala got a higher rank as compared to Chetan. Chetan's rank was lower than the median. Who among the five got the highest rank? (2007)
- A: Atul was the last rank holder.  
 B: Bala was not among the top two rank holders.

113. Thirty per cent of the employees of a call centre are males. Ten per cent of the female employees have an engineering background. What is the percentage of male employees with engineering background? (2007)
- A: Twenty five per cent of the employees have engineering background.
- B: Number of male employees having an engineering background is 20% more than the number of female employees having an engineering background.
- 

**Directions for Questions 114 and 115 :**

Mark (a) if Q can be answered from A alone but not from B alone.

Mark (b) if Q can be answered from B alone but not from A alone.

Mark (c) if Q can be answered from A alone as well as from B alone.

Mark (d) if Q can be answered from A and B together but not from any of them alone.

Mark (e) if Q cannot be answered even from A and B together.

In a single elimination tournament, any player is eliminated with a single loss. The tournament is played in multiple rounds subjects to the following rules :

- (a) If the number of players, say  $n$ , in any round is even, then the players are grouped in to  $n/2$  pairs. The players in each pair play a match against each other and the winner moves on to the next round.
- (b) If the number of players, say  $n$ , in any round is odd, then one of them is given a bye, that is, he automatically moves on to the next round. The remaining  $(n - 1)$  players are grouped into  $(n - 1)/2$  pairs. The players in each pair play a match against each other and the winner moves on to the next round. No player gets more than one bye in the entire tournament.

Thus, if  $n$  is even, then  $n/2$  players move on to the next round while if  $n$  is odd, then  $(n + 1)/2$  players move on to the next round. The process is continued till the final round, which obviously is played between two players. The winner in the final round is the champion of the tournament.

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114. Q: What is the number of matches played by the champion?
- A: The entry list for the tournament consists of 83 players.
- B: The champion received one bye. (2008)
115. Q: If the number of players, say  $n$ , in the first round was between 65 and 128, then what is the exact value of  $n$ ?
- A: Exactly one player, received a bye in the entire tournament.
- B: One player received a bye while moving on to the fourth round from the third round. (2008)

## ANSWERS WITH SOLUTIONS

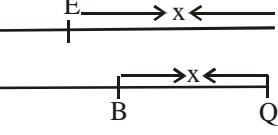
1. (d) We have time taken from O - H & H - C is same but speed from C - H is less therefore distance H - C should be less than O - H

2. (a) No matter who starts the work, the work will be completed in the same number of days.

3. (b)  $2G + 3B = 20$  and  $2B + 3G = 20$   
so G and B can be formed by these equations

4. (b) Let S.P be S  
C.P be C  
Volume of sales is V  
Profit =  $(S - C)V$  ....(i)  
if S.P is increased by 10% the new S.P =  $S + 10\% \text{ of } S = 1.1S$   
and new cost price be  $C + 10\% C = \frac{11}{10}C = 1.1C$   
and V changes to  $V - 10\% V = 0.9V$   
then new profit =  $0.9V(1.1S - 1.1C) = .99V(S - C)$  ....(ii)  
from (i) and (ii) we can say if C is constant, change in profit can not be found.

5. (d) Since previous average weight is unknown then new can not be found so ques. can not be answered

6. (b)   
BQ = ES = x and PB > RE from A  
also B and E lies an P Q and RS respectively from B  
hence we say PQ = RS

7. (b) Suppose first boy has x toffees  
then second has  $x + 4$   
and third has  $x + 8$   
Geometric progression be  
 $(x - 4 - 2), (x - 4 - 6 - 2), (x - 8 - 4)$   
 $(x - 2), x, x - 4 \Rightarrow x^2 = (x - 2)(x - 4)$   
 $x^2 - x^2 - 2x - 8 \Rightarrow x = 4$   
So the question can be answered with the help of II alone.

8. (a) Let number of sheep last year was x then  
 $x = 400 - x - 20\% \text{ of } x$   
 $x = 400 - x - \frac{20}{1000}x$  (using I st. statement)  
x can be calculated from here

9. (d) Since dimensions of each tile are not given so number of tiles can not be found hence total cost can not be found as cost of a single tile has been given.

10. (d) It is not given that mangoes stolen by each boy form a series, hence total number can not be found

11. (a) x can be obtained by using the information provided by both 'I' & 'II'  
using 'I' we get  $x = 4, 12$   
Using 'II' we get that x is only a multiple of 2 and not of 3. Using both we get  $x = 4$   
OR pdt of two nos.  $LCM \times HCF = 18 \times 4 = 72$   
 $\Rightarrow x = \frac{72}{18} = 4$

12. (d) (I) shows that x, y and z all are odd so it answers  $z - x$ . But from (II) it is not possible exactly to comment on x, y and z

13. (b) (I) gives infinite values for x & y; eg: 2, 4; 4, 6 etc.  
(II) shows that  $x + y < 10$ , which will be satisfied by 2 & 4 only. But we can not say which is x & which is y.

14. (d) It is clear that only (I) answers the question

15. (a) (I) shows that  $\ell \times b = 48$   
(II) shows  $\ell^2 + b^2 = 100$  (by pythagorous theorem)  
Hence using both we can get  $\ell$

16. (c) (I) is useless  
(II) gives the price of bananas, which is double the price for 48 bananas  $\frac{12}{48} \times 2 = 0.5\text{Rs.}$

17. (d) (II) is useless  
(a) (I) shows that the two integers on squaring add up to  $116 < 11^2$   
which means the integers are less than 10.  
We further find that the nos. are 10 and 4.

18. (a) (II) shows that both t & z are odd.  
(I) shows that  $x + y + t$  is even.

19. (a) If the altitude to the base of an isosceles triangle is known, the base can be found, and hence the area. So both the statements are required.

20. (a) From statement (i) and (ii), we cannot find out the cost price of the particle. We are only able to find the ratio of SP and CP.

21. (d) The given inequality reduces to  
 $(-2b) < (-2c) \text{ or } -b < -c$  Both the statements are required to determine the outcome. Hence option (d) is correct in this case

22. (b) We cannot find out SP of the article from statement (i). However statement (ii) is sufficient to answer the given query. Hence (b) is the correct option.

23. (a) None of the statements alone or together are sufficient to determine the radius of the rear wheel.

24. (a) In this question also, it is not possible to find the ratio of the two liquids in the three vessels.

25. (a) The statements that are given hold good for any quadratic equation of the given form. From the given statements, the value of  $\alpha^2 - \beta^2$  can be expressed in terms of a and b.

26. (c) 
$$\begin{array}{r} x \quad y \quad 20,000 \\ 100x \quad 94y \quad 20,000 \\ \hline 100 \quad 100 \end{array} \quad \left[ \begin{array}{l} \times 1.1 \\ \times 1 \end{array} \right]$$

$$1.1x - 1.1y = 22,000$$

$$1.1 - 0.94y = 20,000$$

$$0.16y = 2,000$$

$$y = \frac{200000}{16} = 125000$$

$$x = 7,500$$

27. (a) Anil's age was a prime number in 1996 and 1998. So Anil's age can be two consecutive primes with a difference of 2. The pairs can be (3,5), (5,7), (11,13) ----and so on. It is not possible to find a unique solution.

28. (d) We can find the total worth of Lakhiram's assets by calculating the given data in both the statements. Hence (d) is the correct option.

29. (a) Different triangles that can be formed by 16 non-parallel but coplanar lines cannot be found because the lines may be interacting at a single point. Thus it is not possible to find the number of triangles.

30. (d)  $a - b = \sqrt{(a^2 - b^2) - 2ab}$

$$a - b = \sqrt{(a^2 - b^2) - 2ab}$$

Since  $(a - b)$  and  $(a + b)$  are not uniquely determined we can't find  $a$  &  $b$  nor we can uniquely determine  $(a + b)$ , so we can't even apply formula. Hence cannot be determined even with the help of both statements.

31. (b) The number is divisible by 99 if its reverse is divisible by 9 and 11 and also it will be divisible by 9 and 11, this is property of divisibility test of 9 and 11. Hence if reverse is divisible by 9 and 11, then number is also divisible.

32. (b) Since both the statements can be used to solve the distance between Mali & Pali

$$\text{Distance} = 3\sqrt{3^2 - 1} = 3\sqrt{10} \text{ from I}$$

$$\text{Distance} = 2 \times \frac{3}{2} \sqrt{10} = 3\sqrt{10} \text{ from II}$$

Both the statements independently tell us the distance

33. (d) Since both the equations

$$3x - 2y = 45 \quad \dots\dots(1)$$

Multiply (1) by 3.5

$$and \quad 10.5x + 7y = 157.5 \quad \dots\dots(2)$$

Both are same equations i.e. equations of parallel lines, hence their solution cannot be found even using both the equations.

34. (d) Say Q is wearing Black hat

So R is wearing White

and P is wearing Black

if Q → white

R → Black

P → white

so using the two given statements, we can not comment regarding the colour of hat.

35. (c) Let speed of motorcycle be =  $x$

Speed of Car =  $x + 10$

$$\therefore \frac{100}{x} - \frac{100}{x + 10} = 2$$

using this equation we can find valid value of  $x$ .

Hence, the speed cannot be found using any one independently, while both the equations have to be used to find solution.

36. (b) Since both the statements tell the ratio of dimensions, hence any one statement independently can help.

37. (c) Statement I gives us the point of intersection of the two lines (3,2) Statement II gives us the equation of one line passing through (0, 4) & pt (3, 2) also since two lines are perpendicular, we can find its slope also. Hence we can find the area with the help of both the statements.

38. (d) Let the cost prices of the chair and the table be Rs  $X$  and Rs  $Y$  respectively from. Therefore, corresponding selling prices are Rs.  $1.15X$  Rs.  $1.2Y$  and profit is Rs  $(0.15X + 0.2Y)$

From II the profit is Rs.  $0.05X$

$$\text{hence } 0.05X = 0.15X - 0.2Y - 20$$

Which can't be solved. Therefore, even both statements together are not sufficient to answer the question.

39. (d) From the two statements we can obtain a relation between the times taken by Tez and Gati to complete one lap. But, we do not know the direction in which they are moving they would require less time if they are moving in opposite directions than they when moving in the same direction.

∴ Even both the statements together are not sufficient to answer the question.

40. (d) Since  $\angle YBC = \angle CAX = \angle YOX = 90^\circ$

$$\text{Hence } AB^2 = OA^2 = OB^2$$

therefore we need both the length or any other relation since OACB is a rectangle

$$\text{Hence } OC = AB$$

$$\text{Therefore radius } = AB$$

Hence, only statement I can give us the answer

41. (c) If  $n$  is divisible by 3, 5, 7 and 9 i.e.  $n$  is divisible by 315 (LCM of 3, 5, 7, 9) But, it is not necessary that it is odd unless and until  $n < 316$

Since  $n < 400$ , hence we can say that  $n$  is an odd number because as  $n$  exceeds 400 then any even multiple of 315 will be even. Hence both statements are required

42. (a) To find  $2 \otimes 3$ , we need to define  $\otimes$ . That can be done by statement II which says

$$2 \otimes 3 = \frac{5}{2}. \text{ Statement I can't help in final answer so,}$$

statement II alone will give answer

43. (d) Since no data is given about number of question, i.e. question attempted by any one of them. Hence, even both the statements can't help in finding the number of question.

44. (c) Let price of tea be Rs  $x$

$$\text{so price of coffee} = \text{Rs } x + 5$$

$$\text{from II, } x + 5 = 3x - 5$$

Hence, both the statements are required to find the price of tea

45. (d) Let  $a$  be  $3x$  and  $b$  be  $5x$

so, obviously ratio of  $2a : b = 6 : 5$  Hence, even both the statements would not help in finding out the solution. As both the statements are same.

46. (a) 150 students

Let number of girls be  $x$

$$\text{number of boys} = 150 - x$$

$$\text{so from I, } \frac{1}{2}x = \frac{150 - x}{4} = 49$$

$$\Rightarrow 2x = 150 - x = 49 \times 4$$

$$\Rightarrow x = 150 - 196 \Rightarrow x = 46$$

$$\text{from II, } \frac{3}{10}x = (150 - x) \times \frac{3}{10} = 45$$

this gives no solution. So, we can solve only using statement I.

47. (a)  $E_1 \ E_2 \ E_3 \ E_4$

$$L_1 \ L_2 \ L_3 \ L_4$$

$$C_1 \ C_2 \ C_3 \ C_4$$

from (i) we know that  $L_2$  is in envelope I so  $C_2$  will open  $E_1$

from (ii) we have no idea where  $L_2$  is. Hence using (i) only we can find the letter of  $C_2$

48. (a) 1 2 3 4 Rack

from (1) 2nd book is in 3rd rack so 4th book can be only in 1st rack

from (2) we can't tell about 2nd and 4th book so, only (1) can give is the answer

49. (a) From (i)  $\frac{x - y}{2} = a$

$$xy = a^2$$

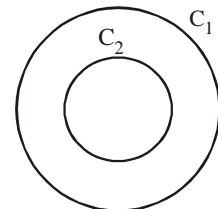
$$(x - y)^2(x - y)^2 - 4xy = 4a^2 - 4a^2 = 0$$

$$\Rightarrow x = y \Rightarrow x = a$$

$$\text{from (ii) } X = RY - Y(R - A) = D \Rightarrow Y = \frac{D}{R - 1}$$

So we can't find in terms of  $a$ . So only statement (1) can give us answer.

50. (c)

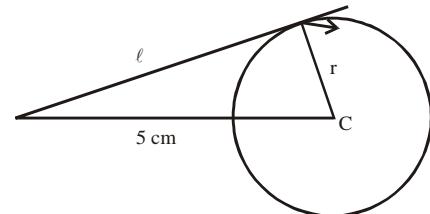


$$\text{from (1) } 2\pi(r_2 - r_1) = K$$

$$\text{from (2) } \pi(r_2 - r_1)(r_2 + r_1) = m$$

Hence, from (1) & (2) we can find  $r_1$  &  $r_2$ . Both the statements together give the solution.

51. (b)



(i) if radius ( $r$ ) is given we know side  $r\sqrt{2}$   
 $\text{area} = 2r^2$

$$\text{from (ii) } 1^2 + 5^2 = r^2$$

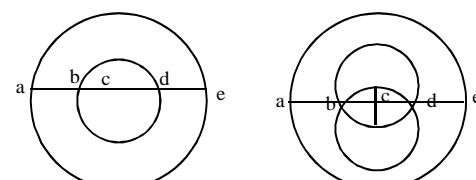
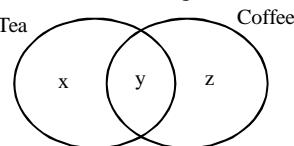
so if length of tangent is given we know  $r$ , hence any statement can individually give us the answer.

52. (d) By one of the options we can say that there are at least 10 white seeds but no conclusion can be arrived at, about the number of black seeds even with the help of both the statements.

53. (c) From first statement alone we can't deduce any thing as we don't know the radius of the sphere. From second statement alone we can't conclude anything as it gives information only about outer volume. Considering both the statements together the volume can be found.

54. (d) From the first statement it gives that mathematician can never add 2 numbers correctly, but it is quite possible that apart from mathematician, others can also do the same mistake. The same logic is applied for the second statement as mathematician is given. If it is only mathematician then we can answer with the help of both the statements.

55. (c) From statement 1, the relation comes to  $2^{\sqrt{x}}$   $x$ , where the solution set is given by 4, 16, 64 .... From the second statement alone too, nothing can be said, but when considered together, the answer comes to be (d).
56. (c) The first statement states the polygon is rectangle but we don't know anything about the sides of the rectangle and by combining both the statements we can have solution.
57. (a) From the question itself, the shape of the figure is known and the only thing remaining is the orientation of the fig. The first statement fixes the position of the point D, which defines the orientation. The second statement gives us four sets of values, which can't uniquely answer the query.
58. (a) The answer can be arrived with the help of first statement alone.
59. (d) Statement 1 doesn't give us anything towards the number of students. Statement two also can't oblige as it itself is an inference from the data already encountered.
60. (b) Statement one implies that both the equations are basically the same, which gives the number of solution sets as infinite, but +ve integral solution sets are limited and will depend on the particular values of the coefficients. Statement 2 implies that the set of equations is inconsistent, which give number of solution set as nil.
61. (c) Statement 1 gives that A & B have passed, nothing is definite about the other two. Statement 2 alone is also not enough to determine the passed students exactly, which only means that none of C & D have passed. But when combined, they conclude that A & B have passed and C & D have failed.
62. (c) Statement I gives you the length of none of sides of the  $\Delta PQR$ . Statement II gives you 'n' no. of right triangles inscribed in the semicircle. Combining the two statements we can say that for the given right triangle and inradius, we can have only one triangle of which you know the hypotenuse. This is possible to find the summation of the other two sides.
63. (c) Statement I gives us no relation between Y and Z. Statement II gives us no relation between X and Z. Combining the two, we can say that  $X > Y > Z$ .
64. (a) Statement I gives us the ratio of cost price and selling price. So we can find out the profit percentage which will remain independent of the money invested. Statement II cannot lead to any conclusions.
65. (a) Statement I gives  $|x| = 3$ . Statement II gives  $x < 0$  or  $x < 3$ . Hence statement I can give us an answer. Hence answer option is (a).

66. (b) Statement I gives us that  $ac = ae$ . Similarly, Statement II also gives  $ac = ae$ . Refer the diagram
- 
- So, the answer is (b).
67. (c) Neither of the statements alone can give us any answer. But combining the two statements we can say that  $f(0,1) = f(1,0) \dots \dots \dots$  from statement I  
 $f(1,0) = 0 \dots \dots \dots$  from statement II  
Hence answer option is (c).
68. (c) Neither statement alone gives us any solution.
- 
- $Z = 100 \dots \dots \dots$  from question  
 $Y = 100 \dots \dots \dots$  from Statement I  
 $X + Y + Z = 1500 \dots \dots \dots$  from Statement II  
Combining the two we get  $x = 1300$ .
69. (d) Neither of the statement alone or in combination can provide us any solution. We could have decided on the answer. Only if we are given the numerical value or the ratio of corresponding constants.
70. (d) Neither of the statements are sufficient as we are given neither direction nor the relation for the local time.
71. (b) Statement I gives us nothing new as we know that the hypotenuse will be the longest when the right triangle is isosceles. Statement II gives us the length of the isosceles sides. Hence statement II alone is sufficient.
72. (c) It can be answered using both the statements.  
 $I \rightarrow m \text{ even}$   
 $n \text{ even} \& m \text{ odd}$   
 $II \rightarrow \text{product} = 30 = 15 \times 2, 10 \times 3, 5 \times 6, 30 \times 1$   
 $15 \times 2$  is the only possible according to I
73. (d) I Rise in X for past 5 years = 5% annually  
Rise in Y for past 5 years = 6% annually  
Five years ago, GDP of X > GDP of Y. It cannot be said whether X's GDP was higher or not till we know the actual values of GDP's.
74. (b) (A) X & Y are unequal even integer  $X < 10, Y < 10$   
 $\frac{X}{Y}$  an odd integer  
 $\therefore X = 6, Y = 2$  is only combination possible  
(B) X & Y both are even  
 $X < 10, Y < 10$   
 $XY = 12$   
Hence solution is 6, 2 But independently, it cannot be said which one is X and which one is Y.  
So only (a) can give us value of X not B.

75. (a) (A) The boat can carry 200 passenger of any time, but we don't know how many did it carry for trips. So (I) can't tell about number of trips

(B) Statement II gives the number of trips  
Say X trips  
for each trip time =  $80 + 40 = 120$  min  
So, boat makes 6 trips

76. (c) Transfer rate = 6 Kb / sec  
size =  $4.5 \times 10^3$  kb

$$\text{Time} = \frac{\text{Size}}{\text{Transfer Rate}}$$

Hence, it can be solved with the help of both equations

77. (b)

$$\text{Diameter} = 25\sqrt{2} \text{ or } R = \frac{25}{\sqrt{2}}$$

Side of square = 25, so, bath area can be calculated & difference can be calculated from II side = 25

$$\text{Dia} = 25\sqrt{2}$$

Hence it can be calculated

Hence it can be answered from any of the statements.

78. (d) (a) No. of apples of Ram =  $\frac{1}{2}$  (apples of Gopal)

- (b) Total stock of Dealer = 500.

Even using both the statements. The question cannot be answered.

79. (d) Suppose before last five minutes score was India 0 & Korea 2

Considering both (A) & (B) statements

final score becomes India 0 + 3 = 3

Korea 2 + 1 = 3

So given ques. Can not be answered by either of the statements

80. (a) If 12 students were added then total number of students will be 16, hence teacher would be able to divide her students evenly into dance team of 8.

$$81. (a) (x - y) \left( \frac{1}{x} - \frac{1}{y} \right) = 4; (x - y) \left( \frac{y - x}{xy} \right) = 4$$

$$(x - y)^2 - 4xy = 0; x^2 - y^2 - 2xy - 4xy = 0$$

$$\text{or } (x - y)^2 = 0$$

$\Rightarrow x - y = 0 \Rightarrow x = y$ ; Hence statement (1) gives the answer.

But from II<sup>nd</sup> statement,  $(x - 50)^2 = (y - 50)^2$

$$\Rightarrow x - 50 = (y - 50), \text{ so it is not sure that } x = y$$

82. (b) Let listed price =  $\ell$ , whole sale cost =  $w$   
using (A) statement

$$(\ell - 10\% \text{ of } \ell) = w \text{ or } \frac{9\ell}{10} = w \quad \dots(1)$$

$$\text{also it is given that } w = \frac{20w}{100} = \ell \quad \dots(2)$$

using (1) & (2)  $w$  can be determined

$$\text{if we use only (B) statement then } w = \frac{20w}{100} = 50$$

we can be calculated

83. (d) 500 is the arithmetic mean it does not show how many people above 500 and how many are below. If 500 would have been median then it would be true. The second statement do not provide any useful information. Therefore answer can be not given by either of the statement.

84. (d)  $|x - 2| < 1 \Rightarrow -1 < x - 2 < 1 \Rightarrow 1 < x < 3$

$$A. |x| < 1 \quad B. |x| < 2$$

From A statement,  $-1 < x < 1$ , for which  $|x - 2| < 1$  is always true

From B statement,  $-1 < x < 3$ , which does not clearly says about  $|x - 2| < 1$

85. (c)

Shaded portion = only French =  $300 - 196 - 58$ ; so both A & B are necessary

86. (c) Let P unit receive Rs P  
Girish Rs G  
Jagdish Rs J  
P G J 38,500 .....(1)

$$J = \frac{2}{9}(P + G)$$

$J = \frac{2}{9}(38,500 - J) \Rightarrow J = ?$ , But A alone do not say anything about P & G

$$P = \frac{3}{11}(J + G)$$

$$P = \frac{3}{11}(38,500 - P) \Rightarrow P = ?$$

Therefore both A & B are necessary

87. (d)  $2^{44} < b^{11} \Rightarrow b > 2^4$ . Even if  $b > 16$ , we cannot say whether b is an integer or not.

88. (b) Sum of roots =  $-b/4$  and product of roots =  $c/4$   
 From **Statement I** : Sum of roots = 0 and product of roots =  $-1/4$   
 From this, b and c can be found out.  
**Statement II** :  $c/b = 1$  or  $c = b$   
 Put  $x = -1/2$  in the equation  $4x^2 - bx - b = 0$ . Hence b can be found out. Answer is obtained through either statement.
89. (d) We cannot get the answer from both the statements.
90. (a) Statement I is not enough.  
 From statement II : We get  $x = \frac{1}{2} - a$   
 Hence LHS > RHS.
91. (b) From statement I, we get ABC as equilateral triangle, hence  $\Delta DEF$  can be found out. Similarly we can get the answer from statement II as well.
92. (c) The data shows F has two siblings and M has five. M has 2 brothers, if. F has two brothers. So it can be answered  
 Using option (a) alone. Option (b) is useless and do not provide any resent.
93. (b) It can be answered using option (a) alone  
 $50(10 - x) = 100$  or  $x = 140$   
 Option (b) can not give any exact answer.
94. (c) Combining the statements, we get (A) : number of coupons = 21, and (B) : number of vowels = 18. The last letter being S, it leaves 2 blanks, which must be P's. Hence answer is (c).
95. (a) To find C's time, we need total distance and C's speed. These 2 variables are given by statement (A) and (B) combined.
96. (d) Runs      Catches      Catches  
                     Dropped  
 A      50      At least 2       $\geq 1$ , say x  
 B      50      2       $\geq 1, x+2$   
 C      35      0       $\geq 1$ , atleast 2  
 From second statement, as catches dropped by Biplob are one more then catches taken by Akash. So Akash has taken atleast 2 catches.  
 For the man of match, we require both the statements [A] and [B]
97. (c) Using A  $\rightarrow$   $\begin{bmatrix} B \rightarrow 1 \\ C \rightarrow 2 \\ D \rightarrow 3 \\ A \rightarrow 4 \end{bmatrix}$ ; we get solution ;  
 Using B  $\rightarrow$   $\begin{bmatrix} B \rightarrow 1 \\ C \rightarrow 2 \\ A \rightarrow 4 \\ D \rightarrow 3 \end{bmatrix}$ ; we get solution.
98. (a) B statement does not give any useful conclusion.  
 From A :  $nx = 600$  and  $(n-5)(x+10) = 600$ , which can be solved to get an answer.
99. (a) Father      mother  
 after n years       $4(x - n)$        $3(x - n)$   
 Using A, we get  $x + n = 10$ , so combined ages can be found.  
 Using B,  $x + n = 2x$  or  $x = n$ ; so ages can not be found.
100. (c)  $2p + 1g < 1p + 2g$  or  $p < g$  .....(i)  
 $1p + 2O = 1O + 2g$   
 or  $1p + 1O = 2g$   
 using (i), we get  $O > g$   
 So none of the statements alone can't give the answer but on combining we get the answer.
101. (b) Here the answer can be obtained from both the statements individually.  
 In A : 21 tosses takes him to a mark which is possible only with 12 Tails & 9 Heads and he reaches the blue mark.  
 In B : In this case he clearly reaches the blue mark.
102. (d) For 13 notes, we can not find the no. of Rs. 1, Rs. 2, Rs. 5 & Rs. 10 notes individually. Even after combining with B statement, we can get various combinations of the given currency notes.
103. (a) This can be answered using A alone. As when the top 3 scorers will vote the topper will clearly get 2 votes.
104. (a) A says there were 18 boys and 12 girls, and Kumar was among top 5 boys but his rank among them is not known. So A can not answer the question. As per B, there were 3 boys in top 5, hence remaining 2 were girls. As Kumar is 6th so Rasmi is definitely behind him.
105. (a) A does not give the answer as  $0.2Z > 0.25S$  or  $Z > 1.25S$  which does not tell that  $0.3Z$  is greater or less than  $0.4S$ .  
 From B,  $0.13S > 0.10Z$  or  $Z < 1.3S$ ; which show that  $0.3Z < 0.4S$
106. (c) Let weight of Deepak =  $D$  kg  
 and weight odd Poonam =  $P$  kg  
 If Deepak of section II is moved to section I and Poonam of Section I is moved to Section II, then  

$$\frac{50W_I + D - P}{50} = W_{II} \text{ and } \frac{50W_I - D + P}{50} = W_I$$
  

$$\Rightarrow D - P = 50(W_{II} - W_I) \text{ and } D - P = 50(W_I - W_{II})$$
  
 Total weight of 100 students of the class = 4500 kg  

$$\Rightarrow 50W_1 + 50W_2 = 4500$$
  

$$\Rightarrow W_I + W_{II} = 90 \quad \dots(i)$$
  
 On using statement (A), we get  

$$W_{II} - W_I = 1 \quad \dots(ii)$$
  
 On solving equation (i) and (ii), we get  

$$W_I = 44.5 \text{ kg}, W_{II} = 45.5 \text{ kg}$$
  

$$\therefore D - P = 50(45.5 - 44.5)$$
  

$$\Rightarrow D - P = 50 \quad \dots(iii)$$
  
 From this, we can not get the age of Poonam

Now, on using statement (B), we get

$$\begin{aligned} & \frac{50W_I + D}{51} \quad \frac{50W_{II} - D}{49} \\ \Rightarrow & 10D = 255W_{II} - 245W_I \\ \Rightarrow & 10D = 255 \times 45.5 - 245 \times 44.5 \\ \Rightarrow & D = 70 \end{aligned} \quad (\text{iv})$$

From this, we also can not get the age of Poonam

Now, on combining statements (A) and (B),  
i.e., Using equation (iii) and (iv), we get  $P = 20$

Therefore, on using both statements (A) and (B), we get the solution.

107. (a) A:  $x + y + z = 89$

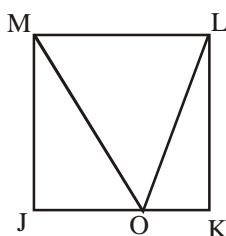
For  $x^2 + y^2 + z^2$  to be minimum, each of  $x, y, z$  must take integral value nearest to  $89/3$ .

Let  $x = 30, y = 30, z = 29$

$$\begin{aligned} \therefore \text{Minimum value of } x^2 + y^2 + z^2 \\ = (30)^2 + (30)^2 + (29)^2 = 2641 \end{aligned}$$

Hence statement A alone is sufficient to answer the question. Hence, [a].

108. (b)



Length OM is maximum, when point O coincides with point K. In this case OM become a diagonal and OL become the a side of the square.

Hence, maximum length of OM =  $\sqrt{2} OL$

But according to the statement (A),

Length of OM =  $2.0L$ , which is not possible

That's why, Rahim unable to draw the square.

From statement (B), we can not get any useful information.

109. (b) Outer radius = 5m

According to the statement (A),

Inner radius is at least 4 m

$$\therefore 4 \leq r \leq 5$$

If V be the capacity of the tank, then

$$\frac{4}{3} \times 3.14 \times 4^3 \leq V < \frac{4}{3} \times 3.14 \times 5^3$$

$$\Rightarrow 268.8 \text{ m}^3 \leq V < 523 \text{ m}^3 \text{ (approx.)}$$

Thus, we can't say that the capacity of the tank is at least 400 kilolitres.

110. (e) The question cannot be answered.

A – If M & M scored 4 goals then still it will lose if the opponent scores 2 or more goals. As the goals scored by the opponent is not known so we cannot answer this.

B – The opponent scores 4 goals in the match. The half time score can be 3 – 0 or 4 – 1. We do not know the goals scored by M & M in B.

If we combine the two, A & B, there is a possibility of draw, if the half time score is 3 – 0. So, we can not answer the question.

111. (a) A answers the questions, as it gives the top performers, who are not athletes. By adding the 10 athlete who are top academic performer. We will know the total top academic performers.

B is redundant and do not provide any information.

112. (d) A says that Atul was ranked 5<sup>th</sup>. The median is 3, so Chetan was ranked 4<sup>th</sup>. But we do not know anything about the positions of D, B & E, which can be D E B or D B E or B D E.

B says Bala was not 1<sup>st</sup> or 2<sup>nd</sup>, so he can be 3<sup>rd</sup> or 4<sup>th</sup> as C has to be 4<sup>th</sup> and 5<sup>th</sup> respectively. So, B alone do not tell us anything.

On combining the 2, we see that only D E B satisfies A and B among the 3 options possible – D E B, D B E, B D E.

113. (c) The question can be answered using any of the options, A or B, alone.

A → We know the total students with Engineering background. By subtracting the Female Engineers. we calculate the Male Engineers.

B → As the number of Female Engineers is known so, we can calculate the Male Engineers.

114. (d) (A) If there are 83 players, then one player get bye before first, second and fourth round each because before the first, second and fourth round each, the number of players is odd.

Hence, there may be a player who get more than one bye. Therefore, statement (A) is not possible.

(B) We are unable to give the answer from the given information.

By combining the two statements we can get the answer.

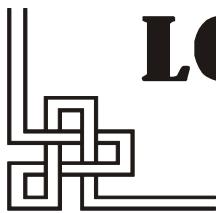
115. (d) (A) This statement is not possible. For example, if number of players is 127, then there are more than one bye.

(B) This statement is not possible. For example, if number of players is 80, then there is no player, who receive any bye.

By combining the two statements, we can get the answer  $n = 72$ .

# 16

CHAPTER



# LOGICAL REASONING



## TYPE - A

**Directions for Questions 1 to 10 :** From the alternatives, choose the one which correctly classifies the four sentences as a

- F** : Fact : If it relates to a known matter of direct observation, or an existing reality or something known to be true.  
**J** : Judgement : If it is an opinion or estimate or anticipation of common sense or intention.  
**I** : Inference : If it is a logical conclusion or deduction about something, based on the knowledge of facts.
1. A. If India has embarked on the liberalization route, she cannot afford to go back (1994)  
B. Under these circumstances, being an active supporter of WTO policies will be a good idea.  
C. The WTO is a truly global organization aiming at freer trade.  
D. Many member countries have already drafted plans to simplify tariff structures.  
(a) FJFI (b) IFJF (c) IJFF (d) IFIF
2. A. The Minister definitely took the wrong step (1994)  
B. Under the circumstances, he had many other alternatives.  
C. The Prime Minister is embarrassed due to the Minister's decision.  
D. If he has put the government in jeopardy, the Minister must resign.  
(a) JFFI (b) IFJI (c) FFJI (d) IFIJ
3. A. The ideal solution will be to advertise aggressively (1994)  
B. One brand is already popular amongst the youth.  
C. Reducing prices will mean trouble as our revenues are already dwindling.  
D. The correct solution will be to consolidate by aggressive marketing.  
(a) JFIJ (b) FJJI (c) IJFF (d) JJIF
4. A. If democracy is to survive, the people must develop a sense of consumerism (1994)  
B. Consumerism has helped improve the quality of goods in certain countries.  
C. The protected environment in our country is helping the local manufacturers.  
D. The quality of goods suffers if the manufacturers take undue advantage of this.  
(a) IJFJ (b) JFJI (c) IJFJ (d) IFJJ
5. A. Unless the banks agree to a deferment of the interest, we cannot show profits this year (1994)  
B. This would not have happened had we adopted a stricter credit scheme.  
C. The revenues so far cover only the cost and salaries.  
D. Let us learn a lesson : we cannot make profits without complete control over credit.  
(a) IIJF (b) IJFI (c) FJIF (d) FJFI
6. A. Qualities cannot be injected into one's personality (1994)  
B. They are completely dependent on the genetic configuration that one inherits.  
C. Hence changing our inherent traits is impossible as the genes are unalterable.  
D. The least one can do is to try and subdue the "bad qualities".  
(a) FIJI (b) JFFI (c) JFIJ (d) JIFI
7. A. Everything is purposeless (1994)  
B. Nothing before and after the existence of the universe is known with certainty.  
C. Man is a part of the purposeless universe; hence man is also purposeless.  
D. There is only one way of adding purpose to the universe : Union with Him.  
(a) JFIJ (b) FJJI (c) JFFI (d) IJFJ

8. A. Everyday social life is impossible without interpersonal relationships (1994)  
 B. The root of many misunderstandings has been cited in poor relations among individuals.  
 C. Assuming the above to be true, social life will be much better if people understand the importance of good interpersonal relations.  
 D. A study reveals that interpersonal relations and hence life in general can be improved with a little effort on the part of individuals.  
 (a) FJIJ (b) JFIF (c) FIFJ (d) IFFJ
9. A. The prices of electronic goods are falling (1994)  
 B. Since we have substantial reductions in import duties, this is obvious.  
 C. The trend is bound to continue in the near future.  
 D. But the turnover of the electronic industry is still rising, because the consumers are increasing at a rapid rate.  
 (a) IFJF (b) FJII (c) FIJF (d) JIFF
10. A. In the past, it appears, wealth distribution, and not wealth creation has dominated economic policy (1994)  
 B. Clearly, the government has not bothered to eradicate poverty.  
 C. Today's liberalization is far from the hitherto Nehruvian socialism.  
 D. Results are evident in the form of a boom in the manufacturing sector output and turnover of all Industries.  
 (a) FJIF (b) FIFJ (c) IJIF (d) JIFF

**Directions for Questions 11 to 15 : Each question has a set of four sequentially ordered statements. Each statement can be classified as one of the following :**

- Facts**, which deal with pieces of information that one has heard, seen or read, and which are open to discovery or verification (the answer option indicates such a statement with an 'F').
- Inferences**, which are conclusions drawn about the unknown, on the basis of the known (the answer option indicates such a statement with an 'I').
- Judgements**, which are opinions that imply approval or disapproval of persons, objects, situations and occurrences in the past, the present or the future (the answer option indicates such a statement with a 'J').

11. 1. We should not be hopelessly addicted to an erroneous belief that corruption in India is caused by the crookedness of Indians.  
 2. The truth is that we have more red tape - we take eighty-nine days to start a small business, Australians take two.  
 3. Red tape leads to corruption and distorts a people's character.  
 4. Every red tape procedure is a point of contact with an official, and such contacts have the potential to become opportunities for money to change hands. (2006)  
 (a) JFIF (b) JFJJ (c) JIJF (d) IFJF (e) JFJI
12. 1. Given the poor quality of service in the public sector, the HIV/AIDS affected should be switching to private initiatives that supply anti-retroviral drugs (ARVs) at a low cost.  
 2. The government has been supplying free drugs since 2004, and 35000 have benefited up to now - though the size of the affected population is 150 times this number.  
 3. The recent initiatives of networks and companies like AIDS Care Network, Emcure, Reliance-Cipla-CII, would lead to availability of much-needed drugs to a larger number of affected people.  
 4. But how ironic it is that we should face a perennial shortage of drugs when India is one of the world's largest suppliers of generic drugs to the developing world. (2006)  
 (a) JFIJ (b) JIJJ (c) IFIJ (d) IFFJ (e) JFII
13. 1. According to all statistical indications, the Sarva Shiksha Abhiyan has managed to keep pace with its ambitious goals.  
 2. The Mid-day Meal Scheme has been a significant incentive for the poor to send their little ones to school, thus establishing the vital link between healthy bodies and healthy minds.  
 3. Only about 13 million children in the age group of 6 to 14 years are out of school.  
 4. The goal of universalisation of elementary education has to be a pre-requisite for the evolution and development of our country. (2006)  
 (a) IJFJ (b) JJJJ (c) IJFJ (d) IJFI (e) JIFI
14. 1. Inequitable distribution of all kinds of resources is certainly one of the strongest and most sinister sources of conflict.  
 2. Even without war, we know that conflicts continue to trouble us - they only change in character.  
 3. Extensive disarmament is the only insurance for our future; imagine the amount of resources that can be released and redeployed.  
 4. The economies of the industrialized western world derive 20% of their income from the sale of all kinds of arms. (2006)  
 (a) IJJI (b) JIJF (c) IIJF (d) JIIF (e) IJIF

## TYPE - B

**Directions for Questions 1 to 39 :** In the questions below, choose the option, which represents a legitimate argument, i.e. where the third sentence is a conclusion that can be arrived at from the previous two sentences. For instance

All cigarettes are harmful for health.

Brand X is a cigarette.

Brand X is harmful for health.

1. A. All vegetarians eat meat  
B. All those who eat meat are not vegetarians  
C. All those who eat meat are herbivorous  
D. All vegetarians are carnivorous  
E. All those who eat meat are carnivorous  
F. Vegetarians are herbivorous  
(a) BCE (b) ABE (c) ACD (d) ACF (1994)

2. A. All roses have thorns  
B. All roses have nectar.  
C. All plants with nectar have thorns  
D. All shrubs have roses  
E. All shrubs have nectar  
F. Some roses have thorns  
(a) BEF (b) BCF (c) BDE (d) ACF (1994)

3. A. No spring is a season  
B. Some seasons are springs  
C. Some seasons are autumns  
D. No seasons are autumns  
E. Some springs are not autumns  
F. All springs are autumns  
(a) DFA (b) BEF (c) CEB (d) DEB (1994)

4. A. All falcons fly high  
B. All falcons are blind.  
C. All falcons are birds.  
D. All birds are yellow.  
E. All birds are thirsty.  
F. All falcons are yellow.  
(a) ABC (b) CDF (c) DEF (d) BCA (1994)

5. A. No wires are hooks  
B. Some springs are hooks.  
C. All springs are wires  
D. Some hooks are not wires  
E. No hook is a spring  
F. All wires are springs  
(a) AED (b) BCF (c) BEF (d) ACE (1994)

6. A. Some abra are dabra  
 B. All abra are cabra.  
 C. All dabra are abra.  
 D. All dabra are cabra.  
 E. Some cabra are abra.  
 F. Some cabra are dabra.  
 (a) AEF (b) BCF (c) ABD (d) BCE (1994)

7. A. No plane is a chain  
 B. All manes are chains.  
 C. No mane is a plane.  
 D. Some manes are not planes.  
 E. Some planes are manes.  
 F. Some chains are not planes.  
 (a) ACD (b) ADF (c) ABC (d) CDF (1994)

8. A. All dolls are nice  
 B. All toys are nice  
 C. All toys are dolls  
 D. Some toys are nice  
 E. Some nice things are dolls  
 F. No doll is nice  
 (a) CDE (b) CEF (c) ACD (d) BEF (1994)

9. A. Some buildings are not sky-scrappers  
 B. Some sky-scrappers are not buildings.  
 C. No structure is a sky-scraper  
 D. All sky-scrappers are structures  
 E. Some sky-scrappers are buildings  
 F. Some structures are not buildings  
 (a) ACE (b) BDF (c) CDE (d) ACF (1994)

10. A. All bins are buckets  
 B. No bucket is a basket  
 C. No bin is a basket  
 D. Some baskets are buckets  
 E. Some bins are baskets  
 F. No basket is a bin  
 (a) BDE (b) ACB (c) CDF (d) ABF (1994)

11. 1. Some men are bad  
 2. All men are sad  
 3. All bad things are men  
 4. All bad things are sad  
 5. Some sad things are men  
 6. Some sad things are bad  
 (a) 165 (b) 236 (c) 241 (d) 235 (1995)

12. 1. No tingo is a bingo  
 2. All jingoes are bingoos  
 3. No jingo is a tingo  
 4. Some jingoes are not tingoes  
 5. Some tingoes are jingoes  
 6. Some bingoos are not tingoes  
 (a) 123 (b) 132 (c) 461 (d) 241 (1995)

13. 1. All Toms are bright  
 2. No bright Toms are Dicks  
 3. Some Toms are Dicks  
 4. Some Dicks are bright  
 5. No Tom is a dick  
 6. No Dick is a Tom  
 (a) 123 (b) 256 (c) 126 (d) 341 (1995)

14. 1. Some bubbles are not dubbles  
 2. Some dubbles are not bubbles  
 3. No one who is rubbles is dubbles  
 4. All dubbles are rubbles  
 5. Some dubbles are bubbles  
 6. Some who are rubbles are not bubbles.  
 (a) 146 (b) 456 (c) 123 (d) 246 (1995)
15. 1. All witches are nasty  
 2. Some devils are nasty  
 3. All witches are devils  
 4. All devils are nasty  
 5. Some nasty are devils  
 6. No witch is nasty.  
 (a) 234 (b) 341 (c) 453 (d) 653 (1995)
16. 1. An ostrich lays eggs  
 2. All birds lay eggs  
 3. Some birds can fly  
 4. An ostrich cannot fly  
 5. An ostrich is a bird  
 6. An ostrich cannot swim  
 (a) 251 (b) 125 (c) 453 (d) 532 (1996)
17. 1. Some paper is wood  
 2. All wood is good  
 3. All that is good is wood  
 4. All wood is paper  
 5. All paper is good  
 6. Some paper is good  
 (a) 254 (b) 246 (c) 612 (d) 621 (1996)
18. 1. Some pins are made of tin  
 2. All tin is made of copper  
 3. All copper is used for pins  
 4. Some tin is copper  
 5. Some pins are used for tin  
 6. Some copper is used for tin  
 (a) 123 (b) 356 (c) 345 (d) 125 (1996)
19. 1. All bricks are tricks  
 2. Some tricks are shrieks  
 3. Some that are shrieks are bricks  
 4. Some tricks are not bricks  
 5. All tricks are shrieks  
 6. No tricks are shrieks  
 (a) 513 (b) 234 (c) 123 (d) 543 (1996)
20. 1. Some sand is band  
 2. All sandal is sand  
 3. All band is sandal  
 4. No sand is sandal  
 5. No band is sand  
 6. Some band is sandal  
 (a) 231 (b) 165 (c) 453 (d) 354 (1996)

21. 1. No wife is a life  
 2. All life is strife  
 3. Some wife is strife  
 4. All that is wife is life  
 5. All wife is strife  
 6. No wife is strife  
 (a) 256 (b) 632 (c) 126 (d) 245 (1996)

22. 1. Poor girls want to marry rich boys  
 2. Rich girls want to marry rich boys  
 3. Poor girls want to marry poor girls  
 4. Rich boys want to marry rich girls  
 5. Poor girls want to marry rich girls  
 6. Rich boys want to marry poor girls  
 (a) 145 (b) 123 (c) 234 (d) 456 (1996)

23. 1. Six is five  
 2. Five is not four  
 3. Some five is ten  
 4. Some six is twelve  
 5. Some twelve is five  
 6. Some ten is four  
 (a) 145 (b) 123 (c) 156 (d) 543 (1996)

24. 1. Some crows are flies  
 2. Some flies are mosquitoes  
 3. All mosquitoes are flies  
 4. Some owls are flies  
 5. All owls are mosquitoes  
 6. Some mosquitoes are not owls  
 (a) 123 (b) 356 (c) 145 (d) 542 (1996)

25. A. No bird is viviparous  
 B. All mammals are viviparous  
 C. Bats are viviparous  
 D. No bat is a bird  
 E. No bird is a mammal  
 F. All bats are mammals  
 (a) ADC (b) ABE (c) FBA (d) AFC (1997)

26. A. No mother is a nurse  
 B. Some nurses like to work  
 C. No woman is a prude  
 D. Some prude are nurses  
 E. Some nurses are women  
 F. All women like to work  
 (a) ABE (b) CED (c) FEB (d) BEF (1997)

27. A. Oranges are sweet  
 B. All oranges are apples  
 C. Some sweets are apples  
 D. Some oranges are apples  
 E. All sweets are sour.  
 F. Some apples are sour  
 (a) DAC (b) CDA (c) BCA (d) FEC (1997)

28. A. Zens are Marutis  
 B. Zens are fragile  
 C. Marutis are fragile  
 D. All stable are weak  
 E. Marutis can beat Opels  
 F. Opels are stable  
 (a) ACB (b) EFD (c) CEA (d) ABC (1997)

29. A. Dogs sleep in the open (1997)  
 B. Sheep stay indoors  
 C. Dogs are like sheep  
 D. All indoors are sheep  
 E. Some dogs are not sheep  
 F. Some open are not sheep  
 (a) DEF (b) DCA (c) EAF (d) FBD
30. A. All software companies employ knowledge workers (1999)  
 B. Tara Tech employs knowledge workers.  
 C. Tara Tech is a software company.  
 D. Some software companies employ knowledge workers  
 E. Tara Tech employs only knowledge workers  
 (a) ABC (b) ACB (c) CDB (d) ACE
31. A. Traffic congestion increase carbon monoxide in the environment (1999)  
 B. Increase in carbon monoxide is hazardous to health  
 C. Traffic congestion is hazardous to health.  
 D. Some traffic congestion does not cause increased carbon monoxide.  
 E. Some traffic congestion is not hazardous to health  
 (a) CBA (b) BDE (c) CDE (d) BAC
32. A. Apples are not sweets (1999)  
 B. Some apples are sweet  
 C. All sweets are tasty  
 D. Some apples are not tasty  
 E. No apple is tasty.  
 (a) CEA (b) BDC (c) CBD (d) EAC
33. A. Some towns in India are polluted (1999)  
 B. All polluted towns should be destroyed  
 C. Town Meghana should be destroyed  
 D. Town Meghana is polluted  
 E. Some towns in India should be destroyed  
 (a) BDE (b) BAE (c) ADE (d) CDB
34. A. No patriot is a criminal (1999)  
 B. No Bundledas is a criminal  
 C. Bundledas is a patriot  
 D. Bogusdas is a patriot  
 E. Bogusdas is a criminal  
 (a) ACB (b) ABC (c) ADE (d) ABE
35. A. Ant eaters like ants (1999)  
 B. Boys are ant eaters  
 C. Balram is an ant eater  
 D. Balram likes ants  
 E. Balram may eat ants  
 (a) DCA (b) ADC (c) ABE (d) ACD
36. A. All actors are handsome (1999)  
 B. Some actors are popular  
 C. Ram is handsome  
 D. Ram is a popular actor  
 E. Some popular people are handsome  
 (a) ACD (b) ABE (c) DCA (d) EDC

37. A Modern industry is technology driven (1999)  
 B. BTI is a modern industry.  
 C. BTI is a technology driven  
 D. BTI may be technology driven  
 E. Technology driven industry is modern  
 (a) ABC (b) ABD (c) BCA (d) EBC
38. A All Golmal islanders are blue coloured people (1999)  
 B. Some smart people are not blue coloured people.  
 C. Some babies are blue coloured  
 D. Some babies are smart  
 E. Some smart people are not Golmal islanders  
 (a) BCD (b) ABE (c) CBD (d) None of these
39. A. MBA's are in great demand (1999)  
 B. Ram and Sita are in great demand  
 C. Ram is in great demand  
 D. Sita is in great demand  
 E. Ram and Sita are MBA's  
 (a) ABE (b) ECD (c) AEB (d) EBA

 **TYPE - C** 

**Directions for Questions 1 to 14 :** In each of the following sentences, the main statement is followed by four sentences each. Select the pair of sentences that relate logically with the given statement.

1. Either Sam is ill; or he is drunk (1997)  
 A. Sam is ill.  
 B. Sam is not ill.  
 C. Sam is drunk  
 D. Sam is not drunk  
 (a) AB (b) DA (c) AC (d) CD
2. Whenever Ram hears of a tragedy, he loses sleep (1997)  
 A. Ram heard of a tragedy  
 B. Ram did not hear of a tragedy  
 C. Ram lost sleep  
 D. Ram did not lose sleep  
 (a) CA (b) BD (c) DB (d) AD
3. Either the train is late; or it has derailed (1997)  
 A. The train is late  
 B. The train is not late  
 C. The train is derailed  
 D. The train is not derailed  
 (a) AB (b) DB (c) CA (d) BC
4. When I read a horror story I have a nightmare (1997)  
 A. I read a horror story  
 B. I did not read a horror story  
 C. I did not have a nightmare  
 D. I had a nightmare  
 (a) CB (b) AD (c) BC (d) AC
5. When I eat berries I get rashes (1997)  
 A. I ate berries  
 B. I did not get rashes  
 C. I did not eat berries  
 D. I got rashes  
 (a) DA (b) BC (c) CB (d) AD
6. Either Sita is sick or she is careless (1998)  
 A. Sita is not sick  
 B. Sita is not careless  
 C. Sita is sick  
 D. Sita is careless  
 (a) AB (b) AD (c) BA (d) DA

7. Ram gets a swollen nose whenever he eats hamburgers (1998)  
 A. Ram gets a swollen nose  
 B. Ram does not eat hamburgers  
 C. Ram does not get a swollen nose  
 D. Ram eats hamburgers  
 (a) AB (b) DC (c) AC (d) BC
8. Either the employees have no confidence in the management or they are hostile by nature (1998)  
 A. They are hostile by nature  
 B. They are not hostile by nature  
 C. They have confidence in the management  
 D. They have no confidence in the management.  
 (a) BA (b) CB (c) DA (d) BD
9. Whenever Ram reads late into the night, his father beats him up (1998)  
 A. His father does not beat Ram  
 B. Ram reads late into the night  
 C. Ram reads early in the morning  
 D. Ram's father beats him in the morning  
 (a) CD (b) BD (c) AB (d) None of the above
10. All irresponsible parents shout if their children do not cavort (1998)  
 A. All irresponsible parents do not shout  
 B. Children cavort  
 C. Children do not cavort  
 D. All irresponsible parents shout  
 (a) AB (b) BA (c) CA (d) All of the above
11. Either the orangutan is not angry, or he frowns upon the world (1999)  
 A. The orangutan frowns upon the world.  
 B. The orangutan is not angry.  
 C. The orangutan does not frown upon the world.  
 D. The orangutan is angry.  
 (a) CB only (b) DA only (c) AB only (d) CB and DA
12. Either Ravan is a demon, or he is a hero (1999)  
 A. Ravan is a demon.  
 B. Ravan is not a demon  
 C. Ravan is a hero  
 D. Ravan is not a hero  
 (a) AD (b) BC (c) DB (d) Both 1 and 2
13. Whenever Rajeev uses the internet, he sees a spider in his dream (1999)  
 A. Rajeev sees a spider in his dream.  
 B. Rajeev uses the internet.  
 C. Rajeev does not see a spider in his dream.  
 D. Rajeev does not use the internet.  
 (a) BA (b) CD (c) AB (d) Both 1 and 2
14. If he talks to the professor, he will not need medicine (1999)  
 A. He talks to the professor.  
 B. He will not need medicine  
 C. He does not talk to the professor.  
 D. He will need medicine  
 (a) AD (b) AB (c) BA (d) DC



**Directions for Questions 1 to 14 :** Each of the questions below contains four arguments of three sentences each. Choose the set in which the third statement is a logical conclusion of the first two.

1. A. Some Xs are Ps; Some Ps are Ys; Some Xs are Ys (1998)  
 B. All Sonas are bright; Some bright are crazy; Some Sonas are crazy.  
 C. Some Cs are funny; All funny are wild; Some Cs are wild.  
 D. No faith is strong; some strong have biceps; no faith has biceps.  
 (a) A and D (b) C only (c) D only (d) None of the above

2. A. Some icicles are cycles; all cycles are men; some icicles are men (1998)  
 B. All girls have teeth; no teeth are yellow; no girls have yellow teeth.  
 C. No hand is foot; some foot are heads; some heads are not hands  
 D. Every man has wife; all wives are devoted; no devoted wife has a husband.  
 (a) A, B and C only (b) A and B (c) C and B (d) A, B and C and D
3. A. No sun is not white; all moon is sun; all moon is white (1998)  
 B. All windows are open; No open space is allocated; all window is closed space  
 C. Some As can sleep late; some Bs wake up early; some As wake up early.  
 D. No German can fire; all Americans bombard; both Germans and Americans can fight.  
 (a) A only (b) B only (c) C only (d) D only
4. A. All Ts are square; all square are rectangular; all Ts are rectangular (1998)  
 B. Some fat are elongated; some elongated things are huge; some fat are huge.  
 C. Idiots are bumbler; bumbler fumble; Idiots fumble  
 D. Water is good for health; health foods are rare; water is rare  
 (a) D only (b) C only (c) Both A & C (d) All of the above
5. A. No cowboys laugh. Some who laugh are sphinxes. Some sphinxes are not cowboys (1999)  
 B. All ghosts are fluorescent. Some ghosts do not sing. Some singers are not fluorescent.  
 C. Cricketers indulge in swearing. Those who swear are hanged. Some who are hanged are not cricketers.  
 D. Some crazy people are pianists. All crazy people are whistlers. Some whistlers are pianists.  
 (a) A and B (b) C only (c) A and D (d) D only
6. A. All good peoples are knights. All warriors are good people. All knights are warriors (1999)  
 B. No footballers are ministers. All footballers are tough. Some ministers are players  
 C. All pizzas are snacks. Some meals are pizzas. Some meals are snacks.  
 D. Some barkers are musk-dear. All barkers are sloth bears. Some sloth bears are musk deer  
 (a) C and D (b) B and C (c) A only (d) C only
7. A. Dinosaurs are pre-historic creatures. Water buffaloes are not dinosaures. Water buffaloes are not pre historic creatures (1999)  
 B. All politicians are frank. No frank people are crocodiles. No crocodiles are politicians  
 C. No diamond is quartz. No opal is quartz. Diamonds are opals.  
 D. All monkeys like bananas. Some GI joes like bananas. Some GI joes are monkeys.  
 (a) C only (b) B only (c) A and D (d) B and C
8. A. All earthquakes cause havoc. Some landslides cause havoc. Some earthquakes cause landslides (1999)  
 B. All glass things are transparent. Some curios are glass things. Some curios are transparent.  
 C. All clay objects are brittle. All XY are clay objects. Some XY are brittle  
 D. No criminal is a patriot. Ram is not a patriot. Ram is a criminal  
 (a) D only (b) B only (c) C and B (d) A only
9. A. MD is an actor. Some actors are pretty. MD is pretty (1999)  
 B. Some man are cops. All cops are brave. Some brave people are cops.  
 C. All cops are brave. Some men are cops. Some men are brave.  
 D. All actors are pretty. MD is not an actor. MD is not pretty.  
 (a) A and B (b) C and D (c) A only (d) C only
10. A. All IIMs are in India. No BIMs are in India. No IIMs are BIMs (1999)  
 B. All IIMs are in India. No BIMs are in India. Some brave people are cops  
 C. Some IIMs are not in India. Some BIMs are not in India. Some IIMs are BIMs.  
 D. Some IIMs are not in India. Some BIMs are not in India. Some BIMs are IIMs.  
 (a) A and B (b) C and D (c) A only (d) B only
11. A. Citizens of Yes Islands speak only the truth. Citizens of Yes islands are young people. Young people speak only the truth (1999)  
 B. Citizens of Yes islands speak only the truth. Some Yes Islands are in the Atlantic. Some citizens of Yes islands are in Atlantic.  
 C. Citizens of Yes Islands speak only the truth. Some young people are citizens of yes islands. Some young people speak only the truth.  
 D. Some people speak only the truth. Some citizens of yes islands speak only the truth. Some people who speak only the truth are citizens of yes Islands.  
 (a) A only (b) B only (c) C only (d) D only
12. A. All mammals are viviparous. Some fish are viviparous. Some fish are mammals (1999)  
 B. All birds are oviparous. Some fish are not oviparous. Some fish are birds  
 C. No mammal is oviparous. Some creatures are oviparous and some are not. Some creatures are not mammals.  
 D. Some creatures are mammals. Some creatures are viviparous. Some mammals are viviparous.  
 (a) A only (b) B only (c) C only (d) D only

13. A. Many singers are not writers. All poets are singers. Some poets are not writers (1999)  
 B. Giants climb beanstalks. Some chicken do not climb beanstalks. Some penguins are explorers  
 C. All explorers live in snowdrifts. Some penguins live in snowdrifts. Some penguins are explorers.  
 D. Amar is taller than Akbar. Anthony is shorter than Amar. Akbar is shorter than Anthony.  
 (a) A only (b) B only (c) B and C (d) None of the above
14. A. A few farmers are rocket scientists. Some rocket scientists catch snakes. A few farmers catch snakes (1999)  
 B. Poonam is a kangaroo. Some kangaroos are made of teaks. Poonam is made of teak.  
 C. No bulls eat grass. All matadors eat grass. No matadors are bulls.  
 D. Some skunks drive cadillacs. All skunks are polar bears. Some polar bears drive cadillacs  
 (a) B only (b) A and C (c) C only (d) C and D



**Directions for Questions 1 to 3 : A robot moves on a co-ordinate plane as per the following instructions :**

GOTO(x,y)	Robot directly moves to the point (x,y) from its initial position.
WALKX(p)	Robot moves the distance 'p' parallel to the X - axis in the positive X direction for positive values of p and in the negative X direction for negative values of p.
WALKY(p)	Robot moves the distance 'p' parallel to the Y - axis in the positive Y direction for positive values of p and in the negative Y direction for negative values of p.

1. Robot reaches (6,6) following the given set of instructions (1999)  
 (i) GOTO (x,y) ; (ii) WALKX(2) ; (iii) WALKY (4)  
 Find out position of the robot after instruction (i).  
 (a) (2,4) (b) (4,2) (c) (-4,-2) (d) Both (b) & (c)
2. If use of GOTO instruction is not allowed & the robot is currently at (x ,y) such that  $x \neq 0, y \neq 0$ , then what is the minimum number of instructions required to bring the robot to origin? (1999)  
 (a) 1 (b) 2 (c) 3 (d) 4
3. Robot goes from point A(2,6) to point B( 7, 6) to point C (2, -4) and then back to point A. Which of the following points doesn't lie on the path of the Robot? (1999)  
 (a) (2,0) (b) (3,6) (c) (0,6) (d) (4,0)

**Directions for questions 4 & 5 : Read the information given below and answer the questions that follow :**

There are three vessels A, B and C with capacities 5, 3 and 2 respectively. There is a computer program that can perform certain functions as described below:

Drain (Y) : drains the liquid in a vessel Y.

Fill (X, Y) : fill amount from Y into X such that the amount of liquid withdrawn from Y is equal to the liquid in X.

Empty (X,Y) : empty amount from Y into X such that the amount left in Y is equal to the amount of liquid in X.

4. The following operations are performed in succession (2000)

1. Fill k(C,A)
2. ....
3. Fill (C,A)

What should the second operation be if after the three operations A should contain one litre of liquid ?

- (a) Empty (C, B) (b) Empty (B, C) (c) Fill (C, B) (d) Fill (B, C)
5. In addition to the three operations in above problem, the fourth operation performed is Drain A. What operations should follow so that A contains four litres of liquid ? (2000)
- (a) Empty (B,A) , Drain (c) (b) Empty (B,A), Empty (C,A)  
 (c) Fill (B,A), Fill (C,A) (d) Fill (A,B), Fill (A,C)

## ANSWERS WITH SOLUTIONS

### TYPE - A

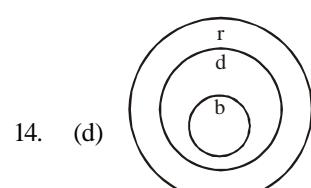
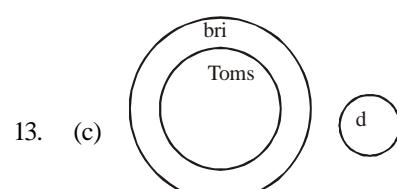
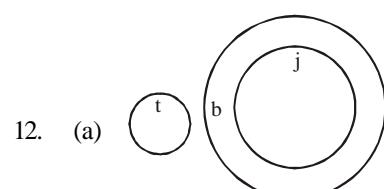
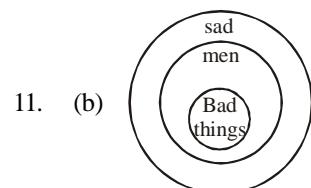
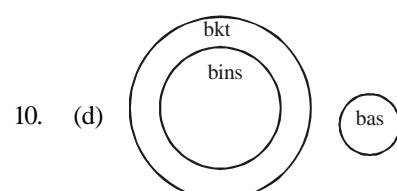
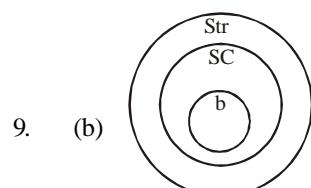
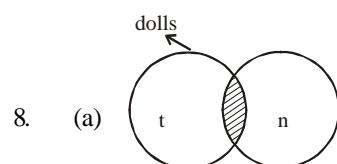
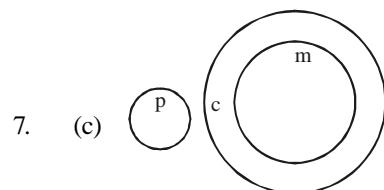
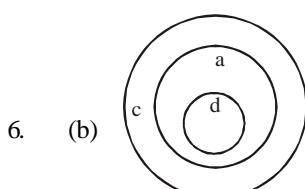
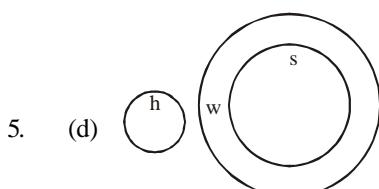
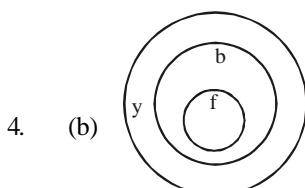
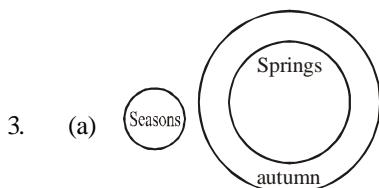
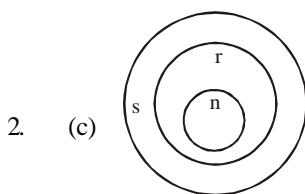
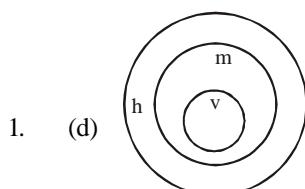
1. (c) Clearly out of the four statements C and D are facts as they already exist and are known.  
B is a judgement as it is an opinion that it will be a good idea. A is an inference as it is a logical conclusion of the fact that the world is moving towards free trade (liberalisation).
2. (a) A is clearcut an opinion (judgement) about somebody else's decision. D is a conclusion (inference) about the minister's future action. B and C are facts as C is something known and B is a known matter of direct observation.
3. (a) A and D are judgements as they talk about two opinions/solutions in a specific situation. B is a fact as it is known. C is an inference as it is clearly a logical conclusion.
4. (b) B is clearly a fact - something known/observed. D is inference - logical conclusion - as quality will go down if manufacturers took undue advantage of the situation. A and C are judgements.
5. (d) A is a fact because we know that profits won't come until the bank agrees. C is also a fact as it is a known observation. D is a clear cut lesson/inference. B is a judgement as "If we would have done this, it wouldn't have happened" - an opinion.
6. (c) B is a fact - something known to be true. C is an inference as it is clearly dependent on the fact B. A and D are judgements.
7. (a) Out of the four statements, only B can be a fact. A and D are judgements as they are opinions. C is an inference.
8. (b) B and D are facts – D is clearly a study report and B is an observation. Clearly C is inference (clear from the language, "Assuming the above to be true). A is a judgement.
9. (c) A and D are facts. B is an inference based on the fact A (prices are falling because of reductions in import duties). C is a judgement as it is an estimate.
10. (d) A is not a fact but a judgement (clear from the language 'it appears'). C and D are facts. B is an inference based on the fact C.
11. (e) The first statement is a judgement, it uses the modal 'should' which has a judgemental, dogmatic use. The statement shows an opinion on the 'erroneous belief' and, thus, is a judgement made by the writer. This eliminates option (d). The second statement is a fact. It gives us a piece of information, statistics, figures, plain verifiable truth. Infact, the statement begins with 'The truth is that' and continues to give figures on days needed to start a small business. Thus, option (c) is eliminated. The third statement is not a fact, it does not give information but an opinion, it is a judgement. It is neither a verifiable truth nor a conclusion drawn from other statements but an opinion, thus, the third

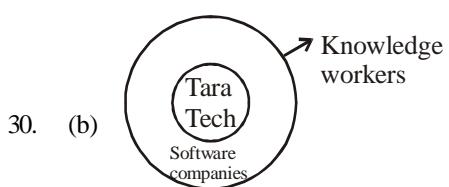
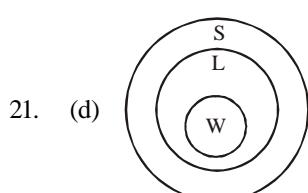
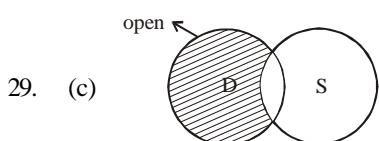
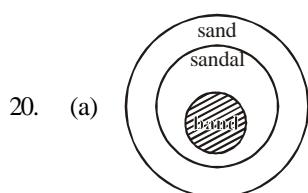
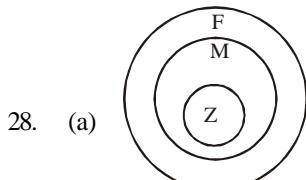
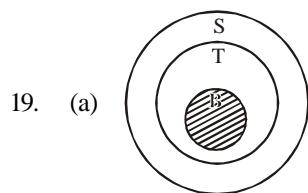
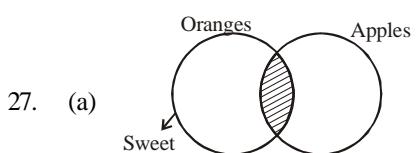
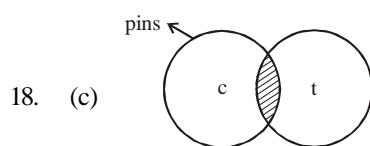
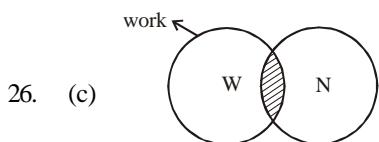
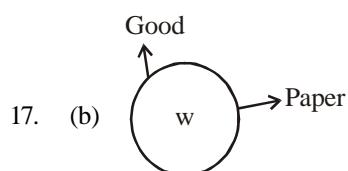
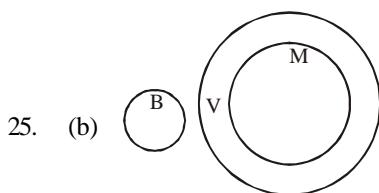
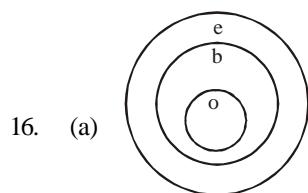
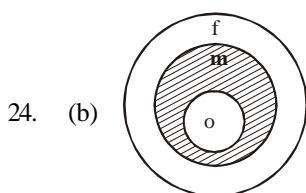
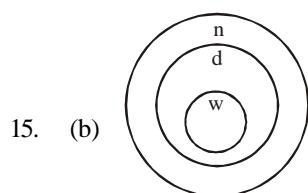
statement is a judgement. So, we have only to choose between (b) and (e). The last statement is an inference as it is a conclusion drawn from facts. 'Contact with official' and 'money changing hands' are known truths about Red tapeism on basis of which this conclusion is drawn. Thus, (e) is the right answer.

12. (d) The first statement is an inference, a conclusion drawn from the given statements. The given information is mentioned in the statement - 'the poor quality of service in public sector' and the conclusion drawn, thus, is 'HIV/AIDS affected should be switching to private initiatives'. The second statement is a fact, it's a verifiable truth stating statistics and figures about the time since free drugs have been supplied by the government, number of benefitted people etc. The third statement is an inference statement, a conclusion based on given facts. The facts in the statement being 'recent initiatives of networks and companies like AIDS Care Network...' and the conclusion drawn from this is that it 'would lead to availability of much needed drugs....'. The fourth statement is a clear judgement. This statement gives the opinion of the author i.e. the shortage of drugs in India is "Ironical". So, the right answer will be (c).
13. (a) The first statement is an inference, it uses the phrase 'According to all statistical indication', thus, it is a conclusion drawn from the statistical information mentioned in the sentence. The second statement, also, is an inference, use of the word. 'Thus' shows it is a conclusion. The first part of the statement is a given fact while the second part is the drawn conclusion, so, the statement is an inference. The third statement is a fact, it states figures, statistics and gives plain, true information. The fourth statement is a judgement. It is not a fact for it does not give verifiable information. It can be confused as an inference but one should keep in mind that the statement is not a conclusion drawn from given facts but a personal opinion of the writer. The writer believes that the goal of universalisation of elementary education should be evolution and development of the country. Thus, it is a judgement. Thus, the correct answer is (a).
14. (b) The first statement is a judgement, it is not a conclusion derived from objective, known facts but an opinion of the author. The second statement is an inference because it is based on some previously known facts 'we know', conflicts continue to trouble us even without war and the conclusion drawn from this is that they change in character. So, this statement is an inference. The third statement is a judgement. There is no fact stated on basis of which the conclusion is drawn, rather it is simply a personal opinion and not an objective truth. The fourth statement is a fact which gives verifiable information, figures or statistics. Thus, the right answer is (b).

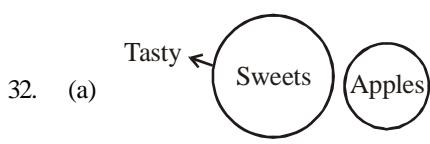
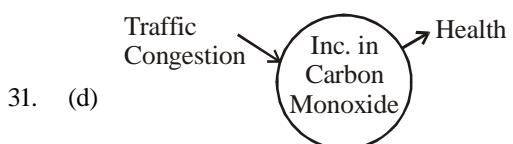
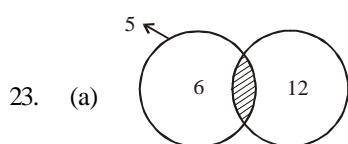
15. (d) The first statement is a judgement though it might appear as an inference on first reading but it is an opinion not a conclusion. A subjective statement is always a judgement while an objective statement can either be a fact or an inference. The second statement is also a judgement. It is a personal opinion, you may or may not agree with this opinion, thus, it is a judgement. The third statement is also a judgement, this too an opinion of the writer and not an objective statement. The fourth statement is also a judgement, it is an author's opinion that doing what you love makes each moment a celebration. So, all the four statements are judgements. Thus, answer is (d).

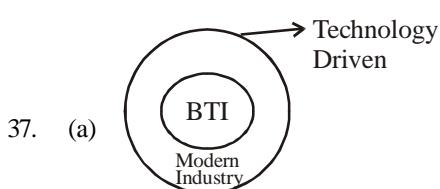
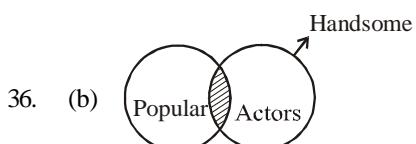
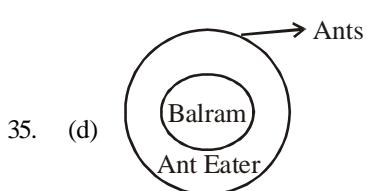
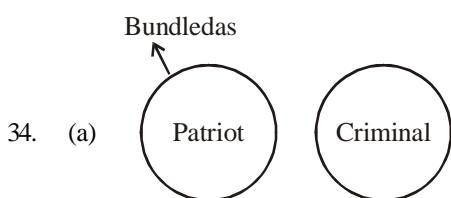
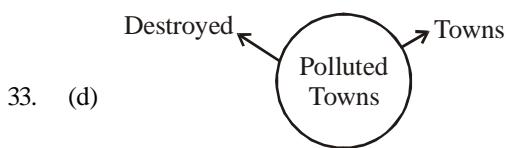
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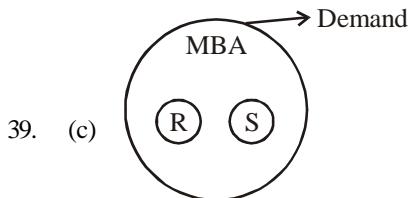


22. (a) It clearly follow from :  $A \subset B \text{ & } B \subset D \Rightarrow A \subset D$





38. (d) None of the options form a logical sequence. It can be verified by drawing venn diagrams.

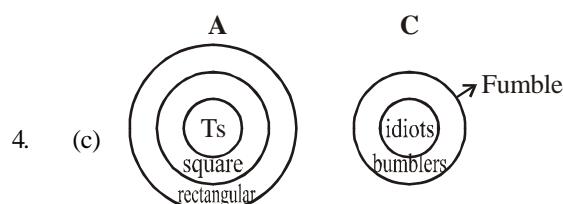
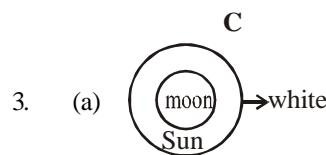
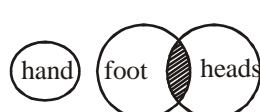
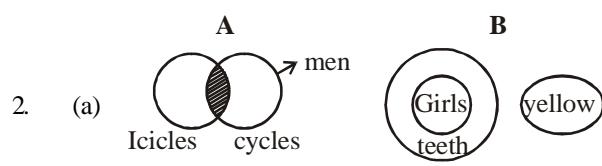
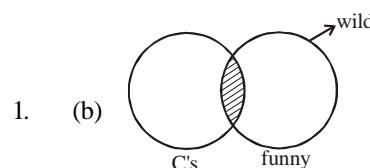


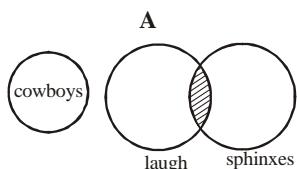
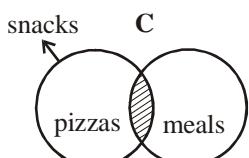
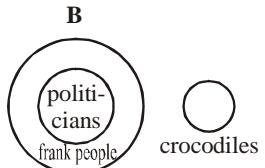
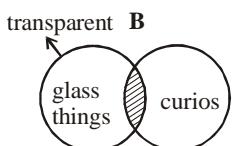
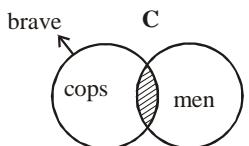
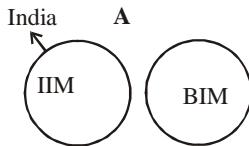
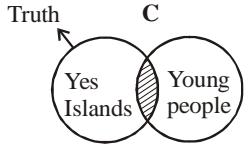
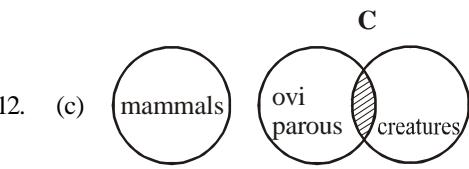
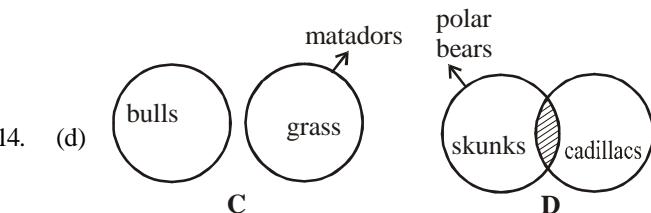
### TYPE - C

- (b) The two statements mean that atleast one of the two, i.e. "Sam is ill" or "he is drunk" is true, which clearly follows in DA.
- (c) The statement means that Ram did not lose sleep if he did not hear of a tragedy. Clearly DB follows. BD is not sure as he might lose sleep because of something as well.
- (d) The two statements mean that atleast one of the two, i.e. "train is late" or "it has derailed" is true, which clearly follows in BC.
- (a) The given statement means, 'I did not have a nightmare if I did not read a story'. CB follows but BC is not sure as he might have a nightmare because of something else.

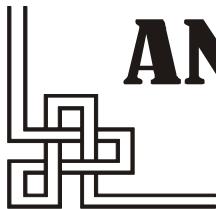
- (b) AD is not correct as rashes can be because of something else as well. The only conclusion which is true is BC, which states that, "I did not get rashes, which definitely means I did not eat berries".
- (b) The given statement means if Sita is not sick, then, she is careless and vice-versa. Clearly option AD follows.
- (d) DC and AC are clearly wrong. AB is not sure. BC is the correct option.
- (b) Clearly BA and DA are wrong. The given statement means if they have confidence, then, they are hostile by nature and vice-versa. So BD follows.
- (d) CD and BD - irrelevant. AB not correct as 'A' must be followed by 'Ram didn't read late in the night'.
- (a) AB is true but BA is not sure. CA is definitely wrong.
- (d) If orangutan is angry he frowns upon the world and vice-versa. Both CB and DA are true.
- (b) If Ravan is not a demon then he is a hero and vice-versa. Clearly BC and DA are correct.
- (d) AB is not sure. Both BA and CD are correct.
- (d) AD is clearly wrong. BA is not sure. Out of DC and AB, DC seems to be more close to the given statement.

### TYPE - D



5. (c) 
6. (a) 
7. (b) 
8. (b) 
9. (d) 
10. (c) 
11. (c) 
12. (c) 
13. (d) Can be found out by drawing Venn diagrams. None is correct.
14. (d) 
- TYPE - E**
- (b) Final Position = (6, 6)  
Position after instruction (ii) = (6, 2)  
Position after instruction (i) = (4, 2)
  - (b) Clearly we use two instructions to reach the origin.  
One condition for X-axis and one condition for Y-axis.
  - (c) Points using on the path of the Robot :  
From A to B : (3, 6), (4, 6), (5, 6), (6, 6)  
From B to C : (6, 4), (5, 2), (4, 0), (3, -2)  
From C to A : (2, -3), (2, -2), (2, -1), (2, 0), ..... (2, 5)  
Hence, (0, 6) doesn't lie on the path.
  - (d) From the first operation Fill (C, A) water is taken out from vessel A and vessel C is filled. Now in the second operation water from the vessel C is filled in vessel B this operation can be written as fill (B,C).
  - (d) After the above steps vessel A has one litre, vessel B and C has two litres each. After drain A it is empty now there can be four liters in A only if the liquids from C and B are emptied into A. This will happen by the commands Fill (A, C) and Fill (A, B).

# 17



# ANALYTICAL REASONING



**Directions for Questions 1 to 4 :** Study the information below and answer questions based on it.

A leading socialite decided to organise a dinner and invited a few of her friends. Only the host and the hostess were sitting at the opposite ends of a rectangular table, with three persons along each side. The pre-requisite for the seating arrangement was that each person must be seated such that atleast on one side it has a person of opposite sex. Maqbool is opposite Shobha, who is not the hostess. Ratan has a woman on his right and is sitting opposite a woman. Monisha is sitting to the hostess's right, next to Dhirubhai. One person is seated between Madhuri and Urmila who is not the hostess. The men were Maqbool, Ratan, Dhirubhai and Jackie, while the women were Madhuri, Urmila, Shobha and Monisha.

1. The eighth person present, Jackie, must be (1994)

I. the host                    II. seated to Shoba's right            III. seated opposite Urmila

(a) I only                    (b) III only                    (c) I and II only                    (d) II and III only

2. Which of the following persons is definitely not seated next to a person of the same sex? (1994)

(a) Maqbool                    (b) Madhuri                    (c) Jackie                    (d) Shobha

3. If Ratan would have exchanged seats with a person four places to his left, which of the following would have been true after the exchange? (1994)

I. No one was seated between two persons of the opposite sex. (e.g. no man was seated between two women)

II. One side of the table consisted entirely of persons of the same sex.

III. Either the host or the hostess changed seats.

(a) I only                    (b) II only                    (c) I and II only                    (d) II and III only

4. If each person is placed directly opposite his or her spouse, which of the following pairs must be married? (1994)

(a) Ratan and Monisha            (b) Madhuri and Dhirubhai            (c) Urmila and Jackie                    (d) Ratan and Madhuri

**Directions for Questions 5 to 7 :** Study the information below and answer questions based on it.

Five of India's leading models are posing for a photograph promoting "y'know, world peace and understanding". But then, Rakesh Shreshtha the photographer is having a tough time getting them to stand in a straight line, because Aishwarya refused to stand next to Sushmita because Sushmita had said something about her in a leading gossip magazine. Rachel and Anu want to stand together because they are "such good friends, y'know". Manpreet on the other hand cannot get along well with Rachel, because there is some talk about Rachel scheming to get a contract already awarded to Manpreet. Anu believes her friendly astrologer who has asked her to stand at the extreme right for all group photographs. Finally, Rakesh managed to pacify the girls and got a beautiful picture of five beautiful girls smiling beautifully in a beautiful straight line, promoting world peace.

5. If Aishwarya is standing to the extreme left, which is the girl standing in the middle? (1994)  
(a) Manpreet (b) Sushmita (c) Rachel (d) Can't say

6. If Aishwarya stands to the extreme left, which is the girl who stands second from left? (1994)  
(a) Can't say (b) Sushmita (c) Rachel (d) Manpreet

7. If Anu's astrologer tells her to stand second from left and Aishwarya decides to stand second from right, then who is the girl standing on the extreme right? (1994)  
(a) Rachel (b) Sushmita (c) Can't say (d) Manpreet

**Directions for Questions 8 to 11 : Study the information below and answer questions based on it.**

A, B, C, D, E, F and G are brothers. Two brothers had an argument and A said to B “You are as old as C was when I was twice as old as D, and will be as old as E was when he was as old as C is now”. B said to A, “You may be older than F but G is as old as I was when you were as old as G is, and D will be as old as F was when F will be as old as G is”.

8. Who is the eldest brother? (1994)  
 (a) A (b) E (c) C (d) Can't be determined
9. Who is the youngest brother? (1994)  
 (a) B (b) D (c) F (d) Can't be determined
10. Which two are probably twins (1994)  
 (a) D and G (b) E and C (c) A and B (d) Can't be determined
11. Which of the following is false? (1994)  
 (a) G has 4 older brothers (b) A is older than G but younger than E  
 (c) B has three older brothers (d) There is a pair of twins among the brothers

**Directions for Questions 12 to 15 : Study the information below and answer questions based on it.**

The primitive tribes-folk of the island of Lexicophobos have recently developed a language for themselves, which has a very limited vocabulary. In fact, the words can be classified into only three types : the Bingoes, the Cingoies and the Dingoes.

The Bingoes type of words are : Grumbs, Harrumphs, Ihavitoo

The Cingoies type of words are : Ihavitoo, Jingongo, Koolodo

The Dingoes type of words are : Lovitoo, Metoo, Nana

They have also devised some rules of grammar :

- I. Every sentence must have only five words
- II. Every sentence must have two Bingoes, one Cingo and two Dingoes.
- III. If Grumbs is used in a sentence, Ihavitoo must also be used and vice versa.
- IV. Koolodo can be used in a sentence only if Lovitoo is also used.

12. Which choice of words in a sentence is not possible, if no rules of grammar are to be violated? (1994)  
 (a) Grumbs and Harrumphs as the Bingoes and Ihavitoo as the Cingo  
 (b) Harrumphs and Ihavitoo as the Bingoes  
 (c) Grumbs and Ihavitoo as the Bingoes and Lovitoo and Nana as the Dingoes  
 (d) Metoo and Nana as the Dingoes
13. If Grumbs and Harrumphs are the Bingoes in a sentence, and no rule of grammar is violated, which of the following is/are true? (1994)  
 I. Ihavitoo is the Cingo  
 II. Lovitoo is the Dingo  
 III. Either Lovitoo or Metoo must be one of - or both - the Dingoes  
 (a) I only (b) II only (c) III only (d) I & III only
14. Which of the following is a possible sentence if no grammar rule is violated? (1994)  
 (a) Grumbs harrumphs ihavitoo lovitoo metoo (b) Grumbs harrumphs ihavitoo jingongo lovitoo  
 (c) Harrumphs ihavitoo jingongo lovitoo metoo (d) Grumbs ihavitoo koolodo metoo nana
15. If in a sentence Grumbs is the Bingo and no rule of grammar is violated, which of the following can be true? (1994)  
 (a) Harrumphs must be a Bingo (b) Ihavitoo must be a Bingo  
 (c) Lovitoo must be used (d) All three Bingoes are used.

**Directions for Questions 16 to 19 : Study the information below and answer questions based on it.**

Bankatlal works x hours a day and rests y hours a day. This pattern continues for 1 week, with an exactly opposite pattern next week, and so on for four weeks. Every fifth week he has a different pattern. When he works longer than he rests, his wage per hour is twice what he earns per hour when he rests longer than he works.

The following are his daily working hours for the weeks numbered 1 to 13

	<i>1st week</i>	<i>5th week</i>	<i>9th week</i>	<i>13th week</i>
<b>Rest</b>	<b>2</b>	<b>3</b>	<b>4</b>	--
<b>Work</b>	<b>5</b>	<b>7</b>	<b>6</b>	<b>8</b>

A week consists of six days and a month consists of 4 weeks

16. If Bankatlal is paid Rs. 20 per working hour in the 1st week, what is his salary for the 1st month? (1994)  
 (a) 1440 (b) 2040 (c) 1320 (d) 1680
17. Referring to the data given in previous question, Bankatlal's average monthly salary at the end of the first four months will be (1994)  
 (a) 1760 (b) 2040 (c) 1830 (d) 1680
18. The new manager Khushaldas stipulated that Rs 5 be deducted for every hour of rest and Rs 25 be paid per hour starting 9th week, then what will be the change in Bankatlal's salary for the 3rd month? (Hourly deductions and salaries are constant for all weeks starting 9th week) (1994)  
 (a) 540 (b) 480 (c) 240 (d) 0
19. Using the data in the previous questions, what will be the total earning of Bankatlal at the end of sixteen weeks (1994)  
 (a) 7320 (b) 7800 (c) 8400 (d) 7680

**Directions for Questions 20 to 23 : Study the information below and answer questions based on it.**

Four sisters Suvarna, Tara, Uma and Vibha are playing a game such that the loser doubles the money of each of the other players. They played four games and each sister lost one game in alphabetical order. At the end of fourth game each sister had Rs 32.

20. Who started with the lowest amount? (1995)  
 (a) Suvarna (b) Tara (c) Uma (d) Vibha
21. Who started with the highest amount? (1995)  
 (a) Suvarna (b) Tara (c) Uma (d) Vibha
22. What was the amount with Uma at the end of the second round? (1995)  
 (a) 36 (b) 72 (c) 16 (d) None of these.
23. How many rupees did Suvarna start with? (1995)  
 (a) 60 (b) 34 (c) 66 (d) 28

**Directions for Questions 24 to 28 : Study the information below and answer questions based on it.**

Machine M1 as well as Machine M2 can independently produce either Product P or Product Q. The times taken by machines M1 and M2 (in minutes) to produce one unit of product P and Q are given in the table below : (Each machine works 8 hours per day).

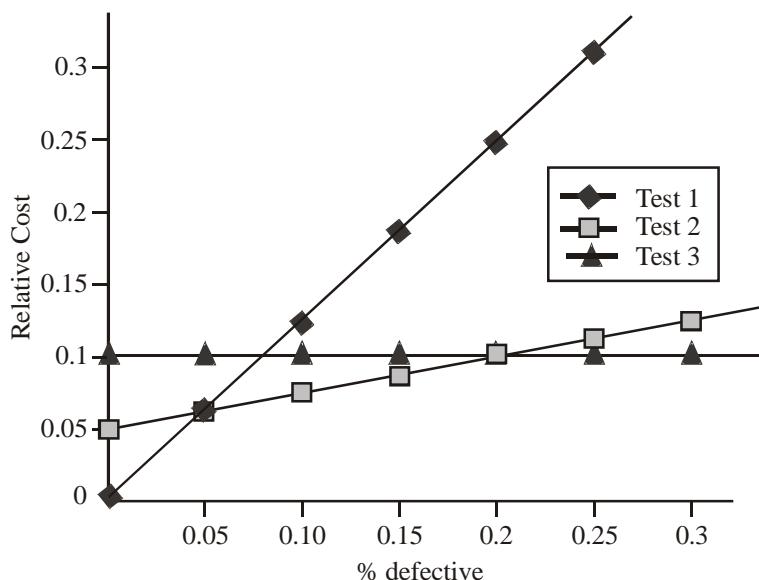
Product	M1	M2
P	10	8
Q	6	6

24. What is the maximum number of units that can be manufactured in one day? (1995)  
 (a) 140 (b) 160 (c) 120 (d) 180
25. If the number of units of P are 3 times that of Q, what is the minimum idle time for maximum total units manufactured? (1995)  
 (a) 0 minutes (b) 24 minutes (c) 1 hour (d) 2 hours

26. If equal quantities of both are to be produced, then out of the four choices given below, the least efficient way would be ... (1995)
- (a) 48 of each with 3 minutes idle (b) 64 of each with 12 minutes idle  
(c) 53 of each with 10 minutes idle (d) 71 of each with 9 minutes idle
27. If M1 works at half its normal efficiency, what is the maximum number of units produced, if at least one unit of each must be produced? (1995)
- (a) 96 (b) 89 (c) 100 (d) 119
28. What is the least number of machine hours required to produce 30 pieces of P and 25 pieces of Q? (1995)
- (a) 6 hours 30 minutes (b) 7 hours 24 minutes (c) 5 hours 48 minutes (d) 4 hours 6 minutes

**Directions for Questions 29 to 33 : Study the information below and answer questions based on it.**

A manufacturer can choose from any of the three types of tests available for checking the quality of his product. The graph that follows gives the relative costs for each of these tests for a given percentage of defective pieces.



29. Adopting Test-2 will be feasible if the percentage of defective pieces (p) lies between (1996)
- (a) 0.10 to 0.20 (b) 0.20 to 0.30 (c) 0.05 to 0.20 (d) 0.00 to 0.05
30. If p is equal to 0.2, then which test will be feasible? (1996)
- (a) either 1 or 2 (b) 2 only (c) 3 only (d) either 2 or 3
31. When will Test-3 be feasible? (1996)
- (a)  $p > 0.2$  (b)  $0.1 < p < 0.2$  (c)  $0.05 < p < 0.1$  (d)  $p < 0.05$
32. When is Test -1 feasible? (1996)
- (a)  $p < 0.05$  (b)  $0.0 < p < 0.2$  (c)  $0.1 < p < 0.2$  (d)  $0.05 < p < 0.2$
33. If  $p < 0.2$ , then the best alternative will be (1996)
- (a) Test -2 (b) Test-3 (c) Test-1 (d) Not Test -3

**Directions for Questions 34 & 35 : Study the information below and answer questions based on it.**

In a locality, there are five small towns, A, B, C, D and E. The distances of these towns from each other are as follows:

AB = 2 km AC = 2 km AD > 2 km AE > 3 km BC = 2 km

BD = 4 km BE = 3 km CD = 2 km CE = 3 km DE > 3 km

34. If a ration shop is to be set up within 2 km of each city, how many ration shops will be required? (1996)
- (a) 2 (b) 3 (c) 4 (d) 5
35. If a ration shop is to be set up within 3 km of each city, how many ration shops will be required? (1996)
- (a) 1 (b) 2 (c) 3 (d) 4

**Directions for Questions 36 to 38 : Study the information below and answer questions based on it.**

A certain race is made up of three stretches A, B and C, each 2 km long, and to be covered by a certain mode of transport. The following table gives these modes of transport for the stretches, and the minimum and maximum possible speeds (in kmph) over these stretches. The speed over a particular stretch is assumed to be constant. The previous record for the race is ten minutes.

<b>A</b>	<b>Car</b>	<b>40</b>	<b>60</b>
<b>B</b>	<b>Motor-cycle</b>	<b>30</b>	<b>50</b>
<b>C</b>	<b>Bicycle</b>	<b>10</b>	<b>20</b>

36. Anshuman travels at minimum speed by car over A and completes stretch B at the fastest. At what speed should he cover stretch C in order to break the previous record? (1997)  
 (a) Max. speed for C (b) Min. speed for C (c) This is not possible (d) None of these
37. Mr. Hare completes the first stretch at the minimum speed and takes the same time for stretch B. He takes 50% more time than the previous record to compete the race. What is Mr. Hare's speed for the stretch C? (1997)  
 (a) 10.9 kmph (b) 13.3 kmph (c) 17.1 kmph (d) None of these
38. Mr. Tortoise completes the race at an average speed of 20 kmph. His average speed for the first two stretches is 4 times that for the last stretch. Find his speed over stretch C (1997)  
 (a) 15 kmph (b) 12 kmph (c) 10 kmph (d) This is not possible

**Directions for Questions 39 & 40 : Study the information below and answer questions based on it.**

The Weirdo Holiday Resort follows a particular system of holidays for its employees. People are given holidays on the days where the first letter of the day of the week is the same as the first letter of their names. All employees work at the same rate.

39. Raja starts working on February 25th, 1996 and finishes the job on March 2nd, 1996. How much time would T and J take to finish the same job if both start on the same day as Raja? (1997)  
 (a) 4 days (b) 5 days (c)  $3\frac{1}{2}$  days (d) Insufficient data
40. Starting on February 25th, 1996, if Raja had finished his job on April 2nd, 1996, when would T and S have completed the job, had they started on the same day as Raja? (1997)  
 (a) March 15th, 1996 (b) March 14th, 1996 (c) March 22nd, 1996 (d) Insufficient data

**Directions for Questions 41 & 42 : Study the information below and answer questions based on it.****Production pattern for no. of units (in cubic feet) per day**

Day	1	2	3	4	5	6	7
No. of units	150	180	120	250	160	120	150

For a truck that can carry 2000 cubic feet, hiring cost per day is Rs 1000. Storing cost per cubic feet is Rs 5 per day.

41. If all the units should be sent to the market, on which days should the truck be hired to minimize the cost? (1998)  
 (a) 2nd, 4th, 6th, 7th (b) 7th (c) 2nd, 4th, 5th, 7th (d) None of these
42. If storage cost reduced to Rs 0.8 per cubic feet per day, then on which days should the truck be hired to minimize the cost? (1998)  
 (a) 4th (b) 7th (c) 4th and 7th (d) None of these

**Directions for Questions 43 to 45 : Study the information below and answer questions based on it.**

A, B, C, D are to be seated in a row. But C and D cannot be together. Also B cannot be at the third place.

43. Which of the following must be false? (1998)  
 (a) A is at the first place (b) A is at the second place (c) A is at the third place (d) A is at the fourth place
44. If A is not at the third place, then C has the following option only (1998)  
 (a) the first place only (b) the third place only  
 (c) the first and the third place only (d) any of the places
45. If A and B are together then which of the following must be necessarily false (1998)  
 (a) C is not at the first place (b) A is at the second place (c) D is at the first place (d) C is at the first place

**Directions for Questions 46 to 48 :** Study the information below and answer questions based on it.

A, B, C, D collected one rupee coins following the given pattern.



**Directions for Questions 49 & 50 :** Study the information below and answer questions based on it.

Amar, Akbar, Anthony are three friends. Only three colors are available for their shirts, viz. Red, Green and Blue. Amar did not wear red shirt. Akbar did not wear green shirt. Anthony did not wear blue shirt.



**Directions for Question 51 :** Study the information and answer question.

51. My son adores chocolates. He likes biscuits. But he hates apples. I told him that he can buy as many chocolates he wishes. But then he must have biscuits twice the number of chocolates and apples more than biscuits and chocolates together. Each chocolate costs Re. 1. The cost of apple is twice of chocolate and four biscuits are worth of one apple. Then which of the following can be the amount that I spent on that evening on my son? (1998)

**Directions for Questions 52 to 55 :** Study the information below and answer questions based on it.

Bankatlal acted as a judge for the beauty contest. There were four participants, viz. Ms. Andhra Pradesh, Ms. Uttar Pradesh, Ms. West Bengal and Ms. Maharashtra. Mrs. Bankatlal, who was very anxious about the result asked him about it as soon as he was back home. Bankatlal just told that the one who was wearing the yellow saree won the contest. When Mrs. Bankatlal pressed for further details, he elaborated as follows:

- I. All of them were sitting in a row
  - II. All of them wore sarees of different colors, viz. Green, Yellow, White, Red
  - III. There was only one runner up and she was sitting beside Ms. Maharashtra
  - IV. The runner up was wearing the Green saree
  - V. Ms. West Bengal was not sitting at the ends and was not a runner up
  - VI. The winner and the runner up are not sitting adjacent to each other
  - VII. Ms. Maharashtra was wearing white saree
  - VIII. Ms. Andhra Pradesh was not wearing the Green saree
  - IX. Participants wearing Yellow saree and White saree were at the ends

52. Who wore the Red saree? (1998)  
 (a) Ms. Andhra Pradesh (b) Ms. West Bengal (c) Ms. Uttar Pradesh (d) Ms. Maharashtra
53. Ms. West Bengal was sitting adjacent to..... (1998)  
 (a) Ms. Andhra Pradesh and Ms. Maharashtra (b) Ms. Uttar Pradesh and Ms. Maharashtra  
 (c) Ms. Andhra Pradesh and Ms. Uttar Pradesh (d) Ms. Uttar Pradesh only
54. Which saree was worn by Ms. Andhra Pradesh? (1998)  
 (a) Yellow (b) Red (c) Green (d) White
55. Who was the runner up? (1998)  
 (a) Ms. Andhra Pradesh (b) Ms. West Bengal (c) Ms. Uttar Pradesh (d) Ms. Maharashtra

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**Directions for Questions 56 to 60 : Study the information below and answer questions based on it.**

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Krishna distributed 10 acre of land to Gopal and Ram who paid him the total amount in the ratio 2:3. Gopal invested further Rs 2 lac in the land and planted coconut and lemon trees in the ratio 5:1 on equal area of land. There were a total of 100 lemon trees. The cost of one coconut was Rs 5. The crop took 7 years to mature and when the crop was reaped in 1997, the total revenue generated was 25% of the total amount put in by Gopal and Ram together. The revenue generated from the coconut and lemon trees was in the ratio 3:2 and it was shared equally by Gopal and Ram as the initial amount spent by them were equal.

56. What was the total output of coconuts? (1998)  
 (a) 24000 (b) 36000 (c) 18000 (d) 48000
57. What was the value of output per acre of lemon trees planted (in lakh/ acre )? (1998)  
 (a) 0.72 (b) 2.4 (c) 24 (d) Cannot be determined
58. What was the amount received by Gopal in 1997? (1998)  
 (a) Rs1.5 lac (b) Rs 3.0 lac (c) Rs 6 lac (d) None of these
59. What was the value of output per tree for coconuts? (1998)  
 (a) 36 (b) 360 (c) 3600 (d) 240
60. What was the ratio of yields per acre of land for coconuts and lemons? (1998)  
 (a) 3:2 (b) 2:3 (c) 1:1 (d) Cannot be determined

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**Directions for Questions 61 & 62 : Study the information below and answer questions based on it.**

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There are six people A, B, C, D, E and F. Two of them are housewives, one is an accountant, one is an architect, one is a lawyer and one is a lecturer. A, the lawyer is married to D & E is not the housewife. None of the females is the architect or the accountant. There are two married couples. C is the accountant, Married to the lecturer F.

61. What is the profession of E (1999)  
 (a) Accountant (b) Lecturer (c) Architect (d) None of these
62. How many males are there (1999)  
 (a) 2 (b) 3 (c) 4 (d) can't be determined

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**Directions for Questions 63 to 66 : Study the information below and answer questions based on it.**

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Ten coins are distributed among four people P,Q,R & S such that if one person gets n coins, second gets (n+1), third gets (n+2) and so on but not necessarily in the same order. Q gets more coins than P and S gets fewer coins than R.

63. If P gets even number of coins which one of them is necessarily true (1999)  
 (a) Sum of P & Q is 5 (b) Sum of P & R is 5  
 (c) Sum of Q & R is more than 5 (d) Sum of P & Q is multiple of 3
64. If R gets two coins more than S but maximum number of coins which of the following is necessarily true (1999)  
 (a) Sum of P & S is 4 (b) Sum of R & S is 4 (c) Sum of P & Q is 5 (d) All of these

65. If Q gets twice the number of coins given to P which of the following is necessarily true? (1999)  
 (a) S can have only odd values (b) S can have both even as well as odd values  
 (c) Sum of P & S is 4 (d) Only R can have both even as well as odd values
66. If R receives 3 coins then number of coins received by Q is (1999)  
 (a) 2 (b) 3 (c) 4 (d) All of these

**Directions for Questions 67 & 68 : Study the information below and answer questions based on it.**

Seven players A, B, C, D, E, F & G have to take dinner sitting on the same side of a rectangular table. Both A & G want to leave early so they must sit on the extreme right positions. B has to receive the man of the match award so he must sit in the middle. C & D don't like each other so they must sit as far from each other as possible. E & F are very good friends & so they must sit together. With the help of this information answer the following questions.

67. Which of the following two person can not sit together (1999)  
 (a) C & A (b) G & C (c) E & F (d) E & G
68. Which of the following persons can not sit on either of the extreme positions (1999)  
 (a) A (b) D (c) G (d) F

**Directions for Questions 69 to 71 : Study the information below and answer questions based on it.**

On the bank of a river there are four deities. Sandhya went there with x flowers. Before offering the flowers she dips them in the river & they get doubled. Now she offers y flowers to the first deity & dips the remaining flowers in the river so that they get doubled again. She offers y flowers to the second deity as well & repeats the same process for 3<sup>rd</sup> & 4<sup>th</sup> deity. After offering flowers to the 4th deity, she realises that she is left with no flowers at all.

69. If she started with 30 flowers. How many flowers did she offer to each deity? (1999)  
 (a) 30 (b) 31 (c) 32 (d) 33
70. What is the minimum number of flowers she could have offered to each deity (1999)  
 (a) 15 (b) 16 (c) 18 (d) Indeterminable
71. What is the minimum number of flowers she could have started with (1999)  
 (a) 15 (b) 16 (c) 18 (d) Indeterminable

**Directions for Questions 72 to 74 : Study the information below and answer questions based on it.**

Ghosh Babu goes to a casino in Kay - Kay islands where he comes across an interesting game of cards. The visitor playing the game is called the player & the clubman is called the dealer. The rules of the game are as follows: First the player picks the card. This card is called the base card & the number on the face of the card is called the base value of the card. Ace, King, Queen & Jack all have base value of 10. The dealer pays the player same number of rupees as the base value of the card. Now the dealer picks a card &. This is called the top card. If topcard is of the same suite then the player pays the dealer double the amount of base value. If it is of the same colour but not the same suite then the player pays the dealer the amount of a bse value. If it is of different colour then the dealer pays the player the amount of base value.

Ghosh Babu plays the game 4 times. First time, he draws 8 of club & the dealer draws jack of club. Second time he draws 10 of hearts & the dealer draws 2 of spade. Third time he draws 6 of diamond & the dealer draws 1 of heart. Finally, Ghosh Babu draws 8 of spade and the dealer draws ace of the spade.

72. If Ghosh Babu should leave the game when his profit is maximum then what is that profit (1999)  
 (a) 12 (b) 18 (c) 20 (d) None of these
73. If Ghosh Babu did not have to borrow any money from anyone then what is the minimum amount that he could have started with (1999)  
 (a) 16 (b) 24 (c) 8 (d) None of these
74. If Ghosh Babu is left with 100 rupees now what is the amount that he had started with (1999)  
 (a) 120 (b) 104 (c) 96 (d) None of these

No.	Nautanki	Duration	Show Times
1.	Sati-Savitri	1 hour	9:00 a.m. and 2:00 p.m.
2.	Joru ka Ghulam	1 hour	10:30 a.m. and 11:30 a.m.
3.	Sundar Kand	30 minutes	10:00 a.m. and 11:00 a.m.
4.	Veer Abhimanyu	1 hour	10:00 a.m. and 11:00 a.m.
5.	Reshma aur Shera	1 hour	9:30 a.m., 12:00 noon and 2:00 p.m.
6.	Jhansi ki Rani	30 minutes	11:00 a.m. and 1:30 p.m.

You like to see all the six nautankis. Further, you wise to ensure that you get a lunch break from 12:30 p.m. to 1:30 p.m. Which of the following ways can you do this?

- (a) *Sati-Savitri* is viewed first; *Sunder kand* is viewed third and *Jhansi Ki Rani* is viewed last.

(b) *Sati-Savitri* is viewed last; *Veer Abhimanyu* is viewed third and *Reshma aur Shera* is viewed first.

(c) *Sati-Savitri* is viewed first; *Sunder Kand* is viewed third and *Joru ka Ghulam* is viewed fourth.

(d) *Veer Abhimanyu* is viewed third; *Reshma aur Shera* is viewed fourth and *Jhansi ki Rani* is viewed fifth.

82. Mrs. Ranga has three children and has difficulty remembering their ages and the months of their birth. The clues below may help her remember (2001)

* The boy, who was born in June, is 7 years old	* One of the children is 4 years old, but it is not Anshuman
* Vaibhav is older than Suprita	* One of the children was born in September, but it was not Vaibhav
* Suprita's birthday is in April	* The youngest child is only 2 years old.

- Based on the above clues, which one of the following statements is true?
- (a) Vaibhav is the oldest, followed by Anshuman who was born in September, and the youngest is Suprita who was born in April.  
 (b) Anshuman is the oldest being born in June, followed by Suprita who is 4 years old, and the youngest is Vaibhav who is 2 years old  
 (c) Vaibhav is the oldest being 7 years old, followed by Suprita who was born in April, and the youngest is Anshuman who was born in September  
 (d) Suprita is the oldest who was born in April, followed Vaibhav who was born in June, and Anshuman who was born in September.
83. The Bannerjees, the Sharmas, and the Pattabhiramans each have a tradition of eating Sunday lunch as a family. Each family serves a special meal at a certain time of day. Each family has a particular set of chinaware used only for this meal. Use the clues below to answer the following question **(2001)**
- \* The Sharma family eats at noon \* The family that serves fried brinjal uses blue chinaware  
 \* The Bannerjee family eats at 2 o'clock \* The family that serves sambar does not use red chinaware  
 \* The family that eats at 1 o'clock serves fried brinjal \* The Pattabhiraman family does not use white chinaware  
 \* The family that eats last likes makkai-ki-roti
- Which one of the following statements is true?
- (a) The Bannerjees eat makkai-ki-roti at 2 o'clock, the Sharmas eat fried brinjal at 12 o'clock and the Pattabhiramans eat sambar from red chinaware.  
 (b) The Sharmas eat sambar served in white chinaware, the Pattabhiramans eat fried brinjal at 1 o'clock, and the Bannerjees eat makkai-ki-roti served in blue chinaware.  
 (c) The Sharmas eat sambar at noon, the Pattabhiramans eat fried brinjal served in blue chinaware, and the Bannerjees eat makkai-ki-roti served in red chinaware.  
 (d) The Bannerjees eat makkai-ki-roti served in white chinaware, the Sharmas eat fried brinjal at 12 o'clock and the Pattabhiramans eat sambar from red chinaware.
84. While Balbir had his back turned, a dog ran into his butcher shop, snatched a piece of meat of the counter and ran out. Balbir was mad when he realised what had happened. He asked three other shopkeepers, who had seen the dog, to describe it. The shopkeepers really didn't want to help Balbir. So each of them made a statement which contained one truth and one lie **(2001)**
- \* Shopkeeper Number 1 said - "The dog had black hair and a long tail".  
 \* Shopkeeper Number 2 said - "The dog had a short tail and wore a collar."  
 \* Shopkeeper Number 3 said - "The dog had white hair and no collar."
- Based on the above statements, which of the following could be a correct descriptions?
- (a) The dog had white hair, short tail and no collar (b) The dog had white hair, long tail and a collar  
 (c) The dog had black hair, long tail and a collar (d) The dog had black hair, long tail and no collar
- 
- Directions for Questions 85 & 87 : Answer the following questions based on the information given below.**
- Elle is three times older than Yogesh. Zaheer is half the age of Wahida. Yogesh is older than Zaheer.
85. Which of the following can be inferred? **(2001)**
- (a) Yogesh is older than Wahida. (b) Elle is older than Wahida  
 (c) Elle may be younger than Wahida. (d) None of the above
86. Which of the following information will be sufficient to estimate Elle's age? **(2001)**
- (a) Zaheer is 10 years old  
 (b) Both Yogesh and Wahida are older than Zaheer by the same number of years  
 (c) Both (a) and (b) above  
 (d) None of the above

87. P, Q, R, S are four statements. Relation between these statements is as follows (1998)
- If P is true then Q must be true  
 If Q is true then R must be true  
 If S is true then either Q is false or R is false  
 Then which of the following must be true.
- (a) If P is true then S is false  
 (b) If S is false then Q must be true  
 (c) If Q is true then P must be true  
 (d) If R is true then Q must be true

**Directions for Questions 88 to 90 : Study the information below and answer questions based on it.**

A group of three or four has to be selected from seven persons. Among the seven are two women: Fiza and Kavita, and five men : Ram, Shyam, David, Peter and Rahim. Ram would not like to be in the group if Shyam is also selected. Shyam and Rahim want to be selected together in the group. Kavita would like to be in the group only if David is also there. David, if selected, would not like Peter in the group. Ram would like to be in the group only if Peter is also there. David insists that Fiza be selected in case he is there in the group.

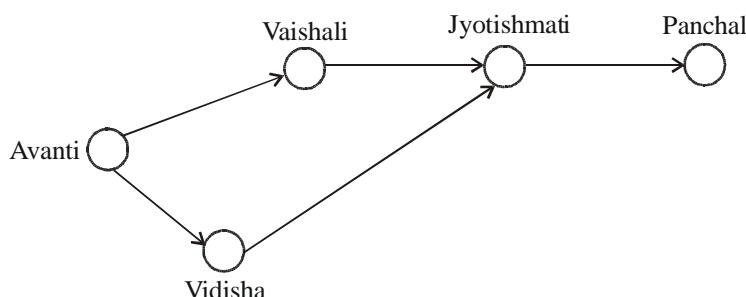
88. Which of the following is a feasible group of three? (2001)
- (a) David, Ram, Rahim      (b) Peter, Shyam, Rahim      (c) Kavita, David, Shyam      (d) Fiza, David, Ram
89. Which of the following is a feasible group of four? (2001)
- (a) Ram, Peter, Fiza, Rahim      (b) Shyam, Rahim, Kavita, David  
 (c) Shyam, Rahim, Fiza, David      (d) Fiza, David, Ram, Peter
90. Which of the following statements is true? (2001)
- (a) Kavita and Ram can be part of a group of four      (b) A group of four can have two women  
 (c) A group of four can have all four men      (d) None of these
91. On her walk through the park, Hamsa collected 50 coloured leaves, all either maple or oak. She sorted them by category when she got home, and found the following : (2001)
- \* The number of red oak leaves with spots is even and positive
  - \* The number of red oak leaves without any spot equals the number of red maple leaves without spots
  - \* All non-red oak leaves have spots, and there are five times as many of them as there are red spotted oak leaves
  - \* There are no spotted maple leaves that are not red
  - \* There are exactly 6 red spotted maple leaves
  - \* There are exactly 22 maple leaves that are neither spotted nor red
- How many oak leaves did she collect?
- (a) 22      (b) 17      (c) 25      (d) 18
92. Eight people carrying food baskets are going for a picnic on motorcycles. Their names are A, B, C, D, E, F, G and H. They have four motorcycles, M1, M2, M3, and M4 among them. They also have four food baskets O, P, Q, and R of different sizes and shapes and each can be carried only on motorcycles M1, M2, M3, or M4, respectively. No more than two persons can travel on motorcycle and no more than one basket can be carried on a motorcycle. There are two husband - wife pairs in this group of eight people and each pair will ride on a motorcycle together. C cannot travel with A or B. E cannot travel with B or F. G cannot travel with F, or H, or D. The husband-wife pairs must carry baskets O and P. Q is with A and P is with D. F travels on M1 and E travels on M2 motorcycles. G is with Q, and B cannot go with R. Who is travelling with H? (2001)
- (a) A      (b) B      (c) C      (d) D
93. In a family gathering there are two males who are grandfathers and four males who are fathers. In the same gathering there are two females who are grandmothers and four females who are mothers. There is at least one grandson or granddaughter present in this gathering. There are two husband-wife pairs in this group. These can either be a grandfather and a grandmother, or a father and a mother. The single grandfather (whose wife is not present) has two grandsons and a son present. The single grandmother (whose husband is not present) has two granddaughters and a daughter present. A grandfather or a grandmother present with their spouses does not have any grandson or grand daughter present. What is the minimum number of people present in this gathering. (2001)
- (a) 10      (b) 12      (c) 14      (d) 16

94. I have a total of Rs. 1000. Item A costs Rs. 110, item B costs Rs 90, C costs Rs 70, item D costs Rs 40 and item E costs Rs 45. For every item D that I purchase, I must also buy two of item B. For every item A, I must buy one of item C. For every item E, I must also buy two of item D and one of item B. For every item purchased I earn 1000 points and for every rupee not spent I earn a penalty of 1500 points. My objective is to maximise the points I earn. What is the number of items that I must purchase to maximise my points? (2001)
- (a) 13 (b) 14 (c) 15 (d) 16
95. Four friends Ashok, Bashir, Chirag and Deepak are out shopping. Ashok has less money than three times the amount that Bashir has. Chirag has more money than Bashir. Deepak has an amount equal to the difference of amounts with Bashir and Chirag. Ashok has three times the money with Deepak. They each have to buy at least one shirt, or one shawl, or one sweater, or one jacket that are priced Rs 200, Rs 400, Rs 600 and Rs 1000 a piece, respectively. Chirag borrows Rs 300 from Ashok and buys a jacket. Bashir buys a sweater after borrowing Rs 100 from Ashok and is left with no money. Ashok buys three shirts. What is the costliest item that Deepak could buy with his own money? (2001)
- (a) A shirt (b) A shawl (c) A sweater (d) A jacket
96. In a “keep-fit” gymnasium class there are fifteen females enrolled in a weight - loss program. They all have grouped in any one of the five weight-groups W1, W2, W3, W4 and W5. One instructor is assigned to one weight-group only. Sonali, Shalini, Shubhra, and Shahira belong to the same weight-group. Sonali and Rupa are in one weight-group, Rupali and Renuka are also in one weight-group. Rupa, Radha, Renuka, Ruchika, and Ritu belong to different weight-groups. Somya cannot be with Ritu, and Tara cannot be with Radha. Komal cannot be with Radha, Somya, or Ritu. Shahira is in W1 and Somya is in W4 with Ruchika. Sweta and Jyotika cannot be with Rupali, but are in a weight-group with total membership of four. No weight-group can have more than five or less than one member. Amita, Babita, Chandrika, Deepika and Elina are instructors of weight-groups with membership sizes 5, 4, 3, 2, and 1, respectively. Who is the instrutor of Radha? (2001)
- (a) Babita (b) Elina (c) Chandrika (d) Deepika
97. A king has unflinching loyalty from eight of his ministers M1 to M8, but he has to select only four to make a cabinet committee. He decides to choose these four such that each selected person shares a liking with at least one of the other three selected. The selected persons must also hate at least one of the likings of any of the other three persons selected (2001)
- M1 likes fishing and smoking, but hates gambling,  
 M2 likes smoking and drinking, but hates fishing,  
 M3 likes gambling, but hates smoking,  
 M4 likes mountaineering , but hates drinking,  
 M5 likes drinking, but hates smoking and mountaineering  
 M6 likes fishing, but hates smoking and mountaineering  
 M7 likes gambling and mountaineering, but hates fishing, and  
 M8 likes smoking and gambling, but hates mountaineering.
- Who are the four people selected by the king?
- (a) M1, M2, M5, M6 (b) M3, M4, M5, M6 (c) M4, M5, M6, M8 (d) M1, M2, M4, M7

**Directions for questions 98 to 100 : Read the information given below and answer the questions that follow :**

Answer these question based on the pipeline diagram below.

The following sketch shows the pipelines carrying material from one location to another. Each location has a demand for material. The demand at Vaishali is 400, at Jyotishmati is 400, at Panchal is 700, and at Vidisha is 200. Each arrow indicates the direction of material flow through the pipeline. The flow from Vaishali to Jyotishmati is 300. The quantity of material flow is such that the demands at all these locations are exactly met. The capacity of each pipeline is 1000.



98. The quantity moved from Avanti to Vidisha is (2001)  
 (a) 200 (b) 800 (c) 700 (d) 1000
99. The free capacity available at the Avanti - Vaishali pipeline is (2001)  
 (a) 0 (b) 100 (d) 200 (d) 300
100. What is the free capacity available in the Avanti - Vidisha pipeline? (2001)  
 (a) 300 (b) 200 (c) 100 (d) 0
101. Four students (Ashish, Dhanraj, Felix and Sameer) sat for the Common Entrance Exam for Management (CEEM). One student got admission offers from three National Institutes of Management (NIM), another in two NIMs, the third in one NIM, while the fourth got none. Below are some of the facts about who got admission offers from how many NIMs and what is their educational background (2002)  
 (i) The one who is an engineer didn't get as many admissions as Ashish  
 (ii) The one who got offer for admissions in two NIMs isn't Dhanraj nor is he a chartered accountant  
 (iii) Sameer is an economist  
 (iv) Dhanraj isn't an engineer and received more admission offers than Ashish  
 (v) The medical doctor got the most number of admission offers  
 Which one of the following statements is necessarily true?  
 (a) Ashish is a chartered accountant and got offer for admission in three NIMs  
 (b) Dhanraj is a medical doctor and got admission offer in one NIM  
 (c) Sameer is an economist who got admission offers in two NIMs  
 (d) Felix who is not an engineer did not get any offer for admission
102. Five boys went to a store to buy sweets. One boy had Rs 40. Another boy had Rs30. Two other boys had Rs20 each. The remaining boy had Rs10. Below are some more facts about the initial and final cash positions (2002)  
 (i) Alam started with more than Jugraj  
 (ii) Sandeep spent Rs 1.50 more than Daljeet  
 (iii) Ganesh started with more money than just only one other person  
 (iv) Daljeet started with 2/3 of what Sandeep started with  
 (v) Alam spent the most, but did not end with the least  
 (vi) Jugraj spent the least and ended with more than Alam or Daljeet  
 (vii) Ganesh spent Rs 3.50.  
 (viii) Alam spent 10 times more than what Ganesh did.  
 In the choices given below, all statements except one are false. Which one of the following statements can be true?  
 (a) Alam started with Rs 40 and ended with Rs9.50 (b) Sandeep started with Rs 30 and ended with Rs 1.00  
 (c) Ganesh started with Rs 20 and ended with Rs 4.00 (d) Jugraj started with Rs 10 and ended with Rs 7.00
103. In a hospital there were 200 Diabetes, 150 Hyperglycaemia and 150 Gastro-enteritis patients. Of these, 80 patients were treated for both Diabetic and Hyperglycaemia. Sixty patients were treated for Gastro-enteritis and Hyperglycaemia, while 70 were treated for Diabetes and Gastro-enteritis. Some of these patients have all the three diseases. Doctor Dennis treats patients with only Diabetes. Doctor Hormis treats patients with only Hyperglycaemia and Doctor Gerard treats patients with only Gastro-enteritis. Doctor Paul is a generalist. Therefore, he can treat patients with multiple diseases. Patients always prefer a specialist for their disease. If Dr. Dennis had 80 patients, then the other three doctors can be arranged in terms of the number of patients treated as (2002)  
 (a) Paul > Gerard > Hormis (b) Pual > Hormis > Gerard  
 (c) Gerard > Paul > Hormis (d) None of these
104. Three children won the prizes in the Bournvita Quiz contest. They are from the schools : Loyola, Convent and Little Flowers, which are located at different cities. Below are some of the facts about the schools, the children and the city they are from (2002)  
 \* One of the children is Bipin \* Loyola School's contestant did not come first  
 \* Little Flower's contestant was named Riaz \* Convent School is not in Hyderabad  
 \* The contestant from Pune took third place \* The contestant from Pune is not from Loyola School  
 \* The contestant from Bangalore did not come first \* Convent School's contestant's name is not Balbir

- Which of the following statements is true?
- (a) 1st prize : Riaz (Little Flowers), 2nd prize : Bipin (Convent), 3rd prize : Balbir (Loyola)  
 (b) 1st prize : Bipin (Convent), 2nd prize : Riaz (Little Flowers), 3rd prize : Balbir (Loyola)  
 (c) 1st prize : Riaz (Little Flowers), 2nd prize : Balbir (Loyola), 3rd prize : Bipin (Convent)  
 (d) 1st prize : Bipin (Convent), 2nd prize : Balbir (Loyola), 3rd prize : Riaz (Little Flowers)
105. Two boys are playing on a ground. Both the boys are less than 10 years old. Age of the younger boy is equal to the cube root of the product of the age of the two boys. If we place the digit representing the age of the younger boy to the left of the digit representing the age of the elder boy, we get the age of father of the younger boy. Similarly, if we place the digit representing the age of the elder boy to the left of the digit representing the age of the younger boy and divided the figure by 2, we get the age of mother of the younger boy. The mother of the younger boy is younger to his father, by 3 years. Then, what is the age of the younger boy (2002)  
 (a) 3 (b) 4 (c) 2 (d) None of these
106. Flights A and B are scheduled from an airport within the next one hour. All the booked passengers of the two flights are waiting in the boarding hall after check-in. The hall has a seating capacity of 200, out of which 10% remained vacant. 40% of the waiting passengers are ladies. When boarding announcements came, passengers of flight A left the hall and boarded the flight. Seating capacity of each flight is two-third of the passengers who waited in the waiting hall for both the flights put together. Half the passengers who boarded flight A are women. After boarding for flight A, 60% of the waiting hall seats became empty. For every twenty of those who are still waiting in the hall for flight B, there is one airhostess in flight A. Then, what is the ratio of empty seats in flight B to number of airhostesses in flight A? (2002)  
 (a) 1 : 3 (b) 2 : 4 (c) 3 : 2 (d) none of these

**Directions for Questions 107 to 110 : Study the information below and answer questions based on it.**

- A country has the following types of traffic signals.
- 3 red lights = stop;  
 2 red lights = turn left;  
 1 red light = turn right;  
 3 green lights = go at 100 kmph speed;  
 2 green lights = go at 40 kmph speed;  
 1 green light = go at 20 kmph speed.
- A motorist starts at a point on a road and follows all traffic signals literally. His car is heading towards the north. He encounters the following signals (the time mentioned in each case below is applicable after crossing the previous signal).
- Starting Point - 1 green light;  
 after half an hour, 1st signal - 2 red & 2 green lights;  
 after 15 minutes, 2nd signal - 1 red light;  
 after half an hour, 3rd signal - 1 red & 3 green lights;  
 after 24 minutes, 4th signal - 2 red & 2 green lights;  
 after 15 minutes, 5th signal - 3 red lights;
107. The total distance travelled by the motorist from the starting point till the last signal is (2002)  
 (a) 90km (b) 100km (c) 120km (d) None of these
108. What is the position (radial distance) of the motorist when he reaches the last signal (2002)  
 (a) 45 km directly north of Starting Point (b) 30 km directly to the east of the Starting Point  
 (c) 50 km away to the northeast of the Starting Point (d) 45 km away to the northwest of the Starting Point
109. After the starting point if the 1st signal were 1 red and 2 green lights, what would be the final position of the motorist (2002)  
 (a) 30 km to the west and 20 km to the south (b) 30 km to the west and 40 km to the north  
 (c) 50 km to the east and 40 km to the north (d) Directly 30 km to the east
110. If at the starting point, the car was heading towards south, what would be the final position of the motorist (2002)  
 (a) 30 km to the east and 40 km to the south (b) 50 km to the east and 40 km to the south  
 (c) 30 km to the west and 40 km to the south (d) 50 km to the west and 20 km to the north

111. The owner of a local jewellery store hired 3 watchmen to guard his diamonds, but a thief still got in and stole some diamonds. On the way out, the thief met each watchman, one at a time. To each he gave 1/2 of the diamonds he had then, and 2 more besides. He escaped with one diamond. How many did he steal originally? (2002)
- (a) 40 (b) 36 (c) 25 (d) None of these

**Directions for Questions 115 to 117 :** Study the information below and answer questions based on it.

A boy is asked to put in a basket one mango when ordered 'One', one orange when ordered 'Two', one apple when ordered 'Three' and is asked to take out from the basket one mango and an orange when ordered 'Four'. A sequence of orders is given as :

1 2 3 3 2 1 4 2 3 1 4 2 2 3 3 1 4 1 1 3 2 3 4

115. How many total oranges were in the basket at the end of the above sequence? (2002)  
(a) 1 (b) 4 (c) 3 (d) 2

116. How many total fruits will be in the basket at the end of the above order sequence? (2002)  
(a) 9 (b) 8 (c) 11 (d) 10

117. Three travelers are sitting around a fire, and are about to eat a meal. One of them has five small loaves of bread, the second has three small loaves of bread. The third has no food, but has eight coins. He offers to pay for some bread. They agree to share the eight loaves equally among the three travelers, and the third traveler will pay eight coins for his share of the eight loaves. All loaves were the same size. The second traveler (who had three loaves) suggests that he be paid three coins, and that the first traveler be paid five coins. The first traveler says that he should get more than five coins. How much the first traveler should get?  
(a) 5 (b) 7 (c) 1 (d) None of these (2002)

**Directions for Questions 118 & 119 :** Study the information below and answer questions based on it.

New Age Consultants have three consultants Gyani, Medha and Buddhi. The sum of the number of projects handled by Gyani and Buddhi individually is equal to the number of projects in which Medha is involved. All three consultants are involved together in 6 projects. Gyani works with Medha in 14 projects. Buddhi has 2 projects with Medha but without Gyani, and 3 projects with Gyani but without Medha. The total number of projects for New Age Consultants is one less than twice the number of projects in which more than one consultant is involved.



**Directions for Questions 120 & 121 : Study the information below and answer questions based on it.**

Some children were taking free throws at the basketball court in school during lunch break. Below are some facts about how many baskets these children shot?

- |  |  |
|--|--|
| (i) Ganesh shot 8 baskets less than Ashish     | (ii) Dhanraj and Ramesh together shot 37 baskets |
| (iii) Jugraj shot 8 baskets more than Dhanraj  | (iv) Ashish shot 5 baskets more than Dhanraj     |
| (v) Ashish and Ganesh together shot 40 baskets |  |

120. Which of the following statements is true? (2003C)  
 (a) Dhanraj and Jugraj together shot 46 baskets  
 (c) Dhanraj shot 3 more baskets than Ramesh  
 (b) Ganesh shot 18 baskets and Ramesh shot 21 baskets  
 (d) Ramesh and Jugraj together shot 29 baskets
121. Which of the following statements is true? (2003C)  
 (a) Ramesh shot 18 baskets and Dhanraj shot 19 baskets (b) Ganesh shot 24 baskets and Ashish shot 16 baskets  
 (c) Jugraj shot 19 baskets and Dhanraj shot 27 baskets (d) Dhanraj shot 11 baskets and Ashish shot 16 baskets

**Directions for Questions 122 to 124 : Study the information below and answer questions based on it.**

Seven varsity basketball players (A, B, C, D, E, F and G) are to be honoured at a special luncheon. The players will be seated on the dais in a row. A and G have the luncheon early and so must be seated at the extreme right. B will receive the most valuable player's trophy and so must be in the centre to facilitate presentation. C and D are bitter rivals and therefore must be seated as far apart as possible.

122. Which of the following pairs cannot occupy the seats on either side of B? (2003C)  
 (a) F & D (b) D & E (c) E & G (d) C & F
123. Which of the following pairs cannot be seated together? (2003C)  
 (a) B & D (b) C & F (c) D & G (d) E & A
124. Which of the following cannot be seated at either end? (2003C)  
 (a) C (b) D (c) F (d) G

**Directions for Questions 125 to 127 : Study the information below and answer questions based on it.**

A, B, C, D, E and F are a group of friends. There are two housewives, one professor, one engineer, one accountant and one lawyer in the group. The lawyer is married to D, who is a housewife. No woman in the group is either an engineer or an accountant. C, the accountant, is married to F, who is a professor. A is married to a housewife. E is not a housewife.

125. How many members of the group are males ? (2003C)  
 (a) 2 (b) 3 (c) 4 (d) Cannot be determined
126. What is E's profession? (2003C)  
 (a) Engineer (b) Lawyer (c) Professor (d) Accountant
127. Which of the following is one of the married couples? (2003C)  
 (a) A & B (b) B & E (c) D & E (d) A & D

**Directions for Questions 128 to 130 : Study the information below and answer questions based on it.**

Rang Barsey paint Company (RBPC) is in the business of manufacturing paints, RBPC buys Red, Yellow, White, Orange and Pink paints. Orange paint can be also produced by mixing Red and Yellow paints in equal proportions. Similarly, Pink paint can also be produced by mixing equal amounts of Red and White paints. Among other paints, RBPC sells Cream paint, (formed by mixing White and Yellow in the ratio 70:30) Avocado paint (formed by mixing equal amounts of Orange and Pink paint) and Washedorange paint (formed by mixing equal amounts of Orange and White paint.) The following table provides the price at which RBPC buys paints .

Colour	Rs. / Litre
Red	20.00
Yellow	25.00
White	15.00
Orange	22.00
Pink	18.00

128. The cheapest way to manufacture avocado paint would cost (2003C)  
 (a) Rs 19.50 per litre (b) Rs 19.75 per litre (c) Rs 20.00 per litre (d) Rs 20.25 per litre
129. Washedorange can be manufactured by mixing (2003C)  
 (a) Cream and Red in the ratio 14:10 (b) Cream and Red in the ratio 3:1  
 (c) Yellow and Pink in the ratio 1:1 (d) Red, Yellow and White in the ratio 1:1:2

130. Assume that Avocado, Cream and Washedorange each sells for the same price . Which of the three is the most profitable to manufacture? (2003C)
- (a) Avocado      (b) Cream      (c) Washedorange      (d) Sufficient data is not available

**Directions for Questions 131 & 132 : Study the information below and answer questions based on it.**

The Head of a newly formed government desires to appoint five of the six elected members A, B, C, D, E and F to portfolios of Home, Power , Defence, Telecom and Finance, F does not want any portfolio if D gets one of the five. C wants either Home or finance or no portfolio. B says that if D gets either Power or Telecom then she must get the other one. E insists on a portfolio if A gets one.

131. If A gets Home and C gets Finance, then which is not a valid assignment for defence and Telecom? (2003C)
- (a) D-Power, B-Telecom      (b) F-Defence , B-Telecom      (c) B-Defence, E-Telecom      (d) B-Defence, D-Telecom
132. Which is a valid assignment? (2003C)
- (a) A-Home, B-Power, C-Defence, D-Telecom, E-Finance      (b) C-Home, D-Power, A-Defence, B-Telecom, E-Finance  
(c) A-Home, B-Power, E-Defence, D-Telecom, F-Finance      (d) B-Home, F-Power, E-Defence, C-Telecom, A-Finance

**Directions for Questions 133 to 135 : Study the information below and answer questions based on it.**

Five friends meet every morning at Sree sagar restaurant for an idli-vada breakfast. Each consumes a different number of *idlis* and *vadas*. The number of *idlis* consumed are 1, 4, 5, 6 and 8 while the number of *vadas* consumed are 0, 1, 2, 4, and 6. Below are some more facts about who eats what and how much.

- (i) The number of *vadas* eaten by Ignesh is three times the number of *vadas* consumed by the person who eats four *idlis*  
(ii) Three persons, including the one who eats four *vadas*, eat without *chutney*  
(iii) Sandeep does not take any *chutney*  
(iv) The one who eats one *idli* a day does not eat any *vadas* or *chutney*. Further he is not Mukesh  
(v) Daljit eats *idli* with *chutney* and also eats *vada*  
(vi) Mukesh, who does not take *chutney*, eats half as many *vadas* as the person who eats twice as many *idlis* as he does  
(vii) Bimal eats two more *idlis* than Ignesh, but Ignesh eats two more *vadas* than Bimal
133. Which of the following statements is true? (2003C)
- (a) Mukesh eats 8 *idlis* and 4 *vadas* but no *chutney*  
(b) The person who eats 5 *idlis* and 1 *vada* does not take *chutney*  
(c) The person who eats equal numbers of *vadas* and *idlis* also takes *chutney*  
(d) The person who eats 4 *idlis* and 2 *vadas* also takes *chutney*
134. Which of the following statements is true? (2003C)
- (a) Sandeep eats 2 *vadas*      (b) Mukesh eats 4 *vadas*      (c) Ignesh eats 4 *vadas*      (d) Bimal eats 4 *vadas*
135. Which one of the following statements is true? (2003C)
- (a) Daljit eats 5 *idlis*      (b) Ignesh eats 8 *idlis*      (c) Bimal eats 1 *idli*      (d) Bimal eats 6 *idlis*

**Directions for Questions 136 to 137 : Study the information below and answer questions based on it.**

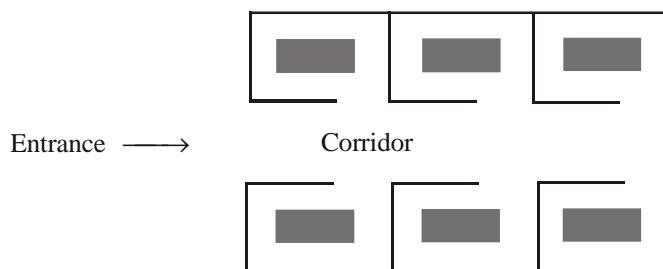
Five women decided to go shopping to M.G.Road, Bangalore. They arrived at the designated meeting place in the following order : (1) Archana, (2) Chellamma, (3) Dhenuka, (4) Helen, and (5) Shahnaz. Each woman spent at least Rs 1000. Below are some additional facts about how much they spent during their shopping spree.

- (i) The woman who spent Rs 2234 arrived before the lady who spent Rs 1193  
(ii) One woman spent Rs 1340 and she was not Dhenuka  
(iii) One woman spent Rs 1378 more than Chellamma  
(iv) One woman spent Rs 2517 and she was not Archana  
(v) Helen spent more than Dhenuka  
(vi) Shahnaz spent the largest amount and Chellamma the smallest
136. What was the amount spent by Helen? (2003C)
- (a) Rs 1193      (b) Rs 1340      (c) Rs 2234      (d) Rs 2517

137. Which of the following amount was spent by one of them? (2003C)  
(a) Rs 1139 (b) Rs 1378 (c) Rs 2571 (d) Rs 2718

138. The woman who spent Rs 1193 is (2003C)  
(a) Archana (b) Chellamma (c) Dhenuka (d) Helen

**Directions for Questions 139 to 142 :** Study the information below and answer questions based on it.



The plan above shows an office block for six officers A, B, C, D, E and F. Both B and C occupy offices to the right of the corridor (as one enters the office block) and A occupies an office to the left of the corridor. E and F occupy offices on opposite sides of the corridor but their offices do not face each other. The offices of C and D face each other. E does not have a corner office. F's office is further down the corridor than A's, but on the same side.

139. If E sits in his office and faces the corridor, whose office is to his left? (2003)  
(a) A (b) B (c) C (d) D

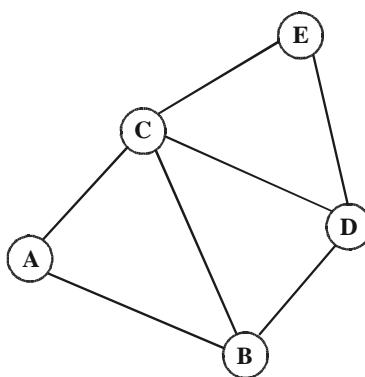
140. Whose office faces A's office? (2003)  
(a) B (b) C (c) D (d) E

141. Who is/are F's neighbour(s)? (2003)  
(a) A only (b) A and D (c) C only (d) B and C

142. D was heard telling someone to go further down the corridor to the last office on the right. To whose room was he trying to direct that person? (2003)  
(a) A (b) B (c) C (d) F

**Directions for Questions 143 & 144 : Study the information below and answer questions based on it.**

## 1. LAYOUT OF MAJOR STREETS IN A CITY



Two days (Thursday and Friday) are left for campaigning before a major election, and the city administration has received requests from five political parties for taking out their processions along the following routes.

Congress : A-C-D-E      BJP : A-B-D-E      SP : A-B-C-E  
BSP : B-C-E      CPM : A-C-D

Street B-D cannot be used for a political procession on Thursday due to a religious procession. The district administration has a policy of not allowing more than one procession to pass along the same street on the same day. However, the administration must allow all parties to take out their processions during these two days.

143. Congress procession can be allowed (2003)  
 (a) only on Thursday (b) only on Friday  
 (c) on either day (d) only if the religious procession is cancelled.
144. Which of the following is NOT true? (2003)  
 (a) Congress and SP can take out their processions on the same day  
 (b) The CPM procession cannot be allowed on Thursday  
 (c) The BJP procession can only take place on Friday  
 (d) Congress and BSP can take out their processions on the same day

**Directions for Questions 145 to 148 : Study the information below and answer questions based on it.**

Seven faculty members at a management institute frequent a lounge for strong coffee and stimulating conversation. On being asked about their visit to the lounge last Friday we got the following responses.

JC: I came in first, and the next two persons to enter were SS and SM. When I left the lounge, JP and VR were present in the lounge. DG left with me

JP: When I entered the lounge with VR, JC was sitting here. There was someone else, but I cannot remember who it was

SM: I went to the lounge for a short while, and met JC, SS, and DG in the lounge that day

SS: I left immediately after SM left

DG: I met JC, SS, SM, JP and VR during my first visit to the lounge. I went back to my office with JC. When I went to the lounge the second time, JP and VR were there

PK: I had some urgent work, so I did not sit in the lounge that day, but just collected my coffee and left. JP and DG were the only people in the lounge while I was there

VR: No comments

145. Based on the responses, which of the two, JP or DG, entered the lounge first? (2003)  
 (a) JP (b) DG (c) Both entered together (d) Cannot be deduced
146. Who was sitting with JC when JP entered the lounge? (2003)  
 (a) SS (b) SM (c) DG (d) PK
147. How many of the seven members did VR meet on Friday in the lounge? (2003)  
 (a) 2 (b) 3 (c) 4 (d) 5
148. Who were the last two faculty members to leave the lounge? (2003)  
 (a) JC and DG (b) PK and DG (c) JP and PK (d) JP and DG

**Directions for Questions 149 to 153 : Study the information below and answer questions based on it.**

Recently, the answers of a test held nationwide were leaked to a group of unscrupulous people. The investigative agency has arrested the mastermind and nine other people A, B, C, D, E, F, G, H and I in this matter. Interrogating them, the following facts have been obtained regarding their operation. Initially the mastermind obtains the correct answer-key. All the others create their answer - key in the following manner. They obtain the answer key from one or two people who already possess the same. The people are called his/her "sources". If the person has two sources, then he/she compares the answer-keys obtained from both sources. If the key to a question from both sources is identical, it is copied, otherwise it is left blank. If the person has only one source, he/she copies the source's answers into his/her copy. Finally, each person compulsorily replaces one of the answers (not a blank one) with a wrong answer in his/her answer key.

The paper contained 200 questions; so the investigative agency has ruled out the possibility of two or more of them introducing wrong answers to the same question. The investigative agency has a copy of the correct answer key and has tabulated the following data. These data represent question numbers.

Name	Wrong Answer(s)	Blank Answer(s)
A	46	---
B	96	46, 90, 25
C	27, 56	17, 46, 90
D	17	---
E	46, 90	---
F	14, 46	92, 90
G	25	---
H	46, 92	---
I	27	17, 46, 90

149. Which one among the following must have two sources? (2003)  
 (a) A (b) B (c) C (d) D
150. How many people (excluding the mastermind) needed to make answer - keys before C could make his answer-key? (2003)  
 (a) 2 (b) 3 (c) 4 (d) 5
151. Both G and H were sources to (2003)  
 (a) F (b) B (c) 1 (d) None of these
152. Which of the following statements is true? (2003)  
 (a) C introduced the wrong answer to question 27 (b) E introduced the wrong answer to question 46  
 (c) F introduced the wrong answer to question 14 (d) H introduced the wrong answer to question 46
153. Which of the following two groups of people had identical sources? (2003)  
 (I) A, D and G (II) E and H  
 (a) Only (I) (b) Only (II) (c) Neither (I) nor (II) (d) Both (I) and (II)

**Directions for Questions 154 to 157 : Study the information below and answer questions based on it.**

Four families decided to attend the marriage ceremony of one of their colleagues. One family has no kids, while the others have at least one kid each. Each family with kids has atleast one kid attending the marriage.

Given below is some information about the families, and who reached when to attend the marriage.

*The family with 2 kids came just before the family with no kids.*

*Shanthi who does not have any kids reached just before Sridevi's family*

*Sunil and his wife reached last with their only kid.*

*Anil is not the husband of Joya*

*Anil and Raj are fathers.*

*Sridevi's and Anita's daughter go to the same school.*

*Joya came before Shanthi and met Anita when she reached the venue.*

*Raman stays the farthest from the venue.*

*Raj said his son could not come because of his exams.*

154. Which woman arrived third? (2003)  
 (a) Shanthi (b) Sridevi (c) Anita (d) Joya
155. Name the correct pair of husband and wife? (2003)  
 (a) Raj and Shanthi (b) Sunil and Sridevi (c) Anil and Sridevi (d) Raj and Anita
156. Of the following pairs, whose daughters go to the same school? (2003)  
 (a) Anil and Raman (b) Sunil and Raman (c) Sunil and Anil (d) Raj and Anil
157. Whose family is known to have more than one kid for certain? (2003)  
 (a) Raman's (b) Raj's (c) Anil's (d) Sunil's

**Directions for Questions 158 & 159 : Answer the questions on the information given below.**

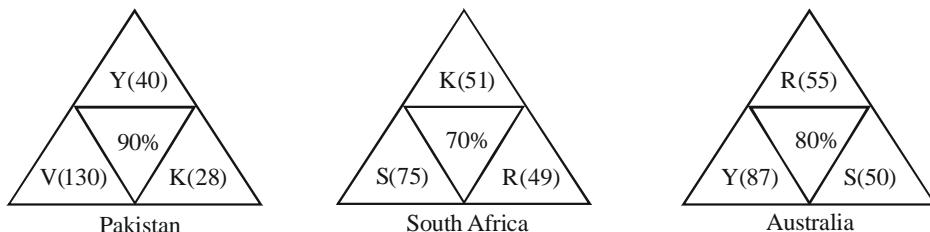
In an examination, there are 100 questions divided into three groups A, B and C such that each group contains at least one question. Each question in group A carries 1 mark, each question in group B carries 2 marks and each question in group C carries 3 marks. It is known that the question in group A together carry at least 60% of the total marks.

158. If group B contains 23 questions, then how many questions are there in group C? (2004 - 2marks)  
 (a) 1 (b) 2 (c) 3 (d) Cannot be determined
159. If group C contains 8 questions and group B carries at least 20% of the total marks, which of the following best describes the number of questions in group B? (2004 - 2marks)  
 (a) 11 or 12 (b) 12 or 13 (c) 13 or 14 (d) 14 or 15

**Directions for Questions 160 to 163 : Answer the questions on the basis of the information given below.**

Coach John sat with the score cards of Indian players from the 3 games in a one-day cricket tournament where the same set of players played for India and all the major batsman got out. John summarized the batting performance through three diagrams, one for each game. In each diagram, the three outer triangles communicate the number of runs scored by the three top scorers from India, where K, R, S, V, and Y represent Kaif, Rahul, Saurav, Virender, and Yuvraj respectively. The middle triangle in each diagram denotes the percentage of total score that was scored by the top three Indian scorers in that game. No two players score the same number of runs in the same game. John also calculated two batting indices for each player based on his scores in the tournament;

the R-index of a batsman is the difference between his highest and lowest scores in the 3 games while the M-index is the middle number, if his scores are arranged in a non-increasing order.



160. Which of the players had the best M-index from the tournament? (2004 - 2marks)  
 (a) Rahul (b) Saurav (c) Virender (d) Yuvraj
161. Among the players mentioned, who can have the lowest R-index from the tournament? (2004 - 2marks)  
 (a) Only Kaif, Rahul or Yuvraj (b) Only Kaif or Rahul  
 (c) Only Kaif or Yuvraj (d) Only Kaif
162. For how many Indian players is it possible to calculate the exact M-index? (2004 - 2marks)  
 (a) 0 (b) 1 (c) 2 (d) More than 2
163. How many players among those listed definitely scored less than Yuvraj in the tournament? (2004 - 2marks)  
 (a) 0 (b) 1 (c) 2 (d) More than 2

**Directions for Questions 164 to 167 : Answer the questions on the basis of the information given below.**

Twenty one participants from four continents (Africa, Americas, Australasia, and Europe) attended a United Nations conference. Each participant was an expert in one of four fields, labour, health, population studies, and refugee relocation. The following five facts about the participants are given.

- The number of labour experts in the camp was exactly half the number of experts in each of the three other categories.
- Africa did not send any labour expert. Otherwise, every continent, including Africa, sent at least one expert for each category.
- None of the continents sent more than three experts in any category.
- If there had been one less Australasian expert, then the Americas would have had twice many experts as each of the other continents.
- Mike and Alfano are leading experts of population studies who attended the conference. They are from Australasia.

164. Which of the following numbers cannot be determined from the information given? (2004 - 2marks)  
 (a) Number of labour experts from the Americas.  
 (b) Number of health experts from Europe.  
 (c) Number of health experts from Australasia.  
 (d) Number of experts in refugee relocation from Africa.
165. Which of the following combinations is NOT possible? (2004 - 2marks)  
 (a) 2 experts in population studies from the Americas and 2 health experts from Africa attended the conference.  
 (b) 2 experts in population studies from the Americas and 1 health expert from Africa attended the conference.  
 (c) 3 experts in refugee relocation from the Americas and 1 health expert from Africa attended the conference.  
 (d) Africa and America each had 1 expert in population studies attending the conference.
166. If Ramos is the lone America expert in population studies, which of the following is NOT true about the numbers of experts in the conference from the four continents? (2004 - 2marks)  
 (a) There is one expert in health from Africa.  
 (b) There is one expert in refugee relocation from Africa.  
 (c) There are two experts in health from the Americas.  
 (d) There are three experts in refugee relocation from the Americas.
167. Alex, an American expert in refugee relocation, was the first keynote speaker in the conference. What can be inferred about the number of American experts in refugee relocation in the conference, excluding Alex? (2004 - 2marks)  
 (i) At least one (ii) Atmost two  
 (a) Only (i) and not (ii) (b) Only (ii) and not (i) (c) Both (i) and (ii) (d) Neither (i) nor (ii)

**Directions for Questions 168 to 171 : Answer the questions on the basis of the information given below.**

The year was 2006, All six teams in Pool A of World Cup hockey, play each other exactly once. Each win earns a team three points, a draw earns one point and a loss earns zero points. The two teams with the highest points qualify for the semifinals. In case of a tie, the team with the highest goal difference (Goal For - Goals Against) qualifies.

In the opening match, Spain lost to Germany. After the second round (after each team played two matches), the pool table looked as shown below.

## PoolA

Teams	Games Played	Won	Drawn	Lost	Goals For	Goals Against	Points
Germany	2	2	0	0	3	1	6
Argentina	2	2	0	0	2	0	6
Spain	2	1	0	1	5	2	3
Pakistan	2	1	0	1	2	1	3
New Zealand	2	0	0	2	1	6	0
South Africa	2	0	0	2	1	4	0

In the third round, Spain played Pakistan, Argentina played Germany, and New Zealand played South Africa. All the third round matches were drawn. The following are some results from the fourth and fifth round matches



**Directions for Questions 172 to 175 : Answer the questions on the basis of the information given below.**

Venkat, a stockbroker, invested a part of his money in the stock of four companies — A, B, C and D. Each of these companies belonged to different industries, viz., Cement, Information Technology (IT), Auto, and Steel, in no particular order. At the time of investment, the price of each stock was Rs 100. Venkat purchased only one stock of each of these companies. He was expecting returns of 20%, 10%, 30% and 40% from the stock of companies A, B, C and D, respectively. Returns are defined as the change in the value of the stock after one year, expressed as a percentage of the initial value. During the year, two of these companies announced extraordinarily good results. One of these two companies belonged to the Cement or the IT industry, while the other one belonged to either the Steel or the Auto industry. As a result, the returns on the stocks of these two companies were higher than the initially expected returns. For the company belonging to the Cement or the IT industry with extraordinarily good results, the returns were twice that of the initially expected returns. For the company belonging to the Steel or the Auto industry, the returns on announcement of extraordinarily good results were only one and a half times that of the initially expected returns. For the remaining two companies,

Which do not announce extraordinarily good results, the returns realized during the year were the same as initially expected.

172. What is the minimum average return Venkat would have earned during the year? (2005)  
1. 30%                    2. 31¼%                    3. 32½%                    4. Cannot be determined

173. If Venkat earned a 35% return on average during the year, then which of these statements would necessarily be true? (2005)  
I. Company A belonged either to Auto or to Steel Industry.  
II. Company B did not announce extraordinarily good results.  
III. Company A announced extraordinarily good results.  
IV. Company D did not announce extraordinarily good results.  
1. I and II only            2. II and III only            3. III and IV only            4. II and IV only

174. If Venkat earned a 38.75% return on average during the year, then which of these statement(s) would necessarily be true?  
 I. Company C belonged either to Auto or to Steel Industry. (2005)  
 II. Company D belonged either to Auto or to Steel Industry.  
 III. Company A announced extraordinarily good results.  
 IV. Company B did not announce extraordinarily good results.  
 1. I and II only      2. II and III only      3. III and IV only      4. II and IV only
175. If Company C belonged to the Cement or the IT industry and did announce extraordinarily good results, then which of these statement(s) would necessarily be true? (2005)  
 I. Venkat earned not more than 36.25% return on average.  
 II. Venkat earned not less than 33.75% return on average.  
 III. If Venkat earned 33.75% return on average, Company A announced extraordinarily good results.  
 IV. If Venkat earned 33.75% return on average, Company B belonged either to Auto or to Steel Industry.  
 (a) I and II only      (b) II and IV only      (c) II and III only      (d) III and IV only

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**Directions for Questions 176 to 179 : Answer the questions on the basis of the information given below :**

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The table below presents the revenue (in million rupees) of four firms in three states. These firms, Honest Ltd., Aggressive Ltd., Truthful Ltd. and Profitable Ltd. are disguised in the table as A,B,C and D, in no particular order.

States	Firm A	Firm B	Firm C	Firm D
UP	49	82	80	55
Bihar	69	72	70	65
MP	72	63	72	65

Further, it is known that :

- In the state of MP, Truthful Ltd. has the highest market share.
- Aggressive Ltd.'s aggregate revenue differs from Honest Ltd.'s by Rs. 5 million.

176. What can be said regarding the following two statements?  
 Statement 1: Honest Ltd. has the highest share in the UP market.  
 Statement 2: Aggressive Ltd. has the highest share in the Bihar market. (2005)
- (a) Both statements could be true.  
 (b) At least one of the statements must be true.  
 (c) At most one of the statements is true.  
 (d) None of the above.
177. What can be said regarding the following two statements?  
 Statement 1 : Aggressive Ltd.'s lowest revenues are from MP.  
 Statement 2 : Honest Ltd.'s lowest revenues are from Bihar. (2005)
- (a) If Statement 2 is true then Statement 1 is necessarily false.  
 (b) If Statement I is false then Statement 2 is necessarily true.  
 (c) If Statement I is true then Statement 2 is necessarily true.  
 (d) None of the above.
178. What can be said regarding the following two statements?  
 Statement 1: Profitable Ltd. has the lowest share in MP market.  
 Statement 2 : Honest Ltd.'s total revenue is more than Profitable Ltd. (2005)
- (a) If Statement 1 is true then Statement 2 is necessarily true.  
 (b) If Statement 1 is true then Statement 2 is necessarily false.  
 (c) Both Statement 1 and Statement 2 are true.  
 (d) Neither Statement 1 nor Statement 2 is true.
179. If Profitable Ltd.'s lowest revenue is from UP, then which of the following is true? (2005)  
 (a) Truthful Ltd.'s lowest revenues are from MP.      (b) Truthful Ltd.'s lowest revenues are from Bihar.  
 (c) Truthful Ltd.'s lowest revenues are from UP.      (d) No definite conclusion is possible.

**Directions for Questions 180 to 183 : Answer the questions on the basis of the information given below.**

In the table below is the listing of players, seeded from highest (#1) to lowest (#32), who are due to play in an Association of Tennis Players (ATP) tournament for women. This tournament has four knockout rounds before the final, i.e., first round, second round, quarterfinals, and semi-finals. In the first round, the highest seeded player plays the lowest seeded player (seed # 32) which is designated match No.1 of first round; the 2nd seeded player plays the 31 st seeded player which is designated match No.2 of the first round, and so on. Thus, for instance, match No. 16 of first round is to be played between 16th seeded player and the 17th seeded player. In the second round, the winner of match No.1 of first round plays the winner of match No. 16 of first round and is designated match No.1 of second round. Similarly, the winner of match No.2 of first round plays the winner of match No. 15 of first round, and is designated match No.2 of second round. Thus, for instance, match No.8 of the second round is to be played between the winner of match No.8 of first round and the winner of match No.9 of first round. The same pattern is followed for later rounds as well.

Seed #	Name of Player	Seed #	Name of Player	Seed #	Name of Player
1	Maria Sharapova	12	Mary Pierce	23	Silvia Farina Elia
2	Lindsay Davenport	13	Anastasia Myskina	24	Tatiana Golovin
3	Amelie Mauresmo	14	Alicia Molik	25	Shinobu Asagoe
4	Kim Clijsters	15	Nathalie Dechy	26	Francesca Schiavone
5	Svetlana Kuznetsova	16	Elena Bovina	27	Nicole Vaidisova
6	Elena Dementieva	17	Jelena Jankovic	28	Gisela Dulko
7	Justine Henin	18	Ana Ivanovic	29	Flavia Pennetta
8	Serena Williams	19	Vera Zvonareva	30	Anna Chakvetadze
9	Nadia Petrova	20	Elena Likhovtseva	31	Ai Sugiyama
10	Venus Williams	21	Daniela Hantuchova	32	Anna-lena Groenefeld
11	Patty Schnyder	22	Dinara Safina		

180. If Elena Dementieva and Serena Williams lose in the second round, while Justine Henin and Nadia Petrova make it to the semi-finals, then who would play Maria Sharapova in the quarterfinals, in the event Sharapova reaches quarterfinals? (2005 - 2 marks)  
 (a) Dinara Safina      (b) Justine Henin      (c) Nadia Petrova      (d) Patty Schnyder
181. If the top eight seeds make it to the quarterfinals, then who, amongst the players listed below, would definitely not play against Maria Sharapova in the final, in case Sharapova reaches the final? (2005 - 2 marks)  
 (a) Amelie Mauresmo      (b) Elena Dementieva      (c) Kim Clijsters      (d) Lindsay Davenport
182. If there are no upsets (a lower seeded player beating a higher seeded player) in the first round, and only match Nos. 6, 7, and 8 of the second round result in upsets, then who would meet Lindsay Davenport in quarter finals, in case Davenport reaches quarter finals?  
 (a) Justine Henin      (b) Nadia Petrova      (c) Patty Schnyder      (d) Venus Williams (2005 - 2 marks)
183. If, in the first round, all even numbered matches (and none of the odd numbered ones) result in upsets, and there are no upsets in the second round, then who could be the lowest seeded player facing Maria Sharapova in semi-finals? (2005 - 2 marks)  
 (a) Anastasia Myskina      (b) Flavia Pennetta      (c) Nadia Petrova      (d) Svetlana Kuznetsova

**Directions for Questions 184 to 187 : Answer the questions on the basis of the information given below.**

Help Distress (HD) is an NGO involved in providing assistance to people suffering from natural disasters. Currently, it has 37 volunteers. They are involved in three projects: Tsunami Relief (TR) in Tamil Nadu, Flood Relief (FR) in Maharashtra, and Earthquake Relief (ER) in Gujarat. Each volunteer working with Help Distress has to be involved in at least one relief work project.

- A Maximum number of volunteers are involved in the FR project. Among them, the number of volunteers involved in FR project alone. is equal to the volunteers having additional involvement in the ER project.
- The number of volunteers involved in the ER project alone is double the number of volunteers involved in all the three projects.
- 17 volunteers are involved in the TR project. ,
- The number of volunteers involved in the TR project alone is one less than the number of volunteers involved in ER project alone.
- Ten volunteers involved in the TR project are also involved in at least one more project.

184. Based on the information given above, the minimum number of volunteers involved in both FR and TR projects, but not in the ER project is : (2005 - 2 marks)
- (a) 1 (b) 3 (c) 4 (d) 5
185. Which of the following additional information would enable to find the exact number of volunteers involved in various projects? (2005 - 2 marks)
- (a) Twenty volunteers are involved in FR.  
 (b) Four volunteers are involved in all the three projects.  
 (c) Twenty three volunteers are involved in exactly one project.  
 (d) No need for any additional information.
186. After some time, the volunteers who were involved in all the three projects were asked to withdraw from one project. As a result, one of the volunteers opted out of the TR project, and one opted out of the ER project, while the remaining ones involved in all the three projects opted out of the FR project. Which of the following statements, then, necessarily follows? (2005 - 2 marks)
- (a) The lowest number of volunteers is now in TR project.  
 (b) More volunteers are now in FR project as compared to ER project.  
 (c) More volunteers are now in TR project as compared to ER project.  
 (d) None of the above.
187. After the withdrawal of volunteers, as indicated in Question 85, some new volunteers joined the NGO. Each one of them was allotted only one project in a manner such that, the number of volunteers working in one project alone for each of the three projects became identical. At that point, it was also found that the number of volunteers involved in FR and ER projects was the same as the number of volunteers involved in TR and ER projects. Which of the projects now has the highest number of volunteers? (2005 - 2 marks)
- (a) ER (b) FR (c) TR (d) Cannot be determined

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**Directions for Questions 188 to 191 : Answer the questions on the basis of the information given below.**

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The year is 2089. Beijing, London, New York, and Paris are in contention to host the 2096 Olympics. The eventual winner is determined through several rounds of voting by members of the IOC with each member **representing a different city**. All the four cities in contention are also represented in IOC.

- In any round of voting; the city receiving the lowest number of votes in that round gets eliminated. The survivor after the last round of voting gets to host the event.
- A member is allowed to cast votes for at most two different cities in all rounds of voting combined. (Hence, a member becomes ineligible to cast a vote in a given round if both the cities(s) he voted for in earlier rounds are out of contention in that round of voting.)
- A member is also ineligible to cast a vote in a round if the city(s) he represents is in contention in that round of voting.
- As long as the member is eligible,(s)he must vote and vote for only one candidate city in any round of voting.

The following incomplete table shows the information on cities that received the maximum and minimum votes in different rounds, the number of votes cast in their favour, and the total votes that were cast in those rounds.

Round	Total votes cast	Maximum votes cast		Eliminated	
		City	No. of votes	City	No. of votes
1		London	30	New York	12
2	83	Paris	32	Beijing	21
3	75				

It is also known that :

- All those who voted for London and Paris in round 1, continued to vote for the same cities in subsequent rounds as long as these cities were in contention. 75% of those who voted for Beijing in round 1, voted for Beijing in round 2 as well.
- Those who voted for New York in round 1, voted either for Beijing or Paris in round 2.
- The difference in votes cast for the two contending cities in the last round was 1.
- 50% of those who voted for Beijing in round 1, voted for Paris in round 3.

188. What percentage of members from among those who voted for New York in round 1, voted for Beijing in round 2? (2005 - 2 marks)
- (a) 33.33 (b) 50 (c) 66.67 (d) 75
189. What is the number of votes cast for Paris in round I? (2005 - 2 marks)
- (a) 16 (b) 18 (c) 22 (d) 24

190. What percentage of members from among those who voted for Beijing in round 2 and were eligible to vote in round 3, voted for London?  
 (a) 33.33 (b) 38.10 (c) 50 (d) 66.67 (2005 - 2 marks)
191. Which of the following statements must be true?  
 (a) IOC member from New York must have voted for Paris in round 2.  
 (b) IOC member from Beijing voted for London in round 3.  
 (a) Only a (b) Only b (c) Both a and b (d) Neither a nor b (2005 - 2 marks)

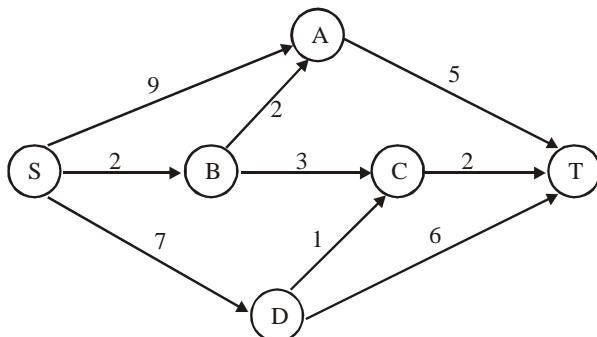
**Directions for Questions 192 to 196 : Answer the questions on the basis of the information given below.**

Two traders, Chetan and Michael, were involved in the buying and selling of MCS shares over five trading days. At the beginning of the first day, the MCS share was priced at Rs 100, while at the end of the fifth day it was priced at Rs 110. At the end of each day, the MCS share price either went up by Rs 10, or else, it came down by Rs 10. Both Chetan and Michael took buying and selling decisions at the end of each trading day. The beginning price of MCS share on a given day was the same as the ending price of the previous day. Chetan and Michael started with the same number of shares and amount of cash, and had enough of both. Below are some additional facts about how Chetan and Michael traded over the five trading days.

- Each day if the price went up, Chetan sold 10 shares of MCS at the closing price. On the other hand, each day if the price went down, he bought 10 shares at the closing price.
  - If on any day, the closing price was above Rs 110, then Michael sold 10 shares of MCS, while if it was below Rs 90, he bought 10 shares, all at the closing price.
192. If Chetan sold 10 shares of MCS on three consecutive days, while Michael sold 10 shares only once during the five days, what was the price of MCS at the end of day 3?  
 (a) Rs 90 (b) Rs 100 (c) Rs 110 (d) Rs 120 (e) Rs 130 (2006)
193. If Michael ended up with 20 more shares than Chetan at the end of day 5, what was the price of the share at the end of day 3?  
 (a) Rs 90 (b) Rs 100 (c) Rs 110 (d) Rs 120 (e) Rs 130 (2006)
194. What could have been the maximum possible increase in combined cash balance of Chetan and Michael at the end of the fifth day?  
 (a) Rs 3700 (b) Rs 4000 (c) Rs 4700 (d) Rs 5000 (e) Rs 6000 (2006)
195. If Chetan ended up with Rs 1300 more cash than Michael at the end of day 5, what was the price of MCS share at the end of day 4?  
 (a) Rs 90 (b) Rs 100 (c) Rs 110 (d) Rs 120 (e) Not uniquely determinable (2006)
196. If Michael ended up with Rs 100 less cash than Chetan at the end of day 5, what was the difference in the number of shares possessed by Michael and Chetan (at the end of day 5)?  
 (a) Michael had 10 less shares than Chetan. (b) Michael had 10 more shares than Chetan.  
 (c) Chetan had 10 more shares than Michael. (d) Chetan had 20 more shares than Michael.  
 (e) Both had the same number of shares. (2006)

**Directions for Questions 197 to 201 : Answer the questions on the basis of the information given below.**

A significant amount of traffic flows from point S to point T in the one-way street network shown below. Points A, B, C, and D are junctions in the network, and the arrows mark the direction of traffic flow. The fuel cost in rupees for travelling along a street is indicated by the number adjacent to the arrow representing the street.



Motorists travelling from point S to point T would obviously take the route for which the total cost of travelling is the minimum. If two or more routes have the same least travel cost, then motorists are indifferent between them. Hence, the traffic gets evenly distributed among all the least cost routes.

The government can control the flow of traffic only by levying appropriate toll at each junction. For example, if a motorist takes the route S-A-T (using junction A alone), then the total cost of travel would be Rs 14 (i.e., Rs 9 + Rs 5) plus the toll charged at junction A.



**Directions for Questions 202 to 206 : Answer the questions on the basis of the information given below.**

Mathematicians are assigned a number called Erdős number (named after the famous mathematician, Paul Erdős). Only Paul Erdős himself has an Erdős number of zero. Any mathematician who has written a research paper with Erdős has an Erdős number of 1. For other mathematicians, the calculation of his/her Erdős number is illustrated below:

Suppose that a mathematician X has co-authored papers with several other mathematicians. From among them, mathematician Y has the smallest Erdős number. Let the Erdős number of Y be  $y$ . Then X has an Erdős number of  $y + 1$ . Hence any mathematician with no co-authorship chain connected to Erdős has an Erdős number of infinity.

In a seven day long mini-conference organized in memory of Paul Erdős, a close group of eight mathematicians, call them A, B, C, D, E, F, G and H, discussed some research problems. At the beginning of the conference, A was the only participant who had an infinite Erdős number. Nobody had an Erdős number less than that of E.

- On the third day of the conference F co-authored a paper jointly with A and C. This reduced the average Erdős number of the group of eight mathematicians to 3. The Erdős numbers of B, D, E, G and H remained unchanged with the writing of this paper. Further, no other co-authorship among any three members would have reduced the average Erdős number of the group of eight to as low as 3.
  - At the end of the third day, five members of this group had identical Erdős numbers while the other three had Erdős numbers distinct from each other.
  - On the fifth day, E co-authored a paper with F which reduced the group's average Erdős number by 0.5. The Erdős numbers of the remaining six were unchanged with the writing of this paper.
  - No other paper was written during the conference.

202. The Erdös number of C at the end of the conference was: (2006)  
(a) 1 (b) 2 (c) 3 (d) 4 (e) 5

203. The Erdös number of E at the beginning of the conference was: (2006)  
(a) 5 (b) 5 (c) 6 (d) 7 (e) 8

204. How many participants had the same Erdös number at the beginning of the conference? (2006)  
(a) 2 (b) 3 (c) 4 (d) 5  
(e) cannot be determined

205. The person having the largest Erdös number at the end of the conference must have had Erdös number (at that time): (2006)  
 (a) 5 (b) 7 (c) 9 (d) 14 (e) 15
206. How many participants in the conference did not change their Erdös number during the conference? (2006)  
 (a) 2 (b) 3 (c) 4 (d) 5  
 (e) cannot be determined

**Directions for Questions 207 to 211 : Answer the questions on the basis of the information given below.**

K, L, M, N, P, Q, R, S, U and W are the only ten members in a department. There is a proposal to form a team from within the members of the department, subject to the following conditions :

- A team must include exactly one among P, R and S.
- A team must include either M or Q, but not both.
- If a team includes K, then it must also include L, and vice versa.
- If a team includes one among S, U and W, then it must also include the other two.
- L and N cannot be members of the same team.
- L and U cannot be members of the same team.

The size of a team is defined as the number of members in the team.

207. Who can be a member of a team of size 5? (2006)  
 (a) K (b) L (c) M (d) P (e) R
208. Who cannot be a member of a team of size 3? (2006)  
 (a) L (b) M (c) N (d) P (e) Q
209. What could be the size of a team that includes K? (2006)  
 (a) 2 or 3 (b) 2 or 4 (c) 3 or 4 (d) Only 2 (e) Only 4
210. In how many ways a team can be constituted so that the team includes N? (2006)  
 (a) 2 (b) 3 (c) 4 (d) 5 (e) 6
211. What would be the size of the largest possible team? (2006)  
 (a) 8 (b) 7 (c) 6 (d) 5  
 (e) cannot be determined

**Directions for Questions 212 to 215 : Answer the questions on the basis of the information given below.**

The proportion of male students and the proportion of vegetarian students in a school are given below. The school has a total of 800 students, 80% of whom are in the Secondary Section and rest equally divided between Class 11 and 12.

	Male (M)	Vegetarian (V)
Class 12	0.60	
Class 11	0.55	0.50
Secondary Section		0.55
<b>Total</b>	0.475	0.53

212. What is the percentage of vegetarian students in Class 12? (2007)  
 (a) 40 (b) 45 (c) 50 (d) 55 (e) 60
213. In Class 12, twenty five per cent of the vegetarians are male. What is the difference between the number of female vegetarians and male non-vegetarians? (2007)  
 (a) less than 8 (b) 10 (c) 12 (d) 14 (e) 16
214. What is the percentage of male students in the secondary section? (2007)  
 (a) 40 (b) 45 (c) 50 (d) 55 (e) 60

215. In the Secondary Section, 50% of the students are vegetarian males. Which of the following statements is correct? (2007)
- Except vegetarian males, all other groups have same number of students.
  - Except non-vegetarian males, all other groups have same number of students.
  - Except vegetarian females, all other groups have same number of students.
  - Except non-vegetarian females, all other groups have same number of students.
  - All of the above groups have the same number of students.

**Directions for Questions 216 to 219 : Answer the questions on the basis of the information given below.**

A health-drink company's R&D department is trying to make various diet formulations, which can be used for certain specific purposes. It is considering a choice of 5 alternative ingredients (O, P, Q, R and S), which can be used in different proportions in the formulations. The table below gives the composition of these ingredients. The cost per unit of each of these ingredients is O: 150, P:50, Q: 200, R: 500, S: 100.

Ingredient	Composition			
	Carbohydrate %	Protein %	Fat %	Minerals %
O	50	30	10	10
P	80	20	0	0
Q	10	30	50	10
R	5	50	40	5
S	45	50	0	5

216. The company is planning to launch a balanced diet required for growth needs of adolescent children. This diet must contain at least 30% each of carbohydrate and protein, no more than 25% fat and at least 5% minerals. Which one of the following combinations of equally mixed ingredients is feasible? (2007)
- O and P
  - R and S
  - P and S
  - Q and R
  - O and S
217. For a recuperating patient, the doctor recommended a diet containing 10% minerals and at least 30% protein. In how many different ways can we prepare this diet by mixing at least two ingredients? (2007)
- One
  - Two
  - Three
  - Four
  - None
218. Which among the following is the formulation having the lowest cost per unit for a diet having 10% fat and at least 30% protein? The diet has to be formed by mixing two ingredients. (2007)
- P and Q
  - P and S
  - P and R
  - Q and S
  - R and S
219. In what proportion P, Q and S should be mixed to make a diet having at least 60% carbohydrate at the lowest per unit cost? (2007)
- 2:1:3
  - 4:1:2
  - 2:1:4
  - 3:1:2
  - 4:1:1

**Directions for Questions 220 & 221 :** Five horses, Red, White, Grey, Black and Spotted participated in a race. As per the rules of the race, the persons betting on the winning horse get four times the bet amount and those betting on the horse that came in second get thrice the bet amount. Moreover, the bet amount is returned to those betting on the horse that came in third, and the rest lose the bet amount. Raju bets Rs. 3000, Rs. 2000, Rs. 1000 on Red, White and Black horses respectively and ends up with no profit and no loss.

220. Which of the following cannot be true? (2008)
- At least two horses finished before Spotted
  - Red finished last
  - There were three horses between Black and Spotted
  - There were three horses between White and Red
  - Grey came in second
221. Suppose, in addition, it is known that Grey came in fourth. Then which of the following cannot be true? (2008)
- Spotted came in first
  - Red finished last
  - White came in second
  - Black came in second
  - There was one horse between Black and White

**Directions for Questions 222 to 224 : Answer the questions on the basis of the information given below.**

For admission to various affiliated colleges, a university conducts a written test with four different sections, each with a maximum of 50 marks. The following table gives the aggregate as well as the sectional cut-off marks fixed by six different colleges affiliated to the university. A student will get admission only if he/she gets marks greater than or equal to the cut-off marks in each of the sections and his/her aggregate marks are at least equal to the aggregate cut off marks as specified by the college.

	Sectional Cut-off Marks				Aggregate Cut-off Marks
	Section A	Section B	Section C	Section D	
College 1	40	42	42		176
College 2		45	45		175
College 3			46		171
College 4	43			45	178
College 5	45		43		180
College 6		41		44	176

222. Charlie got calls from two colleges. What could be the minimum marks obtained by him in a section? (2008)  
 (a) 0 (b) 21 (c) 25 (d) 35 (e) 41
223. Bhama got calls from all colleges. What could be the minimum aggregate marks obtained by her? (2008)  
 (a) 180 (b) 181 (c) 196 (d) 176 (e) 184
224. Aditya did not get a call from even a single college. What could be the maximum aggregate marks obtained by him? (2008)  
 (a) 181 (b) 176 (c) 184 (d) 196 (e) 190

**Directions for Questions 225 to 228 : Answer the questions on the basis of the information given below.**

In a sports event, six teams (A, B, C, D, E and F) are competing against each other. Matches are scheduled in two stages. Each team plays three matches in Stage-I and two matches in Stage-II. No team plays against the same team more than once in the event. No ties are permitted in any of the matches. The observations after the completion of Stage-I and Stage-II are as given below.

**Stage-I:**

- \* One team won all the three matches.
- \* Two teams lost all the matches.
- \* D lost to A but won against C and F.
- \* E lost to B but won against C and F.
- \* B lost at least one match.
- \* F did not play against the top team of Stage-I

**Stage-II:**

- \* The leader of Stage-I lost the next two matches.
  - \* Of the two teams at the bottom after Stage-I, one team won both matches, while the other lost both matches.
  - \* One more team lost both matches in Stage-II.
225. The teams that won exactly two matches in the event are: (2008)  
 (a) A, D & F (b) D & E (c) E & F (d) D, E & F (e) D & F
226. The team(s) with the most wins in the event is (are): (2008)  
 (a) A (b) A & C (c) F (d) E (e) B & E
227. The two teams that defeated the leader of Stage-I are: (2008)  
 (a) F & D (b) E & F (c) B & D (d) E & D (e) F & D
228. The only team(s) that won both the matches in Stage-II is (are): (2008)  
 (a) B (b) E & F (c) A, E & F (d) B, E & F (e) B & F

**Directions for Questions 232 to 234 : Answer the questions on the basis of the information given below.**

- (i) There are three houses on each side of the road.
- (ii) These six houses are labeled as P, Q, R, S, T and U.
- (iii) The houses are of different colours, namely, Red, Blue, Green, Orange, Yellow and White.
- (iv) The houses are of different heights.
- (v) T, the tallest house, is exactly opposite to the Red coloured house.
- (vi) The shortest house is exactly opposite to the Green coloured house.
- (vii) U, the Orange coloured house, is located between P and S.
- (viii) R, the Yellow coloured house, is exactly opposite to P.
- (ix) Q, the Green coloured house, is exactly opposite to U.
- (x) P, the White coloured house, is taller than R, but shorter than S and Q.

229. Which is the second tallest house? (2008)

- (a) P
- (b) S
- (c) Q
- (d) R
- (e) cannot be determined

230. What is the colour of the house diagonally opposite to the Yellow coloured house? (2008)

- (a) White
- (b) Blue
- (c) Green
- (d) Red
- (e) None of these

231. What is the colour of the tallest house? (2008)

- (a) Red
- (b) Blue
- (c) Green
- (d) Yellow
- (e) None of these

**Directions for Questions 232 to 236 : Answer the questions on the basis of the information given below.**

Abdul, Bikram and Chetan are three professional traders who trade in shares of a company XYZ Ltd. Abdul follows the strategy of buying at the opening of the day at 10 am and selling the whole lot at the close of the day at 3 pm. Bikram follows the strategy of buying at hourly intervals: 10 am, 11 am, 12 noon, 1 pm and 2 pm, and selling the whole lot at the close of the day. Further, he buys an equal number of shares in each purchase. Chetan follows a similar pattern as Bikram but his strategy is somewhat different. Chetan's total investment amount is divided equally among his purchases. The profit or loss made by each investor is the difference between the sale value at the close of the day less the investment in purchase. The "return" for each investor is defined as the ratio of the profit or loss to the investment amount expressed as a percentage.

232. Which one of the following statement is always true? (2008)

- (a) Abdul will not be the one with the minimum return
- (b) Return for Chetan will be higher than that of Bikram
- (c) Return for Bikram will be higher than that of Chetan
- (d) Return for Chetan cannot be higher than that of Abdul
- (e) None of these

233. On a day of fluctuating market prices, the share price of XYZ Ltd. ends with a gain, i.e., it is higher at the close of the day compared to the opening value. Which trader got the maximum return on that day? (2008)

- (a) Bikram
- (b) Chetan
- (c) Abdul
- (d) Bikram or Chetan
- (e) cannot be determined

234. On a "boom" day the share price of XYZ Ltd. keeps rising throughout the day and peaks at the close of the day. Which trader got the minimum return on that day? (2008)

- (a) Bikram
- (b) Chetan
- (c) Abdul
- (d) Abdul or Chetan
- (e) cannot be determined

**One** day, two other traders, Dane and Emily joined Abdul, Bikram and Chetan for trading in the shares of XYZ Ltd. Dane followed a strategy of buying equal numbers of shares at 10 am, 11 am and 12 noon, and selling the same numbers at 1 pm, 2 pm and 3 pm. Emily, on the other hand, followed the strategy of buying shares using all her money at 10 am and selling all of them at 12 noon and again buying the shares for all the money at 1 pm and again selling all of them at the close of the day at 3 pm. At the close of the day the following was observed:

- (i) Abdul lost money in the transactions.
- (ii) Both Dane and Emily made profits.
- (iii) There was an increase in share price during the closing hour compared to the price at 2 pm.
- (iv) Share price at 12 noon was lower than the opening price.

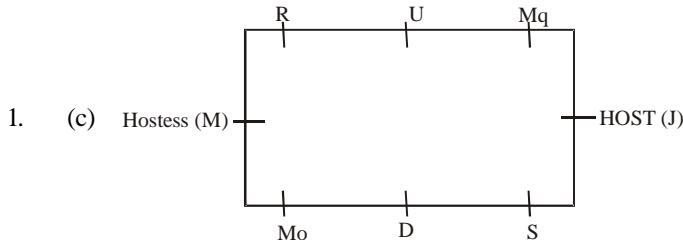
235. Share price was at its highest at (2008)

- (a) 10 am
- (b) 11 am
- (c) 12 noon
- (d) 1 pm
- (e) cannot be determined

236. Which of the following is necessarily false? (2008)

- (a) Share price was at its lowest at 2 pm
- (b) Share price was at its lowest at 11 am
- (c) Share price at 1 pm was higher than the share price at 2 pm
- (d) Share price at 1 pm was higher than the share price at 12 noon
- (e) none of the above

## ANSWERS WITH SOLUTIONS



Jakie is the host and seated to shobha's right

2. (d) Shobha is a person who is seated between Dhirubhai and Jackie
3. (a) Only statement (I) would be true if  $R \rightarrow S$
4. (a) Ratan and Monisha are sitting just opposite to each other. Hence, they must be married.
5. (b) 

Aish	Man	Sush	Rachel	Anu
------	-----	------	--------	-----

  
If Aishwarya is a girl in extreme left then, the girl in the middle is Sushmita.
6. (d) Manpreet (from above)
7. (d) 

Sush	Anu	Rach	Aish	Man
------	-----	------	------	-----

  
Manpreet is on the extreme right.

### For Qs. 8-11.

B is as old as C was when I was twice as old as D

$$\Rightarrow C \ B, A \ D \quad \dots \dots (i)$$

B will be as old as E was when he was as old as C is now

$$\Rightarrow E \ B, E \ C \quad \dots \dots (ii)$$

A may be older than F but G is as old as B was when A was as old as G is

$$\Rightarrow A \ F, B \ G \text{ and } A = B \quad \dots \dots (iii)$$

D will be as old as F was when F will be as old as G is

$$F \ D, G \ F \quad \dots \dots (iv)$$

From (i), (ii), (iii) and (iv)

$$E \ C \ A \ B \ G \ F \ D$$

8. (b) Eldest brother - E
9. (b) Youngest brother - D
10. (c) Twins - A & B
11. (c) B has only 2 elder brothers
12. (b) Ihavito must be used together with Grumbs only, so (b) is not possible.
13. (d) As per the given rules Ihavito must be used together with Grumbs. Lovitoo or Metoo or both can be used as Dingos, hence, (d) is the correct answer.
14. (a) Two Bingos, one Cingo and two Dingos are been used in (a) & other rules are being satisfied, so, (a) is the correct answer.
15. (d) Only (d) i.e. all the three bingos are used can be true.

16. (a) Salary in the first week = Rs 20 per working hour  
As the working pattern changes next week, so wage/hr for the 2nd and fourth week  $\frac{20}{2} = 10$   
Work and Rest hrs/day for the 2nd and 4th weeks respectively are 2 and 5 hrs.  
A week consist of 6 days and a month of 4 week  
Salary from 1st and 3rd week =  $20 \times 5 \times 2 \times 6 = \text{Rs } 1200$   
Salary for 2nd and 4th week =  $2 \times 10 \times 6 \times 2 = \text{Rs } 240$   
Salary for 1st month =  $1200 + 240 = \text{Rs } 1440$   
17. (c) Salary for 5th and 7th week =  $2 \times 7 \times 20 \times 6 = \text{Rs } 1680$   
Salary for 6th and 8th week =  $2 \times 3 \times 10 \times 6 = \text{Rs } 360$   
Salary for 2nd month =  $1680 + 360 = \text{Rs } 2040$   
Similarly salary for 3rd month  
 $= 2(6 \times 20 \times 6) + 2(4 \times 10 \times 6)$   
 $= 1440 + 480 = \text{Rs } 1920$   
Salary for 4th month =  $2(8 \times 20 \times 6) + 2(0) = \text{Rs } 1920$   
Salary at the end of 4 months =  $1440 + 2040 + 1920 + 1920 = \text{Rs } 7320$

18. (b) Under new scheme salary for 9th and 11th week  
 $= 2(25 \times 6 - 5 \times 4) \times 6 = \text{Rs } 1560$   
Now salary for 10th and 12th week =  $2(25 \times 4 - 5 \times 6) \times 6 = \text{Rs } 840$   
Total salary for 3rd month =  $1560 + 840 = \text{Rs } 2400$   
Under previous scheme total salary for 3rd month =  $\text{Rs } 1920$   
Difference =  $2400 - 1920 = \text{Rs } 480$   
19. (b) According to conditions salary for first 3 months  
 $= 1440 + 2040 + 2400 = \text{Rs } 5880$   
Salary for 4th month (13th to 16th week)  
 $= 2(25 \times 8 \times 6) - 2(0 - 8 \times 5 \times 6) = 2400 - 480 = \text{Rs } 1920$   
Total salary for 16 weeks =  $5880 + 1920 = \text{Rs } 7800$

### For Qs. 20-23.

S, T, U and V each has Rs 32 after 4th round i.e. They have a total of  $32 \times 4 = \text{Rs } 128$  among themselves after each round of game.

Possible distribution of money	S	T	U	V	Total
After 4th round	32	32	32	32	128
After 3rd round	16	16	16	80	128
After 2nd round	8	8	72	40	128
After 1st round	4	68	36	20	128
At the beginning	66	34	18	10	128

20. (d) Vibha
21. (a) Suvarna
22. (b) at the end of the second round Uma has Rs 72 with her.
23. (c) Suvarna started with Rs 66.

24. (b) One day =  $8 \times 60 = 480$  minutes  
 Both machines can independently produce P & Q  
 $\therefore$  Total available hours =  $480 \times 2 = 960$  min  
 To produce maximum units we produce only Q

$$\therefore \text{No. of units} = \frac{960}{6} = 160$$

25. (a)  $P = 3Q$   
 For machine M1: 10P = 6Q = 480  
 For machine M2: 8P = 6Q = 480  
 But P takes less time to produce on M2. So, as to manufacture maximum units we produce P through M2.

$$\text{No. of units of P through M2} = \frac{480}{8} = 60 \text{ units}$$

$$\therefore P = 3Q \Rightarrow Q = 20$$

Time taken to produce 20 Q from M1

$$20 \times 6 = 120 \text{ min}$$

Now time left =  $480 - 120 = 360$  minutes

for machine M1 :  $10P + 6Q = 360$

$$\Rightarrow 30Q = 360 \text{ or } Q = 10$$

Hence, no idle time

26. (c) To compare the four options take the LCM of 48, 64, 53 and 71, which comes out to be 722496. Now we have to find the case which will take maximum idle machine hours to manufacture 722496 units. So, idle machine hours for  
 (a) =  $(722496 \times 3) / 48 = 45156$  minutes  
 (b) =  $(722496 \times 12) / 64 = 135468$  minutes  
 (c) =  $(722496 \times 10) / 53 = 136320$  minutes  
 (d) =  $(722496 \times 9) / 71 = 91584$  minutes  
 As (c) takes maximum idle hours, it is the least efficient.

27. (d) For M1: 10P = 6Q = 240  
 For M2: 8P = 6Q = 480  
 For maximum no. of units, 1 unit of P is produced on M2 and rest Q is produced. Hence,  
 $\text{For M1 : } 10 \times 0 = 6Q = 240 \Rightarrow Q = 40$   
 $\text{For M2 : } 8 \times 1 = 6Q = 480$   
 $\Rightarrow Q = \frac{472}{6} = 78 \text{ units} + 4 \text{ hr idle time}$

Hence, total units = 78 + 1 + 40 = 119

28. (a) 30 P and 25 Q  
 for least machine hours, P must be produced on M2.  
 $\Rightarrow$  Total time =  $30 \times 8 + 25 \times 6 = 240 + 150 = 390$  minutes

or 6 hrs 30 min

29. (c) Let the feasibility be decided by the costs involved i.e., if the relative cost is lower than any other test, then the test can be said to be feasible. Hence by looking at the options the percentage of defective pieces lie between 0.05 and 0.20 the test 2 to be feasible.

30. (d) Test 2 and test 3 have same relative costs for  $p = 0.2$ , hence either of them can be adopted.

31. (a) Test 3 will be feasible for  $p > 0.2$  because it has the lowest relative cost.  
 32. (a) Test 1 will be feasible when  $p < 0.05$  because it has the lowest relative cost.  
 33. (d) When  $p < 0.2$ , then alternatives which can be feasible is either test 1 or test 2. But from the given data, it is not possible to say which test is the best. But it is definitely clear that test 3 is the most unfeasible test.  
 34. (a) We do not know the exact distances in case of AD, AE and DE. Since these three cities form a triangle,  $AC + CD > AD$  hence,  $AD < 4$ . Now let us find about A-C-E.  $AC + CE > AE$ . Hence,  $AE < 5$ . Now considering C - D - E, we have  $CD + CE > DE$ . Hence,  $DE < 5$ . Thus, the minimum distance between any two cities is 2 km and the maximum distance does not exceed 5 kms. If we want a ration shop within 2km of each city, we will require one shop as long as the distance between any two cities does not exceed 4 km. The only cities which can be more than 4 km from each other are AE and DE. Since city E is common to both. Hence, one shop will be able to cater to these three. Hence, total number of shops required = 2.

35. (a) If we want a ration shop within 3 km of each city, we will require only one ration shop (This is because distance between no two cities is more than 6 km).

36. (c) Let speed of C be  $x$  km/hr time taken by A =  $\frac{2}{40}$  hr

$$\text{Time taken by B} = \frac{2}{50} \text{ hr}$$

$$\text{Time taken by C} = \frac{2}{x} \text{ hr}$$

$$\text{Total time taken} = \left( \frac{2}{40} + \frac{2}{50} + \frac{2}{x} \right) \times 60 \text{ min}$$

For new record total time < 10 min

$$\frac{2}{40} + \frac{2}{50} + \frac{2}{x} + \frac{1}{6} \Rightarrow x = 26.08 \text{ km/hr}$$

which is not possible

37. (b) Time for A =  $\frac{2}{40}$  hr

$$\text{Time for A} = \frac{2}{40} \text{ hr}$$

Let speed for C be  $x$  km/hr

$$\therefore \text{Total time} = \left( \frac{2}{40} + \frac{2}{40} + \frac{2}{x} \right) \text{ hrs}$$

$$\text{also, total time} = \left( 10 + \frac{50}{100} \times 10 \right) \text{ min} = \frac{15}{60} \text{ hr}$$

After solving we get,

$$\frac{2}{40} + \frac{2}{40} + \frac{2}{x} + \frac{15}{60} \Rightarrow x = 13.3 \text{ km/hr}$$

38. (c) Let times for A, B, C stretches by  $t_1, t_2$  and  $t_3$  hrs. respectively

$$\text{Average Speed} \left( \frac{6}{t_1 + t_2 + t_3} \right) = 20$$

$$\Rightarrow t_1 + t_2 + t_3 = \frac{3}{10}$$

$$\text{Average speed for first two stretches} = \frac{4}{t_1 + t_2}$$

$$\therefore \frac{4}{t_1 + t_2} = 4 \times \frac{2}{t_3} \Rightarrow \frac{1}{2}t_3 = (t_1 + t_2)$$

$$\text{Hence, } t_3 = \frac{1}{5}$$

$$\Rightarrow \text{Average speed for stretch C} = 10 \text{ kmph}$$

39. (a) Since 1996 is a leap year.

25th Feb, 96 will be Wednesday. Since Raja doesn't have any holidays, he completes the job in 7 days.

So, one person can do  $\frac{1}{7}$  th of the work per day

therefore on 25th T and J complete  $\frac{2}{7}$  th of the day. T

will not work on 26th i.e. Thursday. So,  $\frac{1}{7}$  th work done

on 26th. Now  $\frac{4}{7}$  th job remains which will be done on

Friday and Saturday.

$\therefore$  T and J complete the job in 4 days.

40. (c) Raja doesn't take any holiday so he complete job in 38 days each person by himself can complete the job in 38 days if he would not take any holiday. In one

day, T and S together can complete  $\frac{2}{38}$  th of the work.

Sine T takes holiday on Tuesday and Thursday and S takes holiday on Saturday and Sunday.

Therefore, in the one week they can do  $\frac{10}{38}$  th of the work.

In the 3rd weeks  $\rightarrow \frac{30}{38}$

In the 4th week  $\rightarrow \frac{2}{38} \quad \frac{1}{38} \quad \frac{2}{38} \quad \frac{1}{38} \quad \frac{1}{38} \quad \frac{8}{38}$

Hence, it is completed on 22nd March.

41. (c) **Day**      **Units Produced**      **Accumulated Units**

1      150      150      150      150

2      180      0      330      0

3      120      120      450      120

4      250      0      700      0

5      160      160      860      0

6      120      0      980      120

7      150      0      0      0

Storage cost @ 5      2150      17350      1950

Hiring Cost      4000      1000      4000

So the correct option is (c).

42. (a) **Day**      **Units**      **Accumulated Units**

1      150      150      150

2      180      330      330

3      120      450      450

4      250      0      700

5      160      160      860

6      120      280      980

7      150      430      0      0

Storage cost      1440      2776      1096

@ 0.8 per sq. ft.

Cost of truck      1000      1000      2000

Total cost      2440      3776      3096

The minimum cost is in option (a).

43. (a) If A is the first, then B will be either at 2nd or at 4th place and in both the cases, there is a contradiction i.e. C, D sitting together.

44. (c) If A is not at the third place C can only be at the first or third place  $\begin{bmatrix} C & A & D & B \\ D & A & C & B \end{bmatrix}$ .

45. (b) If A and B must be together A cannot be at the second place because if A is at the second place then B has to be at the first place and hence C, D are together which should not be true. Hence, A cannot be at second place.

46. (a) To find maximum number of coins collected by one, we find the minimum number of coins collected by other three

Hence, maximum  $100 - (10 + 12 + 14) = 64$

47. (c) A collected 54 Coins  
No. of coins for rest of the three = 46  
to find the second highest i.e. highest amongst these three, we use the same method as above:

Hence, second highest =  $46 - (10 + 12) = 24$

Difference between highest and second highest  
=  $54 - 24 = 30$

48. (d) A = 54 coins  
So, no. of coins collected by B, C, D =  $100 - 54 = 46$   
If no. of coins collected by C = x  
 $\therefore$  by B =  $2x + 2$   
 $\therefore 2x + 2 + x + y = 46$

where y is the no. of coins which D have.

Minimum value of y is 10.

$$\therefore 3x + 2 < 36 \Rightarrow x < \frac{34}{3}$$

$\therefore x = 10$  and  $y = 12$  and or B have 22.

Hence, coin collected by B = 22

For Qs. 49-50

Colours	Amar	Akbar	Anthony
Red	✗		
Green		✗	
Blue	✓		✗

49. (a) From option (a), Amar — Blue  
Akbar — Green (not possible)  
From option (b), Akbar — Red  
Anthony — Red  
From option (c), Amar — Blue  
Akbar — except blue (red)  
Anthony — Red  
From option (d), Amar — Green or Blue  
Akbar — Red  
Anthony — Red  
Thus only option (a) is not possible.

50. (a) According to above table statement II and IV are false.

51. (a) If number of chocolates is  $N_C$  then those of biscuits

$$N_B = 2N_C$$

and number of apples i.e  $N_A > 3N_C$

also, total amount spent

$$= 2N_A - N_C - \frac{1}{4}(2N_B) - 2N_A - 2N_C$$

(note that amount of money spent is even number)

$$\text{option (b)} 33 = 8 + 24 + 1$$

$$\text{but } 2N_A \neq 25$$

option (c) is not possible

minimum Rs that can be spent =  $10[4 \times 2 + 1 \times 1 + 2 \times 1/2]$

$$\text{So, option (a)} 34 = 8 + 24 + 2$$

$$2N_A, [N_A = 3N_C \text{ also}] \\ \text{even } \text{satisfied}$$

So, option (a) is correct

	Winner (1st)		Runner (2nd)	
Colour	Yellow	Red	Green	White
Sitting arrangement	A	W	U	M

So, Ms. West Bengal wore red saree.

53. (c) From the above solved table Ms. West Bengal was sitting together with Ms. A and Ms. U.

54. (a) Ms. AP has worn yellow saree.

55. (c) Ms. U was runner up.

For Qs. 56-60.

Gopal paid = 40%

Ram paid = 60%

Let total cost be Rs x

$$\frac{2}{5}x = 200000 \quad \frac{3x}{5} \Rightarrow x = 200000 \times 5 = 10,00,000$$

$\therefore$  Total amount put in by Ram and Gopal

$$= 10,00,000 + 2,00,000 = 12,00,000$$

$$\begin{array}{c} \text{Coconut} \quad 5 \\ \hline \text{Lemon} \quad 1 \end{array}$$

So, if 100 lemon trees

Hence, 500 coconut trees

$$\text{So, Revenue generated} = \frac{25}{100} \times \text{Rs} 12 \text{ lakh} = 3 \text{ lac.}$$

$$\text{Revenue for coconut} = \frac{3}{5} \times 3 \text{ lakh}$$

$$\text{Revenue for lemon} = \frac{2}{5} \times 30 \text{ lakh}$$

56. (b) Total output of coconuts

$$\frac{3}{5} \times \frac{3 \times 10^5}{5} = \frac{9}{25} \times 10^3 \times 100 = 36000$$

57. (a) From lemon trees Rs.  $\frac{2}{5} \times 3$  lacs

$$\text{Land for lemon trees} = \frac{1}{6} \times 10 = \frac{5}{3} \text{ acres}$$

Output per acre of lemon trees planted

$$\frac{2}{5} \times \frac{3}{5} = 0.72 \text{ lakh / acre}$$

58. (a) In 1997, amount received by Gopal

$$\frac{1}{2} \text{ of total revenue} = \frac{1}{2} \text{ of } 3 \text{ lakh} = 1.5 \text{ lakh.}$$

59. (b) Total output of coconuts =  $\left( \frac{3}{5} \times 3 \text{ lakh} \right) 1,80,000$

$$\text{Hence, output per tree} = \left( \frac{180,000}{500} \right) = 360$$

60. (a) Ratio of yields from coconut and lemons was 3:2, further the coconut and lemon trees were planted on the equal area of the total 10 acres of land. Therefore the ratio of yields per acre of land for coconuts and lemon was 3:2.

For Qs. 61-62.

The information provided in the problem can be tabulated as follows :

Husband	Occupation	Wife	Occupation
A	Lawyer	D	(Housewife)
C	Accountant	F	Lecturer

E can only be the architect, hence has to be male. D can only be a housewife, which means that A is a male. Consequently, B also has to be a housewife. The males are A, C and E.

61. (c) E is architect

62. (b) There are three males in all.

## For Qs. 63-66.

n n 1 n 2 n 3 4n 6 10 or n 1

⇒ the coins distributed are : 1, 2, 3, 4

Q > P and S < R.

63. (c) P gets even number of coins i.e. 2 or 4.

∴ Q > P hence P cannot be 4.

⇒ P = 2 and Q = 3 or 4 .....(i)

Again S < R, using (i), S = 1 and R = 3 or 4

∴ Sum of Q and R > 5

64. (b) R = S + 2, but R is not maximum.

⇒ R 3 and S 1

Again Q > P ⇒ P = 2 and Q = 4

∴ Sum of R and S = 3 + 1 = 4

65. (a) Q = 2 P ⇒ Q = 4 and P = 2

Again, S < R ⇒ S = 1 and R = 3

Only (a), i.e. 'S can have only odd value' is true.

66. (c) R = 3 ⇒ S = 1 or 2

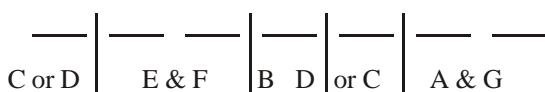
Again Q > P, so P can be 1 or 2.

But 1 and 2 values can be taken by P and S

Hence Q = 4

## For Qs. 67-68.

From the conditions,



So E & G cannot sit together. F cannot sit on extreme position.

67. (d)

68. (d)

## For Qs. 69-71.

Sandhya starts with the even number of flowers because after last offering, she is left with no flowers and the flower have been doubled, it has to be in even numbers.

No. of flowers after dipping	Offered	Left with
60	32	28
56	32	24
48	32	16
32	32	0

So, she offered 32 flowers at each deity.

It can also be inferred that the number of flowers offered is actually a power of 2, because each time the flowers are getting doubled. So the minimum number of flowers that she can start with is 15 and the minimum number she can offered is 16.

69. (c)

70. (b)

71. (a)

## For Qs. 72-74.

	Ghosh	Dealer	Net effect
1	8	16	Loss of 8 to Ghosh Babu
2	10	-10	Gain of 20 to Ghosh Babu
3	6	6	No gain / loss
4	8	16	Loss of 8 to Ghosh Babu

If the Ghosh Babu leaves the game after he has played it twice his gain will be maximum i.e. Rs 12.

Because 1st the dealer pays the base amount, Ghosh Babu, has to start with Rs 8. as minimum.

So, that he can pay Rs 16 at the end of 1st game.

Net result = Gain of Rs 4 to Ghosh Babu.

So, he must start with Rs 96.

72. (a) 73. (c) 74. (c)

75. (c) The task with the person is to optimize his points. If he takes a book of

1 management +2 fictions ⇒ 4 2×1 6

1 mathematics + 2 physics ⇒ 3 2×2 7

There are no restrictions on carrying either fiction or physics alone. So to maximize the no. of points , he will carry 1 management +2 fictions = 6

2 × (1mathematics + 2 physics) = 14

1 Physics = 2 so total = 22.

76. (a) The given clues can be arranged as follows :

Occupant	Colours	Residence
P	Red + Blue	
Q		Hut
S	Red + Blue	
T	Yellow + Black	
M		

Hence, we find that only Q and M can stay in the palace.

Since Q stays in the hut, M stays in the palace.

Hence, the answer option is (a).

77. (d) Arranging the clues the two possible arrangement of the cricketers are :

U\_YTXVX

U\_XTYVW

So, X can occupy either the 3rd or the 5th positions.

Hence, the answer option is (d).

78. (a) Arranging the clues we get the following grid :

	R	S	G	M
T	X	X	X	O
A	O	X	X	X
V	X	O	X	X
K	X	X	O	X

Hence, Mita danced with Tarun.

Hence the answer is (a).

79. (c) Since A doesn't live in the yellow house or in the green or the Red houses adjacent to it, he has to stay in the Blue house.

80. (b) a, b, c, d and e represent numbers 2, 4, 5 , 6 and 10  
From (I), a + c = e

From (II), b = 2d ⇒ b 10 or d = 5 accepted

From (III), a + e = b

From above we have,

a a c b ⇒ 2a c 10, a 4 ⇒ e 2, c 6

Hence, a = 4; b = 10; c = 2; d = 5; e = 6 is the required solution.

81. (c) The perfect schedule is as follows :

Scheduled	Nautanki
10th September	Sati Savitri
11th October	Veer Abhimany
11:00 - 11:30	Sundar Kand
11:30 - 12:30	Joru Ka Gulam
12:30 - 1:30	Lunch
1:30- 2:00	Jhansi Ki Rani
2:00 - 3:00	Reshma aur shera

So, option (c) is correct answer

82. (c)

Mrs. Ranga's children		
Anshuman	Suprita	Vaibhav
September	April	June
2	4	7

Hence, (c) is the right answer.

83. (c) Fried brinjal — Blue Chinaware

Sambar — White Chinaware

Makkai-ki-roti — Red Chinaware.

The family that eats at 10' clock serves fried brinjal, hence Pattabhiraman serves fried brinjal. The family that eats last like *makkai-ki-roti* so, Banerjees like *makkai-ki-roti*. Sharmas are left with *samber*.

Sharma — 12:00 — Samber — White

Pattabhiraman — 1:00 — Fried brinjal — Blue

Bannerjees — 2:00 — *Makkai-ki-roti* — Red

84. (b) We had two options.

Black hair, Short tail and no collar.

And white hair, long tail and a collar

Hence (b) is right answer.

#### For Qs. 85-87.

From the given statement

$$E = 3Y \quad \dots(1)$$

$$Z = \frac{W}{2} \quad \dots(2)$$

$$Y > Z \quad \dots(3)$$

85. (b) (a) gives  $Y > \frac{W}{2}$ , which is not true from the above equations.

For (b), From (1), (2), (3);  $\frac{E}{3} > \frac{W}{2}$  or  $E > 1.5W$ ,

which is true.

(c) is clearly wrong as can be seen above.

86. (c) (a) gives  $Z = 10$ , which alone is not sufficient.

(b) gives  $Y = W$ , which again is not sufficient.

On combining (a) and (b),

$$W = Y = 2Z = 20; Z = 10 \Rightarrow E = 3Y = 60$$

Hence (c) is the correct option.

87. (a) (a) is correct as if P is true it means Q and R are true which further means S is false (from the given statements).

(b) is wrong because it gives that either Q or R is true, which is not sure.

(c) & (d) can't be sure.

#### For Qs. 88-90.

Women	Men
Fiza	Ram
Kavita	Shyam
	David
	Peter
	Rahim

88. (b) Peter, Shyam and Rahim is become feasible if Shyam is there & Ram is not there

Shyam & Rahim together

If Peter no David

No David, no Kavita.

89. (c) Shyam, Rahim, Fiza, David

Shyam and Rahim together

Shyam with no Ram

David without Peter

Fiza with David's demand

90. (d) If Kavita

$\Rightarrow$  David is there  $\Rightarrow$  No Peter  $\Rightarrow$  No Ram

Hence (a) is not possible

If Kavita then David, no Peter no Ram. Fiza will be the

fourth member. Again not possible

A group of 4 cannot be possible.

So, none of the options is correct

91. (b)

	Oak Leaves		Maple Leaves	
	Red	Non-red	Red	Non-Red
Spot	y	5y	6	0
	(even, +ve)			
W. Spot	x	0	x	22

$$6 + 22 + x + x + y + 5y = 50 \Rightarrow 2x + 6y = 22 \Rightarrow x + 3y = 11$$

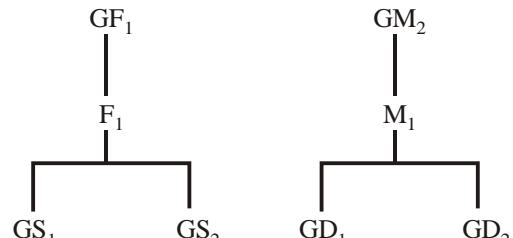
As y is even, so,  $y = 2$ ,  $x = 5$ .

$$\text{Oak leaves} = x + y + 5y = x + 6y = 5 + 12 = 17$$

92. (c)

O	M1 – F B	C $\rightarrow$ A, B
P	M2 – E D	E $\rightarrow$ B, F
Q	M3 – A G	G $\rightarrow$ F, H, D
R	M4 – C H	Q $\rightarrow$ A P $\rightarrow$ D G $\rightarrow$ Q B $\rightarrow$ R

93. (b)



The two married couples are  $GF_2$  &  $GM_2$  and  $F_2$  and  $M_2$ .

Thus, we have 2 grandfathers  $GF_1$ ,  $GF_2$

4 fathers  $GF_1$ ,  $GF_2$ ,  $F_1$  and  $F_2$ .

2 grandmothers  $GM_1$ ,  $GM_2$

4 mothers  $GM_1$ ,  $GM_2$ ,  $M_1$  and  $M_2$ .

Thus, minimum number will be 12.

94. (b)  $D \rightarrow 2B$  ....(i)  
 $A \rightarrow C$  ....(ii)  
 $E \rightarrow 2D$   $B \rightarrow 3B$  ....(iii)

(Since for every D there are 2B)

As there is no condition with C, so the average cost in any scheme shall be less than 70, so as to maximise the points. Otherwise, C would be preferred.

Scheme (i),

$$\text{Average Cost} = \frac{1D \quad 2B}{3} \quad \frac{40 \quad 180}{3} \quad 73.33$$

$$\text{Scheme (ii), Average Cost} = \frac{1A \quad 1C}{2} \quad \frac{110 \quad 70}{2} \quad 90$$

Scheme (iii), Average Cost

$$= \frac{1E \quad 2D \quad 4B}{7} \quad \frac{45 \quad 80 \quad 360}{7} \quad 70$$

But following the 3rd scheme, I need to buy atleast

$$2(1E \quad 2D \quad 4B) \quad 2(45 \quad 2 \times 40 \quad 4 \times 90) \equiv \text{Rs.970}$$

Which fetches  $30 \times 1500$  -ve points.

Which is not possible. So, maximum points can be attained in case of buying

$$13C's \quad 1B \quad 13 \times 70 \quad 90 \quad 910 \quad 90 \quad 1000$$

$$\therefore \text{No. of items purchased} = 14$$

95. (b) From question we have

$$A < 3B$$

$$C > B$$

$$D = |B - C| = C - B$$

$$A = 3D$$

Friend	Have buy	Price
A	Shirt	200
D	Shawl	400
B	Sweater	600
C	Jacket	1000

C buys Jacket for Rs 1000, with Rs 300 borrowed from A  
 $\Rightarrow C$  had atleast  $1000 - 300 = \text{Rs } 700$

B buys Sweater for Rs 600 with Rs 100 borrowed from A  
 $\Rightarrow B$  had  $600 - 100 = \text{Rs } 500$

$$\Rightarrow A = 1500$$

As A buys 3 shirts  $\equiv \text{Rs.} 600 \Rightarrow A$  had atleast  $600 + 300 + 100 = \text{Rs } 1000$  atleast

As shirt, jacket and sweater has already been bought, a Shawl is left.

$\Rightarrow D$  buys a Shawl worth Rs 400 and  $A = 3 \times 400 = \text{Rs } 1200$

96. (b)  $W_1 = W_x =$  Sonali, Shalini, Shubhra, Shahira, Rupa

$Somya \neq Ritu \neq W_b$

$W_y =$  Rupali, Renuka, Komal  $Tara \neq Radha \neq W_z$

$W_z =$  Radha  $Komal \neq Radha, Somya, Ritu$

$W_4 = W_a =$  Ruchika, Somya, Sweta, Jyotika  $Rupali \neq Sweta, Jyotika \neq W_y$

$W_b =$  Ritu, Tara

Komal is in  $W_y$  as  $W_1$  is full

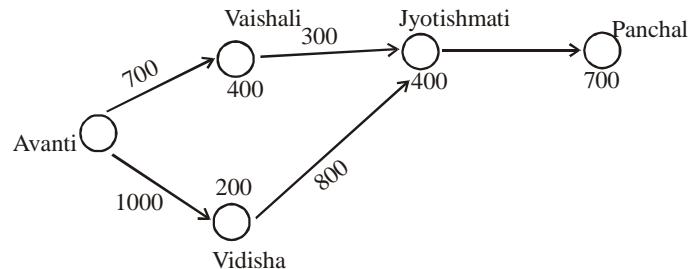
Hence, Elina is the instructor of Radha.

97. (d)

Ministers	Likes	Dislikes
M1	Fishing, Smoking	Gambling
M2	Smoking, Drinking	Fishing
M3	Gambling	Smoking
M4	Mountaineering	Drinking
M5	Drink	Smoking and Mountaineering
		Mountaineering
M6	Fishing	Smoking and Mountaineering
		Mountaineering
M7	Gambling,	Fishing
	Mountaineering	
M8	Smoking, Gambling	Mountaineering

- (a) M1, M2, M5, M6 - not possible because M1 hates Gambling which is not a liking of any of the rest three.
- (b) M3, M4, M5, M6 - not possible because none of them share a liking with each other.
- (c) M4, M5, M6, M8 - not possible because none of them share a liking with each other.
- (d) M1, M2, M4, M7 - correct.

For Qs. 98 to 100.



98. (d) Clearly since each pipeline can have maximum of 1000. So, here we have put the values according to demand of the places

99. (d)  $Avanti - Vaishali = 700$

$$\text{So, free capacity} = 1000 - 700 = 300$$

100. (d)  $Avanti - Vidisha = 1000$

$$\text{Free capacity} = 0$$

101. (c) Conclusion comes out from all five statements that Sameer is an Economist who got admission offers in two NIMs

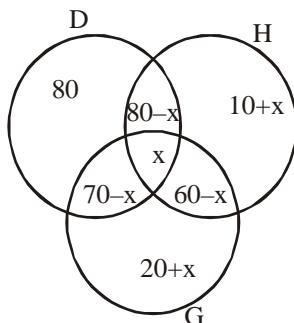
102. (d) Given that  $A > J$ ,  $S = D + 1.50$ ,  $G >$  only one person

$D = \frac{2}{3}S$ , A spent the most but did not end with the least

J spent least,  $J' > A$  or  $D'$ ,  $G' = 3.50$ ,  $A = 10 G$

therefore conclusion comes out that Jugraj started with Rs 10 and ended with Rs 7.00

103. (a)



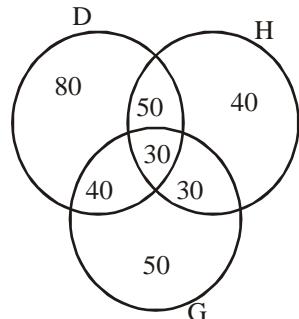
$$80 - (80-x) = x \quad (70-x) = 200$$

$$80 = 200 - (150-x) \text{ or } 80 = 50+x \text{ or } x = 30$$

Patients for hyperglycaemia only

$$= 150 - (80-x + x + 60-x) = 10+x$$

Patients for Gastroenteritis only = 20 + x

Dr Paul had  $50 + 30 + 40 + 30 = 150$  Patients

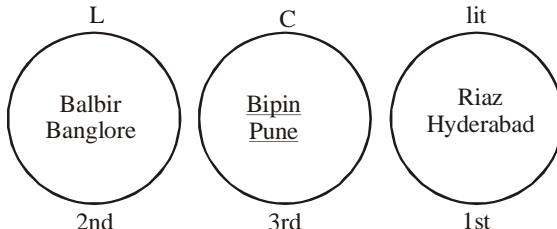
Dr Dennis had 80 Patients

Dr Gerard had 50 Patients

D Hormis had 40 Patients

Paul &gt; Gerard &gt; Hormis

104. (c)



105. (c) Let age of younger boy = y years

and age of elder boy = x years

According to given conditions

$$y \cdot (xy)^{1/3} \Rightarrow y^2 = x$$

$$\text{Age of father} = yx = 10y = x$$

$$\text{Age of mother} = \frac{1}{2}xy = \frac{1}{2}(10x - y)$$

$$\therefore \frac{1}{2}(10x - y) = 3 \cdot 10y = x$$

$$\text{Put } x = y^2 \text{ then, } \frac{1}{2}(10y^2 - y) = 3 \cdot 10y = y^2$$

$$\text{or } 8y^2 - 19y + 6 = 0$$

$$(y-2)(8y-3) = 0$$

$$\therefore y \neq 3/8 \therefore y = 2$$

106. (a) Seating capacity of hall = 200

Vacant seats in hall = 20

$$\text{Waiting ladies passenger} = 180 \times \frac{40}{100} = 72$$

$$\text{Seating capacity of each flight} = 180 \times \frac{2}{3} = 120$$

After boarding for flight A, vacant seats in hall

$$= \frac{200 \times 60}{100} = 120$$

Passengers who boarded flight A = 120 - 20 = 100

Now passengers waiting for flight B = 180 - 100 = 80

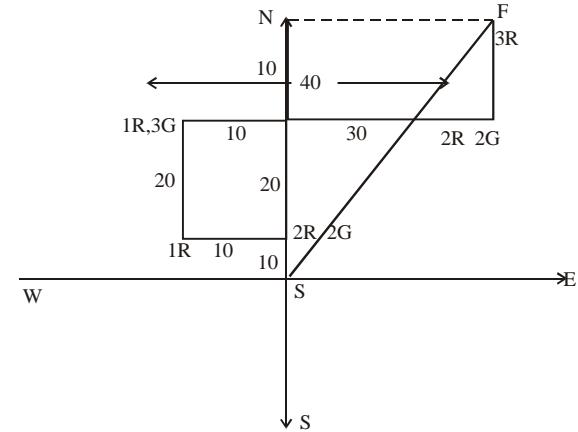
$$\text{Air hostess in flight A} = \frac{80}{20} = 4$$

Empty seats in flight B = 120 - 80 = 40

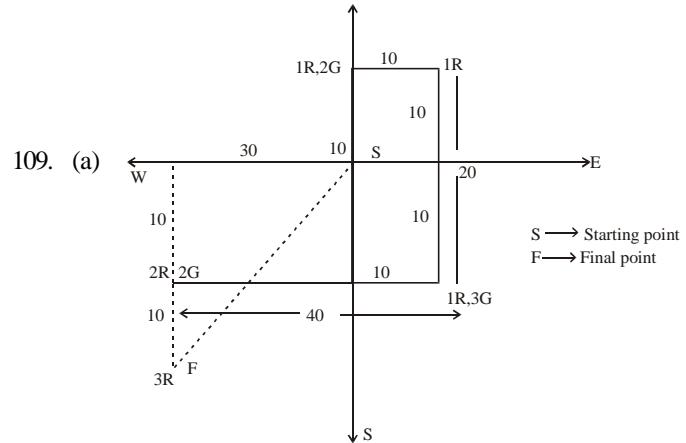
Required ratio 40 : 4 = 10 : 1.

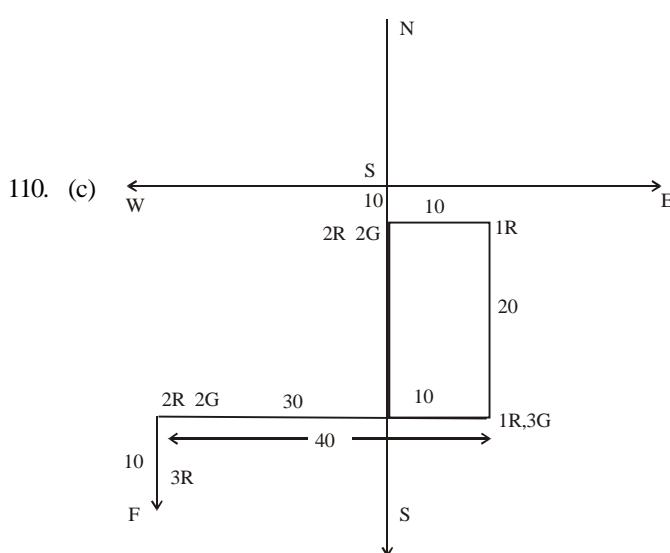
107. (a) Total distance travelled from starting point till last signal =  $10 + 20 + 20 + 40 + 0 = 90$  km to west in 20 km to south F is situated at 30 km to west in 40 km to south

108. (c)



$$\text{SF} = \sqrt{(40)^2 + (30)^2} = \sqrt{1600 + 900} = 50 \text{ km}$$





110. (c) Final position be 30 km to west to 20 km to south

111. (b) Let he stole originally  $8x$  diamond  
According to question

$$\text{Diamonds given to first watchman } \frac{8x}{2} - 2 = 4x + 2$$

$$\text{Now, thief has diamonds } 8x - (4x + 2) = 4x - 2$$

$$\begin{aligned} \text{Diamonds given to second watchman } & \frac{4x - 2}{2} - 2 \\ & = 2x + 1 \end{aligned}$$

$$\text{Now, thief has } (4x - 2) - (2x + 1) = (2x - 3) \text{ diamonds}$$

$$\text{Diamonds given to third watchman } \frac{(2x - 3)}{2} - 2$$

$$x - \frac{3}{2} - 2 \quad x - \frac{1}{2}$$

Now, remaining diamonds

$$= 2x - 3 - \left( x - \frac{1}{2} \right) = x - \frac{7}{2}$$

According to question

$$x - \frac{7}{2} = 1 \text{ or } x = 1 \frac{7}{2} = \frac{9}{2}$$

$$\text{Originally he theft } 8x = 8 \times \frac{9}{2} = 36$$

112. (d) Suppose two unequal numbers of coins are  $x$  and  $y$ , then according to question

$$48(x - y) = x^2 - y^2$$

$$48(x - y) = (x - y)(x + y)$$

$$(x - y)(x + y) - 48(x - y) = 0$$

$$(x - y)(x + y - 48) = 0$$

But  $x - y \neq 0$  (since  $x \neq y$ )

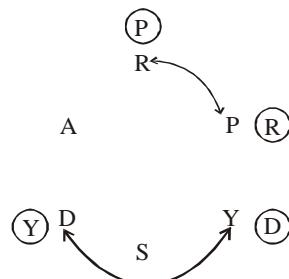
$$\therefore x + y - 48 = 0$$

$$\therefore x + y = 48$$

total coins = 48

113. (c) They did nothing on 24 mornings  
They did nothing on 14 evenings  
 $\therefore$  They played tennis on  $(24 - 14) = 10$  evenings  
The remaining playouts, i.e.,  $22 - 10 = 12$  can be done in 6 days, i.e., 6 mornings and 6 evenings.  
So, Shyam stayed for 30 days.

114. (c)



After interchanging the seats it is clear from the fig. that Suresh (S) is to the left of Dhiraj (D)

115. (d) 1 2 3 3 2 1 4 2 3 1 4 2 2 3 3 1 4 1 1 3 2 3 4  
there are six '2' in the sequence and four '4'. Therefore, 6 oranges are put and 4 oranges are taken out. So, total oranges at the end of sequence =  $6 - 4 = 2$

116. (c) There are six '1' in the sequence  
 $\therefore$  6 mangoes are put  
There are six '2' in the sequence  
 $\therefore$  6 oranges are put  
There are seven '3' in the sequence  
 $\therefore$  7 apples are put  
Total fruits put =  $6 + 6 + 7 = 19$   
There are four '4' in the sequence  
 $\therefore$  4 mangoes and 4 oranges are taken out  
 $\therefore$  Taken out fruits = 8  
Total fruits at the end of sequence =  $19 - 8 = 11$

117. (b) Share of each traveller  $\frac{8}{3}$

1st traveller gave to 3rd traveller  $5 - \frac{8}{3} = \frac{7}{3}$

2nd traveller gave to 3rd traveller  $3 - \frac{8}{3} = \frac{1}{3}$

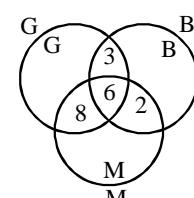
3rd traveller pays 8 coins for his share  $\frac{8}{3}$

$\therefore$  For  $\frac{8}{3}$  bread = 8 coins

$\frac{7}{3}$  bread  $8 \times \frac{3}{8} \times \frac{7}{3} = 7$  coins

Therefore, 1st traveller should get 7 coins.

118. (d)  $G + B = M + 16$  .....(i)



$$\begin{aligned}\text{Total number of projects} &= 2(8+6+3+2) - 1 \\ &= G + M + B + 19\end{aligned}$$

$$\text{Hence, } G + M + B = 18 \quad \dots\text{(ii)}$$

Using (i) & (ii), we can solve for M but cannot find G.

119. (b) Using (i) & (ii), we get  $M = 1$

For Qs. 120-121.

$$G = A - 8$$

$$A \quad G \quad 40 \Rightarrow 2A - 8 \quad 40 \text{ or } A \quad 24 \Rightarrow G \quad 24 - 8 \quad 16$$

$$\text{Again, } A \quad D \quad 5 \text{ or } D \quad A - 5 \quad 24 - 5 \quad 19$$

$$\text{Again, } J \quad D \quad 8 \quad 19 \quad 8 \quad 27$$

$$\text{Again, } D \quad R \quad 37 \text{ or } R \quad 37 - D \quad 37 - 19 \quad 18$$

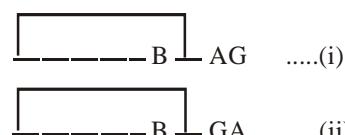
120. (a)  $D + J = 27 + 19 = 46$ , (a) is true.

Clearly (b), (c) and (d) are wrong

121. (a) is true

For Qs. 122-124.

From the data provided, the two possible options are



122. (c) E and G as G can not be on B's adjacent side.

123. (d) E and A as in option (i), A's adjacent position has to be occupied by C or D

124. (c) Clearly F.

For Qs. 125-127.

Following information can be inferred from the given data:

Lawyer  $\leftrightarrow$  D (Housewife)

woman  $\neq$  Engineer / Accountant

Friends	Profession	Sex
A	Lawyer	M
B	Housewife	F
C	Accountant	M/F
D	Housewife	F
E	Engineer	M
F	Professor	F/M

C (Accountant)  $\leftrightarrow$  F(Professor) – Couple

A  $\leftrightarrow$  Housewife(B / D) – Couple

E  $\neq$  Housewife

125. (b) 3 Males

126. (a) E - Engineer

127. (d) A and D

128. (b) Cost of 1 litre Avocado paint

$$= \text{Cost of } \frac{1}{2} \text{ litre orange} \quad \text{cost of } \frac{1}{2} \text{ litre pink}$$

$$= 11 + \text{cost of } \left( \frac{1}{4} \text{ litre Red} \quad \frac{1}{4} \text{ litre white} \right)$$

$$= 11 + 5 + 3.75 = \text{Rs } 19.75$$

129. (d) 1 litre of washed orange can be produced by mixing

$$\frac{1}{2} \ell \text{ orange and } \frac{1}{2} \text{ litre white or } \frac{1}{4} \text{ litre Red} \quad \frac{1}{4}$$

yellow  $\frac{1}{2}$  litre white or 1: 1 : 2 in red, yellow & white

colour respectively.

130. (b) Cost of 1 litre cream  $= 0.7 \times 15 + .3 \times 25 = 10.5 + 7.5 = \text{Rs } 18$

Cost of 1 litre Avocado  $= \text{Rs } 19.75$  (From Q. 40)

Cost of 1 litre washed orange  $= \frac{1}{2} \times 22 + \frac{1}{2} \times 15 = \text{Rs } 18.50$

Hence, cream is the cheapest

131. (d) A = home, then C = finance, D and B must have power and telecom, hence (d) is wrong.

132. (b) C gets home or finance, hence (a) and (d) are wrong.. Statement (c) is also wrong as D and F cannot come together.

For Qs. 133-135.

Friends	Idli	Vada	Chutney
Ignesh	$a = 6$	$3x = 6$	✓
Mukesh	4	$x = 2$	✗
Bimal	$a + 2 = 8$	4	✗
Mukesh			
Sandeep	1	0	✗
Daljit	5	1	✓

133. (c) Ignesh takes 6 Idli and 6 Vada and takes Chutney.

134. (d) Clearly, Ignesh eats and Vadas.

135. (a) We get the following table :

Friends	Idli	Vada	Chutney
Ignesh	6	6	✓
Bimal	8	4	✗
Mukesh	4	2	✗
Sandeep	1	0	✗
Daljit	5	1	✓

For Qs. 136-138.

Women	Spent Rs	
A	2234	Has to come before 1193
C	1139	Lowest and 1378 less than 2517
D	1193	
H	1340	Higher than D
S	2517	Highest

136. (b) We get  $S = 2517$ . Then  $C = 2517 - 1378 = 1139$

$A = 2234$ ,  $D = 1193$  and  $H = 1340$ .

137. (a) Rs 1139

138. (c) Dhenuka

139. (c) The given facts can be formulated in the following figure:

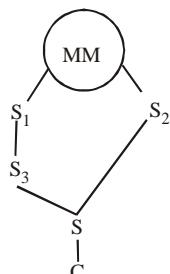


So, C's office is to the left of E.

140. (d) E and A face each other  
 141. (a) A only  
 142. (b) Office of B is right and in the corner.  
 143. (a) SP and BSP clash routes, so, separate days.  
 Congress and CPM clash routes, so, separate days.  
 Political Parties take out their processions from following days :

Political Parties	Days of processions
BJP	Friday
SP and BSP	Thursday or Friday
Congress and CPM	Thursday or Friday
SP	Thursday (since BJP covers AB route on Friday)
BSP	Friday
Congress	Thursday (since BJP covers DE route on Friday)
CPM	Friday

- Congress should be allowed on Thursday  
 144. (d) Congress on Thursday and BSP on Friday  
 So, not on the same day  
 145. (b) The order of events as given in the problem can be written as:  
 JC (e); SS (e); SM (e); DG (e); SM (l); SS (l); VR (e),  
 JP(e); JC(l) DG(l); DG(e<sub>2</sub>); VR (l); PK (e); PK (l); JP (l);  
 DG (l)  
 where e shows entered, l shows left and e<sub>2</sub> show entered 2nd time.  
 So, DG entered before JP  
 146. (c) DG was sitting with JC, when JP entered  
 147. (b) 3 members whom VR met were JC, DG and JP  
 148. (d) JP and DG were the last to leave  
 149. (b) A and D have no blank answers, so, they may have only one source  
 C has copied from 1 source only (as there are 2 wrong answers)  
 B has copied from 2 sources as there is only 1 wrong answer (which has been done by himself) and rest blank answers (which have not matched in the 2 sources)  
 150. (c) C has 2 wrong answers and 3 blank answers. This means one wrong answer has been done by himself and the other from the source, say S, from where he copied. 3 blank answer mean that they were present in S's answer key too. This means S has got it from two sources – S<sub>2</sub>, one with one wrong answer and the other S<sub>3</sub>, with 2 wrong answers. The one having 1 wrong answer could have got it from the master mind but the other one has to get it from a single source S<sub>1</sub>, (who has got it from MM) with one wrong answer. So, 4 people before him



151. (d) If G and H would be sources to some one than he should have 25, 46 and 92 as blanks which is not there in any case  
 152. (c) (a) False, as 27 was introduced by I  
 (b) False, as 46 was introduced by A  
 (c) True (d) False  
 153. (d) (I) A, D, and G have the same source as the mastermind as they have only one wrong answer and no blank answers  
 (II) E and H have no blank answers so it means they both have got their answers from one single source, i.e. A.  
 So, both (I) & (II) had identical sources.

**For Qs. 154-157.**

The data provided in the question can be tabulated in the following form.

Families			kid		Entry
				marriage	
F1	Raman	Shanthi	0	0	Third
F2	Raj	Joya	$\geq 1 = 2$	$\geq 1 = 1$	Second
F3	Sunil	Sridevi	$\geq 1 = 1$	$\geq 1 = 1$	Last
F4	Anil	Anita	$\geq 1$	$\geq 1$	First

154. (a) Table shows that Shanthi was the third one to arrive.  
 155. (b) Sunil and Sridevi  
 156. (c) Sridevi and Anita, so, Sunil and Anil  
 157. (b) Raj has two kids.  
 158. (a) Question is group B = 23 ≡ 46 marks

Groups	Questions	Marks
A		$\geq 60\%$
B	23	46
C	c	3c

If c = 1 then total marks = 76 + 46 + 3 = 125 whose 60% is 75. As marks of A > 75, so, c = 1 satisfy but for any c > 1, then % marks of A will be less than 60%.

159. (c) If C has 8 question, it has 24 marks. Then if B has 12 question, A must have 80 questions. Percentage of marks in B = 24/128 = 18.75%, hence the first two choices are wrong since it must be 20%. If B has 13 questions, percentage = 26/129 > 20%, and if B has 14 questions, percentage = 28/130 > 20%.

**For Qs. 160-163.**

Players	Runs scored				M - Index	R - Index
	P	SA	Aus.	Total		
K	28	51	$\leq 48$	79+	<50	$\geq 23 \leq 51$
R	$\leq 22$	49	55	104 +	49	$> 3 < 55$
S	$\leq 22$	75	50	125 +	50	$> 53 < 75$
V	130	$\leq 49$	$\leq 48$	130 +	< 50	$> 82 < 130$
Y	40	$\leq 49$	87	127 +	< 49	$\geq 47 < 87$

Top 3 Batsmen 198 175 192

Inning Total 220 250 240

160. (b) From the above table it is clear that Saurav has the highest M-index
161. (a) The players who can have the lowest R-index can be seen from the table  
Saurav's R-index will be  $> 53$  and Virender's R-index  $> 82$ , so both can not have the lowest R-index.  
Kaif's R- index lies between 23-51, so he definitely falls in the category of lowest R-index.  
Rahul (between 33-55) and Yuvraj (47-87) also fall in this category.
162. (c) It is only possible to calculate the M-index for Rahul and Saurav, i.e., 2 players.
163. (b) The above table shows that Rahul definitely scores less than Yuvraj. Kaif scores  $\leq 127$  in all the three matches whereas Yuvraj scores 127 in 2 matches. In case Yuvraj scores 0 in the 3rd match and Kaif scores 48 in the 3rd match they both score 127. So, nothing can be said for Kaif.

For Qs. 164-167.

Continent	Labour	Health	PS	Refugee	
Africa	0	$\geq 1$	$\geq 1$	$\geq 1$	$y = 4$
America	1	$\geq 1$	$\geq 1$	$\geq 1$	$2y = 8$
Australasia	1	1	2	1	$y + 1 = 5$
Europe	1	1	1	1	$y = 4$
	$x = 3$	$2x = 6$	$2x = 6$	$2x = 6$	21

$$x + 2x + 2x + 2x = 21 = 7x$$

$$\Rightarrow x = 3$$

$$y + 2y + y + 1 + y = 21 = 5y + 1$$

$$\Rightarrow y = 4$$

164. (a) No. of Labour experts from the Americas = 1  
No. of health experts from the Europe = 1  
No. of health experts from the Australasia = 1  
No. of Refugee relocation from the Africa can not be found.
165. (d) Clearly from the table option (d) is not possible as no. of expert in Africa and America has to be  $6 - 3 = 3$ .
166. (c) American expert in population studies the above table becomes

	L	H	PS	R
Africa	0	1	2	1
America	1	3	1	3
Australasia	1	1	2	1
Europe	1	1	1	1

Option (c) is not true.

167. (c) From the top table it is clear that the Refugee relocation experts in America can be at the most 3. So both (i) and (ii) are correct.
168. (d) Best done by elimination.  
(a) If true, then NZ lost the second game by 5-1, which does not match.  
(b) If Spain beats NZ by 4-0, then in the next game it should lose by 1-2  
(c) If Spain beats SA by 2-0, then it should win the next game by 3-2, but it lost the other game. Only (d) is possible.

169. (b) As above (a). If Pakistan has 2-1, it should draw the next game 0-0, which is not true. (b) is possible. (c) same as in the first choice.
170. (d) The question is inconsistent. If Pakistan wins the last two rounds, and we are also told in (a) to (c) that Spain, Argentina, Germany and Pakistan won their fifth round matches. This is not possible, since there can be only three winners.
171. (d) We can say nothing about the winner.
172. (a) One of the companies with extraordinary results belongs to cement or IT industry (double return) stored and the other one belong to steel or auto industry

$$(1\frac{1}{2} \text{ times return})$$

	A	B	C	D	Total	Avg. Return
Return	20	10	30	40	100	25%
For min. Return	30	20	30	40	120	30%

	A	B	C	D	Total	Avg. Return
Return	20	10	30	40	100	25%
Possibilities	30	10	60	40	140	35%
For 35% rtn.	40	10	30	60	140	35%

So, II and III are correct.

	A	B	C	D	Total	Avg.
Return	20	10	30	40	100	25%
For 38.75 rtn.	20	10	45	80	155	38.75%

So I & IV are correct.

	A	B	C	D	Total	Avg.
Return	20	10	30	40		
For max. rtn.	20	10	60	60	150	37.5%
For min. rtn.	20	15	60	40	135	33.75%

So clearly II and IV are true.

For Qs. 176-179.

	A	B	C	D
UP	49	82	80	55
Bihar	69	72	70	65
MP	72	63	72	65
<b>Total</b>	190	217	222	185

Hence it is clear from condition (2) that B and C have their names between Aggressive Ltd. & Honest Ltd.

176. (c) If statement (1) is true then B is Honest Ltd.  
If statement (2) is true then B is Aggressive Ltd.  
So (c) i.e., at most one of these is true.

177. (c) As per 1 B is Aggressive Ltd.

As per 2, C is Honest Ltd.

So if 1 is true than 2 has to be true.

178. (b) As per 1, B is profitable Ltd.

As per 2, C should be Honest Ltd., Which has the highest aggregate revenue of 222 m. But as per the given condition in M.P, Truthful Ltd, has the highest market share. So 2 is necessarily false.

179. (c) If profitable Ltd.'s is lowest revenue is from UP, then it is either A or D. In either case the other one (A or D) is truthful Ltd. Hence the lowest revenue is from up again.

180. (c) In the second round, Elena Dementieva ( $\neq 6$ ) will lose to the winner of Patty Schnyder ( $\neq 11$ ) and Dinara ( $\neq 22$ ) and Serena Williams ( $\neq 8$ ) will lose to Nadia Petrova ( $\neq 9$ ).

Further in round 3 (quarter finals), Nadia Petrova will play with Maria Sharapova and defeat her.

181. (c) In question final Maria will defeat Serena and play with the winner of  $\neq 4$  and  $\neq 5$  and will defeat her in the semi finals. So she will definitely not play Kim Clijsters in the finals.

182. (d) In the IIInd round there will be the top 16 players.

As there is upset in the 6th, 7th and 8th match of the 2nd round, so the quarter finalists will be :  $\neq 1, \neq 2, \neq 3, \neq 4, \neq 5, \neq 9, \neq 10, \neq 11$ .

So Lindsay Davenport ( $\neq 2$ ) plays  $\neq 10$  (Venus Williams) in the quarters.

183. (a) The line up for second round becomes

1, 31, 2, 29, 5, 27, 7, 25, 9, 23, 11, 21, 13, 19, 15, 17

The line up for 3rd round is :

1, 15, 3, 13, 5, 11, 7, 9

So, in the semifinal Maria Sharapova will meet  $\neq 13$  or  $\neq 5$ .

Hence, Anastasia Myskina is the answer.

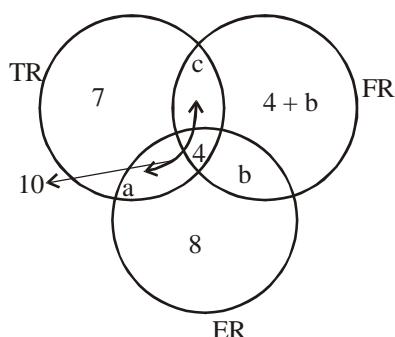
184. (c)  $n(\text{TR}) = 17$

$n(\text{involved in TR \& atleast 1 more}) = 10$

$n(\text{only TR}) = 17 - 10 = 7$ ;  $n(\text{only ER}) = 7 + 1 = 8$

$n(\text{TR} \cap \text{ER} \cap \text{FR}) = 8/2 = 4$

$n(\text{FR only}) = n(\text{FR volunteers involved in ER}) = b + 4$



$$n(\text{FR} \cap \text{TR} \text{ but not ER}) = c = 6 - a \quad \dots\dots(1)$$

Total volunteers = 37

$$\Rightarrow 17 + 8 + 4 + 2b = 37$$

$$\Rightarrow 2b = 8 \text{ or } b = 4$$

From (1),  $a + c = 6$

As FR has to have maximum volunteers so c can have the following possible values

$$(1) c = 4, a = 2 \quad (2) c = 5, a = 1$$

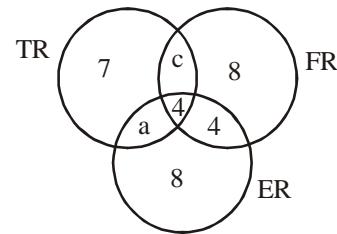
But for minimum volunteers in FR & TR,  $c = 4$ .

185. (a) Only 1st option is useful

$$20 = 4 + 4 + 8 + c \text{ or } c = 4$$

Using the value of c and b we can get all required values.

186. (b) The Venn-diagram looks like,



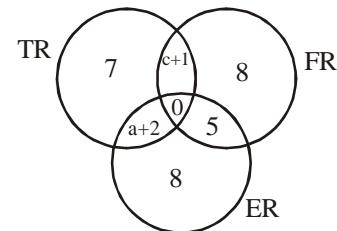
Now the 4 students common to all the three projects are asked to shift.

1 moves from TR and remains in ER & FR

1 moves from ER and remains in FR & TR

2 moves from FR and remains in ER & TR

So, the new diagram becomes



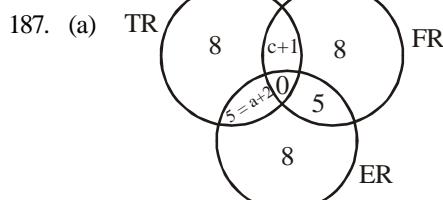
$$n(\text{TR}) = 10 + a + c$$

$$n(\text{FR}) = 9 + 5 + c = 14 + c$$

$$n(\text{ER}) = 8 + 5 + a + 2 = 15 + a$$

Further,  $a + c = 6$  for which either  $c = 5$  &  $a = 1$  or  $c = 4$  &  $a = 2$

Thus, FR has maximum volunteers for any values of c & a.



$$a + 2 = 5 \Rightarrow a = 3$$

$$a + c = 6 \Rightarrow c = 3$$

$$n(\text{TR}) = 8 + 4 + 5 = 17$$

$$n(\text{FR}) = 8 + 5 + 4 = 17$$

$$n(\text{ER}) = 8 + 5 + 5 = 18$$

So, maximum volunteers are in ER = 18

For Qs. 188-191.

Round	Total votes cast	L	P	B	N	
1	82	30	24	16	12	
2	83	30	24+3(N)+ 4(B)+1new	21	—	1 new member from N votes
3	75	30+50%	32+4(B)+1	—	—	1 new member from B votes
		of 16(B in round 1)				

In all 9 members could not vote in round 3 [  $83 - (75 - 1)$  ] as both the countries they voted for — New York & Beijing lost in the first two rounds. So the remaining members who voted for Beijing in round 2 (i.e.,  $21 - 9 = 12$ ) are equivalent to the 75% of members who voted Beijing in round 1.

$$\text{Hence Members voting for Beijing in round 1} = \frac{12}{.75} = 16$$

$$\text{Total votes in round 1} = 83 - 1 = 82$$

188. (d) Members who voted for NY in round 1 but for Beijing in round 2

$$= \frac{9 \times 100}{12} = 75\%$$

189. (d) Votes for Paris in round 1 = 24

190. (d) Voters who voted for London in round 3 but voted for

$$\text{Beijing in round 2} = \frac{8}{12} \times 100 = 66.67\%$$

(Note : 9 out of 21 members of Beijing left)

191. (a) Clearly the new member from NY voted for Paris in round 2. Further the new member from Beijing also voted for Paris in round 3.

192. (c) The opening price on day 1 was Rs 100. The closing price on day 5 was Rs 110.

Chetan sold 10 shares of MCS on 3 consecutive days and Michael sold 10 shares only once during the 5 days. The possible trend of the closing price of MCS shares is:

Day	Opening Price	Closing Price	
1	100	90	
2	90	100	Chetan sells
3	100	110	Chetan sells
4	110	120	Chetan sells; Michael sells
5	120	110	

So the closing price at the end of day 3 was Rs 110/-

193. (a) Michael ended up with 20 more shares than Chetan at the end of day 5. The various possibilities in this situation for the given options are :

Day	Closing prices						
	Option 1	2	3	4	5		
1	90/110		90/110		110		
2	80/100		100/120		120		
3	90	100	110	120	130		
4	100		100/120		120		
5	110	110	110	110	110		
Shares gained by Chetan	+10+10 -10-10 -10	-10+10 +10-10 -10	Not possible +10 +10	10-10 +10-10 +10	Not possible -10-10	10+10+10 -10-10	
Gained by Michael	10	-		-10-10		-10-10-10	
Net of Michael	+20	+10	-	10	-10	-	-40

So it is clear from the above table that Michael had 20 more shares than Chetan for option 1, where the closing prices were, 90, 80, 90, 100 and 110. So the price at the end of day 3 was Rs 90.

194. (d) The maximum possible increase in combined cash balance of Chetan and Michael would be in the case when both Chetan and Michael sell their shares and that too at higher prices. Further for Michael to sell his shares the price has to be above 110. This will be possible when the closing prices are : 110, 120, 130, 120 and 110.

Day	Chetan	Michael
1	110	1100
2	120	1200
3	130	1300
4	120	-1200
5	110	-1100
<b>Total</b>	<b>1300</b>	<b>3700</b>

So total increase in combined cash balance =  $1300 + 3700 = \text{Rs } 5000$

195. (b) The various possible cases of price variation are given below.

	I	II	III	IV	V	VI	VII	VIII	IX	X
1	90	90	90	90	110	110	110	110	110	110
2	80	100	100	100	100	120	120	100	100	120
3	90	90	110	110	110	110	130	90	110	110
4	100	100	120	100	120	120	120	100	100	100
5	110	110	110	110	110	110	110	110	110	110
Chetan's Transac- tions	-900	-900	-900	-900	1100	1100	1100	1100	1100	1100
	-800	1000	1000	1000	-1000	1200	1200	-1000	-1000	1200
	900	-900	1100	1100	1100	-1100	1300	-900	1100	-1100
	1000	1000	1200	-1000	1200	1200	-1200	1000	-1000	-1000
	1100	1100	-1100	1100	-1100	-1100	-1100	1100	1100	1100
Michael's Transac- tions	800	-	1200	-	1200	1200	1200	-	-	1200
								1300		
								1200	1200	
Chetan – Michael	2100	1300	100	1300	100	1100	2400	1300	1300	100

- So in four cases II, IV, VIII and IX, Chetan had 1300 Rs more than Michael. In all the four cases, the closing price of day 4 is Rs 100/-.
196. (e) From the above table it is clear that Michael had Rs 100 less cash than Chetan in case III, V and X. In all the three cases we see that Chetan sold 30 shares and bought 20 shares. But Michael only sold 10 shares. So finally both had the same number of shares.
197. (d) For the traffic to be evenly distributed at S, the cost on the routes SAT, SBAT, SBCT, SDCT, and SDT has to be the same.

Routes	Fuel Cost	Total Cost				
		1	4	2	3	5
SAT	$9 + 5 = 14$	14	15	14	15	14
SBAT	$2 + 2 + 5 = 9$	14	15	14	15	13
SBCT	$2 + 3 + 2 = 7$	16	15	14	15	14
SDCT	$7 + 1 + 2 = 10$	15	15	14	16	15
SDT	$7 + 6 = 13$	14	15	15	16	15

Option (e) is ruled out as the traffic moves only on SBAT. Again (3) is ruled out as the traffic do not move to the SD route. Similarly in (2) and (4) the traffic can not be equally divided as there are various paths possible which makes the distribution unequal. But in (1), there are only three routes SAT, SBAT and SDT, which among themselves can divide the traffic equally.

198. (e) Street DT is not functional. For equal traffic through junctions A and C, the cost on routes SAT, SBAT, SBCT and SDCT shall be equal so that the traffic gets evenly distributed. This is true in case of option (e).

Route	Fuel cost	Total cost
SAT	14	$14 + 0 = 14$
SBAT	9	$9 + 5 + 0 = 14$
SBCT	7	$7 + 5 + 2 = 14$
SDCT	10	$10 + 2 + 2 = 14$

199. (b) Again the costs on all routes SAT, SBAT, SDCT and SDT have to be equal so that all motorists pay the same amount.

Route	Fuel cost	Total cost
SAT	14	$14 + 0 = 14$
SBAT	9	$9 + 5 + 0 = 14$
SBCT	10	$10 + 1 + 3 = 14$
SDT	13	$13 + 1 = 14$

This is possible in option (b).

200. (d) In this case cost on all the 5 routes has to be the same.

Route	Fuel cost	Total cost				
		1	2	3	4	5
SAT	14	14	14	15	15	15
SBAT	9	14	14	15	15	15
SBCT	7	14	16	15	15	16
SDCT	10	14	15	16	15	16
SDT	13	15	14	16	15	15

So clearly (d) is the correct option.

201. (c) The minimum cost to the commuters is Rs 7 for the route SBCT with 100% traffic flowing through it. If we increase this cost by a Re (using tolls 0, 0, 1, 0), i.e. the minimum cost becomes Rs 8, still 100% traffic flows through B.

Further increasing the minimum cost to 9 (using tolls 0, 0, 2, 0) the traffic flows through SBAT ( $2 + 2 + 5 = 9$ ) and SBCT ( $2 + 3 + 2 + 2 = 9$ ), but still 100% traffic flows through B.

Again increasing the minimum cost to 10, the traffic can move through SBAT, SBCT and SDCT. The various situations are

Route	Cost	Cost	Cost
(Toll)	(0, 1, 2, 0)	(1, 0, 3, 0)	(0, 3, 0, 0)
SBAT	10	10	12
SBCT	10	10	10
SDCT	12	13	10
Traffic	100%	100%	50%
through B			

So for minimum cost of Rs 10, the situation is fulfilled.

For Qs. 202-206.

At Beginning	After 3rd day	After 5th day
$A = \infty$	$A \ f \ 1$	$A \ f \ 1$
B	B	B
C	$C \ f \ 1$	$C \ f \ 1$
D	D	D
E	$E \ f \ 5$	$E \ f \ 1$
F min. f	F f	F f
G	G	G
H	H	H
	Avg. 3; Total 24	Avg. 2.5; Total 20

As the total Erdos no. of the group changes from 24 to 20, i.e. a difference of 4 and the Erdos no. of E becomes  $f + 1$  after 5th day, it means the Erdos no of E was  $f + 1 + 4 = f + 5$  after the third day.

After 3rd day 5 mathematician have similar Erdos no. and the rest of 3 have distinct Erdos no. Hence 5 people have Erdos no. =  $f + 1$

$$\Rightarrow 5(f + 1) + f + f + 5 + x = 24 \Rightarrow 7f + x = 14$$

The only values of f and x which satisfy this equation are f = 1 and x = 7

**Note :** The condition no other co-authorship among any 3 members would have reduced the avg. Erdos no to 3 means A followed by C had the largest Erdos no. at the beginning of the conference.

202. (b) The Erdos no. of C at the end of conference was  $f + 1 = 1 + 1 = 2$ .

203. (c) The Erdos no. of E at the beginning of conference was  $f + 5 = 1 + 5 = 6$

[**Note :** that the Erdos no. of E did not change till the third day as he did not co-authored any paper.]

204. (b) After 3rd day 5 participants had Erdos no. of  $f+1$ . But A and C changed their Erdos no. to  $f+1$  on the third day itself. So, at the beginning of the conference only 3 participants had the same Erdos no.
205. (b) As calculated above, the Erdos no. of one of the participants was 7 (x) which do not change after the 5th day.
206. (d) During the conference, A and C changed their Erdos no. on the 3rd day and E changed its Erdos no. on the 5th day. So in all 5 participants do not change their Erdos no.
207. (c) Making K as a member      Not included

K	L	P	M	Q	
---	---	---	---	---	--

N, U, W

Making M as a member

M	S	U	W	N
---	---	---	---	---

Q, P, R, K, L

So from above grids it is clear that K, L, P and R can not be a member of a team of size 5.

208. (a) Making L as a member

L	K	
---	---	--

This can not be a 3 member team as one from M/Q and R/P/S each has to be there.

- M can be member of a team of 3, viz. MPN,
- P and N again are members of MPN
- Q can be a member of QPN, QRN etc.

209. (e) If K is there, L has to be there. So N and U are out. Again as U is out so S and W will be out. So N, U, S and W are out. Now from M and Q only one has to be there. Again from P, R, S only one has to be there. But S is out. So team can be

K	L	M	P	
Q		R		

so a team of only 4.

210. (e) If N is there, L is out and so K is also out. Also, one from M or Q has to be there. Similarly one from P, R and S has to be there. So teams using N, are

NMP

NMS UW

NMR

NQP

NQR

NQS UW

Hence 6 teams can be constituted.

211. (d) The largest team size would be 5.

For the largest team SUW has to be there.

So P, R, K, L are out and only one from M or Q can be there.

212. (a) Total students = 800

$$\text{Students in secondary section} = \frac{80}{100} \times 800 = 640$$

$$\text{Students in class XI/XII} = \frac{800 - 640}{2} = 80 \text{ each}$$

Let the proportion of vegetarian students in XII = x

$$\Rightarrow 80 \times x + 80 \times 0.5 + 640 \times 0.55 = 0.53 \times 800$$

$$\Rightarrow 80x = 424 - 40 - 352 = 32$$

$$\Rightarrow x = \frac{32}{80} = 0.4$$

∴ Percentage of vegetarian students in XII = 40%

213. (e) Vegetarian in class XII =  $\frac{40}{100} \times 80 = 32$

$$\therefore \text{Male vegetarians} = \frac{25}{100} \times 32 = 8$$

$$\therefore \text{Female vegetarians} = 32 - 8 = 24$$

$$\text{Males in class XII} = 0.6 \times 80 = 48$$

$$\therefore \text{Male non-vegetarians} = 48 - 8 = 40$$

$$\Rightarrow \text{Required difference} = 40 - 24 = 16$$

214. (b)  $80 \times 0.6 + 80 \times 0.55 + 640 \times x = 0.475 \times 800$

$$\Rightarrow 48 + 44 + 640x = 380$$

$$\Rightarrow x = \frac{380 - 92}{640} = \frac{288}{640} = 0.45$$

∴ Percentage of male students in secondary section = 45%

215. (b) THIS QUESTION IS WRONG

50% students in Secondary section are vegetarian males is not possible as we have just calculated that there are 45% males in the secondary section.

Consider that 50% of vegetarian students of secondary section are males.

$$\text{Vegetarian students} = 0.55 \times 640 = 352$$

$$\text{So, MVS} = \frac{352}{2} = 176$$

$$\text{FVS} = 176$$

$$\text{Non-vegetarian students} = 640 - 352 = 288$$

$$\text{Total males} = 288 \text{ (from above question)}$$

$$\therefore \text{MN-VS} = 288 - \text{MVS} = 288 - 176 = 112$$

$$\text{Further FN-VS} = \text{NVS} - \text{MN-VS} = 288 - 112 = 176$$

$$\text{So, (2) is correct as MN-VS} = 112 \text{ but}$$

$$\text{MVS} = \text{FVS} = \text{FN-VS} = 176.$$

	Carbohydrates ( $\geq 30\%$ )	Protein ( $\geq 30\%$ )	Fat ( $\geq 25\%$ )	Minerals ( $\geq 5\%$ )
(1) O & P	65%	25%	5%	5%
(2) R & S	25%	50%	20%	5%
(3) P & S	62.5%	35%	0%	2.5%
(4) Q & R	7.5%	40%	45%	7.5%
(5) O & S	47.5%	40%	5%	7.5%

217. (a) As the diet contains 10% minerals, it can be prepared only by mixing ingredients containing 10% mineral content. As none of the ingredients contains more than 10% minerals so we cannot formulate a diet using an ingredient containing less than 10% minerals in whatever ratio we mix it.

218. (d) As we require 10% fat content so it cannot be formulated by mixing any two out of O, P and S as O contain 10% and P & S contain less than 10% fat content. So (b) is wrong. Similarly P and Q can not be mixed to give  $\geq 30\%$  protein content. So (a) is out.

Diet	Fat (10%)	Ratio	Cost
P & R	10%	3 : 1	
	$50 \times \frac{3}{4} + 500 \times \frac{1}{4}$	162.5	
Q & S	10%	1 : 4	
	$200 \times \frac{1}{5} + 100 \times \frac{4}{5}$	120	
R & S	10%	1 : 3	
	$500 \times \frac{1}{4} + 100 \times \frac{3}{4}$	200	

[Note: For P & R, Ratio of mix = P : R

$$\Rightarrow \frac{P \times 0 + R \times 40}{(P + R)} = 10 \Rightarrow 40R = 10P + 10R$$

$$\Rightarrow 30R = 10P \text{ or } \frac{P}{R} = \frac{3}{1}$$

219. (e) Ratio Carbohydrate content Cost

(a) 2 : 1 : 3	$80 \times \frac{2}{6} + 10 \times \frac{1}{6} + 45 \times \frac{3}{6}$	—
	$\cong 51\%$	
(b) 4 : 1 : 2	$80 \times \frac{4}{6} + 10 \times \frac{1}{6} + 45 \times \frac{2}{6}$	$50 \times \frac{4}{6} = 200$
	$\cong 70\%$	$\times \frac{1}{6} + 100 \times \frac{2}{6}$
		$= 100$
(c) 2 : 1 : 4	$80 \times \frac{2}{6} + 10 \times \frac{1}{6} + 45 \times \frac{4}{6}$	—
	$\cong 58\%$	
(d) 3 : 1 : 2	$80 \times \frac{3}{6} + 10 \times \frac{1}{6} + 45 \times \frac{2}{6}$	—
	$\cong 57\%$	

$$(e) 4 : 1 : 1 \quad 80 \times \frac{4}{6} + 10 \times \frac{1}{6} + 45 \times \frac{1}{6} \quad 50 \times \frac{4}{6} = 200$$

$$\cong 62.5\% \quad \times \frac{1}{6} + 100 \times \frac{1}{6}$$

$$= 83.3$$

220. (d) There may be an order in which the five horses finished the race as given in the different options:

For option (a)

I	II	III	IV	V
Black	Grey	White	Spotted	Red

For option (b)

I	II	III	IV	V
Grey	White	Spotted	Black	Red

For option (c)

I	II	III	IV	V
Black	Grey	White	Red	Spotted

For option (e)

I	II	III	IV	V
Black	Grey	White	Spotted	Red

For each of the above mentioned order so far option (a), (b), (c) and (e) respectively, total winning amount is Rs. 6000. That means there is no profit and no loss.

Hence option (a), (b), (c) and (e) can be true.

For option (d), two cases are possible :

W ..... R ....(i)

R ..... W ..(ii)

In each cases winning amount is greater than Rs. 6000. Therefore, option (d) is not possible.

221. (c) There may be an order in which the five horses finished the race as given in the different options.

For option (a)

I	II	III	IV	V
Spotted	Black	Red	Grey	White

For option (b)

I	II	III	IV	V
Black	Spotted	White	Grey	Red

For option (d)

I	II	III	IV	V
Spotted	Black	Red	Grey	White

**For option (e)**

I	II	III	IV	V
Black	Spotted	White	Grey	Red

For each of the above mentioned orders for option (a), (b), (d) and (e) respectively, total winning amount is Rs. 6000. That means there is no profit and no loss.

Hence, option (a), (b), (d) and (e) can be true.

**Now for option (c),**

There are two cases arises

**Case (i) :** If one of the two positions I and III occupied by spotted horse then the remaining of the two positions I and III will be occupy by one of the red or black horse. i.e.,

S W R G .....(i)

S W B G .....(ii)

R W S G .....(iii)

B W S G .....(iv)

For each (i), (ii), (iii) and (iv) order, winning amount is more than Rs. 6000.

**Case (ii) :** If spotted horse comes at V position then the I and III positions occupied by the red and black horses in any order i.e.,

R W B G S .....(i)

B W R G S .....(ii)

For each (i) and (ii) order, winning amount is more than Rs. 6000

Hence, option (c) is not possible.

222. (c) Since, Charlie got calls from only two colleges. So, the aggregate cut off marks of these two colleges will be minimum i.e. 171 and 175. Therefore, the two colleges from which Charlie got the calls are college 2 and 3.

Now, the minimum marks obtained by Charlie in a section (say section A) can be find out by maximising the marks obtained in remaining three sections (B,C and D) like

	Sec-A	Sec-B	Sec-C	Sec-D	Aggregate cut off marks
College 2	25	50	50	50	175
College 3	21	50	50	50	171

If minimum marks obtained in a section is 21, then Charlie will get the call only from college 3. If minimum marks obtained in a section is 25, then Charlie will get the call from two colleges 2 and 3.

223. (b) Since, Bhama got calls from all colleges, hence minimum aggregate marks obtained by her = Sum of maximum cut-off of each section

$$=45 + 45 + 46 + 45 = 181.$$

224. (c) Four colleges have cut off for section C and the remaining two colleges have cut off for section D.

Since, Aditya did not get a call from even a single college therefore, Aditya get less than the minimum cut off marks in section C (42) and less than the minimum cut off marks for section D (44).

Hence, maximum aggregate marks obtained by Aditya  $= 50 \text{ (Section A)} + 50 \text{ (Section B)} + 41 \text{ (Section C)} + 43 \text{ (Section D)} = 184$ .

**For Qs. 225-228:**

As each team plays 3 matches in stage I and 2 matches in stage II so in stage I there would be 9 matches and in stage II there would be 6 matches.

**Stage I :** There is one team which won all the matches in stage I, so it cannot be D, E, B, C or F as they all lost matches as per the observations of stage I. So A wins all 3 matches.

- A, B, D & E won atleast one match. So it is C and F who lost all 3 matches.
- D has 2 wins (against C & F) and one loss (to A).
- E has 2 wins (against C & F) and one loss (to B).

Hence, the situation after stage I observations is :

A — 3 W

D — 2W, 1L

E — 2W, 1L

C — 3 L

F — 3 L

B — 2 W, 1L

i.e. 9W and 9L in all ( 9 matches.)

**Stage II :** A lost its next 2 matches.

- Out of C & F one wins its next two matches and the other loses the next 2 matches. As F did not play against A in stage I, so he will win against A in stage II. Thus F wins both matches and C loses both matches in stage II.
- Out of the remaining 3 teams, viz. B, D and E, one team loses both matches. As there have to be 6 wins in all, so the other two will win both their matches.
- E has played with B, C and F in stage I, so he plays with A and D in stage II. Thus E wins both its matches.
- D played with A, C and F in stage I, so he plays with B & E in stage II. As E has won both its matches so D lost both its matches.

Situation after stage II

	Stage I	Stage II
A	→ 3W	2L
B	→ 2W, 1L	2W
C	→ 3L	2L
D	→ 2W, 1L	2L
E	→ 2W, 1L	2W
F	→ 3L	2W

225. (e) The teams which won exactly 2 matches in the event are D & F.

226. (e) The team with most wins are B and E (4 wins each).

227. (b) The matches in stage I :

Plays with (wins or lose)

A—D (L)

B—E (L)

C—D (W), E (W)

D—A (W), C (L), F (L)

E—B (W), C (L), F (L)

F—D (W), E (W)

As F did not play with the top team (A) in stage I so only B, C, D and E can play with A. As E plays its matches with B, C and F so A plays with B, C and D in stage I and with E and F in stage II.

Hence, E & F defeats A in stage II.

228. (d) B, E & F wins both their matches in stage - II.

229. (e) From the given information it is clear that

$$U < R < P < S < T$$

$$U < R < P < Q < T$$

So the second tallest house may be S or Q and hence exactly are second tallest house cannot be determine.

230. (d) There can be two possible arrangements of houses

(i) (White) (Orange) (Red)

P	U	S
R	Q	T

(Yellow)	(Green)	(Blue)
----------	---------	--------

(ii) (Red) (Orange) (White)

S	W	P
T	Q	R

(Blue)	(Green)	(Yellow)
--------	---------	----------

In both the arrangements (i) and (ii), the colour of the house diagonally opposite to the yellow coloured house is Red.

231. (b) T is the tallest house whose colour is blue.

232. (e) The pattern of rise-fall of the price of the share of the XYZ Ltd. with respect to time on the day is not given. Hence, it is not possible to compare the returns of the three traders Abdul, Bikram and Chetan.

233. (e) If Bikram and Chetan buy the shares at prices less than bought by Abdul, their profits will be more than Abdul. If not, profit of Abdul will be more than that of the other two. But the actual rise-fall pattern of price of a share with respect to time on one day is not known, therefore answer cannot be determined.

234. (a) Since, the share price of XYZ Ltd. keeps rising throughout the day and peaks at the close of the day. Therefore, Abdul bought all his shares at the minimum share price.

Bikram bought equal number of shares each time at 10 am, 11 am, 12 am, 1 pm and 2 pm. But Chetan spent the same amount to buy the shares at each time 10 am, 11 am, 12 am, 1 pm and 2 pm. Therefore, Chetan bought less number of shares when prices are high and more shares when price are less as compared to Bikram.

Hence, Abdul's return is more than Chetan and Chetan's return is more than Bikram.

235. (a) Let the price of a share at different timings be as follows:

Time	10 am	11am	12noon	1pm	2pm	3pm
Price	a	b	c	d	e	f

Since, the number of shares bought by Abdul at a 10 am is the same as the number of shares he sold at 3 pm. But Abdul lost money. Hence, the share price at 3 pm must be less than at 10 am.

$$\therefore P_{10} > P_3 > P_2$$

Since price increased from 2 pm to 3 pm.

As number of shares bought/sold by Emily in each time is same and she made a profit.

$$\therefore P_{12} + P_3 > P_{10} + P_1$$

$$\text{So } P_{12} > P_1 \text{ as } P_{10} > P_3$$

Also for Dane,

$$P_1 + P_2 + P_3 > P_{10} + P_{11} + P_{12}$$

$$\text{So } P_2 > P_{11} \text{ as } P_{12} > P_1 \text{ and } P_{10} > P_3$$

Since price at 12 noon was lower than the opening price.

$$\text{So } P_{10} > P_{12}$$

$$\text{Thus, } P_{10} > P_{12} > P_1 \\ > P_3 > P_2 > P_{11}$$

Thus  $P_{10}$  is the highest share price which is at 10 am.

236. (a, d)

$$\text{From above, } P_{10} > P_{12} > P_1 \\ > P_3 > P_2 > P_{11}$$

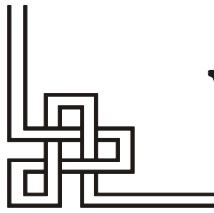
So, option (a) is necessarily false as  $P_2 > P_{11}$ .

Also, (d) is necessarily false as  $P_{12} > P_1$ .

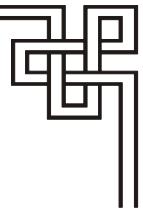


# UNIT - III : VERBAL ABILITY

**18**  
CHAPTER



## VOCABULARY



### ~~TYPE - A~~

*Directions for questions 1 to 22 : From the given alternatives, select the one in which the pairs of words have a relationship similar to the one between the bold words.*

1.	<b>LYING</b>	:	<b>PERJURY</b>	(1994)		
	(a) statement	:	testimony	(b) seeing	:	observing
	(c) taking	:	stealing	(d) eating	:	dining
2.	<b>PREHISTORIC</b>	:	<b>MEDIEVAL</b>	(1994)		
	(a) Akbar	:	British	(b) present	:	future
	(c) Shakespeare	:	Tennyson	(d) colossus	:	elephant
3.	<b>LOUD</b>	:	<b>STENTORIAN</b>	(1994)		
	(a) mild	:	noisy	(b) painful	:	prickly
	(c) adjective	:	descriptive	(d) bright	:	resplendent
4.	<b>BUILDING</b>	:	<b>STOREY</b>	(1995)		
	(a) book	:	chapter	(b) sentence	:	adjective
	(c) tree	:	stem	(d) elephant	:	tusk
5.	<b>EASE</b>	:	<b>ALLEViate</b>	(1995)		
	(a) hint	:	allocate	(b) revolt	:	repudiate
	(c) collapse	:	rise	(d) question	:	interrogate
6.	<b>SECRET</b>	:	<b>CLANDESTINE</b>	(1995)		
	(a) overt	:	furtive	(b) covert	:	stealthy
	(c) open	:	closed	(d) news	:	rumour
7.	<b>LIMPID</b>	:	<b>MURKY</b>	(1995)		
	(a) dazed	:	clouded	(b) obscure	:	vague
	(c) bright	:	gloomy	(d) nebulous	:	dim
8.	<b>DRAMA</b>	:	<b>AUDIENCE</b>	(1995)		
	(a) brawl	:	vagabonds	(b) obscure	:	vague
	(c) art	:	critics	(d) movie	:	actors
9.	<b>LIQUIDITY</b>	:	<b>GASEOUSNESS</b>	(1996)		
	(a) serum	:	fume	(b) humid	:	arid
	(c) thaw	:	distil	(d) smoke	:	cloud
10.	<b>DOUBT</b>	:	<b>FAITH</b>	(1996)		
	(a) atheist	:	religious	(b) sceptic	:	pious
	(c) iconoclast	:	idol	(d) apostate	:	state
11.	<b>FISSION</b>	:	<b>FUSION</b>	(1996)		
	(a) implosion	:	explosion	(b) separation	:	togetherness
	(c) intrusion	:	extrusion	(d) enemy	:	friend

12.	<b>ACTION</b>	:	<b>REACTION</b>		(1996)
	(a) introvert	:	extrovert	(b) assail	defend
	(c) diseased	:	treatment	(d) death	rebirth
13.	<b>DULCET</b>	:	<b>RAUCOUS</b>		(1996)
	(a) sweet	:	song	(b) crazy	sane
	(c) palliative	:	exacerbating	(d) theory	practical
14.	<b>MALAPROPSIM</b>	:	<b>WORDS</b>		(1996)
	(a) anachronism	:	time	(b) ellipsis	sentence
	(c) jinjanthropism	:	apes	(d) catechism	religion
15.	<b>ANTERIOR</b>	:	<b>POSTERIOR</b>		(1996)
	(a) in	:	out	(b) top	bottom
	(c) head	:	tail	(d) front	rear
16.	<b>BRICK</b>	:	<b>BUILDING</b>		(1996)
	(a) word	:	dictionary	(b) alphabet	letter
	(c) platoon	:	soldier	(d) idiom	language
17.	<b>PEEL</b>	:	<b>PEAL</b>		(1997)
	(a) coat	:	rind	(b) laugh	bell
	(c) rain	:	reign	(d) brain	cranium
18.	<b>DOGGEREL</b>	:	<b>POET</b>		(1997)
	(a) symphony	:	composer	(b) prediction	astrologer
	(c) wine	:	vintner	(d) pulp fiction	novelist
19.	<b>PREMISE</b>	:	<b>CONCLUSION</b>		(1997)
	(a) assumption	:	inference	(b) hypothesis	theory
	(c) knowledge	:	ideas	(d) brand	marketing
20.	<b>BARGE</b>	:	<b>VESSEL</b>		(1997)
	(a) shovel	:	instrument	(b) book	anthology
	(c) rim	:	edge	(d) training	preparation
21.	<b>LOVE</b>	:	<b>AFFECTION</b>		(1997)
	(a) happiness	:	joy	(b) amity	harmony
	(c) enemy	:	hatred	(d) sorrow	misery
22.	<b>PARADIGM</b>	:	<b>PATTERN</b>		(1997)
	(a) skeleton	:	flesh	(b) method	system
	(c) plant	:	genus	(d) dinosaur	tyrannosaurus

**Directions for questions 23 to 27 :** In each of the following questions a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship that is least similar to the one expressed in the original pair.

23.	<b>XENOPHOBIA</b>	:	<b>FOREIGNERS</b>		(1995)
	(a) claustrophobia	:	foreigners	(b) anglophobia	Englishmen
	(c) bibliophobia	:	book	(d) hemophobia	blood
24.	<b>SAIL</b>	:	<b>SHIP</b>		(1995)
	(a) propeller	:	dog	(b) radar	satellite
	(c) hydrogen	:	balloon	(d) accelerator	car
25.	<b>CANINE</b>	:	<b>DOG</b>		(1995)
	(a) feline	:	cat	(b) aquatic	parrot
	(c) serpentine	:	cobra	(d) vulpine	fox
26.	<b>COSMIC</b>	:	<b>UNIVERSE</b>		(1995)
	(a) terrestrial	:	earth	(b) lunar	moon
	(c) connubial	:	youth	(d) annular	rumour
27.	<b>GERMANE</b>	:	<b>PERTINENT</b>		(1995)
	(a) apt	:	appropriate	(b) quick	urgent
	(c) dull	:	sluggish	(d) excited	serene

 **TYPE - B** 

**Directions for questions 1 to 21 :** In the following questions, a set of four words is given. Three of the words are related in some way, the remaining word is not related to the rest. You have to pick the word which does not fit in the relation and mark that as your answer.

- |                     |                   |                  |                   |        |
|---------------------|-------------------|------------------|-------------------|--------|
| 1. (a) quell        | (b) ruffle        | (c) allay        | (d) pacify        | (1995) |
| 2. (a) couple       | (b) sever         | (c) rend         | (d) lacerate      | (1995) |
| 3. (a) eulogy       | (b) panegyric     | (c) ignominy     | (d) glorification | (1995) |
| 4. (a) cease        | (b) launch        | (c) initiate     | (d) commence      | (1995) |
| 5. (a) adroit       | (b) adept         | (c) dexterous    | (d) awkward       | (1995) |
| 6. (a) brink        | (b) hub           | (c) verge        | (d) brim          | (1995) |
| 7. (a) detest       | (b) abhor         | (c) ardour       | (d) loathe        | (1995) |
| 8. (a) fanatic      | (b) zealot        | (c) maniac       | (d) rational      | (1995) |
| 9. (a) sporadic     | (b) frequent      | (c) intermittent | (d) scarce        | (1995) |
| 10. (a) taciturn    | (b) reserved      | (c) clamorous    | (d) silent        | (1995) |
| 11. (a) hiatus      | (b) break         | (c) pause        | (d) end           | (1996) |
| 12. (a) effusion    | (b) intrusion     | (c) percolation  | (d) effluence     | (1996) |
| 13. (a) duplicity   | (b) guilelessness | (c) artfulness   | (d) shrewdness    | (1996) |
| 14. (a) impetuosity | (b) equanimity    | (c) zealousness  | (d) effervescence | (1996) |
| 15. (a) taxi        | (b) cruise        | (c) amble        | (d) cab           | (1996) |
| 16. (a) keen        | (b) kin           | (c) enthusiastic | (d) willing       | (1997) |
| 17. (a) adept       | (b) adapt         | (c) skillful     | (d) proficient    | (1997) |
| 18. (a) ring        | (b) round         | (c) bell         | (d) circle        | (1997) |
| 19. (a) computer    | (b) internet      | (c) grid         | (d) network       | (1997) |
| 20. (a) suffer      | (b) endure        | (c) ordeal       | (d) withstand     | (1997) |
| 21. (a) break       | (b) hiatus        | (c) chasm        | (d) bridge        | (1997) |

 **TYPE - C** 

**Directions for questions 1 to 10 :** For the word given at the top of each table, match the dictionary definitions on the left (A, B, C, D) with their corresponding usage on the right (E, F, G, H). Out of the four possibilities given in the boxes below the table, select the one that has all the definitions and their usages correctly matched.

1. **Exceed**

(2001)

	<b>Dictionary Definition</b>		<b>Usage</b>
A.	To extend outside of or enlarge beyond-used chiefly in strictly physical relations	E.	The mercy of God exceeds our finite minds
B.	To be greater than or superior to	F.	Their accomplishments exceeded our expectation
C.	Be beyond the comprehension of	G.	He exceeded his authority when he paid his brother's gambling debts with money from the trust
D.	To go beyond a limit set by (as an authority or privilege)	H.	If this rain keeps up, the river will exceed its banks by morning

(a)	
A	H
B	F
C	E
D	G

(b)	
A	H
B	E
C	F
D	G

(c)	
A	G
B	F
C	E
D	H

(d)	
A	F
B	G
C	H
D	E

## 2. Infer

(2001)

Dictionary Definition		Usage
A.	To derive by reasoning or implication	E. We see smoke and infer fire
B.	To surmise	F. Given some utterance, a listener may infer from it all sorts of things which neither the utterance nor the utterer implied
C.	To point out	G. I waited all day to meet him. From this you can infer my zeal to see him.
D.	To hint	H. She did not take part in the debate except to ask a question inferring that she was not interested in the debate.

(a)	
A	G
B	E
C	H
D	F

(b)	
A	F
B	H
C	E
D	G

(c)	
A	H
B	G
C	F
D	E

(d)	
A	E
B	F
C	G
D	H

## 3. Mellow

(2001)

Dictionary Definition		Usage
A.	Adequately and properly aged so as to be free of harshness	E. He has mellowed with age
B.	Freed from the rashness of youth	F. The tones of the old violin were mellow
C.	Of soft and loamy consistency	G. Some wines are mellow
D.	Rich and full but free from stridency	H. Mellow soil is found in the Gangetic plains

(a)	
A	E
B	G
C	F
D	H

(b)	
A	E
B	F
C	G
D	H

(c)	
A	G
B	E
C	H
D	F

(d)	
A	H
B	G
C	F
D	E

## 4. Relief

(2001)

Dictionary Definition		Usage
A.	Removal or lightening of something distressing	E. A ceremony follows the relief of a sentry after the morning shift
B.	Aid in the form of necessities for the indigent	F. It was a relief to take off the tight shoes
C.	Diversion	G. The only relief I get is by playing cards
D.	Release from the performance of duty	H. Disaster relief was offered to the victims

(a)	
A	F
B	H
C	E
D	G

(b)	
A	F
B	H
C	G
D	E

(c)	
-----	--

(d)	
-----	--

## 5. Purge

(2001)

Dictionary Definition		Usage
A. Remove a stigma from the name of		E. The opposition was purged after the coup
B. Make clean by removing whatever is superfluous, foreign		F. The committee heard his attempt to purge himself of a charge of heresy
C. Get rid of		G. Drugs that purge the bowels are often bad for the brain
D. To cause evacuation of		H. It is recommended to purge water by distillation.

(a)	
A	E
B	G
C	F
D	H

(b)	
A	F
B	E
C	H
D	G

(c)	
A	H
B	F
C	G
D	E

(d)	
A	F
B	H
C	E
D	G

## 6. Measure

(2002)

Dictionary definition		Usage
A. Size or quantity found by measuring		E. A measure was instituted to prevent outsiders from entering
B. Vessel of standard capacity		F. Sheila was asked to measure each item that was delivered
C. Suitable action		G. The measure of the cricket pitch was 22 yards
D. Ascertain extent or quantity		H. Ramesh used a measure to take out one litre of oil

(a)	
A	H
B	F
C	E
D	G

(b)	
A	G
B	E
C	F
D	H

(c)	
A	G
B	H
C	E
D	F

(d)	
A	A
B	B
C	C
D	D

## 7. Bound

(2002)

Dictionary definition		Usage
A. Obliged, constrained		E. Dinesh felt bound to walk out when the discussion turned to kickbacks.
B. Limiting Value		F. Bulleted by contradictory forces he was bound to lose his mind
C. Move in a specified direction		G. Vidya's story strains the bounds of credulity.
D. Destined or certain to be		H. Bound for a career in law, Jyoti was reluctant to study Milton

(a)	
A	F
B	H
C	G
D	E

(b)	
A	E
B	G
C	H
D	F

(c)	
A	E
B	H
C	F
D	G

(d)	
A	F
B	G
C	E
D	H

## 8. Catch

(2002)

Dictionary definition		Usage
A. Capture		E. All her friends agreed that Prasad was a good catch.
B. Grasp with senses or mind		F. The proposal sounds very good but where is the catch?
C. Deception		G. Hussain tries to catch the spirit of India in this painting
D. Thing or person worth trapping		H. Sorry, I couldn't catch you

(a)	
A	H
B	F
C	E
D	G

(b)	
A	F
B	G
C	E
D	H

(c)	
A	G
B	F
C	E
D	H

(d)	
A	G
B	H
C	F
D	E

## 9. Deal

(2002)

Dictionary definition		Usage	
A	Manage, attend to	E	Dinesh insisted on dealing the cards
B	Stock, sell	F	This contract deals with handmade cards
C	Give out to a number of people	G	My brother deals in cards
D	Be concerned with	H	I decided not to deal with handmade cards

(a)	
A	F
B	E
C	G
D	H

(b)	
A	H
B	G
C	E
D	F

(c)	
A	F
B	H
C	G
D	E

(d)	
A	H
B	E
C	G
D	F

## 10. Turn

(2002)

Dictionary definition		Usage	
A	Give new direction to	E	It was now his turn to be angry
B	Send	F	Leena never turned away a beggar
C	Change in form	G	Ashish asked Laxman to turn his face to the left
D	Opportunity coming successively for each person	H	The old school building has been turned into a museum

(a)	
A	H
B	E
C	F
D	G

(b)	
A	G
B	F
C	E
D	H

(c)	
A	G
B	E
C	F
D	H

(d)	
A	G
B	F
C	H
D	E

 TYPE - D 

**Directions for questions 1 to 5 :** For each of the words below, a contextual usage is provided. Pick the word from the alternatives given, that is most inappropriate in the given context.

1. **Specious :** A specious argument is not simply a false one but one that has the ring of truth. (2001)
 

(a) Deceitful	(b) Fallacious	(c) Credible	(d) Deceptive
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2. **Obviate :** The new mass transit system may obviate the need for the use of personal cars. (2001)
 

(a) Prevent	(b) Forestall	(c) Preclude	(d) Bolster
-------------	---------------	--------------	-------------
3. **Disuse :** Some words fall into disuse as technology makes objects obsolete. (2001)
 

(a) Prevalent	(b) Discarded	(c) Obliterated	(d) Unfashionable
---------------	---------------	-----------------	-------------------
4. **Parsimonious :** The evidence was constructed from very parsimonious scraps of information. (2001)
 

(a) Frugal	(b) Penurious	(c) Thrifty	(d) Altruistic
------------	---------------	-------------	----------------
5. **Facetious :** When I suggested that war is a method of controlling population, my father remarked that I was being facetious. (2001)
 

(a) Jovian	(b) Jovial	(c) Jocular	(d) Joking
------------	------------	-------------	------------

**Directions for questions 6 to 10 :** For each of the words below, a contextual usage is provided. Pick the word from the alternatives given, that is closest in meaning in the given context.

6. **Opprobrium :** The police officer appears oblivious to the opprobrium generated by his blatantly partisan conduct. (2002)
 

(a) Harsh criticism	(b) Acute distrust	(c) Bitter enmity	(d) Stark oppressiveness
---------------------	--------------------	-------------------	--------------------------
7. **Portends :** It appears to many that the US “war on terrorism” portends trouble in the Gulf. (2002)
 

(a) Introduces	(b) Evokes	(c) Spells	(d) Bodes
----------------	------------	------------	-----------
8. **Prevaricate :** When a videotape of her meeting was played back to her and she was asked to explain her presence there, she started prevaricating. (2002)
 

(a) Speaking evasively	(b) Speaking violently	(c) Lying furiously	(d) Throwing a tantrum
------------------------	------------------------	---------------------	------------------------

9. **Restive** : The crowd became restive when the minister failed to appear even by 10 p.m. (2002)  
 (a) Violent (b) Angry (c) Restless (d) Distressed
10. **Ostensible** : Manohar's ostensible job was to guard the building at night. (2002)  
 (a) Apparent (b) Blatant (c) Ostentatious (d) Insidious

**Directions for Questions 11 to 14 :** Each of the following questions has a paragraph with one italicized word that does not make sense. Choose the most appropriate replacement for that word from the options given below the paragraph.

11. Intelligent design derives from an early 19th-century explanation of the natural world given by an English clergyman, William Paley. Paley was the populariser of the famous watchmaker analogy. Proponents of intelligent design are *crapping* Paley's argument with a new gloss from molecular biology. (2005)  
 (a) destroying (b) testing (c) resurrecting (d) questioning
12. Women squat, heads covered, beside huge piles of limp fodder and *blunk* oil lamps, and just about all the cows in the three towns converge upon this spot. Sinners, supplicants and yes, even scallywags hand over a few coins for a crack at redemption and a handful of grass. (2005)  
 (a) shining (b) bright (c) sputtering (d) effulgent
13. It is *clang* to a sensitive traveler who walks through this great town, when he sees the streets, the roads, and cabin doors crowded with beggars, mostly women, followed by three, four, or six children, all in rags and importuning every passenger for alms. (2005)  
 (a) amusing (b) irritating (c) disgusting (d) distressing
14. Or there is the most *fungummy* diplomatic note on record: when Philip of Macedon wrote to the Spartans that, if he came within their borders, he would leave not one stone of their city, they wrote back the one word - "If". (2005)  
 (a) witty (b) rude (c) simple (d) terse



**Directions for Questions 1 to 5 :** Four statements with blanks have been given. These statements are followed by four alternatives. Choose the one which fits into the set of statements the maximum number of times.

1. A. Professional studies has become the \_\_\_\_\_ of the rich. (1994)  
 B. Every citizen has the \_\_\_\_\_ to speak, travel and live as he pleases.  
 C. He has a definite \_\_\_\_\_ over all his rivals.  
 D. Sheron no longer has the \_\_\_\_\_ of the company's bungalow and car.  
 (a) advantage (b) privilege (c) right (d) concession
2. A. People sensed \_\_\_\_\_. (1994)  
 B. A bad \_\_\_\_\_ case had come in - a person with a smashed arm.  
 C. And then, without warning, \_\_\_\_\_ struck.  
 D. The dogs were the first to recognize the signs of oncoming \_\_\_\_\_.  
 (a) tragedy (b) accident (c) disaster (d) calamity
3. A. The men there have fought \_\_\_\_\_ and emotional withdrawal, and were more capable of helping Jim. (1994)  
 B. But \_\_\_\_\_ does occasionally inflict all the adults.  
 C. A person who is deeply hurt feels very \_\_\_\_\_.  
 D. It is hard to survive this feeling of \_\_\_\_\_.  
 (a) dejection (b) lonely (c) trouble (d) depression
4. A. I have had a small power of \_\_\_\_\_. (1994)  
 B. Down with a very high fever, he suffers from frequent fits of \_\_\_\_\_.  
 C. They are now bitter enemies - all because of a small \_\_\_\_\_.  
 D. Her \_\_\_\_\_ is the most creative thing she has ever possessed.  
 (a) illusion (b) imagination (c) hallucination (d) misunderstanding

5. A. Communism states that every individual must live for the \_\_\_\_\_. (1994)  
 B. The \_\_\_\_\_ of the affairs of the nation is deplorable.  
 C. \_\_\_\_\_ have been laid down by the United States : states The Statesman.  
 D. No \_\_\_\_\_ has succeeded in gaining complete autonomy from the Federal government.  
 (a) state (b) nation (c) government (d) condition

 TYPE - F 

**Directions for Questions 1 to 54 :** In each of the following questions, a part / two of a sentence has been left blank. You are to select from among the four options given below each question, the one which would best fill the blanks. In case of more than one blanks, the first word in the pair, given in the choices, should fill the first gap.

1. One dark night a Darvesh \_\_\_\_\_ passing by a dry well. (1994)  
 (a) wasn't (b) happened to be (c) discovered in (d) found to
2. Nordisk have recently \_\_\_\_\_ a product called Glucometer. (1994)  
 (a) started (b) commissioned (c) launched (d) begun
3. I had already published a novel and it was an unexpected success. I thought my \_\_\_\_\_. (1994)  
 (a) days were up (b) chances were good (c) lady luck was happy (d) fortune was made
4. The neighbour grabbed the boy, and rolled him on the road to \_\_\_\_\_ the flames. (1994)  
 (a) smother (b) kill (c) burn out (d) fizz out
5. Sam asked me to keep this secret \_\_\_\_\_. (1994)  
 (a) secret (b) in myself (c) amongst us (d) between us
6. Sometimes the greatest inventions \_\_\_\_\_ an idea of startling simplicity. (1994)  
 (a) stumbles upon (b) hinge upon (c) starves without (d) lacks
7. Real friends, genuinely wanting the best for the organization, \_\_\_\_\_ different garbs. (1994)  
 (a) come in (b) clad in (c) dressed in (d) clothed in
8. I am an entertainer, \_\_\_\_\_, I have to keep smiling because in my heart laughter and sorrow have an affinity. (1996)  
 (a) even if I have tears in me (b) even though I am depressed inside  
 (c) while entertaining people (d) in the entertainment business
9. Political power is just as permanent as today's newspaper. Ten years down the line, \_\_\_\_\_, who the most powerful man in any state was today. (1996)  
 (a) who cares  
 (b) nobody will remember what was written in today's newspaper or  
 (c) few will know, or care about  
 (d) when a lot of water will have passed under the bridge, who will care
10. When we call others dogmatic, what we really object to is \_\_\_\_\_. (1996)  
 (a) their giving the dog a bad name  
 (b) their holding dogmas that are different from our own  
 (c) the extremism that goes along with it  
 (d) the subversion of whatever they actually believe in concomitantly
11. Although it has been more than 50 years since Satyajit Ray made Pather Panchali, \_\_\_\_\_ refuse to go away from the mind. (1996)  
 (a) the haunting images (b) its haunting images (c) its haunted images (d) the haunt of its images
12. \_\_\_\_\_, the more they remain the same. (1996)  
 (a) People all over the world change (b) The more people change  
 (c) The more they are different (d) The less people change
13. The stock markets \_\_\_\_\_. The state they are in right now speaks volumes about this fact. (1996)  
 (a) is the barometer of public confidence (b) are the best indicators of public sentiment  
 (c) are used to trade in expensive shares (d) are not used to taking stock of all markets

14. An act of justice closes the book on a misdeed; an act of vengeance \_\_\_\_\_. (1997)  
 (a) writes one of its own (b) opens new books  
 (c) reopens the first chapter (d) writes an epilogue
15. This is about \_\_\_\_\_ a sociological analysis can penetrate. (1997)  
 (a) as far as (b) the outer limit that  
 (c) just how far into the subject (d) just the relative distance that
16. I am always the first to admit that I have not accomplished everything that I \_\_\_\_\_ achieve five years ago. (1997)  
 (a) set out to (b) went to (c) thought to (d) thought of
17. This is not the first time that the management has done some \_\_\_\_\_. (1997)  
 (a) tough talk (b) tough talking (c) firm talk (d) firm talking
18. In India the talent is prodigious, really, and it increases \_\_\_\_\_. (1997)  
 (a) each year (b) year by year (c) annually (d) progressively
19. The present Constitution will see \_\_\_\_\_ amendments but its basic structure will survive. (1997)  
 (a) much more (b) many more (c) too many more (d) quite a few more
20. Taking risks, breaking the rules, and being a maverick have always been important for companies, but, today, they are \_\_\_\_\_. (1997)  
 (a) more crucial than ever (b) more crucial (c) much more crucial (d) very crucial
21. Education is central because electronic networks and software-driven technologies are beginning to \_\_\_\_\_ the economic barriers between nations. (1997)  
 (a) break down (b) break (c) crumble (d) dismantle
22. Football evokes a \_\_\_\_\_ response in India compared to cricket, the almost \_\_\_\_\_ the nation. (1998)  
 (a) tepid, boiling (b) lukewarm, electrifies  
 (c) turbid, fascinating (d) apocryphal, genuinely fascinates
23. Social studies, science matters of health and safety, the very atmosphere of the classroom - these areas are few of the \_\_\_\_\_ for the \_\_\_\_\_ of proper emotional reactions. (1998)  
 (a) things, growth (b) fertile areas, basis (c) fertile fields, inculcation (d) important areas, formation
24. When children become more experienced with words as visual symbols, they find that they can gain meaning without making \_\_\_\_\_ sounds. (1998)  
 (a) aural (b) audible (c) vocal (d) intelligible
25. Learning is more efficient when it is \_\_\_\_\_, less efficient when it is \_\_\_\_\_. (1998)  
 (a) fast, slow (b) rapid, turtle-slow (c) tedious, like a joy ride (d) fun, drudgery
26. To a greater or lesser degree all the civilized countries of the world are made up of a small class of rulers, \_\_\_\_\_, and of a large class of subjects, \_\_\_\_\_. (1998)  
 (a) formed by a small minority, who are uncivilized  
 (b) powerfully corrupt, pointless crusaders  
 (c) corrupted by too much power, corrupted by too much passive obedience  
 (d) who are ruled, who ruled
27. Simple arithmetic tells us that there is more \_\_\_\_\_ than \_\_\_\_\_. (1998)  
 (a) imitation, innovation (b) improvisation, improvement  
 (c) impracticality, knowledge (d) improbability, probability
28. As a step towards protesting against the spiralling prices, the farmers have decided to stage a picket in an effort to \_\_\_\_\_. (1998)  
 (a) show their virility (b) make themselves heard (c) curb the prices (d) topple the government
29. Science is a sort of news agency comparable \_\_\_\_\_ to other news agencies. (1998)  
 (a) principally (b) in principle (c) in principal (d) in spirit and form
30. Most political leaders acquire their position by causing a large number of people to believe that these leaders are \_\_\_\_\_ by altruistic desires. (1998)  
 (a) actuated (b) convinced (c) categorised (d) led
31. Every one will admit that swindling one's fellow beings is a necessary practice; upon it, is based really sound commercial success \_\_\_\_\_. (1998)  
 (a) sell what you cannot buy back (b) buy what you will sell to another at a higher price  
 (c) buy cheap and sell dear (d) sell what you can, do not buy from a competitor

32. Though one eye is kept firmly on the \_\_\_\_\_, the company now also promotes \_\_\_\_\_ contemporary art. (2000)  
 (a) present, experimental (b) future, popular (c) present, popular (d) market, popular
33. The law prohibits a person from felling a sandalwood tree, even if it grows on one's own land, without prior permission from the government. As poor people cannot deal with the government this legal provision leads to a rip-roaring business for \_\_\_\_\_, who care neither for the \_\_\_\_\_, nor for the trees. (2000)  
 (a) middlemen, rich (b) the government, poor (c) touts rich (d) touts, poor
34. It will take some time for many South Koreans to \_\_\_\_\_ the conflicting images of North Korea, let alone to \_\_\_\_\_ what to make of their northern cousins. (2000)  
 (a) reconcile, decide (b) understand, clarify (c) make out, decide (d) reconcile, understand
35. In these bleak and depressing times of \_\_\_\_\_ prices, non-performing governments and \_\_\_\_\_ crime rates, Sourav Ganguly has given us, Indians, a lot to cheer about. (2000)  
 (a) escalating, increasing (b) spiralling, booming (c) spiralling, soaring (d) ascending, debilitating
36. The manners and \_\_\_\_\_ of the nouveau riche is a recurrent \_\_\_\_\_ in the literature. (2000)  
 (a) style, motif (b) morals, story (c) wealth, theme (d) morals, theme
37. But \_\_\_\_\_ are now regularly written not just for tools, but well-established practices, organisations and institutions, not all of which seem to be \_\_\_\_\_ away. (2001)  
 (a) reports, withering (b) stories, trading (c) books, dying (d) obituaries, fading
38. The Darwin who \_\_\_\_\_ is most remarkable for the way in which he \_\_\_\_\_ the attributes of the world class thinker and head of the household. (2001)  
 (a) comes, figures (b) arises, adds (c) emerges, combines (d) appeared, combines
39. Since her face was free of \_\_\_\_\_ there was no way to \_\_\_\_\_ if she appreciated what had happened. (2001)  
 (a) make-up, realise (b) expression, ascertain (c) emotion, diagnose (d) scars, understand
40. In this context, the \_\_\_\_\_ of the British labour movement is particularly \_\_\_\_\_. (2001)  
 (a) affair, weird (b) activity, moving (c) experience, significant (d) atmosphere, gloomy
41. Indian intellectuals may boast, if they are so inclined, of being \_\_\_\_\_ to the most elitist among the intellectual \_\_\_\_\_ of the world. (2001)  
 (a) subordinate, traditions (b) heirs, cliques (c) ancestors, societies (d) heir, traditions
42. Companies that try to improve employees' performance by \_\_\_\_\_ rewards encourage negative kind of behavior instead of \_\_\_\_\_ a genuine interest in doing the work well. (2003C)  
 (a) withholding, fostering (b) conferring, discrediting  
 (c) bestowing, discouraging (d) giving, seeking
43. A growing number of these expert professionals \_\_\_\_\_ having to train foreigners as the students end up \_\_\_\_\_ the teachers who have to then unhappily contend with no jobs at all or new jobs with drastically reduced pay packets. (2003C)  
 (a) are, supplanting (b) welcome, assisting (c) resist, challenging (d) resent, replacing
44. The \_\_\_\_\_ regions of Spain all have unique cultures, but the \_\_\_\_\_ views within each region make the issue of an acceptable common language of instruction an even more contentious one. (2003C)  
 (a) different, competing (b) divergent, distinct (c) distinct, disparate (d) different, discrete
45. Early \_\_\_\_\_ of maladjustment to college culture is \_\_\_\_\_ by the tendency to develop friendship networks outside college which mask signals of maladjustment. (2003C)  
 (a) prevention, helped (b) identification, complicated  
 (c) detection, facilitated (d) treatment, compounded
46. The British retailer, M&S, today formally \_\_\_\_\_ defeat in its attempt to \_\_\_\_\_ King's, its US subsidiary, since no potential purchasers were ready to cough up the necessary cash. (2003C)  
 (a) ratified, auction (b) announced, dispose (c) conceded, offload (d) admitted, acquire
47. This simplified \_\_\_\_\_ to the decision-making process is a must read for anyone \_\_\_\_\_ important real estate, personal, or professional decisions. (2003)  
 (a) primer, maximizing (b) tract, enacting (c) introduction, under (d) guide, facing

48. Physicians may soon have \_\_\_\_\_ to help paralyzed people move their limbs by bypassing the \_\_\_\_\_ nerves that once controlled their muscles. (2003)  
 (a) instruments, detrimental (b) ways, damaged  
 (c) reason, involuntary (d) impediments, complex
49. The Internet is a medium where users have nearly \_\_\_\_\_ choices and \_\_\_\_\_ constraints about where to go and what to do. (2003)  
 (a) unbalanced, nonexistent (b) embarrassing, no  
 (c) unlimited, minimal (d) choking, shocking
50. The best punctuation is that of which the reader is least conscious; for when punctuation, or lack of it, \_\_\_\_\_ itself, it is usually because it \_\_\_\_\_. (2003)  
 (a) obtrudes, offends (b) enjoins, fails (c) conceals, recedes (d) effaces, counts
51. The argument that the need for a looser fiscal policy to \_\_\_\_\_ demand outweighs the need to \_\_\_\_\_ budget deficits is persuasive. (2003)  
 (a) assess, minimize (b) outstrip, eliminate (c) stimulate, control (d) restrain, conceal
52. The Athenians on the whole were peaceful and prosperous; they had \_\_\_\_\_ to sit at home and think about the universe and dispute with Socrates, or to travel abroad and \_\_\_\_\_ the world. (2003)  
 (a) leisure, explore (b) time, ignore (c) ability, suffer (d) temerity, understand
53. Their achievement in the field of literature is described as \_\_\_\_\_; sometimes it is even called \_\_\_\_\_. (2003)  
 (a) magnificent, irresponsible (b) insignificant, influential  
 (c) significant, paltry (d) unimportant, trivial
54. From the time she had put her hair up, every man she had met had groveled before her and she had acquired a mental attitude toward the other sex which was a blend of \_\_\_\_\_ and \_\_\_\_\_. (2003)  
 (a) admiration, tolerance (b) indifference, contempt  
 (c) impertinence, temperance (d) arrogance, fidelity

**Directions for Questions 55 to 58 : Each of the following questions has a sentence with two blanks. Given below each question are five pairs of words. Choose the pair that best completes the sentence.**

55. The genocides in Bosnia and Rwanda, apart from being mis-described in the most sinister and \_\_\_\_\_ manner as 'ethnic cleansing', were also blamed, in further hand-washing rhetoric, on something dark and interior to \_\_\_\_\_ and perpetrators alike. (2008)  
 (a) innovative; communicator (b) enchanting; leaders  
 (c) disingenuous; victims (d) exigent; exploiters  
 (e) tragic; sufferers
56. As navigators, calendar makers, and other \_\_\_\_\_ of the night sky accumulated evidence to the contrary, ancient astronomers were forced to \_\_\_\_\_ that certain bodies might move in circles about points, which in turn moved in circles about the earth. (2008)  
 (a) scrutinizers; believe (b) observers; agree  
 (c) scrutinizers; suggest (d) observers; concede  
 (e) students; conclude
57. Every human being, after the first few days of his life, is a product of two factors: on the one hand, there is his \_\_\_\_\_ endowment; and on the other hand, there is the effect of environment, including \_\_\_\_\_. (2008)  
 (a) constitutional; weather (b) congenital; education  
 (c) personal; climate (d) economic; learning  
 (e) genetic; pedagogy
58. Exhaustion of natural resources, destruction of individual initiative by governments, control over men's minds by central \_\_\_\_\_ of education and propaganda are some of the major evils which appear to be on the increase as a result of the impact of science upon minds suited by \_\_\_\_\_ to an earlier kind of world. (2008)  
 (a) tenets; fixation (b) aspects; inhibitions  
 (c) institutions; inhibitions (d) organs; tradition  
 (e) departments; repulsion

 **TYPE - G** 

**Directions for questions 1 to 16 :** Fill in the blanks, numbered [1], [2] .....up to [16], in the passages below with the most appropriate word from the options given for each blank. Be guided by the author's overall style and meaning when you choose the answers.

Von Nuemann and Morgenstern assume a decision framework in which all options are thoroughly considered, each option being independent of the others, with a numerical value derived for the utility of each possible outcome (these outcomes reflecting, in turn, all possible combinations of choices). The decision is then made to maximize the expected utility.

[1], such a model reflects major simplifications of the way decisions are made in the real world. Humans are not able to process information as quickly and effectively as the model assumes; they tend not to think [2] as easily as the model calls for; they often deal with a particular option without really assessing its [3], and when they do assess alternatives, they may be extremely nebulous about their criteria of evaluation.

- |                       |                    |                    |                  |        |
|-----------------------|--------------------|--------------------|------------------|--------|
| 1. (a) Regrettably    | (b) Firstly        | (c) Obviously      | (d) Apparently   | (2002) |
| 2. (a) Quantitatively | (b) Systematically | (c) Scientifically | (d) Analytically | (2002) |
| 3. (a) Implications   | (b) Disadvantages  | (c) Utility        | (d) Alternatives | (2002) |

In a large company, [4] people is about as common as using a gun or a switch-blade to [5] an argument. As a result, most managers have little or no experience of firing people, and they find it emotionally traumatic; as result, they often delay the act interminably, much as an unhappy spouse will prolong a bad marriage. And when the firing is done, it's often done clumsily, with far worse side effects than are necessary.

Do the world-class software organizations have a different way of firing people? No, but they do the deed swiftly, humanely, and professionally.

The key point here is to view the fired employee as a "failed product" and to ask how the *process* [6] such a phenomenon in the first place.

- |                   |                |              |                 |        |
|-------------------|----------------|--------------|-----------------|--------|
| 4. (a) dismissing | (b) punishing  | (c) firing   | (d) admonishing | (2002) |
| 5. (a) resolve    | (b) thwart     | (c) defeat   | (d) close       | (2002) |
| 6. (a) derived    | (b) engineered | (c) produced | (d) allowed     | (2002) |

At that time the White House was as serene as a resort hotel out of season. The corridors were [7]. In the various offices, [8] gray men in waistcoats talked to one another in low-pitched voices. The only color, or choler, curiously enough, was provided by President Eisenhower himself. Apparently, his [9] was easily set off; he scowled when he [10] the corridors.

- |                 |               |             |                |                   |
|-----------------|---------------|-------------|----------------|-------------------|
| 7. (a) striking | (b) hollow    | (c) empty   | (d) white      | (2004 - 1/2 mark) |
| 8. (a) quiet    | (b) faded     | (c) loud    | (d) stentorian | (2004 - 1/2 mark) |
| 9. (a) laughter | (b) curiosity | (c) humour  | (d) temper     | (2004 - 1/2 mark) |
| 10. (a) paced   | (b) strolled  | (c) stormed | (d) prowled    | (2004 - 1/2 mark) |

"Between the year 1946 and the year 1955, I did not file any income tax returns." With that [11] statement, Ramesh embarked on an account of his encounter with the Income Tax Department. "I originally owed Rs. 20,000 in unpaid taxes. With [12] and [13], the 20,000 became 60,000. The Income Tax Department then went into action, and I learned first hand just how much power the Tax Department wields. Royalties and trust funds can be [14]; automobiles may be [15], and auctioned off. Nothing belongs to the [16] until the case is settled."

- |                   |              |                |                 |                   |
|-------------------|--------------|----------------|-----------------|-------------------|
| 11. (a) devious   | (b) blunt    | (c) tactful    | (d) pretentious | (2004 - 1/2 mark) |
| 12. (a) interest  | (b) taxes    | (c) principal  | (d) returns     | (2004 - 1/2 mark) |
| 13. (a) sanctions | (b) refunds  | (c) fees       | (d) fines       | (2004 - 1/2 mark) |
| 14. (a) closed    | (b) detached | (c) attached   | (d) impounded   | (2004 - 1/2 mark) |
| 15. (a) smashed   | (b) seized   | (c) dismantled | (d) frozen      | (2004 - 1/2 mark) |
| 16. (a) purchaser | (b) victim   | (c) investor   | (d) offender    | (2004 - 1/2 mark) |


**TYPE - H**


**Directions for Questions 1 to 16 :** In each question, the word at the top is used in four different ways, numbered (a) to (d). Choose the option in which the usage of the word is Incorrect or Inappropriate.

1. **SORT**

(2003C)

(a)	Let's sort these boys into four groups
(b)	They serve tea of a sort on these trains.
(c)	Farmers of all sort attended the rally.
(d)	What sort of cheese do you use in pizza?

2. **HOST**

(2003C)

(a)	A virus has infected the host computer
(b)	Ranchi will play the host to the next national film festival
(c)	Kerala's forests are host to a range of snakes
(d)	If you host the party, who will foot the bill

3. **IMPLICATION**

(2003C)

(a)	Death, by implication, is the only solution the poem offers the reader
(b)	Several members of the audience misseed the implication of the minister's promise
(c)	This letter will lead to the implication of several industrialists in the share market scam
(d)	Everyone appreciated the headmaster's implication in raising flood relief in the village

4. **DISTINCT**

(2003C)

(a)	Mars became distinct on the horizon in the month of August
(b)	The distinct strains of Ravi's violin could be heard above the general din
(c)	He is distinct about what is right and what is wrong
(d)	Ghoshbabu's is a distinct case of water rising above its own level

5. **BUNDLE**

(2003C)

(a)	He made a bundle in the share market
(b)	It was sheer luck that brought a bundle of boy scouts to where I was lying wounded
(c)	The newborn body was a bundle of joy for the family
(d)	Mobile operators are offering a bundle of additional benefits

6. **HELP**

(2003)

(a)	This syrup will help your cold
(b)	I can't help the color of of my skin
(c)	Ranjit may help himself with the beer in the fridge
(d)	Do you really expect me to help you out with cash?

7. **REASON**

(2003)

(a)	Your stand is beyond all reason
(b)	Has she given you any reason for her resignation?
(c)	There is little reason in your pompous advice
(d)	How do you deal with a friend who doesn't listen to a reason?

8. **PAPER**

(2003)

(a)	Your suggestions look great on the paper, but are absolutely impractical
(b)	Do you know how many trees are killed to make a truckload of paper?
(c)	So far I have been able to paper over the disagreements among my brothers
(d)	Dr. Malek will read a paper on criminalization of politics

## 9. BUSINESS

(2003)

(a)	I want to do an MBA before going into business
(b)	My wife runs profitable business in this suburb
(c)	If we advertise we will get twice as much business as we have now
(d)	How you spend your money is as much my business as yours

## 10. SERVICE

(2003)

(a)	Customers have to service themselves at this canteen
(b)	It's a service lift; don't get into it.
(c)	I'm not making enough even to service the loan
(d)	Jyoti's husband has been on active service for three months

## 11. BOLT

(2004)

(a)	The shopkeeper showed us a bolt of fine silk.
(b)	As he could not move, he made a bolt for the gate.
(c)	Could you please bolt the door?
(d)	The thief was arrested before he could bolt from the scene of the crime.

## 12. PASSING

(2004)

(a)	She did not have passing marks in mathematics.
(b)	The mad woman was cursing everybody passing her on the road.
(c)	At the birthday party all the children enjoyed a game of passing the parcel.
(d)	A passing taxi was stopped to rush the accident victim to the hospital.

## 13. FALLOUT

(2004)

(a)	Nagasaki suffered from the fallout of nuclear radiation.
(b)	People believed that the political fallout of the scandal would be insignificant.
(c)	Who can predict the environmental fallout of the WTO agreements?
(d)	The headmaster could not understand the fallout of several of his good students at the public examination.

## 14. FOR

(2005)

(a)	He has a great eye for detail.
(b)	We are waiting for the day.
(c)	I can't bear for her to be angry.
(d)	It couldn't be done for ever.

## 15. HAND

(2005)

(a)	I have my hand full, I cannot do it today.
(b)	The minister visited the jail to see the breach at first hand.
(c)	The situation is getting out of hand here!
(d)	When the roof of my house was blown away, he was willing to lend me a hand.

## 16. NEAR

(2005)

(a)	I got there just after you left – a near miss!
(b)	She and her near friend left early.
(c)	The war led to a near doubling of oil prices.
(d)	They came near to tear seeing the plight of the victims.

**Directions for Questions 17 to 20 :** In each of the questions, a word has been used in sentences in five different ways. Choose the option corresponding to the sentence in which the usage of the word is incorrect or inappropriate.

## 17. RUN

(2008)

(a)	I must run fast to catch up with him.
(b)	Our team scored a goal against the run of play.
(c)	You can't run over him like that.
(d)	The newly released book is enjoying a popular run.
(e)	This film is a run-of-the-mill production.

## 18. ROUND

(2008)

(a)	The police fired a round of tear gas shells.
(b)	The shop is located round the corner.
(c)	We took a ride on the merry-go-round.
(d)	The doctor is on a hospital round.
(e)	I shall proceed further only after you come round to admitting it.

19. BUCKLE

(2008)

(a)	After the long hike our knees were beginning to buckle.
(b)	The horse suddenly broke into a buckle.
(c)	The accused did not buckle under police interrogation.
(d)	Sometimes, an earthquake can make a bridge buckle.
(e)	People should learn to buckle up as soon as they get into a car.

20 ELE

(2008)

- (a) You will find the paper in the file under C.
- (b) I need to file an insurance claim.
- (c) The cadets were marching in a single file.
- (d) File your nails before you apply nail polish.
- (e) When the parade was on, a soldier broke the file.



**Directions for Questions 1 to 4 :** In each question, there are five sentences. Each sentence has a pair of words that are italicized and highlighted. From the italicized and highlighted words, select the most appropriate words (A or B) to form correct sentences. The sentences are followed by options that indicate the words, which may be selected to correctly complete the set of sentences. From the options given, choose the most appropriate one.

2. The **further** [A] / **farther** [B] he pushed himself, the more disillusioned he grew.  
For the crowds it was more of a **historical** [A] / **historic** [B] event; for their leader, it was just another day.  
The old man has a healthy **distrust** [A] / **mistrust** [B] for all new technology. This film is based on a **real** [A] / **true** [B] story.  
One suspects that the **compliment** [A] / **complement** [B] was backhanded. (2007)

(a) BABAB (b) ABBBA (c) BAABA  
(d) BBAAB (e) ABABA

3. **Regrettably** [A] / **Regretfully** [B] I have to decline your invitation.  
I am drawn to the poetic, **sensual** [A] / **sensuous** [B] quality of her paintings.  
He was **besides** [A] / **beside** [B] himself with age when I told him what I had done.  
After brushing against a **stationary** [A] / **stationery** [B] truck my car turned turtle.  
As the water began to rise **over** [A] / **above** [B] the danger mark, the signs of an imminent flood were clear. (2007)

(a) BAABA (b) BBBAB (c) AAABA  
(d) BBAAB (e) BABAB

4. Anita wore a beautiful **broach** (A)/**brooch**(B) on the lapel of her jacket.  
If you want to complain about the amenities in your neighbourhood, please meet your **councillor** (A)/**counsellor** (B).  
I would like your **advice**(A)/**advise**(B) on which job I should choose.  
The last scene provided a **climactic**(A)/**climatic**(B) ending to the film.  
Jeans that **flair**(A)/**flare**(B) at the bottom are in fashion these days. (2008)

(a) BABAA (b) BABAB (c) BAAAB  
(d) ABABA (e) BAABA

5. The cake had lots of **currents**(A)/**currants**(B) and nuts in it.  
If you engage in such **exceptional**(A)/**exceptionable**(B) behaviour, I will be forced to punish you.  
He has the same capacity as an adult to **consent**(A)/**assent**(B) to surgical treatment.  
The minister is **obliged**(A)/**compelled**(B) to report regularly to a parliamentary board.  
His analysis of the situation is far too **sanguine** (A)/**genuine**(B). (2008)

(a) BBABA (b) BBAAA (c) BBBBA  
(d) ABBAB (e) BABAB

6. She managed to bite back the **ironic**(A)/**caustic**(B) retort on the tip of her tongue.  
He gave an impassioned and **valid**(A)/**cogent**(B) plea for judicial reform.  
I am not **adverse**(A)/**averse**(B) to helping out.  
The **coupé**(A)/**coup**(B) broke away as the train climbed the hill.  
They heard the bells **peeling**(A)/**pealing**(B) far and wide. (2008)

(a) BBABA (b) BBBAB (c) BAABB  
(d) ABBAA (e) BBBBA

7. We were not successful in **defusing**(A)/**diffusing**(B) the Guru's ideas.  
The students **baited**(A)/**bated**(B) the instructor with irrelevant questions.  
The **hoard**(A)/**horde**(B) rushed into the campus.  
The prisoner's **interment**(A)/**internment**(B) came to an end with his early release.  
The hockey team could not deal with his **unsociable** (A)/**unsocial**(B) tendencies. (2008)

(a) BABBA (b) BBABB (c) BABAA  
(d) ABBAB (e) AABBA

## ANSWERS WITH SOLUTIONS

### TYPE-A

1. (a) Perjury means to swear falsely under oath. The relationship between the two words therefore is of degree. Similarly testimony means a statement under oath. While other pairs either differ in meaning or manner.
2. (b) The relation between the two words is that of chronology, prehistory came before medieval times just as present comes before future. Even though Akbar came before British and Shakespeare before Tennyson these are people, while the given pair of words are divisions of time.
3. (d) The relation between the pair is that of degree. Stentorian means very loud just as resplendent means very bright. Other pair do not have a relationship of degree.
4. (a) The relation between the two words is that of component and whole, like a building is made of many storeys, a book is made of many chapters, a sentence is not made of many adjectives, it also has other different components, same for tree-stem and elephant-tusk pairs.
5. (d) The relation between the two words is that of degree. Alleviate means the same as ease but higher in degree, just as interrogate is higher in degree to question. Repudiate means to reject or disown and allocate means to assign. No other pair has a similar relationship.
6. (b) The relation between the two words is synonyms. Secret and Clandestine are synonyms just as covert and stealthy are synonyms, furtive means stealthy, overt means obvious.
7. (c) Relation between the words is of antonym. Limpid means clear and murky means dark, unclear. Dazed means stunned or bewildered, clouded means unclear or confused. Obscure means indirect, indistinct and vague means not clear, nebulous means indistinct. Gloomy and bright are also antonyms.
8. (c) Drama is done for audience and the two are intrinsically connected just as Art is for the gaze of the critic. Brawl is a fight.
9. (a) The given words are two different states of matter — Liquid and gas. Serum and fume also are in different states of matter like liquid and gas. Arid means dry and humid means moist.
10. (b) Relation between the two words is of antonyms. Sceptic is a person with doubt and pious is the person with faith. Atheist is a person who does not believe in god, hence there is no doubt. Iconoclast is a person who attacks cherished belief.
11. (b) Fission means breaking while fusion is combining. Separation and togetherness also have the same relation with each other. Intrusion means to come uninvited and extrusion is to squeeze out.
12. (b) Reaction is in response to an action just as a defence is in response to an attack. All other pairs have a different relationship.

13. (b) Dulcet means sounding sweet, raucous means loud and harsh, the two words are thus antonyms. Palliative means to excuse and exacerbate means to irritate or make worse, crazy and sane are antonyms.
14. (a) Malapropism means comical confusion of words, similarly anachronism is related to time, ellipsis is a kind of punctuation. Catechism is a series of questions.
15. (d) Posterior means the rear and anterior means the front.
16. (a) Relation is of component to whole. Words together constitute a dictionary. Letter also constitute an alphabet just as soldiers form a platoon, but in these pairs the relation is reverse whole : component.
17. (c) The given pair are homophones, i.e., they have the same sound, same as rain & reign.
18. (d) Doggerel is written by a poet just as symphony is made by a composer but Doggerel is a bad poem just as pulp fiction is bad writing by a novelist.
19. (a) A conclusion is drawn from a premise, similarly an inference can be drawn from an assumption. Hypothesis is also an assumption but a theory is a usually drawn from proofs.
20. (a) A barge is a kind of vessel. A similar relation is between shovel and instrument. A book can be an anthology (a collection of works) but it is not necessarily so.
21. (d) The relation in the given pair of words is that of degree. Affection is higher degree of love. Just as misery is a higher degree for sorrow. Joy and happiness are simply synonyms.
22. (b) Paradigm is an example or a model for something. So a pattern can be a type of paradigm. Method and system have a similar relation to each other just as there can be various methods of a particular process, and a system of doing it. None of the other pairs have a similar relation.
23. (a) Xenophobia is fear for foreigners, anglophobia is fear of Englishmen, bibliophobia is fear of book and hemophobia is fear of blood but claustrophobia is fear of closed spaces and thus this does not have the same relation as in given pair.
24. (a) Sail helps a ship move. Same is the relation between all the pair except propeller and dog.
25. (b) Dog belongs to category of Canine mammals. Parrot does not belong to the aquatic category (water inhabiting animals).
26. (c) Cosmic is related to universe; cosmic means “of the universal”, just as terrestrial means “of the land”. Connubial means of the marriage and not youth. Thus this pair has a relation different from the given one.
27. (d) Germane and pertinent are synonyms as are all pairs except excited and serene which are antonyms.

### TYPE-B

1. (b) Ruffle means to disarrange, while quell, allay and pacify all mean to harmonise, suppress or bring to peace.
2. (a) Couple means to bring two things together. Other terms suggest a separation or cutting away.

3. (c) Ignominy is to cause disgrace, eulogy, panegyric and glorification means to praise excessively.
4. (a) Cease means to stop; commence, initiate, launch all mean to start. So cease is odd one among these.
5. (d) Adroit, adept and dexterous are synonyms and means skillful.
6. (b) Brink, verge and brim are synonyms and mean edge while hub means in between.
7. (c) Detest, abhor and loathe mean to hate while ardour means love, affection.
8. (d) Rational is person with balance of mind while a maniac, fanatic and zealot have irrational and imbalanced surge of emotion.
9. (d) Scarce means little, while the other words means unstopped, quick, spontaneous.
10. (c) Clamorous means noisy; taciturn, reserved means to talk little.
11. (d) Hiatus, break, pause mean a temporary break but not an end.
12. (a) Effusion is a state of giving out or emanating while intrusion, percolation and effluence means seeping in.
13. (b) Guilelessness means being without vile or not being sly or shrewd; shrewdness, duplicity and artfulness all mean sly behaviour.
14. (b) Equanimity means calmness or composed behaviour zealousness, effervescence, impetuosity all refer to states of excited emotion.
15. (c) Amble is a way of walking, other words are means of transport, propelled by external sources.
16. (b) Kin means a relative, other words mean eager to do.
17. (b) Adapt means to adjust, other words are synonymous.
18. (c) bell is a musical instrument; which is hollow. Round, ring and circle are two dimensional shapes.
19. (a) Computer is an instrument, internet, grid and network are only different kinds of networks.
20. (c) Ordeal means a difficult punishment, other words are synonymous verbs which mean to suffer or bear.
21. (d) Bridge joins while hiatus, chasm refer to a break

### TYPE-C

1. (a) Since option (a) mentions that this use is strictly in physical relations then the possible usage can only be H. C gives the meaning as beyond comprehension and E gives usage as beyond finite mind, which means comprehension.
2. (d) The result of fire is derived by implication on seeing the smoke, surmise means to guess, so there need not be any real connection between the statement and conclusions drawn. The girls not taking part in the debate hints at her lack of interest.
3. (c) Ageing frees of harshness in the first meaning, just as old wines become smooth and softer. Second meaning concerns a person and not a thing, thus usage E fits with this meaning. Soft and loamy consistency can refer to soil not to a violin.

4. (b) Removal of the tight shoes brought immediate relief, relief or help was necessary for the victims of disaster, playing cards help to diversify the mood, the sentry felt relieved after his shift.
5. (d) He wanted to remove the offence of heresy (going against orthodoxy); water was cleaned of all impurities; the coup removed the opposition medicines for the bowel may affect the brain.
6. (c) The size of the length of the cricket pitch was of 22 yards. The cup is also a standard measurement cup, action to prevent (someone/something), Sheila found out about the quantity of each item that was delivered.
7. (d) Dinesh's obligation made him walk out; the story narrated by Vidya is beyond the limits of belief; Milton held no appeal for Jyoti as she wanted to take up law.
8. (d) In his drawing, Hussain has tried to capture the spirit of India, couldn't understand what was being said, the nice sounding proposal had to have hidden traps. Prasad was a good (talented) person, worth trapping.
9. (b) I decided not to manage or attend to handmade cards. My brother sells cards, Dinesh insisted on giving cards to a number of people. This deal is concerned with cards.
10. (d) Ashish asked Laxman to change the direction of his face, Leena never sends away a beggar, the form of the old school building has changed into a museum. He got the opportunity to be angry.

### TYPE-D

1. (c) Credible is something that is convincing and is to be believed.
2. (d) To Bolster means to provide support. While usage suggests a meaning 'to prevent'.
3. (a) Prevalent means in widespread use in a particular area at a particular time.
4. (d) Altruistic means generous and selfless concern for others, but parsimonious is something in little amount.
5. (a) Jovian means to be like the Roman God Jupiter.
6. (a) Harsh criticism means the same as opprobrium or scorn.
7. (d) Portends means a sign or warning and Bodes means to bring about some outcome.
8. (a) Prevaricate means to act or speak evasively.
9. (c) Restive means unable to keep still, same as restless.
10. (a) Ostensible means anything that is apparently true.
11. (c) In the last sentence, 'crapping ..... new gloss' shows that the word, 'crapping' has been used to favour Paley's argument, as with a gloss' means making it look more attractive than it actually is. So destroying, testing and questioning are negative words in the context of the passage.
12. (c) In the opening line of the first sentence, the tone (i.e., negative) of blunk oil limps is similar to lamp fodder (useless). So it can not mean shining, bright or effulgent (shining) and the correct option is sputtering (burning or working in an uneven way).

13. (d) Seeing the wretched condition of the state no one can be amused (happy). Among irritated (annoyed), disgusting (sickening, distasteful) and distressing (disturbing, painful, traumatic) the last one seems to be most appropriate in the given context.
14. (d) The context here is diplomatic, so simple is ruled out as a simple statement or remark can not be diplomatic similarly a rude remark can not be diplomatic as it is straightforward and tactless. Witty is also ruled out as a witty remark must contain an element of humour. So the correct option is 'terse', which means to the point, laconic. Moreover use of 'most' is also an important indicator.

#### TYPE-E

1. (b) Privilege is the only word that can fit in 3 sentences, A, B & D. Right fits into B & D but not in other 2, advantage fits only in C, concession fits in none.
2. (c) Disaster fits in A, C, D. Accident fits only in B, tragedy in A & C and calamity in C.
3. (d) Depression fits in A, B and D while lonely only fits in C. Dejection can fit in A and D, trouble does not fit in any of the blanks.
4. (b) Imagination fits in A and D, hallucination fits in B and misunderstanding fits in C.
5. (a) The word state fits in A, B & D even though in different usage, government may fit in D and condition fits in C.

#### TYPE-F

1. (b) Discovered or found should be preceded by an auxiliary verb like was, wasn't cannot be an apt word.
2. (c) A product is launched not commissioned or even started.
3. (d) Fortune was made means he was settled as a success. Days were up suggests an ending, chances are talked of before the result. Lady luck cannot fit as mentioned here.
4. (a) Flames can only be smothered to be put out, so the answer is (a).
5. (d) The answer is between us (d), as the secret was between Sam and the Speaker. Amongst is used for more than two people.
6. (b) The answer is (b), as the sentence is based on the fact that success depends upon (hinge upon) a simple idea. The other three choices suggest a negative relationship between invention and simplicity.
7. (a) Although garb means cloth and thus option b, c & d will appear as probable answer. In this sentence the use of garb goes well with 'come'. Real friends come in different clothes (forms, appearances etc.)
8. (b) Since the speaker talks both of laughter and sorrow, and uses 'have to keep smiling' instead of 'I keep smiling' there must be mention of sorrow in the first part of the sentence.
9. (c) As political power is transient, i.e. lasting for a short time thus few people will know or care about people currently in power ten years hence.
10. (b) Dogma means a set of principle, dogmatic usually refers to being strict about one's own belief and not very accepting of different voices.

11. (b) 'its' refer to the film, the images are 'haunting' and not 'haunted'.
12. (b) The sentence builds a sense of paradox, suggesting that with change similarities also increase and not the other way round.
13. (b) The stock market reflects public sentiments.
14. (c) An act of justice puts an end to a misdeed thus closing the chapter but an act of vengeance can trigger another cycle of violence and misdeed so going back to the first chapter.
15. (a) If 'just' is to be used in the sentence it should be before 'about'. 'As far as' is the only grammatically correct option.
16. (a) 'Set out to' means set the goal of, thought of should have been followed by 'achieving' not 'achieve'.
17. (b) 'tough talking' is an expression usually used to suggest strict attitude of a management towards employees.
18. (b) 'Year by year' fits better than all other choices with 'prodigious' talent. Annually implies once in a year. Progressively is used for individual talent.
19. (b) The amendments would be many more, keeping the basic structure of the constitution the same. 'Much' is used with uncountable noun and amendments are countable, too many more and quite a few more are wrong grammatical usages.
20. (a) Taking risks, breaking the rules and being a maverick are 'more crucial than ever'.
21. (a) The economic barrier will break down. Crumble is not used with barrier.
22. (b) The response to football is lukewarm, while to cricket is electrifying. Lukewarm means mild or mellow.
23. (d) Social studies, science, matters of health and safety are all fields which will aid in the formation of emotional reactions.
24. (b) Audible sounds are those which can be heard.
25. (d) Efficient learning is fun whereas dull work or drudgery makes learning less efficient.
26. (c) Rulers are corrupted by power whereas subjects are corrupted by passive obedience.
27. (a) Innovations are much rare whereas imitations are much more common. Arithmetic deals with operation on numbers where some numbers are operated on for different results but there is rarely an innovation.
28. (b) The farmers want their protests against the spiralling prices, to be heard and that is the purpose of the staging of a picket. Other options are not suitable.
29. (b) As a news agency science is comparable in principle to other news agencies. Both share the principle of reaching and exposing the truth.
30. (a) Political leaders make a large number of people believe that they are actuated (motivated) by the desire to do good.
31. (c) Commercial success is based upon buying cheap and selling dear. This also entails swindling, that is, cheating. Only through sly moves and fooling others can you sell a cheap product at a high cost.

32. (b) Since the company in the present promotes popular contemporary (of the present time) art it also keeps an eye on the future.
33. (d) The touts persuade the people to sell illegally thereby making a profit, not caring about either the poor or the trees.
34. (a) North and South Korea were divided after IIInd World War thus it will take them sometime to reconcile (restore relations) when South Koreans cannot even decide what to do of the North Koreans.
35. (c) Prices are usually called as 'spiralling up' when they go up. 'soaring crime rates' is proper expression. Soaring means increasing rapidly.
36. (d) The nouveau riche (newly rich) have loose morals which is used as a popular theme in literature.
37. (a) Reports seems the only fitting word to go with tools, organisation, practice etc. For option (b) trading does not fit in meaningfully, obituaries are written for people on their death.
38. (b) The second blank can only be fitted with 'combines' since there are two attributes following it, since the second blank is filled with a word in present tense. The sentence will maintain the verb-tense agreement so the first blank will have 'emerges'.
39. (b) If one's face is free of expression it could not be ascertained (made out) if one had appreciated or not what had happened.
40. (c) The pairs (a) & (b) do not seem appropriate while (d) can fit in grammatically but is not as apt in the meaning as (c).
41. (d) Indian intellectuals may boast of being heirs to the most intellectual traditions of the world.
42. (a) Withholding rewards will encourage negative behaviour instead of fostering (bringing about) genuine interest.
43. (a) Expert professionals are having to train, and students supplant (replace) teachers.
44. (a) The first blank can be only fit in with 'different'. Though 'divergent' also appears correct, 'distinct' will not fit in the second blank.
45. (c) Maladjustment to college culture can be detected early by the tendency to develop friendship network outside college.
46. (c) One concedes defeat. In this case M & S conceded defeat in attempt to offload kings.
47. (d) The pair of words guide and facing fit right in, rest do not make sense.
48. (b) Soon there will be ways to help paralysed people, by bypassing the damaged nerves.
49. (c) Internet gives us unlimited choices and the minimum of constraints.
50. (a) Obtrude means forcing on someone, thus, when punctuation obtrudes it is because it offends.
51. (c) The need of looser fiscal policy to stimulate demand is greater than the need to control budget deficit.
52. (a) Being, peaceful and prosperous the Athenians had leisure to sit at home and the time to explore the world.
53. (d) However their literature never amounted to much and therefore their achievement was unimportant and trivial. The sentence is such that the two words that fill the blanks should differ in degree but have almost the same meaning.
54. (b) Since every man she met groveled before her, she became indifferent and held them in contempt.
55. (c) The situation due to the genocides is sinister, which means threatening. So the other word which will fill the first blank has to complement sinister. Thus the options which may fit in can be disingenuous (which means lacking in frankness, candor, or sincerity) or tragic. The other three words are positive words. In the last part of the sentence, 'to ..... and perpetrators alike' the contrast between the blank word and perpetrators (to commit: to perpetrate a crime) is quite clear. So the correct option is victims, which is antonym to perpetrators.
56. (d) Students would be a very casual option for the first blank. So we have to choose among scrutinizers and observers. However, the second part of the sentence describes how the ancient astronomers were forced to change their opinion in the face of contradictory evidence. When someone is compelled to accept defeat, 'concede' is the best word that can be used.
57. (b) There is a clear-cut contrast in the sentence which is clear from the presence of the phrases 'on the one hand' and 'on the other hand'. The word in the first blank has to be connected with something that is present at the time of birth - thus 'congenital'. However, the "effect of the environment" qualifies 'education'.
58. (d) The earlier kind of world in the second part of the sentence signals the use of tradition in the second blank.

#### TYPE - G

1. (d) According to the options 'apparently' is the only choice as the others do not fit in to make the sentence clear.
2. (d) All the options seem to fit in over here however taken in the context the best choice is analytically.
3. (d) Taking the whole paragraph in context, alternatives is the most obvious choice.
4. (c) Firing comes across as the best option as it is the subject of discussion.
5. (a) An argument is always resolved, the other options do not make sense.
6. (d) None of the options except for allowed fit in over here.
7. (c) The answer is (c). As the first line of the passage says that the White House was 'serene', empty is the only suitable adjective for the corridors.
8. (a) The atmosphere as mentioned in the passage as silent, so quiet is the right word. Stentorian is used for people with loud voices.
9. (d) The correct answer is 'temper'. As the immediate effect results in his scowling, which means frowning, so, laughter, curiosity and humor are not suited.

10. (a) Pace is used to refer to a continuous up and down movement. Prowled has associations with a predator looking for prey is too strong a word, given the context. Similarly stormed is a very strong word and strolled means to walk leisurely and with no apparent aim and therefore out of context.
11. (b) Ramesh is too blunt (straightforward) in his statement. Hence 'blunt' is the correct option.

**For Qs.12-13.**

As Rs.20000/- became Rs.60000/-, the only possibility is of interest and fines - interest on the unpaid tax and fine for not paying on time.

12. (a) 13. (d)
14. (c) Attach is to take temporary possession of as a security. Impound means "to take legal possession of", which is most often used for objects rather than funds.
15. (b) Seize also means to take possession of, which is the correct answer in the given context as the passage implies confiscation of property.
16. (d) Offender is the correct choice as he has committed an offence by not paying taxes.

**TYPE-H**

1. (c) In (c) sort has been used in incorrect manner, as it refers to sorts of farmers i.e. types. In (a), (b) and (d) the word sort has been used in the correct way.
2. (c) Option (c) is the correct choice, as here 'host' refers to home which is not suitable here. (a), (b) and (d) used the word host correctly.
3. (d) Implication means a likely consequence, in this case (d) is eliminated as the word implication in this sentence does not make sense.
4. (c) The sentence (c) uses distinct in an incorrect manner, thus it is to be eliminated whereas (a), (b) and (d) use the word in the right sense.
5. (b) As a collective noun the phrase "bundle of boy scouts" is incorrect. Thus (b) has to be the answer.
6. (c) Sentence (c) is to be rejected as Ranjit may help himself "to" the beer in the fridge rather than help himself "with".
7. (d) is the incorrect sentence as "a" has been used with reason, which is inappropriate.
8. (a) "The paper" in sentence (a) has been incorrectly used as the word "the" refers to something in particular. Thus, (a) is the choice.
9. (b) is the incorrect sentence and has to be eliminated as it has to be "a" profitable business.
10. (a) The words 'serve themselves' should be used.
11. (b) The word has been correctly used in (a), (c) and (d) with meanings, a roll of fabric, fasten or lock and a sudden escape, respectively. In (b) the usage of 'bolt' would mean run, sprint etc, which is contradictory to the 1st part (As he could not move).
12. (a) In (a), the use of the word 'passing marks' is wrong, it should have been 'pass marks'. Other follow with the meaning of the word passing - transient, fleeting, brief, advance, etc.

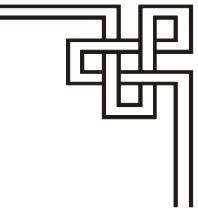
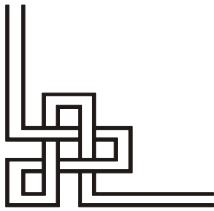
13. (d) In options (a), (b) & (c), the use of the word 'fallout' is acceptable with its meaning but in (d) it does not make any sense - 'failure' would be a better word.
14. (c) This sentence is incorrect as 'Bear for her' do not make any sense. The correct sentence is : I can't bear her to be angry.
15. (a) The correct sentence is :  
I have my hands full, I cannot do it today
16. (b) 'near friend' is not appropriate and must be replaced with close friend.
17. (c) The sentence (c) has the wrong usage of 'run over'. Run over means (a) to overflow; as, a cup runs over, or the liquor runs over, (b) to go over, examine, or rehearse cursorily; as, We'll run over that song again, (c) to ride or drive over; as, to run over a child, (d) to go beyond; exceed; as, His speech ran over the time limit.
18. (d) The sentence (c) has the wrong usage of 'round'. The doctor is never on round, he is on rounds. Here rounds is a Noun. 'A round of tear gas shells' means a sequence of gun shots. 'Merry-go-round' and 'round the corner' are very common usages of 'round'. 'Come round' means (a) to recover consciousness; revive, (b) to change one's opinion, decision, etc., esp. to agree with another's, (c) to visit: Come around more often, (d) to cease being angry, hurt, etc.
19. (b) Sentence (e) is correct as 'buckle up' means to fasten one's belt, seat belt, or buckles: She won't start the car until we've all buckled up. Sentence (c) is correct as 'buckle' means to yield, surrender, or give way to another (often followed by under): She refused to take the medicine, but buckled under when the doctor told her to. Sentence (a) is correct as 'buckle' also means to bend, warp, or cause to give way suddenly, as with heat or pressure. Similarly sentence (c) is correct. Thus sentence (b) is wrong as the correct sentence is 'The horse suddenly broke into a buckle'.
20. (e) Sentence (a) is correct as 'file' here refers to a folder, cabinet, or other container in which papers, letters, etc., are arranged in convenient order for storage or reference. Sentence (b) is correct as 'file' here refers to 'to make application', to file an insurance claim. Sentence (c) is correct as 'file' here refers to 'to march in a file or line, one after another, as soldiers'. Sentence (d) is correct as 'file' here refers to 'to reduce, smooth, or remove with or as if with a file'. Sentence (e) is wrong as 'A soldier broke the file' is the wrong usage and should be replaced by 'A soldier broke the rank'.

**TYPE-I**

1. (d) 'Cricket Council' is a collective noun and will take the singular form of the verb i.e., was and is. The critics will censure or criticize the new movie not censor or edit. Explanation can be credible or believable not credulous or gullible. She coughed discreetly (which means careful or circumspect manner of doing things) not discretely (which means distinctly and separately). Hence, correct answer is option (d).

2. (b) 'Further' means degree or extent of something whereas 'farther' is related to distance in space or time. So further is appropriate word in this sentence. An event can be historic or historical. 'Historic' means important, significant and 'historical' means ancient, past. But here historic is appropriate usage of word. 'Distrust' is a feeling of suspicion and 'mistrust' is lack of trust but in this sentence mistrust is correct.  
The film is based on true story (connected with facts) not real (actually existing). One suspects that a compliment (a remark that expresses praise or admire) not complement (additional or supplement) was backhanded. So correct answer is option (b).
3. (b) Regretfully is a way of showing disappointment and Regrettably is someone is sorry about and wish had not happened. So one can decline invitation regretfully not regrettably. I am drawn to poetic, sensuous (giving pleasure to senses) not sensual (physically passionate) quality of her paintings.  
He was beside himself (means unable to control himself) not besides (in addition to or apart from) the rage.  
Stationary is correct word because a truck can be stationary or not moving and not stationery or writing material.  
Water rises above the danger mark not over. 'Above' denotes the higher place or position whereas over denotes the physical location. So correct answer is option (b).
4. (c) Sentence 1 - Brooch (A) is a clasp or ornament having a pin at the back for passing through the clothing and a catch for securing the point of the pin, whereas Broach (B) means to mention or suggest for the first time. In the context of the sentence, Brooch is the right choice.  
Sentence 2 - Councillor (A) a member of a council, whereas a counsellor is a person who counsels; adviser.  
In the context of the sentence, Councillor (B) is the right choice.  
Sentence 3 - Advice (A) is the right choice as it is the Noun form, whereas Advise (B) is the verb form (used as, advise me). In the context of the sentence, Advice is the right choice.  
Sentence 4 - Climactic (A) means pertaining to or coming to a climax and hence is the right choice.  
Sentence 5 - Flair (A) means a natural talent, aptitude, or ability whereas, Flare (B) means to spread gradually outward, as the end of a trumpet, the bottom of a wide skirt, or the sides of a ship. In the context of the sentence, Flare is the right choice.  
Thus the correct option is BAAAB
5. (b) Sentence 1 - Currants (B) are the fruits used for jams, jellies, desserts, or beverages, whereas Currents (A) means the movement of water in seas or rivers.  
In the context of the sentence, Currants is the right choice.  
Sentence 2 - Exceptional (A) is something good, whereas Exceptionable (B) is liable to exception or objection; objectionable. In the context of the sentence, Exceptionable (B) is the right choice.

- Sentence 3 - Consent (A) is the right choice as it means to permit, approve, or agree; comply or yield, whereas Assent (B) means to agree or concur; subscribe to something.  
Sentence 4 - Obliged (A) means, to require or constrain, as by law, command, conscience, or force of necessity, whereas Compelled (B) means to force or drive, esp. to a course of action. In the context of the sentence, Obliged (A) is the right choice.  
Sentence 5 - Sanguine (A) is cheerfully optimistic, hopeful, or confident whereas, genuine (B) means exactly what something appears to be. In the context of the sentence, Sanguine (A) is the right choice.  
Thus the correct option is BAACB.
6. (b) Sentence 1 - Ironic (A) means poignantly contrary to what was expected or intended, whereas Caustic (B) means severely critical or sarcastic.  
In the context of the sentence, Caustic (B) is the right choice.  
Sentence 2 - Valid (A) is sound; just; well-founded, whereas Cogent (B) means to the point; relevant; pertinent. In the context of the sentence, Cogent (B) is the right choice.  
Sentence 3 - Adverse (A) means opposing one's interests or desire, whereas Averse (B) means having a feeling of opposition, distaste, or aversion; strongly disinclined. In the context of the sentence, Averse (B) is the right choice.  
Sentence 4 - Coupé (A) means a short, four-wheeled, closed carriage, usually with a single seat for two passengers and an outside seat for the driver, whereas Coup (B) means A sudden appropriation of leadership or power; a takeover. In the context of the sentence, Coupé (A) is the right choice.  
Sentence 5 - Peeling (A) is to strip or cut away the skin, rind, or bark from; pare, whereas, Pealing (B) means a set of bells tuned to each other; a chime. In the context of the sentence, Pealing (B) is the right choice.  
Thus the correct option is BBBAB.
7. (a) Sentence 1 - Defusing (A) means to make less dangerous, tense, or embarrassing, whereas Diffusing (B) means to spread or scatter widely or thinly; disseminate.  
In the context of the sentence, Diffusing (B) is the right choice.  
Sentence 2 - Baited (A) means 'to deliberately try to make somebody angry, whereas Bated (B) means to lessen by retrenching, deducting, or reducing.  
In the context of the sentence, Baited (A) is the right choice.  
Sentence 3 - Hoard (A) means to accumulate money, food, or the like, in a hidden or carefully guarded place for preservation, future use, etc, whereas Horde (B) means A large group or crowd. In the context of the sentence, Horde (B) is the right choice.  
Sentence 4 - Internment (A) means the act or ceremony of interring; burial, whereas Internment (B) means confinement during wartime. In the context of the sentence, Internment (B) is the right choice.  
Sentence 5 - Unsociable (A) means having, showing, or marked by a disinclination to friendly social relations; withdrawn, whereas, Unsocial (B) means outside the normal times of working. In the context of the sentence, Unsociable (A) is the right choice. Thus the correct option is BABBA.



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 **TYPE - A** 

**Directions for Questions 1 to 5 :** In the following questions, each sentence has been divided into four parts, marked a, b, c, d. Identify that part of the sentence which needs to be changed for the sentence to be grammatically correct.

1. (a) The Bombay Police have found (b) the body of a man  
(c) who they believe to be (d) the prime suspect in the murder case. (1995)

2. (a) In the forthcoming elections (b) every man and woman  
(c) must vote for the candidate (d) of their choice (1995)

3. (a) Almost all school teachers insist that (b) a student's mother  
(c) is responsible for the student's conduct (d) as well as his dress (1995)

4. (a) It is essential that diseases like tuberculosis (b) are detected and treated  
(c) as early as possible in order to (d) assure a successful cure. (1995)

5. (a) If one has to decide (b) about the choice of a career  
(c) you should choose that option (d) which is really beneficial. (1995)

## TYPE - B

**Directions for Questions 1 to 24 :** In each of the following questions a part of a paragraph or sentence has been underlined. From the choices given, you are required to choose the one which would best replace the underlined part.

6. The Rumanians may be restive under Soviet direction — but they are tied to Moscow by ideological and military links. (1996)  
 (a) they are tied to Moscow by ideological and military links  
 (b) they are preparing for a great revolution  
 (c) secretly they rather enjoy the prestige of being protected by the mighty Soviets  
 (d) there is nothing they can do about it
7. The government has given subsidies to the Navratnas but there is no telling whether the subsequent one will do. (1997)  
 (a) whether the subsequent government will do so      (b) if the government to follow will accept the policy  
 (c) if the government to follow will adhere to the policy      (d) no telling whether the subsequent one will do so
8. Rahul Bajaj has done a great job of taking the company to its present status, but it is time that he let go of the reins. (1997)  
 (a) let go of the reins      (b) stepped down      (c) let go off the reins      (d) delegated responsibility
9. With the pick-up in the standard of education, expensive private schools have started blooming up in every corner of the country. (1997)  
 (a) started blooming in every corner of the country      (b) have started mushrooming all over the country  
 (c) have mushroomed all over the country      (d) have blossomed all over the country
10. It is important that whatever else happens, these two factors should not be messed around with. (1997)  
 (a) It is important that      (b) It is a fact that  
 (c) It should be urgently understood that      (d) It should be understood that
11. It must be noted that under no circumstance should the company go in for diversification. (1997)  
 (a) It must be noticed that      (b) It must be noted that  
 (c) It must be pointed out that      (d) It should be noticed that
12. British Airspace has been focusing on building European links. (1998)  
 (a) concentrating on creating European links.      (b) pursuing ways of building Europeans connectivity.  
 (c) stressing on building European links.      (d) focusing on forging European links.
13. The appetite of banks for funds was lost under the onslaught of the slowdown, corporates refused to borrow-even as bank deposits flourished. (1998)  
 (a) bank deposits flourished      (b) bank deposits swelled  
 (c) bank deposits were enhanced      (d) bank deposits flummoxed
14. The eight-century revival of Byzantine learning is an inexplicable phenomenon, and its economic and military precursors have yet to be discovered. (1998)  
 (a) a phenomenon yet to be discovered      (b) a phenomenon incompletely explained  
 (c) an inexplicable phenomenon      (d) an unidentifiable phenomenon
15. The management can still hire freely but cannot scold freely. (1998)  
 (a) cannot scold at will      (b) cannot give umbrage  
 (c) cannot take decisions to scold      (d) cannot scold wilfully
16. Many people mistake familiar for a vulgar style, and suppose that to write without affectation is to write at random speed. (1998)  
 (a) is to write at random      (b) is to write randomly      (c) is to write fast      (d) is to do speed writing
17. It was us who had left before he arrived. (1999)  
 (a) we who had before time he had arrived      (b) us who had went before he arrived  
 (c) us who had went before had arrived      (d) we who had left before he arrived
18. The MP rose up to say that, in her opinion, she thought the Woman's Reservation Bill should be passed on unanimously. (1999)  
 (a) rose to say that she thought the women's reservation bill should be passed  
 (b) rose up to say that, the women's reservation bill should be passed on  
 (c) rose to say that, in her opinion, she thought that the women's reservation bill should be passed  
 (d) rose to say that, in her opinion, the women's reservation bill should be passed on
19. Mr. Pillai, the president of the union and who is also a member of the community group. will be in charge of the negotiations. (1999)  
 (a) since he is a member of the community group      (b) also being a member of the community group  
 (c) a member of the community group.      (d) in addition, who is a member of the community group
20. Since the advent of cable television, at the beginning of this decade, the entertainment industry took a giant stride forward in our country. (1999)  
 (a) this decade saw the entertainment industry taking      (b) this decade, the entertainment industry has taken  
 (c) this decade, the entertainment industry had taken      (d) this decade, the entertainment industry took

21. His mother made great sacrifices to educate him, moving house on three occasions, and severing the thread on her loom's shuttle whenever Mencius neglected his lessons to make him understand the need to persevere. (1999)
- severing the thread on her loom's shuttle whenever Mencius neglected his lessons to make him understand the need to persevere
  - severed the thread on her loom's shuttle whenever Mencius neglected his lessons to make him understand the need to persevere.
  - severed the thread on her loom's shuttle whenever Mencius neglected his lessons to make him understand the need for persevering.
  - severing the thread on her loom's shuttle whenever Mencius neglected his lessons, to make them understand the need to persevere.
22. If you are on a three-month software design project and, in two weeks, you're put together a programme that solves part of the problem, show it to your boss without delay. (1999)
- and, you've put together a programme that solves part of the problem in two weeks.
  - and, in two weeks you've put together a program that solves part of the problem
  - and, you've put together a programme that has solved part of the problem in two weeks
  - and, in two weeks you put together a programme that solved only part of the problem
23. Many of these environmentalists proclaim to save nothing less than the planet itself. (1999)
- to save nothing lesser than
  - that they are saving nothing lesser than
  - to save nothing less than
  - that they save nothing less than
24. Bacon believes that the medical profession should be permitted to ease and quicken death where the end would otherwise only delay for a few days and at the cost of great pain. (1999)
- be delayed for a few days
  - be delayed for a few days and
  - be otherwise only delayed for a few days and
  - otherwise only delay for a few days and


**TYPE - C**


**Directions for questions 1 to 9 : In each of the questions below, four different ways of writing a sentence are indicated. Choose the best way of writing the sentence.**

- A. The main problem with the notion of price discrimination is that it is not always a bad thing, but that it is the monopolist who has the power to decide who is charged what price. (2002)
  - B. The main problem with the notion of price discrimination is not that it is always a bad thing, it is the monopolist who has the power to decide who is charged what price.
  - C. The main problem with the notion of price discrimination is not that it is always a bad thing, but that it is the monopolist who has the power to decide who is charged what price.
  - D. The main problem with the notion of price discrimination is not it is always a bad thing, but that it is the monopolist who has the power to decide who is charged what price.
  - (a) A
  - (b) B
  - (c) C
  - (d) D
- A. A symbiotic relationship develops among the contractors, bureaucracy and the politicians, and by a large number of devices costs are artificially escalated and black money is generated by underhand deals. (2002)
  - B. A symbiotic relationship develops among contractors, bureaucracy and politicians, and costs are artificially escalated with a large number of devices and black money is generated through underhand deals.
  - C. A symbiotic relationship develops among contractors, bureaucracy and the politicians, and by a large number of devices costs are artificially escalated and black money is generated on underhand deals.
  - D. A symbiotic relationship develops among the contractors, bureaucracy and politicians, and by large number of devices costs are artificially escalated and black money is generated by underhand deals.
  - (a) A
  - (b) B
  - (c) C
  - (d) D
- A. The distinctive feature of tariffs and export subsidies is that they create difference of prices at which goods are traded on the world market and their price within a local market. (2002)
  - B. The distinctive feature of tariffs and export subsidies is that they create a difference of prices at which goods are traded with the world market and their prices in the local market.

- C. The distinctive feature of tariffs and export subsidies is that they create a difference between prices at which goods are traded on the world market and their prices within a local market.
- D. The distinctive feature of tariffs and export subsidies is that they create a difference across prices at which goods are traded with the world market and their prices within a local market.
- (a) A (b) B (c) C (d) D
4. A. Any action of government to reduce the systemic risk inherent in financial markets will also reduce the risks that private operators perceive and thereby encourage excessive hedging. (2002)
- B. Any action by government to reduce the systemic risk inherent in financial markets will also reduce the risks that private operators perceive and thereby encourage excessive gambling.
- C. Any action by government to reduce the systemic risk inherent due to financial markets will also reduce the risks that private operators perceive and thereby encourages excessive hedging.
- D. Any action of government to reduce the systemic risk inherent in financial markets will also reduce the risks that private operators perceive and thereby encourages excessive gambling.
- (a) A (b) B (c) C (d) D
5. A. Creativity in any field is regarded not only as valuable for itself but also as a service to the nation. (2003C)
- B. Creativity in any field is not regarded only as valuable on its own, but also as a service to the nation.
- C. Creativity, in any field, is not only regarded as valuable, but also as a service to the nation.
- D. Creativity in any field is regarded not only as valuable in itself but also as a service to the nation.
- (a) D (b) C (c) A (d) B
6. A. If precision of thought had facilitated precision of behaviour, and if reflection had preceded action, it would be ideal for humans. (2003C)
- B. It would be ideal for humans if reflection preceded action and precision of thought facilitated precision of behaviour.
- C. It would be ideal for humans if precedence of reflection was followed by action and precision of thought, by precise behaviour.
- D. It would have been ideal for humans, if precise action and behaviour preceded precise reflection.
- (a) D (b) C (c) B (d) A
7. A. We are forced to fall back on fatalism as an explanation of irrational events. (2003C)
- B. We are forced to falling back on the fatalism as an explanation of irrational events.
- C. We are forced to fall back on fatalism as explanations of irrational events.
- D. we are forced to fall back to fatalism as an explanation of irrational events.
- (a) D (b) C (c) B (d) A
8. A. From the sixteenth century awards, people started feeling disdainful and self-conscious about their body and its products that led to a heightened focus on emotional and bodily regulations. (2003C)
- B. The heightened focus on controlling the body and emotions comes from disdain and self-consciousness about the body and its products, found in the sixteenth century.
- C. From the sixteenth century onwards, a growing disdain for and self-consciousness about the body and its products took hold, leading to a heightened focus on emotional and bodily regulation.
- D. The heightened focus on emotional and bodily regulations started from the sixteenth century onwards, when people felt disdain and self-consciousness about the body and its products.
- (a) D (b) C (c) B (d) A
9. A. The running of large businesses consist of getting somebody to make something that somebody else sold to somebody else for more than its cost. (2003C)
- B. The running of a large business consists of getting somebody to make something that somebody else will sell to somebody else for more than it costs.
- C. The running of a large business consists of getting somebody to sell something that somebody else made for more than its cost.
- D. The running of large businesses consist of getting somebody to make something else that somebody else will sell to somebody else for more than it costs.
- (a) D (b) C (c) B (d) A

 **TYPE - D** 

**Directions for Questions 1 to 3 :** Each question consists of four sentences. Some sentences are grammatically incorrect or inappropriate. Select the option that indicates these grammatically incorrect and inappropriate sentence(s).

1. A. Harish told Raj to pled guilty. (2004)  
 B. Raj pleaded guilty of stealing money from the shop.  
 C. The court found Raj guilty of all the crimes he was charged with.  
 D. He was sentenced for three years in jail.  
 (a) A and B (b) B and D (c) A, C and D (d) B, C and D
2. A. Last Sunday, Archana had nothing to do. (2004)  
 B. After waking up, she lay on the bed thinking of what to do.  
 C. At 11 o'clock she took shower and got ready.  
 D. She spent most of the day shopping.  
 (a) B and C (b) C (c) A and B (d) B, C and D
3. A. It was a tough situation and Manasi was taking pains to make it better. (2004)  
 B. Slowly her efforts gave fruit and things started improving.  
 C. Every one complemented her for her good work.  
 D. She was very happy and thanked everyone for their help.  
 (a) A (b) D (c) B and C (d) A and C

**Directions for Questions 4 to 7 :** Each question consists of four sentences. Some sentences are grammatically incorrect or inappropriate. Select the option that indicates grammatically correct and appropriate sentence(s) only.

4. A. The balance of power will shift to the East as China and India evolve. (2005)  
 B. Rarely the economic ascent of two still relatively poor nations has been watched with such a mixture of awe, opportunism, and trepidation.  
 C. Postwar era witnessed economic miracles in Japan and South Korea, but neither was populous enough to power worldwide growth or change the game in a complete spectrum of industries.  
 D. China and India, by contrast, possess the weight and dynamism to transform the 21st-century global economy.  
 (a) A,B & C (b) A&D (c) C (d) C&D
5. A. People have good reason to care about the welfare of animals. (2005)  
 B. Ever since Enlightenment, their treatment has been seen as a measure of mankind's humanity.  
 C. It is no coincidence that William Wilberforce and Sir Thomas Foxwell Buxton, two leaders of the movement to abolish the slave trade, helped found the Royal Society for the Prevention of Cruelty to Animals in 1820s.  
 D. An increasing number of people go further: mankind has a duty not to cause pain to animals that have the capacity to suffer.  
 (a) A & D (b) A&C (c) C&D (d) B
6. A. When virtuoso teams begin their work, individuals are in and group consensus is out. (2005)  
 B. As project progresses, however, the individual stars harness themselves to the product of the group.  
 C. Sooner or later, the members break through their own egocentrism and become a plurality with single-minded focus on the goal.  
 D. In short, they morph into a powerful team with a shared identity.  
 (a) A & C (b) A & D (c) B & D (d) A, C & D
7. A. Large reductions in the ozone layer, which sits about 15-30 km above the Earth, take place each winter over the polar regions, especially the Antarctic, as low temperatures allow the formation of stratospheric clouds that assist chemical reactions breaking down ozone. (2005)  
 B. Industrial chemicals containing chlorine and bromine have been blamed for thinning the layer because they attack the ozone molecules, making them to break apart.  
 C. Many an offending chemicals have now been banned.  
 D. It will still take several decades before these substances have disappeared from the atmosphere.  
 (a) D (b) B&D (c) A&D (d) A&C

**Directions for Questions 8 to 10 :** In each question, there are five sentences or parts of sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/are correct in terms of grammar and usage. Then, choose the most appropriate option.

8. A. When I returned to home, I began to read.  
 B. everything I could get my hand on about Israel.  
 C. That same year Israel's Jewish Agency sent.  
 D. a shaliach a sort of recruiter to Minneapolis.  
 E. I became one of his most active devotees. (2007)
- (a) C&E (b) C only (c) E only  
 (d) B, C & E (e) C, D & E
9. A. So once an economy is actually in recession,  
 B. the authorities can, in principle, move the economy.  
 C. out of slump - assuming hypothetically.  
 D. that they know how to - by a temporary stimuli.  
 E. In the longer term, however, such policies have no affect on the overall behaviour of the economy. (2007)
- (a) A, B & E (b) B, C & E (c) C & D  
 (d) E only (e) B only
10. A. It is sometimes told that democratic.  
 B. government originated in the city-states.  
 C. of ancient Greece. Democratic ideals have been handed to us from that time.  
 D. In truth, however, this is an unhelpful assertion.  
 E. The Greeks gave us the word, hence did not provide us with a model. (2007)
- (a) A, B & D (b) B, C & D (c) B & D  
 (d) B only (e) D only

**Directions for Questions 11 to 14 :** In each of the following questions there are sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/are correct in terms of grammar and usage (including spelling, punctuation and logical consistency). Then, choose the most appropriate option.

11. A. In 1849, a poor Bavarian immigrant named Levi Strauss.  
 B. landed in San Francisco, California,  
 C. at the invitation of his brother-in-law David Stern.  
 D. owner of dry goods business.  
 E. This dry goods business would later became known as Levi Strauss & Company. (2008)
- (a) B only (b) B and C (c) A and B  
 (d) A only (e) A, B and D
12. A. In response to the allegations and condemnation pouring in,  
 B. Nike implemented comprehensive changes in their labour policy.  
 C. Perhaps sensing the rising tide of global labour concerns,  
 D. from the public would become a prominent media issue,  
 E. Nike sought to be a industry leader in employee relations. (2008)
- (a) D and E (b) D only (c) A and E  
 (d) A and D (e) B, C and E
13. A. Charges and countercharges mean nothing.  
 B. to the few million who have lost their home.  
 C. The nightmare is far from over, for the government.  
 D. is still unable to reach hundreds who are marooned.  
 E. The death count have just begun. (2008)
- (a) A only (b) C only (c) A and C  
 (d) A, C and D (e) D only
14. A. I did not know what to make of you.  
 B. Because you'd lived in India, I associate you more with my parents than with me.  
 C. And yet you were unlike my cousins in Calcutta, who seem so innocent and obedient when I visited them.  
 D. You were not curious about me in the least.  
 E. Although you did make effort to meet me. (2008)
- (a) A only (b) A and B (c) A and E  
 (d) D only (e) A and D

## ANSWERS WITH SOLUTIONS

### TYPE-A

1. (c) (c) is grammatically incorrect. As the word “who should be changed with whom”.
2. (d) In (d) the word “dressing” is grammatically incorrect. The correct use will be ‘dress’.
3. (c) (c) is incorrect as “students” should not have an apostrophe. The apostrophe should follow the singular form ‘student’.
4. (d) (d) is incorrect because of the word “assure”, which should be changed to “ensure”.
5. (c) (c) is incorrect sentence because “one is always followed by one and not you”.

### TYPE-B

1. (c) (c) is correct because it rightly states that exercising any other option will cause failure.
2. (a) (a) is the best option and can't be changed with any other options given there as it explains fully the problem of the narrator.
3. (a) (a) is correct answer. It most suitably answers the question of the author.
4. (b) (b) is the answer as realistic details combined with romantic temperament can makeup a good novel.
5. (a) (a) is the best option as none of the others discusses any involvement of welfare aid.
6. (a) (a) is the only one which discusses the Rumanians ties to Moscow, none of the others do so.
7. (d) (d) comes across as the best choice as the word so is missing in the original sentence which is completed in (d). No other option fits in grammatically.
8. (a) (a) is the correct answer. It is a polite and courteous way of saying that he should transfer some of the control.
9. (c) (c) is the best choice as expensive private schools have mushroomed all over the country which means that they are growing everywhere like wild mushrooms.
10. (a) The sentence is grammatically correct.
11. (b) (b) is the only option as the sentence is grammatically correct. And the other choices can't fit in.
12. (d) (d) is the best option as links have been forged between Europe and British Air space.
13. (b) (b) is correct as the word “swelled” is the better option to use than “flourished”, as swelled means growing.
14. (c) (c) is the best option as the economic and military precursors have yet to be discovered and the revival of Byzantine learning is an inexplicable or an unexplained phenomenon.

15. (a) (a), the management cannot scold at will, freely is not the correct word to use.
16. (a) (a) is the only choice as the word “speed” has nothing to do with random given in the sentence.
17. (d) Grammatically (d) is the only one which is correct. As “us” to be replaced with “we”.
18. (a) (a) is the correct choice as grammatically it is the only one which is making sense and the bill should be passed, “on” being wrongly used.
19. (c) The answer is (c) since Mr. Pillai has already been mentioned. So, we don't need to write “who”.
20. (b) Since the entertainment industry has taken a joint straight forward. (b) is the only correct option.
21. (b) In case of (b) the verb ‘made’ in the past tense has to be matched with the verb ‘severed’ which is also in the past tense.
22. (b) (c) is not correct because it is talking about the solution of the problem in two weeks which is changing the meaning. (b) is correct because the programme had been made in two weeks. The comma in the underlined sentence has to be removed as it is referring ‘in two weeks’ to show it to your boss without delay. Hence, (b) is correct.
23. (d) (d) is correct as the environmentalists proclaim “that”. ‘to’ will be wrong usage of preposition.
24. (c) As the end would “be”, otherwise only “delayed”. Thus (c) is the correct option.

### TYPE-C

1. (c) Grammatically C is the best choice as the sentence is in a logical sequence.
2. (b) B comes across as a best option as A, C and D are grammatically not correct with A having the before politicians, C mixing up propositions and consumptions, and D having an error in by large number, which should be replaced with by a large number.
3. (c) A, B and D are eliminated and answer is C because as the difference is created between prices and not of or across as is given in the other option.
4. (b) B is the correct choice as the action is taken by the government to reduce the systematic risk which is inherent in the financial market. Unlike A, C and D in which the action is of government, and in C risk has been given as inherent due to which is wrong.

5. (a) (a) is the correct choice as grammatically D comes across as the sentence which is making sense as creativity is regarded not only as valuable in itself, and not as for itself as given in A, B and C are not correct choices as they are negative sentences.
6. (c) (c) is the correct choice as reflection would be preceded by action as given in the sentence B. Only sentence B give a grammatically and logically correct sequence.
7. (d) (d) is the only option which is making sense, as according to the sentence we are forced to fall back on fatalism and not to fatalism as given in sentence D, also falling back in B is grammatically incorrect as well as C being wrong as it leaves out "an" explanation.
8. (b) Grammatically sentence C is right i.e. the answer is (b) as the sequence in the sentence is correct, rather than D, where the era is given first or B in which it is not clear whether disdain took hold or not.
9. (c) (c) is correct as the sequence in sentence B is logical whereas in A businesses is wrong word to use, in C the sequence is wrong and in D the word "else" has been wrongly used.

#### TYPE-D

1. (b) A and C are correct sentences. In B, 'guilty of stealing' to be replaced by 'guilty to stealing'. Similar mistake is in D, where 'for three', must be changed to 'to three'.
2. (a) B and C are absolutely incorrect. In B, 'After waking up' should be replaced by 'After she woke up'. In C, she cannot do two jobs - 'took shower' and got ready - simultaneously at 11.
3. (c) A and D are perfectly correct. In B, 'her efforts gave fruits', must be replaced by 'her efforts bore fruits'. In C, 'for her good work', should be replaced by 'on her good work'.
4. (b) A & D are grammatically correct. In B, the sentence shall begin with " Rarely as the . ...." and C shall begin with " The postwar era".
5. (a) B is wrong as the use of mankind's is redundant. A is wrong as 'no coincidence' is redundant in the context of the sentence.
6. (b) A and D are correct. B is wrong as the word harness' can not be used for individuals. C is wrong as 'own' can not be used with 'egocentrism'.
7. (c) B is wrong as chlorine and bromine (chemicals) can not be blamed but held responsible. C is wrong because of the wrong usage of the adjective offending with chemicals.
8. (a) Sentence A is incorrect as the preposition 'to' is redundant, it should be 'when I returned home...'. In sentence B, 'on' and 'above' are used together hence this is also incorrect. Statement C is correct. The 'shaliach' should be followed by a comma in sentence D, hence making it incorrect. E is without any error. So, correct answer is option (a).

9. (e) A and B are correct. C is incorrect because semicolon should be used instead of hyphen after 'out of slump'. Stimuli is plural so article 'a' in phrase 'a temporary stimuli' is incorrect in statement D. The word 'affect' should be replaced by word 'effect' in statement E. Effect means a change which is a result of an action whereas affect is to produce a change or difference in something. Since there is no option with A and B. Choose the option B. Hence, correct answer is option (e).
10. (c) The correct verb should be 'said' instead of 'told' in A so it is incorrect. B is correct. In sentence C, the phrase 'have been handed to us' should be 'have been handed over to', hence it is grammatically incorrect. D is correct. The word 'hence' should be substituted by 'but' in sentence E. So, correct pair of sentences are BD and correct option is (c).
11. (a) Sentence A is incorrect as 'immigrant' has been wrongly spelt 'imigrant'. Sentence C is incorrect as there should be commas before and after David Stern, as brother-in-law refers to him and he is the owner of the dry goods business. Sentence D is incorrect because the indefinite article 'a' should precede 'dry goods business'. 'Business' is a countable noun and needs a determiner. Sentence E is incorrect as 'would later became' shall be replaced by 'would later become'. Thus only sentence B is correct.
12. (d) Sentence B is incorrect as the adjective referring to the Noun, 'Nike' should be singular, 'its' and not 'their'. Sentence C is incorrect as there is no need of a comma after concerns. Also we need to add a relative pronoun 'that' after sensing. Sentence E is incorrect as the definite article 'the' must be used in place of the indefinite article 'a'. Sentences A and D are correct.
13. (d) Statement B is incorrect as the noun 'home' should be in the plural form as we are referring to the homes of the few million (people). Statement E is incorrect as there is a problem of subject-verb agreement here. The subject 'the death count' is singular, and hence requires a singular verb 'has', and not, 'have'. The correct statements are A, C and D.
14. (e) As the whole paragraph is in past tense so 'associate' in sentence B must be replaced with 'associated'. Statement B is incorrect as the verb 'seem' should be in the past tense, i.e. 'seemed' as it refers to the same time as indicated by 'when I visited'. Statement E is incorrect as we cannot begin a sentence with a subordinate conjunction. We need to replace it with the adverb equivalent 'however' or 'nevertheless'. Also the noun 'effort' requires an indefinite article 'an' before it. Thus, only statements A and D are correct.

# 20

## CHAPTER

# PARAGRAPH CONSTRUCTION



**Directions for Questions 1 to 45 :** Arrange sentences A, B, C and D between sentences 1 and 6 to form a logical sequence of the six sentences.

1. 1. It is often said that good actors can get out of play more than the author has put into it. (1994)  
A. A good actor, bringing to a part his own talent, often gives it a value that the layman on reading the play had not seen in it, but at the utmost he can do no more than reach the ideal that the author has seen in his mind's eye.  
B. In all my plays I have been fortunate enough to have some of the parts acted as I wanted; but in none have I had all the parts so acted.  
C. That is not true.  
D. He has to be an actor of address to do this; for the most part the author has to be satisfied with an approximation of the performance he visualized.  
6. is so obviously inevitable, for the actor who is suited to a certain role may very well be engaged and you have to put up with the second or third best, because there is no help for it.  
(a) BACD (b) DACB (c) CADB (d) DCBA

2. 1. I can think of no serious prose play that has survived the generation that gave it birth. (1994)  
A. They are museum pieces.  
B. They are revived now and then because a famous part tempts a leading actor, or a manager in want of a stop-gap thinks he will put on a play on which he has no royalties to pay.  
C. A few comedies have haphazardly traveled down a couple of centuries or so.  
D. The audience laughs at their wit with politeness and at their farce with embarrassment.  
6. They are not held nor taken out of themselves.  
(a) CDBA (b) CBAD (c) ABDC (d) BACD

3. 1. The wind had savage allies. (1994)  
A. If it had not been for my closely fitted helmet, the explosions might have shattered my eardrums.  
B. The first clap of thunder came as a deafening explosion that literally shook my teeth.  
C. I didn't hear the thunder, I actually felt it - an almost unbearable physical experience.  
D. I saw lightning all around me in every shape imaginable.  
6. When very close, it raining so torrentially that I thought I would drown in mid-air.  
(a) BCAD (b) CADB (c) CBDA (d) ACDB

4. 1. All human beings are aware of the existence of a power greater than that of the mortals - the name given to such a power by individuals is an outcome of birth, education and choice. (1994)  
A. Logically, therefore such a power should be remembered in good times also.  
B. Their other philanthropic contributions include the construction and maintenance of religious places such as temples or gurudwaras.  
C. Industrial organizations also contribute to the veneration of this power by participating in activities such as religious ceremonies and festivities organized by the employees.  
D. This power provides an anchor in times of adversity, difficulty and trouble.  
6. The top management / managers should participate in all such events, irrespective of their personal choice.  
(a) CADB (b) BCAD (c) DACB (d) DBCA

5. 1. A thorough knowledge of the path or course to be followed is essential for achieving success. (1994)
- A. Seniors must show the path clearly by laying down the precise expectations of the management in terms of job description, key result areas and personal targets.
- B. They should also 'light the path' by personal example.
- C. Advice tendered or help offered must be objectively evaluated for its effectiveness in achieving the desired goal.
- D. A display of arrogance and a false sense of 'self-worth', in order to belittle those who come to help prove dysfunctional.
6. The individuality of each employee must be respected.
- (a) CDAB (b) CADB (c) BADC (d) ABCD
6. 1. But the vessel kept going away. (1995)
- A. He looked anxiously around.
- B. There was nothing to see but the water and empty sky.
- C. He could now barely see her funnel and masts when heaved up on a high wave.
- D. He did not know for what.
6. A breaking wave slapped him in the face, choking him.
- (a) ADBC (b) ACDB (c) CADB (d) ABCD
7. 1. All human beings are aware of the existence of a power greater than that of the mortals- the name given to such a power by individuals is an outcome of birth, education and choice. (1995)
- A. This power provides an anchor in times of adversity, difficulty and trouble.
- B. Industrial organisations also contribute to the veneration of this power by participating in activities such as religious ceremonies and festivities organized by the employees.
- C. Their other philanthropic contributions include the construction and maintenance of religious place such as temples or gurudwaras.
- D. Logically, therefore such a power should be remembered in good times also.
6. The top management/ managers should participate in all such events, irrespective of their .
- (a) ADBC (b) BCAD (c) CADB (d) DACB
8. 1. Total forgiveness for a mistake committed generates a sense of complacency towards target achievement among the employees. (1995)
- A. In such a situation the work ethos gets distorted and individuals get a feeling that they can get away with any lapse.
- B. The feeling that they develop is 'whether I produce results or not, the management will not punish me or does not have the guts to punish me.'
- C. Also excess laxity damages management credibility, because for a long time, the management has maintained that dysfunctional behaviour will result in punishment, and when something goes wrong, it fails to take specific punishment, and when something goes wrong, it fails to take specific punitive action.
- D. The severity of the punishment may be reduced, by modifying it, but some action must be taken against the guilty so as to serve as a reminder for all others in the organization.
6. Moreover, it helps establish the management's image of being firm, fair and yet human.
- (a) DCBA b CDAB (c) BDAC (d) CABD
9. 1. Currency movements can have a dramatic impact on equity returns for foreign investors. (1995)
- A. This is not surprising as many developing economies try to peg their exchange rates to the US dollar or to a basket of currencies.
- B. Many developing economies manage to keep exchange rate volatility lower than that in the industrial economies.
- C. India has also gone in for the full float on the current account and abolished the managed exchange rate.
- D. Dramatic exceptions are Argentina, Brazil, and Nigeria.
6. Another emerging-market-specific risk is liquidity risk.
- (a) ADBC (b) CDAB (c) BDAC (d) CABD
10. 1. Managers must lead by example; they should not be averse to giving a hand in manual work, if required. (1995)
- A. They should also update their competence to guide their subordinates ; this would be possible only if they keep in regular touch with new processes, machines, instruments, gauges, systems and gadgets.
- B. Work must be allocated to different groups and team members in clear, specific terms.
- C. Too much of wall -building is detrimental to the exercise of the 'personal charisma' of the leader whose presence should not be felt only through notice, circulars or memos, but by being seen physically.
- D. Simple, clean living among one's people should be insisted upon.
6. This would mean the maintaining of an updated orgnization chart; laying down job descriptions; identifying key result areas; setting personal target; and above all, monitoring of performance, to meet organizational goals.
- (a) BDAC (b) BCDA (c) ADCB (d) ACDB

11. 1. The top management should perceive the truth worth of people and only then make friends. (1995)  
A. Such 'true friends' are very few and very rare.  
B. Factors such as affluence, riches, outward sophistication and conceptual abilities are not prerequisites for genuine friendship.  
C. Such people must be respected and kept close to the heart.  
D. Business realities call for developing a large circle of acquaintances and contacts: however, all of them will be motivated by their own self-interest and it would be wrong to treat them as genuine friends.  
6. There is always a need for real friends to whom one can turn for balanced, unselfish advice, more so when one is caught in a dilemma.  
(a) ABCD (b) ADBC (c) ADBC (d) ACBD

12. 1. Conflicting demands for resources are always voiced by different functions/ departments in an organization. (1995)  
A. Every manager examines the task entrusted to him and evaluates the resources required.  
B. Availability of resources in full measure makes task achievement easy, because it reduces the effort needed to somewhat make-do.  
C. A safety cushion is built into demand for resources, to offset the adverse impact of any cut imposed by the seniors.  
D. This aspect needs to be understood as the reality.  
6. Dynamic, energetic, growth-oriented and wise management's are always confronted with the inadequacy of resources with respect to one some of the four M's (men, machines, money and materials ) and the two T's (time and technology).  
(a) DABC (b) ACBD (c) ABCD (d) BCDA

13. 1. Managers especially the successful ones, should guard against ascribing to themselves qualities and attributes which they may not have, or may have in a measure much less than what they think they have. (1995)  
A. External appearances can be deceptive.  
B. To initiate action, without being in possession of full facts, can lead to disastrous results.  
C. Also, one should develop confidants who can be used as sounding boards, in order to check one's own thinking against that of others.  
D. It is also useful to be open to receive feedback about oneself so that a real understanding of the 'self' exists.  
6. A false perception can be likened to wearing coloured glasses - all facts get tainted by colour of the glass and the mind interprets them wrongly to fit into the perception.  
(a) DCAB (b) BADC (c) DABC (d) BCAD

14. 1. Managers need to differentiate among those who commit an error once, those who are repetitively arrant but can be corrected, and those who are basically wicked. (1995)  
A. The persons in this category will resort to sweet - talk and make all sorts of promises on being caught, but at the first opportunity will revert to their bad ways.  
B. Managers must take ruthless action against the basically wicked and ensure their separation from the organization at the earliest.  
C. The first category needs to be corrected softly and duly counselled ; the second category should be dealt with firmly and duly counselled till they realize the danger of persisting with their errant behaviour.  
D. It is the last category of whom the managers must be most wary.  
6. The punishment must be fair and based on the philosophy of giving all the possible opportunities and help prior to taking ruthless action.  
(a) ADCB b CDAB (c) CADB (d) BDAC

15. 1. Despite the passage of time, a large number of conflicts continue to remain alive, because the wronged parties, in reality or in imagination, wish to take revenge upon each other, thus creating a vicious circle. (1995)  
A. At times, managers are called upon to take ruthless decisions in the long-term interests of the organization.  
B. People hurt others, at times knowingly, to teach them a lesson and, at other times, because they lack correct understanding of the other person's stand.  
C. The delegation of any power, to any person, is never absolute.  
D. Every ruthless decision will be easier to accept if the situation at the moment of committing the act is objectively analyzed, shared openly and discussed rationally.  
6. power is misused, its effects can last only for a while, since employees are bound to confront it someday, more so, the talented ones.  
(a) BCAD (b) ADBC (c) DABC (d) BADC

16. 1. A few years ago, hostility towards Japanese - Americans was so strong that I thought they were going to reopen the detention camps here in California. (1996)  
A Today Asians are a success story.  
B I cannot help making a comparison to the anti-Jewish sentiment in Nazi Germany when Jewish people were successful in business.  
C But do people applaud President Clinton for improving foreign trade with Asia?  
D Now, talk about the “Arkansas-Asia Connection” is broadening that hatred to include all Asian-Americans.  
6. No, blinded by jealousy, they complain that it is the Asian-Americans who are reaping the wealth.  
(a) DBAC (b) ABDC (c) DABC (d) ACBD

17. 1. It doesn’t take a highly esteemed medical expert to conclude that women handle pain better than men. (1996)  
A First the men would give birth, and then take six months to recover.  
B As for labour pains, the human species would become extinct if men had to give birth.  
C They do, however, make life hell for everyone else with their non-stop complaining about how bad they feel.  
D The men in my life, including my husband and my father, would not take a Tylenol for pain if their lives depended on it.  
6. And by the time they finish sharing their excruciating experience with their buddies, all reproduction would come to a halt.  
(a) ABDC (b) DCBA (c) CDBA (d) BACD

18. 1. Michael Jackson, clearly no admirer of long engagements, got married abruptly for the second time in three years. (1996)  
A The latest wedding took place in a secret midnight ceremony in Sydney, Australia.  
B It is also the second marriage for the new missus, about whom little is known.  
C The wedding was attended by the groom’s entourage and staff, according to Jackson’s publicist.  
D The bride, 37 year old Debbie Rowe, who is carrying Jackson’s baby, wore white.  
6. All that is known is that she is a nurse for Jackson’s dermatologist.  
(a) CBAD (b) BDCA (c) DCBA (d) ACDB

19. 1. Liz Taylor isn’t just unlucky in love (1996)  
A She, and husband Larry Fortensky, will have to pay the tab-\$432,600 in court costs.  
B The duo claimed that a 1993 story about a property dispute damaged their reputations.  
C Taylor has lost a defamation suit against the National Enquirer.  
D She is unlucky in law too.  
6. Alas, all levels of the California court system disagreed.  
(a) CDAB (b) DCAB (c) DABC (d) CDBA

20. 1. Since its birth, rock has produced a long string of guitar heroes. (1996)  
A It is a list that would begin with Chuck Berry, continue on through Hendrix, page and Clapton.  
B These are musicians celebrated for their sheer instrumental talent, and their flair for expansive, showy and sometimes self-indulgent solos.  
C It would also include players of more recent vintage, like Van Halen and Living Colour’s Vernon Reid.  
D But with the advent of alternative rock and grunge, guitar heroism became uncool.  
6. Guitarists like Peter Buck and Kurt Cobain shy away from exhibitionism.  
(a) ACBD (b) ABCD (c) BCAD (d) BADC

21. 1. Hiss was serving as head of the Endowment on Aug 3, 1948, when Whittaker Chambers reluctantly appeared before the House Un-American Activities Committee. (1996)  
A Chambers, a portly rumpled man with a melodramatic style, had been a Communist courier but had broken with the party in 1938.  
B When Nixon, arranged a meeting of the two men in New York, Chambers repeated his charges and Hiss his denials.  
C Summoned as a witness, Hiss denied he had ever been a Communist or had known Chambers.  
D He told the Committee that among the members of a secret Communist cell in Washington during the 30s was Hiss.  
6. Then, bizarrely, Hiss asked Chambers to open his mouth.  
(a) CBAD (b) ADBC (c) ADCB (d) ACDB

22. 1. For many scientists, oceans are the cradle of life. (1996)  
A But all over the world, chemical products and nuclear waste continue to be dumped into them.  
B Coral reefs, which are known as the most beautiful places of the submarine world, are fast disappearing.  
C The result is that many species of fish die because of this pollution.  
D Of course Man is the main cause of these problems.  
6. Man has long since ruined the places he goes to -- continents and oceans alike.  
(a) ACBD (b) BACD (c) ABDC (d) BCAD

23. 1. Am I one of the people who are worried that Bill Clinton's second term might be destroyed by a constitutional crisis? (1996)  
 A. On the other hand, ordinary citizens have put the campaign behind them.  
 B. In other words, what worries me is that Bill Clinton could exhibit a version of what George Bush used to refer to as Big Mo.  
 C. That is, he might have so much campaign momentum that he may not be able to stop campaigning.  
 D. Well, it's true that I've been wondering whether a President could be impeached for refusing to stop talking about the bridge we need to build to the 21st century.  
 6. They prefer now to watch their favourite soaps and ads on TV rather than senators  
 (a) DBCA (b) ABDC (c) BACD (d) CBDA
24. 1. Historically, stained glass was almost entirely reserved for ecclesiastical spaces (1996)  
 A. By all counts, he has accomplished that mission with unmistakable style.  
 B. "It is my mission to bring it kicking and screaming out of that milieu," says Clarke.  
 C. The first was the jewel-like windows he designed for a Cistercian Church in Switzerland  
 D. Two recent projects show his genius in the separate worlds of the sacred and the mundane.  
 6. The other was a spectacular, huge skylight in a shopping complex in Brazil.  
 (a) CBAD (b) BADC (c) ABDC (d) DBAC
25. 1. So how big is the potential market? (1996)  
 A. But they end up spending thousands more each year on hardware upgrades and software overhauls.  
 B. Analysts say the new machines will appeal primarily to corporate users.  
 C. An individual buyer can pick up a desktop computer for less than \$2000 in America  
 D. For them, the NC's best drawing card is its promise of much lower maintenance costs.  
 6. NC's, which automatically load the latest version of whatever software they need, could put an end to all that.  
 (a) BCAD (b) DABC (c) BDCA (d) DCAB
26. 1. Whenever technology has flowered, it has put man's language-developing skills into overdrive (1997)  
 A. Technical and technoid terms are spilling into the mainstream almost as fast as junk-mail is slapped into e-mail boxes.  
 B. The era of computers is no less.  
 C. From the wheel with its axle to the spinning wheel with its bobbins, to the compact disc and its jewel-box, inventions have trailed new words in their wake.  
 D. "Cyberslang is huge, but it's parochial, and we don't know what will filter into the larger culture" said Tom Dalzell, who wrote the slang dictionary *Flappers 2 Rappers*.  
 6. Some slangs already have a pedigree.  
 (a) BCAD (b) CBAD (c) ABCD (d) DBCA
27. 1. Until the MBA arrived on the scene the IIT graduate was king (1997)  
 A. A degree from one of the five IIT's was a passport to a well-paying job, great prospects abroad and, for some, a decent dowry to boot.  
 B. From the day he or she cracked the joint entrance exam, the IIT student commanded the awe of neighbours and close relatives.  
 C. IIT students had, meanwhile, also developed their own special culture, complete with lingo and attitude, which they passed down.  
 D. True, the success stories of IIT graduates are legion and they now constitute the cream of the Indian diaspora.  
 6. But not many alumni would agree that the IIT undergraduate mindset merits a serious psychological study, let alone an interactive one.  
 (a) BACD (b) ABCD (c) DCBA (d) ABCD
28. 1. Some of the maharajas, like the one at Kapurthala, had exquisite taste (1997)  
 A. In 1902, the Maharaja of Kapurthala gave his civil engineer photographs of the Versailles palace and asked him to replicate it, right down to the gargoyles.  
 B. Yeshwantrao Holkar of Indore brought in Bauhaus aesthetics and even works of modern artists like Brancusi and Duchamp.  
 C. Kitsch is the most polite way to describe them.  
 D. But many of them, as the available-light photographs show, had execrable taste.  
 6. Like Ali Baba's caves, some of the palaces were like warehouses with the downright ugly next to the sublimely aesthetic.  
 (a) BACD (b) BDCA (c) ABCD (d) ABDC
29. 1. There, in Europe, his true gifts unveiled (1997)  
 A. Playing with Don Cherie, blending Indian music and jazz for the first time, he began setting the pace in the late 70s for much of present-day fusion is.  
 B. John McLaughlin, the legendary guitarist whose soul has always had an Indian stamp on it, was seduced immediately.  
 C. Fusion by Gurtu had begun.  
 D. He partnered Gurtu for four years, and 'nurtured' him as a composer.  
 6. But for every experimental musician there's a critic nestling nearby.  
 (a) ABCD (b) BCAD (c) ADBC (d) ABDC

30. 1. India, which has two out of every five TB patients in the world, is on the brink of a major public health disaster. (1997)  
 A. If untreated, a TB patient can die within five years.  
 B. Unlike AIDS, the great curse of modern sexuality, the TB germ is air-borne, which means there are no barriers to its spread.  
 C. The dreaded infection ranks fourth among major killers worldwide.  
 D. Every minute, a patient falls prey to the infection in India, which means that over five lakh people die of the disease annually.  
 6. Anyone, anywhere can be affected by this disease.  
 (a) CADB (b) BACD (c) ABCD (d) DBAC
31. 1. Buddhism is a way to salvation. (1998)  
 A. But Buddhism is more severely analytical.  
 B. In the Christian tradition there is also a concern for the fate of human society conceived as a whole, rather than merely as a sum or network of individuals.  
 C. Salvation is a property, or achievement of individuals.  
 D. Not only does it dissolve society into individuals, the individual in turn is dissolved into component parts and instants, a stream of events.  
 6. In modern terminology, Buddhist doctrine is reductionist.  
 (a) ABCD (b) CBAD (c) BDAC (d) ABCD
32. 1. The problem of improving Indian agriculture is both a sociological and an administrative one. (1998)  
 A. It also appears that there is a direct relationship between the size of a state and development.  
 B. The issues of Indian development, and the problems of India's agricultural sector, will remain with us long into the next century.  
 C. Without improving Indian agriculture, no liberalisation and delicensing will be able to help India.  
 D. At the end of the day, there has to be a ferment and movement of life and action in the vast segment of rural India.  
 6. When it starts marching, India will fly.  
 (a) DABC (b) CDBA (c) ACDB (d) ABCD
33. 1. Good literary magazines have always been good because of their editors. (1998)  
 A. Furthermore, to edit by committee, as it were, would prevent any magazine from finding its own identity.  
 B. The more quirky and idiosyncratic they have been, the better the magazine is, at least as a general rule.  
 C. But the number of editors one can have for a magazine should also be determined by the number of contributions to it.  
 D. To have four editors for an issue that contains only seven contributions, is a bit silly to start with.  
 6. However, in spite of this anomaly, the magazine does acquire merit in its attempt to give a comprehensive view of the Indian literary scene as it is today.  
 (a) ABCD (b) BCDA (c) ABDC (d) CBAD
34. 1. It's the success story of the Indian expatriate in the US which today hogs much of the media coverage in India. (1998)  
 A. East and West, the twain have met quite comfortably in their person, thank you.  
 B. Especially in its more recent romancing the -NRI phase.  
 C. Seldom does the price of getting there - more like not getting there - or what's going on behind those sunny smiles get so much media hype.  
 D. Well groomed, with their perfect Colgate smiles, and hair in place, they appear the picture of confidence which comes from having arrived.  
 6. The festival of feature films and documentaries made by Americans of Indian descent being screened this fortnight, goes a long way in filling those gaps.  
 (a) ACBD (b) DABC (c) BDAC (d) ABCD
35. 1. A market for Indian art has existed ever since the international art scene sprang to life. (1998)  
 A. But interest in architectural conceits is an unanticipated fallout of the Festivals of India of the '80s' which were designed to increase exports of Indian crafts.  
 B. Simultaneously, the Indian elite discarded their synthetic sarees and kitsch plastic furniture and a market came into being.  
 C. Western dealers, unhappy in a market afflicted by violent price fluctuations and unpredictable profit margins, began to look East, and found cheap antiques with irresistible appeal.  
 D. The fortunes of the Delhi supremos, the Jew Town dealers in Cochin and myriad others around the country were made.  
 6. A chain of command was established, from the local contacts to the provincial dealers and up to the big boys, who entertain the Italians and the French, cutting deals worth lakhs in warehouse worth corers.  
 (a) BCAD (b) DCBA (c) ACBD (d) CABD

36. 1. Making people laugh is tricky. (1999)  
A. At times, the intended humour may not simply not come off.  
B. Making people laugh while trying to sell them something is a tougher challenge, since the commercial can fall flat on two grounds.  
C. There are many advertisements which do amuse but do not even begin to set the cash thrills ringing.  
D. Again, it is rarely sufficient for an advertiser simply to amuse the target audience in order to reap the sales benefit.  
6. There are indications that in substituting the hard sell for more entertaining approach, some agencies have rather thrown out the baby with the bath water.  
(a) CDBA (b) DBAC (c) BADC (d) DCBA

37. 1. Picture a termite colony, occupying a tall mud hump on an African plain. (1999)  
A. Hungry predators often invade the colony and unsettle the balance.  
B. The colony flourishes only if the portion of soldiers to workers remain roughly the same, so that the queen and the workers can be protected by the soldiers, and the queen and the soldiers can be serviced by workers.  
C. But its fortunes are presently restored, because the immobile queen walled in well below ground level, lays eggs not only large enough numbers, but also in the varying proportions required.  
D. The hump is alive with worker termites and soldier termites going about their distinct kind of business.  
6. How can we account for her mysterious ability to respond like this to events on the distant surface.  
(a) BADC (b) DBAC (c) ABCD (d) BDCA

38. 1. According to recent research, the critical period for developing language skills is between the ages of three and five and a half years. (1999)  
A. The read-to child already has a large vocabulary and a sense of grammar and sentence structure.  
B. Children who read in these years have a far better chance of reading well in school, indeed, of doing well in all subjects.  
C. And the reason is actually quite simple.  
D. This correlation is far and away the highest yet found between home influences and school success.  
6. Her comprehension of language is therefore is very high.  
(a) DACB (b) ADBC (c) ABCD (d) BDCA

39. 1. High-powered outboard motors were considered to be one of the major threats to the survival of Beluga whale. (1999)  
A. With these, hunters could approach belugas within hunting range and profit from its inner skin and blubber.  
B. To escape an approaching motor, Belugas have learned to drive to the ocean bottom and stay there for up to 20 minutes, by which time the confused predator has left.  
C. Today however, even with much more powerful engines, it is difficult to come close because the whales seem to disappear suddenly just when you thought you had them in your sights.  
D. When the first outboard engines arrived in the early 1930's, one came across 4 and 8 HP motors.  
6. Belugas seem to have used their well-known sensitivity to noise to evolve an 'avoidance' strategy to outsmart hunters and their powerful technologies.  
(a) DACB (b) CDAB (c) ADBC (d) BDAC

40. 1. The reconstruction of history by post-revolutionary science texts involve more than a multiplication of historical misconstructions. (1999)  
A. Because they aim quickly to acquaint the student with the contemporary scientific community thinks it knows textbooks treat the various experiments, concepts, laws and theories of the current normal science as separately and as nearly seriatim as possible.  
B. Those misconstruction render revolutions invisible; the arrangement of the still visible material in science texts implies a process that, if it existed, would deny revolutions a function.  
C. But when combined with the generally unhistorical air of science writing and with the occasional systematic misconstruction, one impression is likely to follow.  
D. As pedagogy this technique of presentation is unexceptionable.  
6. Science has reached its present state by series of individual discoveries and inventions that, when gathered together, constitute the modern body of technical knowledge.  
(a) BADC (b) ADBC (c) DACB (d) CBDA

41. 1. Security inks exploit the same principle that causes the vivid and constantly changing colours of a film of oil on water. (2000)  
A. When two rays of light meet each other after being reflected from these different surfaces, they have each traveled slightly different distances.  
B. The key is that the light is bouncing off two surfaces, that of the oil and that of the water layer below it.  
C. The distance the two rays determines which wavelengths, and hence colours, interfere constructively and look bright.  
D. Because light is an electromagnetic wave, the peaks and troughs of each ray then interfere either constructively, to appear bright, or destructively, to appear dim.  
6. Since the distance the rays travel changes with the angle as you look at the surface, different colours look bright from different viewing angles.  
(a) ABCD (b) BADC (c) BDAC (d) DCAB

42. 1. Commercially reared chicken can be unusually aggressive, and are often kept in darkened sheds to prevent them pecking at each other. (2000)  
A. The birds spent far more of their time - up to a third - pecking at the inanimate objects in the pens, in contrast to birds in other pens which spent a lot of time attacking others.  
B. In low light conditions, they behave less belligerently, but are more prone to ophthalmic disorders and respiratory problems.  
C. In an experiment, aggressive head-pecking was all but eliminated among birds in the enriched environment.  
D. Altering the birds' environment, by adding bales of wood-shavings to their pens, can work wonders.  
6. Bales could diminish aggressiveness and reduce injuries; they might even improve productivity, since a happy chicken is a productive chicken.  
(a) DCAB (b) CDBA (c) DBAC (d) BDCA

43. 1. The concept of a 'nation-state' assumes a complete correspondence between the boundaries of the nation and the boundaries of those who live in a specific state. (2000)  
A. Then there are members of national collectivities who live in other countries, making a mockery of the concept.  
B. There are always people living in particular states who are not considered to be (and often do not consider themselves to be) members of the hegemonic nation.  
C. Even worse, there are nations which never had a state or which are divided across several states.  
D. This, of course has been subject to severe criticism and is virtually everywhere a fiction.  
6. However, the fiction has been, and continues to be, at the basic nationalist ideologies.  
(a) DBAC (b) ABCD (c) BACD (d) DACB

44. 1. In the sciences, even questionable examples of research fraud are harshly punished. (2000)  
A. But no such mechanism exists in the humanities-much of what humanities researchers call research does not lead to results that are replicable by other scholars.  
B. Given the importance of interpretation in historical and literary scholarship, humanities researchers are in a position where they can explain away deliberate and even systematic distortion.  
C. Mere suspicion is enough for funding to be cut off ; publicity guarantees that careers can be effectively ended.  
D. Forgeries which take the form of pastiches in which the forger intersperses fake and real parts can be defended as mere mistakes or aberrant misreading.  
6. Scientists funding data have no such defences.  
(a) BDCA (b) ABDC (c) CABD (d) CDBA

45. 1. Horses and communism were, on the whole, a poor match. (2000)  
A. Fine horses bespoke the nobility the party was supposed to despise.  
B. Communist leaders, when they visited villages, preferred to see cows and pigs.  
C. Although a working horse was just about tolerable, the communists were right to be wary.  
D. Peasants from Poland to the Hungarian Pustza preferred their horse to party dogma.  
6. "A farmer's pride is his horse; his cow may be thin but his horse must be fat," went a Slovak saying.  
(a) ACDB (b) DBCA (c) ABCD (d) DCBA

## TYPE - B

**Directions for Questions 1 to 83 :** In each of the following questions, the answer choices suggest alternative arrangements of four or more sentences (denoted by A, B, C, D, E, F). Choose the alternative which suggests a coherent paragraph.

2. A. It is sad that India has always been in a hurry to conform to the western thought, especially the American (1994)  
 B. Even the smaller countries have the guts to take a firm contrarian stand if they feel the policies happen to compromise their country's interest.  
 C. Its one thing to sprout theories on liberalization, and entirely another to barter the interests of the nation in it's name.  
 D. In this case too, while a large number of countries are yet to ratify the GATT, India has not only ratified the treaty, but is also preparing to amend the Patents Act.  
 (a) CABD (b) DCAB (c) CBDA (d) BDCA
3. A. But instead you are faced with another huge crag and the weary trail continues (1994)  
 B. No, the path winds on and another mountain bars your way.  
 C. When for days you have been going through a mountain pass, a moment comes when you are sure that after winding around the great mass of rock in front of you, you will come upon the plain.  
 D. Surely after this you will see the plain.  
 (a) CDBA (b) BADC (c) CADB (d) BCAD
4. A. During one exhibition, however, some air became mixed with the hydrogen, and in the words of the shaken performer : "The explosion was so dreadful that I imagined all my teeth had been blown out!" (1994)  
 B. An entertainer would finish his acts by blowing the hydrogen he had inhaled towards a lighted candle; as the hydrogen caught fire, flames would shoot menacingly from his lips.  
 C. A paper bag filled with hydrogen amazed guests by zooming off into space.  
 D. When people learned about its unique lighter-than-air property, they began to use it in all sorts of parlor stunts.  
 (a) DCBA (b) DBAC (c) CABD (d) ACBD
5. A. It is exciting and various (1994)  
 B. I am a writer as I might have been a doctor or a lawyer.  
 C. The writer is free to work in what he believes.  
 D. It is so pleasant a profession that it is not surprising if a vast number of persons adopt it who have no qualifications for it.  
 (a) CADB (b) ABDC (c) DBCA (d) BDAC
6. A. there was the hope that in another existence a greater happiness would reward one (1994)  
 B. previous existence, and the effort to do better would be less difficult too when  
 C. it would be less difficult to bear the evils of one's own life if  
 D. one could think that they were but the necessary outcome of one's errors in a  
 (a) CABD (b) BDCA (c) BADC (d) CDBA
7. A. he can only renew himself if his soul (1994)  
 B. he renews himself and  
 C. the writer can only be fertile if  
 D. is constantly enriched by fresh experience  
 (a) CBAD (b) CADB (c) BDCA (d) BACD
8. A. But a masterpiece is (1994)  
 B. Untaught genius  
 C. A laborious career than as the lucky fluke of  
 D. More likely to come as the culminating point of  
 (a) CDAB (b) ADCB (c) CDBA (d) ACDB
9. A. What interests you is the way in which you have created the illusion (1994)  
 B. They are angry with you, for it was  
 C. The public is easily disillusioned and then  
 D. The illusion they loved; they do not understand that  
 (a) ACBD (b) BDCA (c) CBDA (d) BCAD
10. A. An adequate physical and social infrastructure level (1994)  
 B. The pattern of spatial growth in these towns as also to  
 C. The failure of the government to ensure  
 D. The roots of the riots are related to  
 (a) ACBD (b) DBCA (c) ABDC (d) CBDA
11. A. No other document gives us so intimate a sense of the tone and temper of the first generation English poets (1995)  
 B. Part of the interest of the journal is of course historical.  
 C. And the clues to Wordsworth's creative processes which the journal affords are of decisive significance.  
 D. Not even in their own letters do Wordsworth and Coleridge stand so present before us than they do through the references in the journal  
 (a) BADC (b) BDAC (c) CBAD (d) DABC

12. A. We can never leave off wondering how that which has ever been should cease to be. (1995)  
 B. As we advance in life, we acquire a keener sense of the value of time.  
 C. Nothing else, indeed, seems of any consequence; and we become misers in this sense.  
 D. We try to arrest its few tottering steps, and to make it linger on the brink of the grave.  
 (a) ACDB (b) BCDA (c) BDCA (d) ABCD
13. A. These high plans died, slowly but definitively, and were replaced by the dream of a huge work on philosophy (1995)  
 B. In doing whatever little he could of the new plan, the poet managed to write speculations on theology, and political theory.  
 C. The poet's large ambitions included the writing of a philosophic epic of the origin of evil.  
 D. However, not much has done in this regard either, with only fragments being written.  
 (a) ABCD (b) CBAD (c) CDAB (d) CADB
14. A. There is no complete knowledge about anything. (1995)  
 B. Our thinking is the outcome of knowledge, and knowledge is always limited.  
 C. Knowledge always goes hand in hand with ignorance.  
 D. Therefore, our thinking which is born out of knowledge, is limited under all circumstances.  
 (a) BCAD (b) BCDA (c) DABC (d) CBDA
15. A. Where there is division there must be conflict not only division between man and woman, but also division as racial, religious and linguistic. (1995)  
 B. We said the present condition of racial divisions, linguistic divisions has brought on so many wars.  
 C. Also we went into the question of why does this conflict between man and man exist.  
 D. May we continue with what we were talking about last evening ?  
 (a) ABCD (b) DABC (c) BCAD (d) BDAC
16. A. However, the severed head could not grow back if fire could be applied at once to the amputated part. (1996)  
 B. To get rid of this monstrosity was truly a Herculean task, for as soon as one head was cut off, two new ones replaced it.  
 C. Hercules accomplished the labour through the aid of an assistant who cauterized the necks as fast as Hercules cut off the heads!  
 D. One of the Twelve labours of Hercules was the killing of Hydra, a water monster with nine heads.  
 (a) DCBA (b) ABCD (c) DBAC (d) BDCA
17. A. Still, Sophie might need open-heart surgery later in life and now be more prone to respiratory infections. (1996)  
 B. But with the news that his infant daughter Sophie has a hole in her heart, he appears quite vulnerable.  
 C. While the condition sounds bad, it is not life threatening, and frequently corrects itself.  
 D. Sylvester Stallone has made millions and built a thriving career out of looking invincible.  
 (a) DCAB (b) DBAC (c) DBCA (d) DCBA
18. A. That Hollywood is a man's world is certainly true, but it is not the whole truth. (1996)  
 B. Even Renaissance film woman, Jodie Foster, who hosts this compendium of movie history, confesses surprise at this.  
 C. She says that she had no idea that women were so active in the industry even in those days.  
 D. During the silent era, for example, female screenwriters outnumbered males 10 to 1.  
 (a) ADBC (b) ABDC (c) DCAB (d) ABCD
19. A. The Saheli Program, run by the US Cross-Cultural Solutions, is offering a three week tour of India that involves more than frenzied sightseeing. (1996)  
 B. Participants interested in women's issues will learn about arranged marriages, dowries and infanticide.  
 C. Holiday packages include all sorts of topics, but female infanticide must be a first for tourism.  
 D. Interspersed with these talks and meetings are visits to cities like New Delhi and Agra, home to the Taj Mahal.  
 (a) ACBD (b) CDBA (c) ADBC (d) CABD
20. A. Its business decisions are made on the timely and accurate flow of information. (1996)  
 B. It has 1700 employees in 13 branch and representative offices across the Asia-Pacific region.  
 C. For employees to maintain a competitive edge in a fast-moving field, they must have quick access to J P Morgan's proprietary trade related data.  
 D. J P Morgan is one of the largest banking institutions in the U S and a premier international trading firm.  
 (a) DBAC (b) DCBA (c) CDAB (d) DCAB
21. A. Something magical is happening to our planet. (1996)  
 B. Some are calling it a paradigm shift.  
 C. It's getting smaller.  
 D. Others call it business transformation.  
 (a) ABDC (b) ACDB (c) ABCD (d) ACBD

22. A. It begins with an ordinary fever and a moderate cough. (1997)  
 B. India could be under attack from a class of germs that cause what is called atypical pneumonias.  
 C. Slowly, a sore throat progresses to bronchitis and then pneumonia and respiratory complications.  
 D. It appears like the ordinary flu, but baffled doctors find that the usual drugs don't work.  
 (a) ABCD (b) BDAC (c) ADCB (d) BCDA
23. A. Chemists mostly don't stock it: only a few government hospitals do but in limited quantities. (1997)  
 B. Delhi's building boom is creating a bizarre problem : snakes are increasingly biting people as they emerge from their disturbed underground homes.  
 C. There isn't enough anti snake serum, largely because there is no centralised agency that distributes the product.  
 D. If things don't improve, more people could face paralysis, and even death.  
 (a) BCAD (b) DBCA (c) ABCD (d) CABD
24. A. But the last decade has witnessed greater voting and political participation by various privileged sections. (1997)  
 B. If one goes by the earlier record of mid-term elections, it is likely that the turnout in 1998 will drop by anything between four and six percentage points over the already low polling of 58 per cent in 1996.  
 C. If this trend offsets the mid-term poll fatigue, the fall may not be so steep.  
 D. Notwithstanding a good deal of speculation on this issue, it is still not clear that who benefits from a lower turnout.  
 (a) BACD (b) ABCD (c) DBAC (d) CBDA
25. A. After several routine elections there comes a 'critical' election which redefines the basic pattern of political loyalties, redraws political geography and opens up the frozen political space. (1997)  
 B. In psephological jargon they call it realignment.  
 C. Rather, since 1989, there have been a series of semi-critical elections.  
 D. On a strict definition, none of the recent Indian elections qualifies as a critical election.  
 (a) ABCD (b) ABDC (c) DBAC (d) DCBA
26. A. Trivial pursuits, marketed by the Congress, is a game imported from Italy. (1997)  
 B. The idea is to create an imaginary saviour in times of crisis so that the party doesn't fall flat - on its collective face.  
 C. Closest contenders are Mani Shankar Aiyar, who still hears His Master's Voice, and V. George, who is frustrated by the fact that his political future remains Sonia and yet so far.  
 D. The current champion is Arjun Singh for whom all roads lead to Rome, or in his case, 10 Janpath.  
 (a) ABDC (b) ABCD (c) DCBA (d) CDBA
27. A. Good advertising can make people buy your products even if it sucks. (1997)  
 B. A dollar spent on brainwashing is more cost-effective than a dollar spent on product improvement.  
 C. That's important because it takes pressure off you to make good products.  
 D. Obviously, there's a minimum quality that every product has to achieve: it should be able to withstand the shipping process without becoming unrecognizable.  
 (a) BACD (b) ACBD (c) ADCB (d) BCDA
28. A. Almost a century ago, when the father of the modern automobile industry, Henry Ford, sold the first Model A car, he decided that only the best would do for his customers. (1997)  
 B. Today, it is committed to delivering the finest quality with over six million vehicles a year in over 200 countries across the world.  
 C. And for over ninety years, this philosophy has endured in the Ford Motor Company.  
 D. A vehicle is ready for the customer only if it passes the Ford 'Zero Defect Programme'.  
 (a) ABCD (b) ACDB (c) ACBD (d) CDAB
29. A. But, clearly, the government still has the final say. (1997)  
 B. In the past few years, the Reserve Bank of India might have wrested considerable powers from the government when it comes to monetary policy.  
 C. The RBI's announcements on certain issues become effective only after the government notifies them.  
 D. Isn't it time the government vested the RBI with powers to sanction such changes, leaving their ratification for later?  
 (a) ACDB (b) ACBD (c) BACD (d) DACB
30. A. I sat there frowning at the checkered table cloth, chewing the bitter cud of insight. (1997)  
 B. That wintry afternoon in Manhattan, waiting in the little French restaurant, I was feeling frustrated and depressed.  
 C. Even the prospect of seeing a dear friend failed to cheer me as it usually did.  
 D. Because of certain miscalculations on my part, a project of considerable importance in my life had fallen through.  
 (a) ADBC (b) BCDA (c) BDCA (d) ABCD

31. A. Perhaps the best known is the Bay Area Writing Project, founded by James Gray in 1974. (1997)  
 B. The decline in writing skills can be stopped.  
 C. Today's back-to-basics movement has already forced some schools to place renewed emphasis on the three Rs.  
 D. Although the inability of some teachers to teach writing successfully remains a big stumbling block, a number of programmes have been developed to attack this problem.  
 (a) BCDA (b) ADCB (c) ACBD (d) CABD
32. A. He was carrying his jacket and walked with his head thrown back. (1998)  
 B. As Anette neared the lamp she saw a figure walking slowly.  
 C. For a while Michael walked on and she followed twenty paces behind.  
 D. With a mixture of terror and triumph of recognition she slackened her pace.  
 (a) ABCD (b) BADC (c) BCDA (d) ACBD
33. A. However, the real challenge today is in unlearning, which is much harder. (1998)  
 B. But the new world of business behaves differently from the world in which we grew up.  
 C. Learning is important for both people and organizations.  
 D. Each of us has a 'mental model' that we've used over the years to make sense.  
 (a) CADB (b) BDAC (c) CDAB (d) ACBD
34. A. There was nothing quite like a heavy downpour of rain to make life worthwhile. (1998)  
 B. We reached the field, soaked to the skin, and surrounded it.  
 C. The wet, as far as he was concerned, was ideal.  
 D. There, sure enough, stood Claudius, looking like a debauched Roman emperor under a shower.  
 (a) DCBA (b) ABDC (c) BDAC (d) BACD
35. A. Alex had never been happy with his Indian origins.  
 B. He set about rectifying this grave injustice by making his house in his own image of a country manor.  
 C. Fate had been unfair to him; if he had his wish, he would have been a count or an Earl on some English estate, or a medieval monarch in a chateau in France.  
 D. This illusion of misplaced grandeur, his wife felt, would be Alex's undoing.  
 (a) ACDB (b) ABDC (c) ACBD (d) CABD
36. A. The influence is reflected the most in beaded wear. (1998)  
 B. Increasingly, the influence of India's colors and cuts can be seen on western styles.  
 C. And even as Nehru jackets and jodhpurs remain staples of the fashion world, designers such as Armani and McFadden have turned to the sleek silhouette of the churidar this year.  
 D. Indian hot pink, paprika and saffron continue to be popular colours year in and year out.  
 (a) BADC (b) ABCD (c) BCAD (d) DABC
37. A. Such a national policy will surely divide and never unite the people. (1998)  
 B. In fact, it suits the purpose of the politicians; they can drag the people into submission by appealing to them in the name of religion.  
 C. In order to inculcate the unquestioning belief they condemn the other states which do not follow their religion.  
 D. The emergence of the theocratic states where all types of crimes are committed in the name of religion, has revived the religion of the Middle Ages.  
 (a) ABCD (b) DBCA (c) DBAC (d) CDAB
38. A. His left hand concealed a blackjack, his right hand groped for the torch in his pocket. (1998)  
 B. The meeting was scheduled for nine o' clock, and his watch showed the time to be a quarter to nine.  
 C. The man lurked in the corner, away from the glare of the light.  
 D. His heart thumped in his chest, sweat beads formed themselves on his forehead, his mouth was dry.  
 (a) CABD (b) BDAC (c) BADC (d) ABCD
39. A. The Director walked into the room and took a look around the class. (1998)  
 B. Mitch wanted to scream - the illogicality of the entire scene struck him dumb.  
 C. The managers stared at him with the look of fear that no democratic country should tolerate in its people.  
 D. Mitch walked out of the room - it was his irrevocable protest against an insensible and insensitive situation.  
 (a) ACBD (b) BDAC (c) BCAD (d) ABCD
40. A. The establishment of the Third Reich influenced events in American history by starting a chain of events which culminated in war between Germany and the United States. (1998)  
 B. The Neutrality Acts of 1935 and 1936 prohibited trade with any belligerents or loans to them.  
 C. While speaking out against Hitler's atrocities, the American people generally favoured isolationist policies and neutrality.  
 D. The complete destruction of democracy, the persecution of Jews, the war on religion, the cruelty and barbarism of the allies, caused great indignation in this country and brought on fear of another World War.  
 (a) ABCD (b) CBDA (c) CDBA (d) ADCB

41. A. An essay which appeals chiefly to the intellect is Francis Bacon's of Studies. (1998)  
 B. His careful tripartite division of studies expressed succinctly in aphoristic prose demands the complete attention of the mind of the reader.  
 C. He considers studies as they should be; for pleasure, for self-improvement, for business.  
 D. He considers the evils of excess study; laziness, affectation, and preciosity.  
 (a) DCBA (b) ABCD (c) CDBA (d) ACBD
42. A. By reasoning we mean the mental process of drawing an inference from two or more statements or going from the inference to the statements which yield that inference. (1998)  
 B. So logical reasoning covers those types of questions which imply drawing an inference from the problems.  
 C. Logic means, if we take its original meaning, the science of valid reasoning  
 D. Clearly, for understanding arguments and for drawing the inference correctly it is necessary that we should understand the statements first.  
 (a) ACBD (b) CABD (c) ABCD (d) DBCA
43. A. In rejecting the functionalism in positivist organization theory, either wholly or partially, there is often a move towards a political model of organization theory. (1999)  
 B. Thus the analysis would shift to the power resources possessed by different groups in held to be completely unrelated to the work to be done and to be caused totally by the political pursuit of self-interest.  
 C. At the extreme, in one set of writings the growth of administrators in the organization is held to be completely unrelated to the work to be done and to be caused totally by the political pursuit of self-interest.  
 D. The political model holds that individual interests are pursued in organizational life through the exercise of power and influence.  
 (a) ADBC (b) CBAD (c) DBCA (d) ABDC
44. A. Group decision making, however, does not necessarily fully guard against arbitrariness and anarchy, for individual capriciousness can get substituted by collusion of group members. (1999)  
 B. Nature itself is an intricate system of checks and balances meant to preserve the delicate balance between various environmental factors that affect our ecology.  
 C. In institutions also, there is a need to have in place a system of checks and balances which inhibits the concentration of power in only some individuals.  
 D. When human interventions alter this delicate balance, the outcomes have been seen to be disastrous.  
 (a) CDAB (b) BCAD (c) CABD (d) BDCA
45. A. He was bone-weary and soul-weary, and found himself muttering, "Either I can't manage this place, or 'it's unmanageable.'" (1999)  
 B. To his horror, he realised that he had become the victim of an amorphous, unwitting, unconscious conspiracy to immerse him in routine work that had no significance.  
 C. It was one of those nights in the office when the office clock was moving towards four in the morning and Bennis was still not through with the incredible mass of paper stacked before him.  
 D. He reached for his calendar and ran his eyes down each hour, half-hour, and quarter-hour to see where his time had gone that day, the day before, the month before.  
 (a) ABCD (b) CADB (c) BDCA (d) DCBA
46. A. With that, I swallowed the shampoo, and obtained most realistic results almost on the spot. (1999)  
 B. The man shuffled away into the back regions to make up a prescription, and after a moment I got through on the shop-telephone to the Consulate, intimating my location.  
 C. Then, while the pharmacist was wrapping up a six-ounce bottle of the mixture, I groaned and inquired whether he could give me something for acute gastric cramp.  
 D. I intended to stage a sharp gastric attack, and entering an old-fashioned pharmacy I asked for a popular shampoo mixture, consisting of olive oil and flaked soap.  
 (a) DCBA (b) DACB (c) BDAC (d) BDCA
47. A. Since then, intelligence tests have been mostly used to separate dull children in school from average or bright children, so that special education can be provided to the dull. (1999)  
 B. In other words, intelligence tests give us a norm for each age.  
 C. Intelligences expressed as intelligence quotient and tests are developed to indicate what an average child of a certain age can do--what a 5 year old can answer, but a 4-year-old cannot, for instance.  
 D. Binet developed the first set of such tests in the early 1900s to find out which children in school needed special attention.  
 E. Intelligence can be measured by tests.  
 (a) CDABE (b) DECAB (c) EDACB (d) CBADE

48. A. If caught in the act, they were punished, not for the crime, but for allowing themselves to be caught another lash of the whip. (2000)  
B. The bellicose Spartans sacrificed all the finer things in life for military expertise.  
C. Those fortunate enough to survive babyhood were taken away from their mothers at the age of seven to undergo rigorous military training.  
D. This consisted mainly of beatings and deprivations of all kinds like going around barefoot in winter, and worse starvation so that they would be forced to steal food to survive.  
E. Male children were examined at birth by the city council and those deemed to weak to become soldiers were left to die or exposure.  
(a) BECDA (b) ECADB (c) BCDAE (d) ECDAB

49. A. This very insatiability of the photographing eye changes the terms of confinement in the cave, our world. (2000)  
B. Humankind lingers unregenerately in Plato's cave, still revelling, its age-old habit, in mere images of truth.  
C. But being educated by photographs is not like being educated by older images drawn by hand ; for one thing, there are a great many more images around, claiming our attention.  
D. The inventory started in 1839 and since then just about everything has been photographed, or so it seems.  
E. In teaching us a new visual code. Photographs alter and enlarge our notions of what is worth looking at and what we have a right to observe.  
(a) EABCD (b) BDEAC (c) BCDAE (d) ECDAB

50. A. To be culturally literate is to possess the basic information needed to thrive in the modern world. (2000)  
B. Nor is it confined to one social class; quite the contrary.  
C. It is by no means confined to "culture" narrowly understood as an acquaintance with the arts.  
D. Cultural literacy constitutes the only sure avenue of opportunity for disadvantaged children, the only reliable way of combating the social determinism that now condemns them.  
E. The breadth of that information is great, extending over the major domains of human activity from sports to science.  
(a) AECBD (b) DECBA (c) ACBDE (d) DBCAE

51. A. Both parties use capital and labour in the struggle to secure property rights. (2000)  
B. The thief spends time and money in his attempt to steal (he buys wire cutters) and the legitimate property owner expends resources to prevent the theft (he buys locks).  
C. A social cost of theft is that both the thief and the potential victim use resources to gain or maintain control over property.  
D. These costs may escalate as a type of technological arms race unfolds.  
(a) ABCD (b) CABD (c) DBCA (d) DBAC

52. A. The likelihood of an accident is determined by how carefully the motorist drives and how carefully the pedestrian crosses the street. (2000)  
B. An accident involving a motorist and a pedestrian is such a case.  
C. Each must decide how much care to exercise without knowing how careful the other is.  
D. The simplest strategic problem arises when two individuals interact with each other, and each must decide what to do without knowing what the other is doing.  
(a) ABCD (b) ADCB (c) DBCA (d) DBAC

53. A. Although there are large regional variations, it is not infrequent to find a large number of people sitting here and there and doing nothing. (2001)  
B. Once in office, they receive friends and relatives who feel free to call any time without prior appointment.  
C. While working, one is struck by the slow and clumsy actions and reactions, indifferent attitudes, procedure rather than outcome orientation, and the lack of consideration for others.  
D. Even those who are employed often come late to the office and leave early unless they are forced to be punctual.  
E. Work is not intrinsically valued in India.  
F. Quite often people visit ailing friends and relatives or go out of their way to help them in their personal matters even during office hours.  
(a) ECADBF (b) EADCFB (c) EADBFC (d) ABFCBE

54. A. But in the industrial era destroying the enemy's productive capacity means bombing the factories which are located in the cities. (2001)  
B. So in the agrarian era, if you need to destroy the enemy's productive capacity, what you want to do is burn his fields, or if you're really vicious, salt them.  
C. Now in the information era, destroying the enemy's productive capacity means destroying the information infrastructure.  
D. How do you do battle with your enemy?  
E. The idea is to destroy the enemy's productive capacity, and depending upon the economic foundation, that productive capacity is different in each case.  
F. With regard to defence, the purpose of the military is to defend the nation and be prepared to do battle with its enemy.  
(a) FDEBAC (b) FCABED (c) DEBACF (d) DFEBAC

55. A. Michael Hofman, a poet and translator, accepts this sorry fact without approval or complaint. (2001)  
 B. But thanklessness and impossibility do not daunt him.  
 C. He acknowledges too - in fact he returns to the point often - that best translators of poetry always fail at some level.  
 D. Hofman feels passionately about his work, and this is clear from his writings.  
 E. In terms of the gap between worth and rewards, translators come somewhere near nurses and street - cleaners.  
 (a) EACDB (b) ADEBC (c) EACBD (d) DCEAB
56. A. Passivity is not, of course, universal. (2001)  
 B. In areas where there are no lords or laws, or in frontier zones where all men go armed, the attitude of the peasantry may well be different.  
 C. So indeed it may be on the fringe of the unsubmissive.  
 D. However, for most of the soil -bound peasants the problem is not whether to be normally passive or active, but when to pass from one state to another.  
 E. This depends on an assessment of the political situation.  
 (a) BEDAC (b) CDABE (c) EDBAC (d) ABCDE
57. A. The situations in which violence occurs and the nature of that violence tends to be clearly defined at least in theory, as in the proverbial Irishman's question: 'Is this a private fight or can anyone join in?' (2001)  
 B. So the actual risk to outsiders, though no doubt higher than our societies, is calculable.  
 C. Probably the only uncontrolled applications of force are those of social superiors to social inferiors and even here there are probably some rules.  
 D. However binding the obligation to kill, members of feuding families engaged in mutual massacre will be genuinely appalled if by some mischance a bystander or outsider is killed.  
 (a) DABC (b) ACDB (c) CBAD (d) DBAC
58. A. Branded disposable diapers are available at many supermarkets and drug stores. (2002)  
 B. If one supermarket sets a higher price for a diaper, customers may buy that brand elsewhere.  
 C. By contrast, the demand for private-label products may be less price sensitive since it is available only at a corresponding supermarket chain.  
 D. So, the demand for branded diapers at any particular store may be quite price sensitive.  
 E. For instance, only Save On Drugs stores sell Save On Drugs diapers.  
 F. Then, stores should set a higher incremental margin percentage for private-label diapers.  
 (a) ABCDEF (b) ABCEDF (c) ADBCEF (d) AEDBCF
59. A. Having a strategy is a matter of discipline. (2002)  
 B. It involves the configuration of a tailored value chain that enables a company to offer unique value.  
 C. It requires a strong focus on profitability and a willingness to make tough tradeoffs in choosing what not to do.  
 D. Strategy goes far beyond the pursuit of best practices.  
 E. A company must stay the course even during times of upheaval, while constantly improving and extending its distinctive positioning.  
 F. When a company's activities fit together as a self-reinforcing system, any competitor wishing to imitate a strategy must replicate the whole system.  
 (a) ACEDBF (b) ACBDEF (c) DCBEFA (d) ABCEDF
60. A. As officials, their vision of a country shouldn't run too far beyond that of the local people with whom they have to deal. (2002)  
 B. Ambassadors have to choose their words.  
 C. To say what they feel they have to say, they appear to be denying or ignoring part of what they know.  
 D. So, with ambassadors as with other expatriates in black Africa, there appears at a first meeting a kind of ambivalence.  
 E. They do a specialized job and it is necessary for them to live ceremonial lives.  
 (a) BCEDA (b) BEDAC (c) BEADC (d) BCDEA
61. A. "This face off will continue for several months given the strong convictions on either side," says a senior functionary of the high-powered task force on drought. (2002)  
 B. During the past week-and-a-half, the Central Government has sought to deny some of the earlier apprehensions over the impact of drought.  
 C. The recent revival of the rains had led to the emergence of a line of divide between the two.  
 D. The state governments, on the other hand, allege that the Centre is downplaying the crisis only to evade its full responsibility of financial assistance that is required to alleviate the damage.  
 E. Shrill alarm about the economic impact of an inadequate monsoon had been sounded by the Centre as well as most of the states, in late July and early August.  
 (a) EBCDA (b) DBACE (c) BDCAE (d) ECBDA

62. A. This fact was established in the 1730s by French survey expeditions to Ecuador near the Equator and Lapland in the Arctic, which found that around the middle of the earth the arc was about a kilometer shorter. (2002)
- B. One of the unsettled scientific questions in the late 18th century was the exact nature of the shape of the earth.
- C. The length of one-degree arc would be less near the equatorial latitudes than at the poles.
- D. One way of doing that is to determine the length of the arc along a chosen longitude or meridian at one-degree latitude separation.
- E. While it was generally known that the earth was not a sphere but an ‘oblate spheroid’, more curved at the equator and flatter at the poles, the question of ‘how much more’ was yet to be established.
- (a) BECAD (b) BEDCA (c) EDACB (d) EBDCA
63. A. To avoid this, the QWERTY layout put the keys most likely to be hit in rapid succession on opposite sides. This made the keyboard slow, the story goes, but that was the idea. (2003C)
- B. A different layout, which had been patented by August Dvorak in 1936, was shown to be much faster.
- C. The QWERTY design (patented by Christopher Sholes in 1868 and sold to Remington in 1873) aimed to solve a mechanical problem of early typewriters.
- D. Yet the Dvorak layout has never been widely adopted, even though (with electric typewriters and then PCs) the anti-jamming rationale for QWERTY has been defunct for years.
- E. When certain combinations of keys were struck quickly, the type bars often jammed.
- (a) BDACE (b) CEABD (c) BCDEA (d) AEBDC
64. A. Surrendered, or captured, combatants cannot be incarcerated in razor wire cages; this ‘war’ has a dubious legality. (2003C)
- B. How can then one characterize a conflict to be waged against a phenomenon as war?
- C. The phrase ‘war against terror’, which has passed into the common lexicon, is a huge misnomer.
- D. Besides, war has a juridical meaning in international law, which has codified the laws of war, imbuing them with a humanitarian content.
- E. Terror is a phenomenon, not an entity – either State or non-State.
- (a) ACBDE (b) BECDA (c) EBCAD (d) CEBDA
65. A. I am much more intolerant of a human being’s shortcomings than I am of an animal’s, but in this respect I have been lucky, formost of the people I have come across have been charming. (2003C)
- B. Then you come across the unpleasant human animal – the District Officer who drawled, ‘We chaps are here to help you chaps’, and then proceeded to be as obstructive as possible.
- C. In these cases of course, the fact that you are an animal collector helps; people always seem delighted to meet someone with such an unusual occupation and go out of their way to assist you.
- D. Fortunately, these types are rare, and the pleasant ones I have met more than compensated for them – but even so, I think I will stick to animals.
- E. When you travel round the world collecting animals you also, of necessity, collect human beings.
- (a) BEDCA (b) ABDCE (c) ECBDA (d) ACBDE
66. A. A few months ago I went to Princeton University to see what the young people who are going to be running our country in a few decades are like. (2003C)
- B. I would go to sleep in my hotel room around midnight each night, and when I awoke, my mailbox would be full of replies – sent at 1 : 15 a.m., 2 : 59 a.m., 3 : 23 a.m.
- C. One senior told me that she went to bed around two and woke up each morning at seven; she could afford that much rest because she had learnt to supplement her full day of work by studying in her sleep.
- D. Faculty members gave me the names of a few dozen articulate students, and I sent them e-mails, inviting them out to lunch or dinner in small groups.
- E. As she was falling asleep she would recite a math problem or a paper topic to herself; she would then sometimes dream about it, and when she woke up, the problem might be solved.
- (a) DABCE (b) DACEB (c) ADBCE (d) CABDE
67. A. Four days later, Oracle announced its own bid for People Soft, and invited the firm’s board to a discussion. (2003C)
- B. Furious that his own plans had been endangered. Peoplesoft’s boss, Craig Conway, called Oracle’s offer “diabolical”, and its boss, Larry Ellison, a “sociopath”.
- C. In early June, People Soft said that it would buy J.D. Edwards, a smaller rival.
- D. Moreover, said Mr. Conway, he “could imagine no price nor combination of price and other condition to recommend accepting the offer”.
- E. On June 12th, PeopleSoft turned Oracle down.
- (a) CABDE (b) CADBE (c) ACBDE (d) CAEBD

68. A. The wall does not simply divide Israel from a putative Palestinian state on the basis of the 1967 borders. (2003)  
 B. A chilling omission from the road map is the gigantic 'separation wall' now being built in the West Bank by Israel.  
 C. It is surrounded by trenches, electric wire and moats; there are watchtowers at regular intervals.  
 D. It actually takes in new tracts of Palestinian land, sometimes five or six kilometers at a stretch.  
 E. Almost a decade after the end of South African apartheid, this ghastly racist wall is going up with scarcely a peep from Israel's American allies who are going to pay for most of it.  
 (a) EBCAD (b) BADCE (c) AEDCB (d) ECADB
69. A. Luckily the tide of battle moved elsewhere after the American victory at Midway and an Australian victory over Japan at Milne Bay. (2003)  
 B. It could have been no more than delaying tactic.  
 C. The Australian Military, knowing the position was hopeless, planned to fall back to the south-east in the hope of defending the main cities.  
 D. They had captured most of the Solomon Islands and much of New Guinea, and seemed poised for an invasion.  
 E. Not many people outside Australia realize how close the Japanese got.  
 (a) EDCBA (b) ECDAB (c) ADCBE (d) CDBAE
70. A. Call it the third wave sweeping the Indian media. (2003)  
 B. Now, they are starring in a new role, as suave dealmakers who are in a hurry to strike alliances and agreements.  
 C. Look around and you will find a host of deals that have been inked or ready to be finalized.  
 D. Then the media barons wrested back control from their editors, and turned marketing warriors with the brand as their missile.  
 E. The first came with those magnificent men in their mahogany chambers who took on the world with their mighty fountain pens.  
 (a) ACBED (b) CEBDA (c) CAEBD (d) AEDBC
71. A. The celebrations of economic recovery in Washington may be as premature as that "Mission Accomplished" banner hung on the USS Abraham Lincoln to hail the end of the Iraq war. (2003)  
 B. Meanwhile, in the real world, the struggles of families and communities continue unabated.  
 C. Washington responded to the favorable turn in economic news with enthusiasm.  
 D. The celebrations and high-fives up and down Pennsylvania Avenue are not to be found beyond the Beltway.  
 E. When the third quarter GDP showed growth of 7.2 % and the monthly unemployment rate dipped to 6%, euphoria gripped the US capital.  
 (a) ACEDB (b) CEDAB (c) ECABD (d) ECBDA
72. A. To much of the labour movement, it symbolises the brutality of the upper classes. (2003)  
 B. And to everybody watching, the current mess over foxhunting symbolises the government's weakness.  
 C. To foxhunting's supporters, Labour's 1991 manifesto commitment to ban it symbolises the party's metropolitan roots and hostility to the countryside.  
 D. Small issues sometimes have large symbolic power.  
 E. To those who enjoy thundering across the countryside in redcoats after foxes, foxhunting symbolises the ancient roots of rural lives.  
 (a) DEACB (b) ECDBA (c) CEADB (d) DBAEC
73. A. In the case of king Merolchazzar's courtship of the princess of the outer Isles, there occurs a regrettable hitch. (2003)  
 B. She acknowledges the gifts, but no word of a meeting date follows.  
 C. The monarch hearing good reports of a neighbouring princess, dispatches messengers with gifts to her court, beseeching an interview.  
 D. The princess names a date, and a formal meeting takes place; after that everything buzzes along pretty smoothly.  
 E. Royal love affairs in olden days were conducted on the correspondence method.  
 (a) ACBDE (b) ABCDE (c) ECDAB (d) ECBAD
74. A. Who can trace to its first beginnings the love of Damon for Pythias, of David for Jonathan, of Swan for Edgar? (2003)  
 B. Similarly with men.  
 C. There is about great friendship between man and man a certain inevitability that can only be compared with the age old association of ham and eggs.  
 D. One simply feels that it is one of the things that must be so.  
 E. No one can say what was the mutual magnetism that brought the deathless partnership of these wholesome and palatable foodstuffs about.  
 (a) ACBED (b) CEDBA (c) ACEBD (d) CEABD

75. A. Events intervened, and in the late 1930s and 1940s. Germany suffered from “over-branding”. (2003)  
 B. The British used to be fascinated by the home of Romanticism.  
 C. But reunification and the federal government’s move to Berlin have prompted Germany to think again about its image.  
 D. The first foreign package holiday was a tour of Germany organized by Thomas Cook in 1855.  
 E. Since then, Germany has been understandably nervous about promoting itself abroad.  
 (a) ACEBD (b) DECAB (c) BDAEC (d) DBAEC
76. A. The two neighbours never fought each other. (2004)  
 B. Fights involving three male fiddler crabs have been recorded, but the status of the participants was unknown.  
 C. They pushed or grappled only with the intruder.  
 D. We recorded 17 cases in which a resident that was fighting an intruder was joined by an immediate neighbour, an ally.  
 E. We therefore tracked 268 intruder males until we saw them fighting a resident male.  
 (a) BEDAC (b) DEBAC (c) BDCAE (d) BCEDA
77. A. He felt justified in bypassing Congress altogether on a variety of moves. (2004)  
 B. At times he was fighting the entire Congress.  
 C. Bush felt he had a mission to restore power to the presidency.  
 D. Bush was not fighting just the democrats.  
 E. Representative democracy is a messy business, and a CEO of the White House does not like a legislature of second guessers and time wasters.  
 (a) CAEDB (b) DBAEC (c) CEADB (d) ECDBA
78. A. In the west, Allied Forces had fought their way through southern Italy as far as Rome. (2004)  
 B. In June 1944 Germany’s military position in World War Two appeared hopeless.  
 C. In Britain, the task of amassing the men and materials for the liberation of northern Europe had been completed.  
 D. The Red Army was poised to drive the Nazis back through Poland.  
 E. The situation on the eastern front was catastrophic.  
 (a) EDACB (b) BEDAC (c) BDECA (d) CEDAB
79. A. Expert such as Larry Burns, head of research at GM, reckon that only such a full hearted leap will allow the world to cope with the mass motorisation that will one day come to China or India. (2004 - 2 marks)  
 B. But once hydrogen is being produced from biomass or extracted from underground coal of made from water, using nuclear or renewable electricity, the way will be open for a huge reduction in carbon emissions from, the whole system.  
 C. In theory, once all the bugs have been sorted out, fuel cells should deliver better total fuel economy than any existing engines.  
 D. That is twice as good as the internal combustion engine, but only five percentage points better than a diesel hybrid.  
 E. Allowing for the resources needed to extract hydrogen from hydrocarbon, oil, coal or gas, the fuel cell has an efficiency of 30%.  
 (a) CEDBA (b) CEBDA (c) AEDBC (d) ACEBD
80. A. But this does not mean that death was the Egyptians’ only preoccupation. (2004 - 2 marks)  
 B. Even papyri come mainly from pyramid temples.  
 C. Most of our traditional sources of information about the Old Kingdom are monuments of the rich like pyramids and tombs.  
 D. House in which ordinary Egyptians lived have not been preserved, and when most people died they were buried in simple graves.  
 E. We know infinitely more about the wealthy people of Egypt than we do about the ordinary people, almost monuments were made for the rich.  
 (a) CDBEA (b) ECDAB (c) EDCBA (d) DECAB
81. A. Similarly, turning to caste, even though being lower caste is undoubtedly a separate cause of disparity, its impact is all the greater when the lower-caste families also happen to be poor. (2005 - 1 mark)  
 B. Belonging to a privileged class can help a woman to overcome many barriers that obstruct women from less thriving classes.  
 C. It is the interactive presence of these two kinds of deprivation - being low class and being female - that massively impoverishes women from the less privileged classes.  
 D. A congruence of class deprivation and gender discrimination can blight the lives of poorer women very severely.  
 E. Gender is certainly a contributor to societal inequality, but it does not act independently of class.  
 (a) EABDC (b) EBDCA (c) DAEBG (d) BECDA
82. A. This is now orthodoxy to which I subscribe - up to a point. (2005 - 1 mark)  
 B. It emerged from the mathematics of chance and statistics.  
 C. Therefore, the risk is measurable and manageable.  
 D. The fundamental concept: Prices are not predictable, but the mathematical laws of chance can describe their fluctuations.  
 E. This is how what business schools now call modern finance was born.  
 (a) ADCBE (b) EBDCA (c) ABDCE (d) DCBEA

**Directions for Questions 84 to 87 :** In each question, there are five sentences/paragraphs. The sentence/paragraph labeled A is in its correct place. The four that follow are labeled B, C, D and E, and need to be arranged in the logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate option.

84. A. In America, highly educated women, who are in stronger position in the labour market than less qualified ones, have higher rates of marriage than other groups.  
B. Some work supports the Becker thesis, and some appear to contradict it.  
C. And, as with crime, it is equally inconclusive.  
D. But regardless of the conclusion of any particular piece of work, it is hard to establish convincing connections between family changes and economic factors using conventional approaches.  
E. Indeed, just as with crime, an enormous academic literature exists on the validity of the pure economic approach to the evolution of family structures. (2007)

(a) BCDE (b) DBEC (c) BDCE  
(d) ECBD (e) EBCD

85. A. Personal experience of mothering and motherhood are largely framed in relation to two discernible or “official” discourses: the “medical discourse and natural childbirth discourse”. Both of these tend to focus on the “optimistic stories” of birth and mothering and underpin stereotypes of the “good mother”.  
B. At the same time, the need for medical expert guidance is also a feature for contemporary reproduction and motherhood. But constructions of good mothering have not always been so conceived - and in different contexts may exist in parallel to other equally dominant discourses.  
C. Similarly, historical work has shown how what are now taken-for-granted aspects of reproduction and mothering practices result from contemporary “pseudoscientific directives” and “managed constructs”. These changes have led to a reframing of modern discourses that pattern pregnancy and motherhood leading to an acceptance of the need for greater expert management.  
D. The contrasting, overlapping, and ambiguous strands within these frameworks focus to varying degrees on a woman’s biological tie to her child and predisposition to instinctively know and be able to care for her child.  
E. In addition, a third, “unofficial popular discourse” comprising “old wives” tales and based on maternal experiences of childbirth has also been noted. These discourses have also been acknowledged in work exploring the experiences of those who apparently do not “conform” to conventional stereotypes of the “good mother”. (2007)

(a) EDBC (b) BCED (c) DBCE  
(d) EDCB (e) BCDE

86. A. Indonesia has experienced dramatic shifts in its formal governance arrangements since the fall of President Soeharto and the close of his centralized, authoritarian “New Order” regime in 1997.  
B. The political system has taken its place in the nearly 10 years since *Reformasi* began. It has featured the active contest for political office among a proliferation of parties at central, provincial and district levels; direct elections for the presidency (since 2004); and radical changes in centre-local government relations towards administrative, fiscal, and political decentralization.  
C. The mass media, once tidily under Soeharto’s thumb, has experienced significant liberalization, as has the legal basis for non-governmental organizations, including many dedicated to such controversial issues as corruption control and human rights.  
D. Such developments are seen optimistically by a number of donors and some external analysts, who interpret them as signs of Indonesia’s political normalization.  
E. A different group of analysts paint a picture in which the institutional forms have changed, but power relations have not. Vedi Hadiz argues that Indonesia’s “democratic transition” has been anything but linear. (2007)

(a) BDEC (b) CBDE (c) CEBD  
(d) DEBC (e) BCDE



**Directions for Questions 1 to 3 :** Each statement has a part missing. Choose the best option from the four options given below the statement to make up the missing part.

1. The ancient Egyptians believed ..... so that when these objects were magically reanimated through the correct rituals, they would be able to function effectively. (2004)

(a) that it was essential that things they portrayed must have every relevant feature shown as clearly as possible.  
(b) it was essential for things they portray to have had every relevant feature shown as clearly as possible.  
(c) it was essential the things they portrayed had every relevant feature shown as clearly as possible.  
(d) that when they portrayed things, it should have every relevant feature shown as clearly as possible.

2. Archaeologists believe that the pieces of red-ware pottery excavated recently near Bhavnagar and ..... shed light on a hitherto dark 600-year period in the Harappan history of Gujarat. (2004)

(a) estimated with a reasonable certainty as being about 3400 years old,  
(b) are estimated reasonably certain to be about 3400 years old,  
(c) estimated at about 3400 years old with reasonable certainty,  
(d) estimated with reasonable certainty to be about 3400 years old.

3. Many people suggest ..... and still others would like to convince people not to buy pirated cassettes. (2004)

(a) to bring down audiocassette prices to reduce the incidence of music piracy, others advocate strong legal action against the offenders.  
(b) bringing down audiocassette prices to reduce the incidents of music piracy, others are advocating strong legal action against offenders.  
(c) bringing down audiocassette prices to reduce the incidence of music piracy, others advocate strong legal action against offenders.  
(d) audiocassette prices to be brought down to reduce incidence of music piracy, others advocate that strong legal action must be taken against offenders.

**Directions for Questions 4 to 12 :** Each of the following questions has a paragraph from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.

4. Federer's fifth grand slam win prompted a reporter to ask whether he was the best ever. Federer is certainly not lacking in confidence, but he wasn't about to proclaim himself the best ever. "The best player of this generation, yes", he said, "But nowhere close to ever. Just look at the records that some guys have. I'm a minnow." \_\_\_\_\_ (2005)

  - (a) His win against Agassi, a genius from the previous generation, contradicts that.
  - (b) Sampras, the king of an earlier generation, was as humble.
  - (c) He is more than a minnow to his contemporaries.
  - (d) The difference between 'the best of this generation' and 'the best ever' is a matter of perception.

5. Thus the end of knowledge and the closing of the frontier that it symbolizes is not a looming crisis at all, but merely one of many embarrassing fits of hubris in civilization's long industry. In the end, it will pass away and be forgotten. Ours is not the first generation to struggle to understand the organizational laws of the frontier, deceive itself that it has succeeded, and go to its grave having failed. \_\_\_\_\_ (2005)
- (a) One would be wise to be humble
  - (b) But we might be the first generation to actually reach the frontier
  - (c) But we might be the first generation to deal with the crisis
  - (d) However, this time the success is not illusory
6. Most firms consider expert individuals to be too elitist, temperamental, egocentric, and difficult to work with. Force such people to collaborate on a high-stakes project and they just might come to fisticuffs. Even the very notion of managing such a group seems unimaginable. So most organizations fall into default mode, setting up project teams of people who get along nicely. \_\_\_\_\_ (2005)
- (a) The result, however, is disastrous.
  - (b) The result is mediocrity.
  - (c) The result is creation of experts who then become elitists.
  - (d) Naturally, they drive innovations.
7. The audiences for crosswords and Sudoku, understandably, overlap greatly, but there are differences, too. A crossword attracts a more literary person, while Sudoku appeals to a keenly logical mind. Some crossword enthusiasts turn up their noses at Sudoku because they feel it lacks depth. A good crossword requires vocabulary, knowledge, mental flexibility and sometimes even a sense of humor to complete. It touches numerous areas of life and provides an "Aha!" or two along the way \_\_\_\_\_ (2005)
- (a) Sudoku, on the other hand, is just a logical exercise, each one similar to the last.
  - (b) Sudoku, incidentally, is growing faster in popularity than crosswords, even among the literati.
  - (c) Sudoku, on the other hand, can be attempted and enjoyed even by children.
  - (d) Sudoku, however, is not exciting in any sense of the term.
8. Age has a curvilinear relationship with the exploitation of opportunity. Initially, age will increase the likelihood that a person will exploit an entrepreneurial opportunity because people gather much of the knowledge necessary to exploit opportunities over the course of their lives, and because age provides credibility in transmitting that information to others. However, as people become older, their willingness to bear risks declines, their opportunity costs rise, and they become less receptive to new information. (2006)
- (a) As a result, people transmit more information rather than experiment with new ideas as they reach an advanced age.
  - (b) As a result, people are reluctant to experiment with new ideas as they reach an advanced age.
  - (c) As a result, only people with lower opportunity costs exploit opportunity when they reach an advanced age.
  - (d) As a result, people become reluctant to exploit entrepreneurial opportunities when they reach an advanced age.
  - (e) As a result, people depend on credibility rather than on novelty as they reach an advanced age.
9. I am sometimes attacked for imposing 'rules'. Nothing could be further from the truth. I hate rules. All I do is report on how consumers react to different stimuli. I may say to a copywriter, "Research shows that commercials with celebrities are below average in persuading people to buy products. Are you sure you want to use a celebrity?" Call that a rule? Or I may say to an art director, "Research suggests that if you set the copy in black type on a white background, more people will read it than if you set it in white type on a black background. " (2006)
- (a) Guidance based on applied research can hardly qualify as 'rules'.
  - (b) Thus, all my so called 'rules' are rooted in applied research.
  - (c) A suggestion perhaps, but scarcely a rule.
  - (d) Such principles are unavoidable if one wants to be systematic about consumer behaviour.
  - (e) Fundamentally it is about consumer behaviour - not about celebrities or type settings.
10. We can usefully think of theoretical models as maps, which help us navigate unfamiliar territory. The most accurate map that it is possible to construct would be of no practical use whatsoever, for it would be an exact replica, on exactly the same scale, of the place where we were. Good maps pull out the most important features and throwaway a huge amount of much less valuable information. Of course, maps can be bad as well as good - witness the attempts by medieval Europe to produce a map of the world. In the same way, a bad theory, no matter how impressive it may seem in principle, does little or nothing to help us understand a problem. (2006)
- (a) But good theories, just like good maps, are invaluable, even if they are simplified.
  - (b) But good theories, just like good maps, will never represent unfamiliar concepts in detail.
  - (c) But good theories, just like good maps, need to balance detail and feasibility of representation.
  - (d) But good theories, just like good maps, are accurate only at a certain level of abstraction.
  - (e) But good theories, just like good maps, are useful in the hands of a user who knows their limitations.

11. In the evolving world order, the comparative advantage of the United States lies in its military force. Diplomacy and international law have always been regarded as annoying encumbrances, unless they can be used to advantage against an enemy. Every active player in world affairs professes to seek only peace and to prefer negotiation to violence and coercion. (2006)
- However, diplomacy has often been used as a mask by nations which intended to use force.
  - However, when the veil is lifted, we commonly see that diplomacy is understood as a disguise for the rule of force.
  - However, history has shown that many of these nations do not practice what they profess.
  - However, history tells us that peace is professed by those who intend to use violence.
  - However, when unmasked, such nations reveal a penchant for the use of force.
12. Relations between the factory and the dealer are distant and usually strained as the factory tries to force cars on the dealers to smooth out production. Relations between the dealer and the customer are equally strained because dealers continuously adjust prices - make deals - to adjust demand with supply while maximizing profits. This becomes a system marked by a lack of long-term commitment on either side, which maximizes feelings of mistrust. In order to maximize their bargaining positions, everyone holds back information - the dealer about the product and the consumer about his true desires: (2006)
- As a result, 'deal making' becomes rampant, without concern for customer satisfaction.
  - As a result, inefficiencies creep into the supply chain.
  - As a result, everyone treats the other as an adversary, rather than as an ally.
  - As a result, fundamental innovations are becoming scarce in the automobile industry.
  - As a result, everyone loses in the long run.

**Directions for Questions 13 to 15 :** Each of the following questions has a paragraph from which the last sentence has been deleted. From the given options, choose the sentence that completes the paragraph in the most appropriate way.

13. Characters are also part of deep structure. Characters tie events in a story together and provide a thread of continuity and meaning. Stories can be about individuals, groups, projects, or whole organizations so from an organizational studies perspective, the focal actor(s) determine the level and unit of analysis used in a study. Stories of mergers and acquisitions, for example, are commonplace. In these stories whole organizations are personified as actors. But these macro-level stories usually are not told from the perspective of the macro-level participants, because whole organizations cannot narrate their experiences in the first person. (2007)
- More generally, data concerning the identities and relationships of the characters in the story are required, if one is to understand role structure and social networks in which that process is embedded.
  - Personification of a whole organization abstracts away from the particular actors and from traditional notions of level of analysis.
  - The personification of a whole organization is important because stories differ depending on who is enacting various events.
  - Every story is told from a particular point of view, with a particular narrative voice, which is not regarded as part of the deep structure.
  - The personification of a whole organization is a textual device we use to make macro-level theories more comprehensible.
14. Nevertheless, photographs still retain some of the magical allure that the earliest daguerreotypes inspired. As objects, our photographs have changed; they have become physically flimsier as they have become more technologically sophisticated. Daguerre produced pictures on copper plates; today many of our photographs never become tangible things, but instead remain filed away on computers and cameras, part of the digital ether that envelops the modern world. At the same time, our patience for the creation of images has also eroded. Children today are used to being tracked from birth by digital cameras and video recorders and they expect to see the results of their poses and performances instantly. The space between life as it is being lived and life as it is being displayed shrinks to a mere second. (2007)
- Yet, despite these technical developments, photographs still remain powerful because they are reminders of the people and things we care about.
  - Images, after all, are surrogates carried into battle by a soldier or by a traveler on holiday.
  - Photographs, be they digital or traditional, exist to remind us of the absent, the beloved, and the dead.
  - In the new era of the digital image, the images also have a greater potential for fostering falsehood and trickery, perpetuating fictions that seem so real we cannot tell the difference.
  - Anyway, human nature being what it is, little time has passed after photography's invention became means of living life through images.

15. Mma Ramotswe had a detective agency in Africa, at the foot of Kgale Hill. These were its assets: a tiny white van, two desks, two chairs, a telephone, and an old typewriter. Then there was a teapot, in which Mma Ramotswe - the only private lady detective in Botswana - brewed redbush tea. And three mugs - one for herself, one for her secretary, and one for the client. What else does a detective agency really need? Detective agencies rely on human intuition and intelligence, both of which Mma Ramotswe had in abundance. (2007)
- (a) But there was also the view, which again would appear on no inventory.  
 (b) No inventory would ever include those, of course.  
 (c) She had an intelligent secretary too.  
 (d) She was a good detective and a good woman.  
 (e) What she lacked in possessions was more than made up by a natural shrewdness.

**Directions for Questions 16 to 19 :** Each of the following questions has a paragraph from which the last sentence has been deleted. From the given options, choose the sentence that completes the paragraph in the most appropriate way.

16. Most people at their first consultation take a furtive look at the surgeon's hands in the hope of reassurance. Prospective patients look for delicacy, sensitivity, steadiness, perhaps unblemished pallor. On this basis, Henry Perowne loses a number of cases each year. Generally, he knows it's about to happen before the patient does: the downward glance repeated, the prepared questions beginning to falter, the overemphatic thanks during the retreat to the door. (2008)
- (a) Other people do not communicate due to their poor observation.  
 (b) Other patients don't like what they see but are ignorant of their right to go elsewhere.  
 (c) But Perowne himself is not concerned.  
 (d) But others will take their place, he thought.  
 (e) These hands are steady enough, but they are large.
17. Trade protectionism, disguised as concern for the climate, is raising its head. Citing competitiveness concerns, powerful industrialized countries are holding out threats of a levy on imports of energy-intensive products from developing countries that refuse to accept their demands. The actual source of protectionist sentiment in the OECD countries is, of course, their current lackluster economic performance, combined with the challenges posed by the rapid economic rise of China and India - in that order. (2008)
- (a) Climate change is evoked to bring trade protectionism through the back door.  
 (b) OECD countries are taking refuge in climate change issues to erect trade barriers against these two countries.  
 (c) Climate change concerns have come as a convenient stick to beat the rising trade power of China and India.  
 (d) Defenders of the global economic status quo are posing as climate change champions.  
 (e) Today's climate change champions are the perpetrators of global economic inequity.
18. Mattancherry is Indian Jewry's most famous settlement. Its pretty streets of pastel coloured houses, connected by first-floor passages and home to the last twelve saree-and-sarong-wearing, white-skinned Indian Jews are visited by thousands of tourists each year. Its synagogue, built in 1568, with a floor of blue-and-white Chinese tiles, a carpet given by Haile Selassie and the frosty Yaheh selling tickets at the door, stands as an image of religious tolerance. (2008)
- (a) Mattancherry represents, therefore, the perfect picture of peaceful co-existence.  
 (b) India's Jews have almost never suffered discrimination, except for European colonizers and each other.  
 (c) Jews in India were always tolerant.  
 (d) Religious tolerance has always been only a façade and nothing more.  
 (e) The pretty pastel streets are, thus, very popular with the tourists.
19. Given the cultural and intellectual interconnections, the question of what is 'Western' and what is 'Eastern' (or 'Indian') is often hard to decide, and the issue can be discussed only in more dialectical terms. The diagnosis of a thought as 'purely Western' or 'purely Indian' can be very illusory. (2008)
- (a) Thoughts are not the kind of things that can be easily categorized.  
 (b) Though 'occidentalism' and 'orientalism' as dichotomous concepts have found many adherents.  
 (c) 'East is East and West is West' has been a discredited notion for a long time now.  
 (d) Compartmentalizing thoughts is often desirable.  
 (e) The origin of a thought is not the kind of thing to which 'purity' happens easily.

## ANSWERS WITH SOLUTIONS

### TYPE-A

1. (c) Taken in context CADB is the most logical sequence, as the first sentence does not come across as a fully true sentence.
2. (b) CBAD is the correct sequence as sentence C fits in right after sentence 1 and then in context it is followed by BAD which talk about the comedies mentioned in C.
3. (a) Thunder comes across as an ally of wind. Thus, B comes after 1, and then C after B. A will follow C.
4. (c) Direct reference to the power mentioned in sentence 1 is in D which is logically followed by A, C and B naturally fall in line because they talk of industrial organisations & their use of this power.
5. (d) Taking all four sentences into consideration only A will follow 1, then in a logical sequence it will be followed by BCD.
6. (c) As the vessel kept going away he could barely see her funnel and mask and thus, he looked anxiously around. The logical sequence will be CADB.
7. (a) The correct answer is ADBC with sentence A following 1, and the rest fitting after A.
8. (b) Excess Laxity in sentence C is to be taken after total forgiveness, therefore C follows 1, which is itself followed by A which speaks of work ethos getting distorted.
9. (b) The first is a general sentence, then followed by a specific one, i.e. on India in C then followed by DAB taken in context. First giving an exception and then reaching a general conclusion.
10. (c) In a logical sequence 1 is followed by A which talks of additional things being done by managers and then it is followed by D, C and B which fits in alongwith sentence number 6.
11. (d) Sentence A naturally follows 1 as it refers to true friends in 1. C follows A again as it refers to such people i.e., true friends, B and D fit right after C.
12. (b) Taken in context the sequence ABCD is the only logical one the others do not make any sense.
13. (a) D is a natural extension of sentence 1, followed by CAB which taken together make sense.
14. (b) C explains sentence 1, D follows as it deals with the third category in 1, A explains D and B follows.
15. (d) Out of the four choices BADC is the only one which makes sense. The rest would be wrong in context.
16. (a) Sentence 1 extends to D which is followed by B and then by A and C which seem the only logical choice.
17. (b) Taking all four sentences into consideration 1 will be followed by D and then by CBA which is the only logical sequence which has a meaning.
18. (d) The sequence ACDB is the only one that makes sense following sentence 1, and ending with sentence 6. A follows sentence 1, C continues the topic in A.
19. (b) D naturally follows 1, as is indicated in the word 'too' at the end of the sentence, C follows D as it is an example of the statement made in D and A is linked to C, thus, the logical sequence is DCAB.
20. (a) The list of Guitar heroes is mentioned in A, so A is the first choice to follow 1, followed by C which refers to guitar heroes of recent vintage. With B following and D ending is the perfect sequence.
21. (c) The logical sequence ADCB comes across as a correct one because in sentence A, a description has been given about chambers which is directly linked to sentence number 1. Sentence D follows, as it is about what he told the committee. This is followed by C and then B which is the most logical sentence which joins together with sentence number 6 as in this both Hiss and Chambers were together before Nixon.
22. (a) ACBD is the most logical sequence as A explains the problems that are occurring to the cradle of the life given in sentence number 1. C is directly linked to A because it is the effect of the activity mentioned in A. B is also an effect whereas D is the cause of these effects and is linked to sentence number 6.
23. (a) Sentence D is a logical sequence to sentence 1 as it is in a way an answer to the question asked in the first sentence. B naturally follows as it is a further explanation of the answer. This is followed by C and A, as A is directly linked to sentence 6 referring to ordinary citizens.
24. (b) Sentence B, logically follows sentence number 1, as 1 is a general statement and B is a statement that hopes to change the situation. This is followed by A which explains B and then by D which give a proof of the statement in B and C which fits right in before sentence number 6.
25. (c) BDCA is the logical sequence as in B analysts have analysed the appeal of the new machines in the potential market. The promise of lower maintenance cost in D naturally follows as it is a conclusion drawn by the analysts. D is followed by C and then by A which is an extension of sentence C as individual buyers in America pickup Desktop computers for less than 2000 dollars spend thousands more on hardware upgrades and software overhauls.
26. (b) Sentence C is the only which makes sense as the 1st sentence because it is an example of the claim made in sentence 1 thus consolidates it. Following it is B, which gives another category of example for sentence 1 and then is A which explains all this and the last is D, which is linked to sentence 6.

27. (a) Sentence 1 and B are linked they refer to IIT graduates. Next comes A which refers to the degree from the IIT as well as its prospects, this is followed by C which is linked to D and sentence number 6 which are about the culture success stories and the IIT undergraduate mindset.
28. (d) Sentence number 1 is followed by A as they both refer to the Maharaja of Kapurthala. Sentence B logically follows A as it is a particular example of the exquisite taste of a Maharaja. This is followed by D and then by C in a logical sequence before linking C to sentence number 6.
29. (d) The sequence ABDC stands out as the only logical sequence as A is directly links the sentence number 1 in which there is given the unveiling of the two gifts, this is followed by B, which gives the proper noun for the pronoun used in the first two sentence and then D and C logically follow as C is a logical sequence of D and both talk about Gurdu.
30. (a) Sentence C explains sentence number 1 and is followed by A which gives more details. D also gives more details and therefore follows A whereas B links to sentence number 6 and comes before it thus the logical sequence is CADB.
31. (b) Sentence C is the sequence of sentence number 1 as it explains the word salvation, this is followed by B which introduces Christianity and its principles about salvation which is the theme. Then is A, which compare Christian tradition and Buddhism in sentence A which is the logical sequence of B. This is followed by D which precedes sentence number 6 in a sequence.
32. (d) The only logical sequence that comes across ABCD which can be explained in context of sentences between 1 and 6 which they appear, as each sentence follows to each other in a logical sequence and sentence D precedes sentence number 6. As the last part of D and the first part of sentence 6 refers to rural area.
33. (b) Sentence B follows sentence number 1, as B refers to the editors of the good literacy magazines given in sentence 1. C logically follows B, again refer to the editors and D directly links to the number of editors referred to in C. The last choice is A which is giving a different choice all together, however, it is in sequence with sentence number 6.
34. (c) Sentence number 1 is logically followed by B as B refers to the NRI phase of the Indian expatriate in the US. This is followed by D explaining the expatriates and then by A which talks about the media image of NRIs and last by C which is altogether in a sequence before ending with sentence number 6.
35. (c) The first choice will be A as it follows sentence number 1 and then comes sentence C which is in sequence of A, explaining the reason for exports of Indian crafts. This is followed by B which mentions event that occurred alongwith those mentioned in C simultaneously in the same era. This will then be followed by D, which explains the fortunes being made by people dealing in Antiques.
36. (c) Sentence number 1 and B are linked together through trying to make people laugh and then is followed by A which is one of the two grounds mentioned in B, this is then followed by D which is the second ground. The last choice is C which is an adequate precursor of sentence number 6.
37. (b) Sentence D picturises the termite colony mentioned in sentence number 1 and thus naturally follows it. This is followed by B which also explains a little bit about the colony and then is followed by A and lastly by C, which is linked to A through the restoration of balance that had been unsettled in sentence A.
38. (d) The most logical sequence in this is BDCA, as sentence B logically follows 1, referring to the ages of 3 and 5½ years. This is followed by D which talks on the correlation between developing language skills and the given age and then by C which gives the reason which has been explained in A.
39. (a) Sentence D explains the kind of outboard engines mentioned in sentence number 1 and thus logically follows sentence number 1. This is followed by A, which has explained why these motors are a major threat and then by C, which talks of the situation today. The last part of the logical sequence is B, which explains why the Belugas cannot be found even with outboard motors having more powerful engines.
40. (a) Both sentence B and sentence number 1 refer to historical mis-constructions, thus sentence B follows the sentence number 1. This is followed by A, which explains B and then by D, which talks about the theory of teaching. Lastly the sentence in the logical sequence is C, which talks about the impression which is most likely to follow in pedagogy is combined with the generally unhistorical air of science writing and occasional systematic misconstruction.
41. (b) Sentence B is the first choice as it explains the principle given in sentence number 1, this is followed by A which further clarifies it and then by D, which is again a further clarification of the principle and last is C, which is the logical conclusion of the principle.
42. (d) In sentence B the low light conditions refer to the darken sheds in sentence number 1, thus sentence B follows sentence number 1. A logical sequence to it is D and then it is followed by C, which talks about the enriched environment of bales of wood-shavings mentioned in D. The last choice is A which gives the conclusion of adding the bales of wood.
43. (a) Sentence D follows sentence number 1 as it talks about criticism of the statement given in sentence number 1. B follows it, which talks of the people living in particular states, not members of the nation state or hegemonic nation. This is followed by A and then by C, which is a culmination of the different types of states mentioned.

44. (c) CABD comes across the most logical sequence as the four sentences follow each other in a sequence. The sentence C talks about the cut off funding for research as given in sentence 1, followed by sentence A which explains that no such funds are cut in humanity, this is followed by B which is an explanation of A and then is followed by D, which is the perfect precursor to sentence number 6.
45. (c) Sentence A is the first choice as it shows why horses and communism were a poor match, this is followed by B which shows the result of the poor match of horses and communism. Then is followed by C and then by D of which, sentence number 6 is a natural extension.

**TYPE - B**

1. (b) C is the introductory sentence and A follows giving the substantiation of statement made in C. B states the authors anxiousness to know the result and then D sums up what the authors wants to put across.
2. (a) C puts forward the topic which is followed by A, which tells that India has been in a hurry to conform to western thoughts. B says that even smaller countries have the gut to take the contrary stand and then D sums up by saying that India has not only ratified GATT but is also preparing to amend the Patents Act.
3. (c) C is the introductory statement which tells us about the plain we will get to see around the great mass of rock. A follows and tells us more about the weary trail. D states that after this we will be able to see the plain and B sums up by saying that the path keeps winding on.
4. (a) D introduces us about its unique property and its use in all sorts of parlor stunts. C continues from there stating that the paper bag filled with hydrogen zoomed off into space and amazed guests. B is in the logical sequence which shows about the flammable properties of hydrogen. A concludes with a horrible incident which shook the performer.
5. (d) B introduces by saying that the author is a writer. D follows in which he writes about the pleasantness of his profession. A comes in the logical sequence says that it is a exciting profession and C concludes by saying that the writer is free to work in what he believes.
6. (d) C begins the paragraph which is logically continued in D. In which it explains that the evils of one's life would be less difficult to bear if one could think they were the outcome of one's errors. This is followed by B which continues that the errors of a previous existence and ends with A which says that there would be a reward of a greater happiness in another existence.
7. (a) C talks about the fertility of the writer's imagination, B continues from there and says that it can only be so if he renews himself, this is followed by A which talks about his soul, logically this is concluded by D which talks about the enrichment of the soul by fresh experience.
8. (b) A introduces the topic of a masterpiece, D continues from there as leveling the masterpiece as the culminating point, C comes logically after that as a laborious career rather than a lucky fluke, it ends with B which continues as lucky fluke of untaught genius.
9. (c) C is a introductory sentence and talks about the disillusionment of public, B follows in which the public is angry, continued in D as the public loved the illusion and do not understand. A, the interest which you have in the creation of the illusion.
10. (b) Sentence D introduces the topic, B follows as related to the pattern of spatial growth, C comes across as the reason that is the failure of the government to ensure, A is the logical end i.e. an adequate physical and social infrastructure level.
11. (a) B introduces the topic and puts across the historical interest of the journal, A follows with more information about the document, D is the next sentence, in which the first generation English poets are better known through references in the journal and C is the logical end.
12. (b) B is the first sentence of the paragraph giving a general statement about the value of time. C talks about becoming misers in the sense. D continues stating that we try to arrest that tottering steps of time and A concludes with wondering how time should cease to be which has never been.
13. (d) C introduces us to the topic of the paragraph which talks about the ambition of the poet. In A, the ambition died slowly and were replaced by another dream, D continues that stating that not much is done regarding this work, and B is the logical ending of the paragraph.
14. (d) C introduces that knowledge and ignorance are inter-related. B stipulates thinking is outcome of knowledge. D states that the thinking is always limited. A concludes that nobody keeps complete knowledge about anything.
15. (b) Paragraph begins with sentence D which requests that we continue with the topic of last evening. A is the topic the talk was on about conflict in division between man and woman and also divisions such as racial, religious and linguistic. B logically follows talking about the present conditions of racial divisions and C ends the paragraph going into the question that why the conflict between man and man exists.
16. (c) D introduces us to the topic of the paragraph i.e. the killing of Hydra, one of the twelve labours of Hercules, B continues as it explains how the task was really Herculean. A follows as it states how the severed head could not grow back and C ends by explaining how Hercules accomplished the labour.
17. (c) D is the introductory sentence, B tells us that he may look invincible but he appears quite vulnerable as his daughter Sophie has a hole in her heart, C re-assures that it is not life threatening, and A ends by stating that Sophie might need open-heart surgery later in life.

18. (a) A begins the paragraph with the statement that 'Hollywood is a man's world' is not the whole truth. D shows that during the silent era female screen writers are more than men, B follows by showing Jodie Fosters surprise at this. It is concluded by C which says that Jodie had no idea about the activeness of women even in those days.
19. (a) A introduces the topic for the paragraph which tells us about the Saheli Program, which offers a three week tour of India. C tells us about the inclusion of female infanticide as a topic for the first time in Holiday packages. B continues telling us about what the participants will learn about in those Holiday packages. D concludes as 'these talks and meetings' refers to what has been discussed in A, B & C.
20. (a) D begins the paragraph telling us about J. P. Morgan, B continues with more details about J. P. Morgan. A tells us about its timely and accurate information which brings about business decisions and it concludes with C which talks about J. P. Morgan's proprietary trade related data.
21. (d) Sentence A beings the paragraph by introducing the topic the magical thing happening to our planet. C states that our planet is getting smaller. B follows in which it says that some are calling it a paradigm shift and in D others call it a business transformation.
22. (b) AC is a clear link in the passage as 'It starts with fever and cough followed by a sore throat'. So BDAC is the correct option.
23. (a) D introduces the topic which is about a bizarre problem i.e about snakes. C talks about anti snake serum, which is not enough, A follows which states that only government hospitals stock it. B concludes by saying that more and more bitten people could face paralysis.
24. (a) B begins the paragraph stating the earlier record of mid-term elections. A follows as it talks about greater political participation. C logically follows talking about this trend and D ends the paragraph speculating about who is to benefit with lower turnout.
25. (b) A is the beginning to the paragraph talking about the critical election. B states that in psephological language it is called realignment. D states that none of the recent elections in India have been a critical election and C concludes by saying that since 1989, there have been a series of semi-critical elections.
26. (a) A begins the paragraph stating about the trivial pursuits, marketed by the Congress with the main point of the paragraph. B explains the idea behind it which is to create an imaginary saviour. D states that Arjun Singh is the current champion and C concludes by saying that closest contenders to him are Mani Shankar Aiyar and V. George.
27. (b) A introduces the topic by introducing good advertising. C follows by talking about the importance of these advertisings, B tells us that a Dollar spent on brainwashing is more cost-effective and D concludes by stating about the minimum quality that every product has to achieve.
28. (c) A is the introduction to the paragraph and talks about father of the modern automobile industry, Henry Ford. C talks about the philosophy that has endured in the Ford Motor Company, B shows its commitment to delivering the finest quality cars. D ends the paragraph with the readiness of the vehicle for the customer.
29. (c) B is the first sentence in the paragraph as it introduces the topic i.e. wrestling for power with the government by the RBI. A states that however the government has the final say. C ratifies this by stating that only after the government notifies to the RBI's announcement become effective. D concludes by questioning whether it isn't the time when the government vested the RBI with powers.
30. (c) B begins the paragraph talking about waiting in a French restaurant in Manhattan feeling frustrating and depressed. D continues showing why the author was frustrating and depressed i.e. because of certain miscalculations. C states that even the prospect of seeing a dear friend failed to cheer him and A concludes stating that he sat there frowning at the checkered tablecloth.
31. (a) B introduces the topic i.e. how to stop the decline in writing skills. C states that the back to basics movement is forcing schools to put emphasis on the three Rs. D continues stating about the programs that have been developed to attack this problem. A is the final statement which talks about the Bay Area Writing Project.
32. (b) B states that as Anette neared the lamp she saw a figure walking slowly, A describes the figure, D tells us about Anette's feelings on recognising the figure. C concludes by saying that she followed twenty paces behind Michael.
33. (a) C introduces us to the topic of the passage, A tells us what is the real challenge today. D speaks about the mental model that we've used over the years and B conclude by stating that the new world of business is different from that in which we grew up.
34. (c) The clear link is BD as when we reached the field we saw Claudius standing. Thus BDAC is the correct order.
35. (c) A tells us that Alex was unhappy with his Indian origin. C shows that Fate was unfair to him, and he wished he could have been a count or a medieval monarch. B says that he tries to correct this injustice by turning his house into a country manor. In D his wife feels that the illusion of misplaced grandeur would pose problems for Alex.
36. (a) B introduces us to topic of the passage i.e. about India's colors and cuts. A states that beaded wear reflects the influence most. D tells us about the Indian colours which continue to be popular. C speaks about the popularity of the Churidar with Armani and McFadden.

37. (b) D introduces us to the topic of the passage which talks about the emergence of the theocratic states. B reflects this by talking about its suitability to politicians who can appeal to people in the name of religion. C logically follows in which these politicians condemn other states for not following their religion. A concludes by saying that a national policy such as this can never unite the people.
38. (a) C tells us about the man who lurked in the corner, away from the glare of the light. A states that in his left hand he had a blackjack and with the right he tried to find the torch in his pocket, B tells us the meeting was for nine o'clock and time in his watch was quarter to nine. D concludes by saying that his heart was thumping in his chest, there was sweat beads on his forehead and his mouth is dry which shows that he was nervous.
39. (a) A states that the Director came to the room and took a look around the class. C tells us that the managers stared at him with the look of fear. In B the author tells us that Mitch wanted to scream because of the illogicality of the entire scene. D concludes by saying that Mitch walked out of the room as a protest.
40. (d) A talks about the establishment of the Third Reich. D follows by stating about the conditions in Germany i.e. the destruction of democracy, the persecution of Jews etc. C follows and talks about American people favouring isolationist policies and neutrality. B naturally concludes by stating about the Neutrality Acts of 1935 and 1936.
41. (b) A gives us the beginning of the passage and talks about Francis Bacon's essay of Studies. B continues and describes his tripartite division of studies. C tells us that study should be for pleasure, for self-improvement, for business. D states that he has considered the evils of excess study i.e. laziness, affectation, and preciosity.
42. (b) C tells us the meaning of Logic i.e. the science of valid reasoning. A follows by stating about the meaning of reasoning which is a mental process. B tells us about logical reasoning and D concludes by stating that for understanding arguments and drawing the correct inference we should first understand the statements.
43. (a) A is the introduction to the passage and talks about the move towards a political model of organization theory. D explains the political model. B shows us how the analysis would shift to the power resources possessed by different groups. C concludes by talking about the extreme in which the growth of administrators is completely unrelated to the work to be done.
44. (d) B is the introduction to the passage and talks about nature which preserves the balances between various environmental factors. D tells us that human intervention in this balance, leads to disaster. C states that there is a need of checks and balances in institutions which will inhibit the concentration of power in only some individuals. A says that Group discussion making, does not necessarily full guard against arbitrariness and anarchy as there can be collusion among the group members.
45. (b) C tells us that it was a typical night in the office getting towards four in the morning and Bennis was not through with his work. A states that he was extremely tired physically and mentally and felt that the office was unmanageable. D shows that he checked in his calendar as to how his time had gone that day, the day before, the month before. B concludes by saying that unwittingly, he had become the victim of a conspiracy which put before him routine work that had no significance.
46. (a) Sentence D gives us the introduction to the passage, C naturally follows D in which the pharmacist is seen as responding to the author's request. In B again the pharmacist makes up the prescription for the acute gastric cramp refer to C. A ends the passage with the author swallowing the shampoo asked for.
47. (c) E is the statement which begins the passage, D talks about the first set of test for intelligence, this is followed by A on the use of such intelligent tests, C tells us about the intelligence quotient and tests which are developed to indicate what an average child of a certain age can do and B ends the passage.
48. (a) Sentence B is the beginning to the passage telling us about the Spartans, E tells us more about the way they treated their male children who were too weak to become soldiers. C talks about those babies who survived babyhood, D continues with the rigorous military training refer to C, A ends the passage by stating that the children were punished if they were caught stealing.
49. (c) B is the introduction to the passage, C follows referring to education by older images drawn by hand to be better than being educated by photographs, D talks about the inventory started in 1839 and everything else being photographed after that A refers to the insatiability of the photographing eye and E talks about the new visual code i.e. of photographs altering and enlarging our notions.
50. (a) A talks about being culturally literate which is needed to thrive in the modern world, E states about the great breadth of that information, C tells us that this information is by no means confined to "culture", B follows stating that nor is it confined to one social class, D ends the passage by stating that cultural literacy is the only reliable way of combating social determinism.
51. (b) Both parties in A refers to the thief and the victim introduced in C. So the link is CA. B explains what both the parties spent in their endeavour to steal/protect. 'These costs' refers to what has been discussed in B (time and money for the thief and resources for the victim).

52. (d) D begins the passage by stating about the simplest strategic problem arising when two individuals interact with each other, B is an example to such a problem, A tells us about the likelihood of an accident between a motorist and a pedestrian, C ends by stating how much care is to be exercised by each.
53. (c) E is a introduction to the passage, A tells us that we can find a large number of people in India sitting idle. D talks about those who are employed but take their job for granted by not being punctual. B tells us that even in office, the employees receive friends and relatives without prior appointment. F refers to the habit of people visiting ailing friends and relatives even during office hours, C concludes by revealing that once can see slow and clumsy actions and reactions, indifferent attitudes, procedures, lack of consideration for others etc. while working.
54. (a) F begins the passage by telling us about the purpose of the military, D questions about how to battle with the enemy, E answers D by telling us that the idea is to destroy the enemy's productive capacity. B is an example which tells us how to deal with the enemy in the agrarian era, A tells us about the destruction of the enemy in the industrial era, and C states about the destruction of the enemy in the information era i.e. in the present.
55. (c) E begins the paragraph telling us about the gap between the worth and rewards of translators. A refers to the feelings of Michael Hofman about this sorry fact. C tells us more about this acknowledgement, B continues by saying that he is not daunted by thanklessness and impossibility, D concludes by saying that Hofman is passionate about his work which is clear from his writings.
56. (d) A lays the tone of the passage by telling us that Passivity is not universal, B refers to areas which are lawless or frontier zones where all men go armed, C continues by saying that it must be the case for those on the fringe of the unsubmissive, D tells us about the problem of the soil-bound peasants, E concludes by talking about the whole matter depending upon the assessment of the political situation.
57. (a) D states about how members of feuding families will be appalled if by some mischance an outsider is killed, A tells us about the situation in which violence occurs and the nature of that violence. B talks about the actual risk to outsiders, which is calculable. C states about the only uncontrolled applications of force which concludes the passage.
58. (c) A gives us the topic to the passage by talking about branded disposable diapers, D continues the topic by saying that the demand for branded diapers may be price sensitive, B tells us that if one supermarket sets a higher price then customers may buy that elsewhere. C states that the demand for private-label products may be seen as a contrast, E gives an example to this and F ends the passage by stating that the store should set a higher incremental margin percentage for private-label diapers.
59. (a) The statement about strategy and discipline in A give the tone to the passage. C follows by telling us that the strategy requires a strong focus on profitability and a willingness to make tough tradeoffs. E continues by telling us to how a company must stay the course, D states how strategy goes far beyond the pursuit of best practices, B continues with the involvement of the configuration of a tailored value chain and F concludes with the companies activities fitting together as a self-reinforcing system in which any competitor has to replace the whole system if he wishes to imitate.
60. (c) B begins the passage by telling us how Ambassadors have to choose their words, E tells us about the specialized jobs they do and about their ceremonial lives, A talks about their visions of a country as an officials, D tells us about the ambivalence that occurs in black Africa, C concludes by stating that they appear to deny or ignore part of what they know when they say, what they feel they have to say.
61. (d) E begins the passage by telling us about the economic impact of an inadequate monsoon, C states the emergence of a line of divide between the state government and the center due to the recent revival of the rains, B talks about the denial of the Central Government on the earlier apprehensions over the impact of drought, D reveals that the state governments, put allegations on the Centre that it is downplaying the crisis to evade its full responsibility, A ends the passage stating that the face off between the central and state governments will continue for several months due to the strong convictions on both sides.
62. (b) The reference to the exact nature of the shape of the earth in B begins the passage, E tells us what is generally known about the shape of the earth and what was yet to be established, D continues with the way of how to do that, C follows D as both talk about the way of knowing more about the shape of the earth through determining the length of the arc along a chosen longitude or meridian. A tells us that this fact was established in 1730s by a French survey expeditions to the Ecuador.
63. (b) C tells us about the QWERTY design which was aimed to solve a mechanical typewriters, E explains the mechanical problem and A states how the mechanical problem could be avoided using the QWERTY layout, B tells us about the different layout patented by August Dvorak which was much faster, D concludes by saying that the Dvorak layout has never been widely adopted.
64. (d) C appears to be the leading sentence of the passage referring to the phrase 'war against terror' as a huge misnomer. E explains the meaning of the word terror, which is a phenomenon, not an entity. B questions how can a conflict waged against a phenomenon be called a war. D refers to the juridical meaning of war in international law and A refers to the incarceration of surrendered or captured combatants in razor wire cages.

65. (c) E begins the passage referring to the collection of animals while traveling around the world as also of the collection of human beings. C states how people go out of their way to assist an animal collector, B refers to the district officer who is the unpleasant human animal, who says that 'he is there to help' but then is as obstructive as possible. In D the author says that fortunately, these types of human animals are rare and in A the author concludes by saying that he is more intolerant of a human being's shortcomings than of an animal's.
66. (c) A is the introduction to the passage, which talks about the author's journey to Princeton University to see the future leaders of his country. In D the author states that the faculty members of the university gave him the name of some articulate students, to whom he sent e-mails. B states that the replies to his e-mails would come at really odd hours of the morning. In C the author reports about a senior student who went to bed at around two and woke up every morning at seven. E continues with C in which the senior would recite a math problem or a paper topic to herself and then in her sleep would dream about the problem which might be found solved when she awoke.
67. (a) C begins the passage, stating about People Soft's intention to buy J. D. Edwards, A refers to the fact that a little later Oracle announced its bid for People Soft, B follows in which People Soft's boss Conway called Oracle's offer as diabolical. In D Mr. Conway continues that under no circumstances would he accept Oracle's offer. And E makes it clear that on 12th June. People Soft turned Oracle down.
68. (b) B begins the passage by referring to the 'separation wall' being built by Israel in the West Bank. A continues by saying that the wall is not a simple division, in D it is made clear that the wall takes a new tracts in Palestinian land. C refers to the chilling reality of the wall which is surrounded by trenches, electric wire, moats and watch towers at regular intervals. E concludes stating the fact that this racist wall being setup is not being referred to by Israel American allies who are going to pay for most of it.
69. (a) In E, it is stated that not many people outside Australia are aware of how close the Japanese got them during the IIInd World War. D tells us that most of the Solomon Islands and much of New Guinea have been captured by them and they were poised for an invasion. In C, it is shown that the Australian Military, knew the hopelessness of the situation, and they have planned to call back. B says that this was no more than a delaying tactic. A concludes that luckily for them the tide of the war moved elsewhere.
70. (d) The reference in A to the third wave sweeping the Indian media begins the passage. E refers to the first wave which consisted of the magnificent men with their mighty fountain pens. D refers to the second wave in which the media barons wrested back control from their editors. B is the third wave in which they are starring in a new role i.e. as suave dealmakers. C ask us to look around and we will find a number of deals that have been inked or ready to be finalized.
71. (d) E begins the passage with the reference to the growth of the third quarter GDP and the dipping of the monthly unemployment rate. C refers to Washington's enthusiastic response to the economic news. B talks about the real world where there is a struggle for the families and communities. D states the reality that the celebrations were not to be found beyond the Beltway. And A concludes by stating that the celebration of the economic recovery may be premature.
72. (a) The statement in D about the large symbolic power of small issues begins the passage. E continues by talking about those who enjoy foxhunting which is a symbol of ancient roots of rural lives. A refers to the Labour movement to which foxhunting symbolises brutality of the upper classes. C states that to those supporting foxhunting the 1991 manifesto to ban it symbolises hostility to the countryside, and B concludes by stating that the current mess over foxhunting symbolises the weakness of the government.
73. (c) E begins the passage by referring to Royal love affairs in olden days which were conducted on the correspondence method. C follows stating about the monarch who having heard of a neighbouring princess, dispatched messengers with gifts to her court. D tells us that having received the gifts the princess names a date which a formal meeting takes place. A refers to the courtship of the princess of the outer Isles by king Merolchazzar. B explains the hitch that the princess acknowledge the gifts but doesn't give a meeting date.
74. (c) A begins with its reference to the love of Damon for Pythias, of David for Jonathan, of Swan for Edgar. C talks about the inevitability of the great friendship between man and man. E states that no one could say what the mutual magnetism was that brought about the deathless partnership of ham and eggs referred to in C, B says that similarly with men, continued in D one simply feels that this is one of the things that must be so.
75. (c) B comes across as the introduction to the paragraph, D continues with his reference to the foreign package holiday tour organised by Thomas Cook, A tells us that but late 1930s and 1940s, Germany suffered from over-branding, and E talks about the nervousness of Germany about promoting itself abroad, C however concludes by saying that reunification of Germany and the government's move to Berlin has prompted Germany to think again about its image.

76. (a) Statement 'B' describes a hopeless situation, 'E' amplifies the description statement 'D' adds to the information and 'A' describes the scenario in the opposite direction. 'C' adds to the preceding statement. The other option following a similar link is option (a), however 'B' concluding the passage does not exhibit logical flow of information.
77. (d) 'E' provides a reference to statement 'C'. Statement 'B' follows from 'D' and statement 'A', acts as a concluding line. The link DBA is also present in option (b) but the link 'E', 'C' do not follow from it.
78. (b) There is a clear link between statement 'B' and 'E'. This is given only in option (a). Statements 'D', 'A' and 'C' follow logically.
79. (a) The correct sequent would be CEDBA. Here C explains comparison between fuel cells and existing engines, which is further elaborated and explained in E and D (ED is the clear link). The paragraph cannot start with A as it says 'reaction that only **such** a .....', which is referred to situation in sentence B.
80. (c) Here the correct sequence is (c). E is the obvious introduction as it mentions the Egyptians. C and B have to be linked as C tells us that most of our traditional sources of information are ... pyramids and tombs. B says even the Papyri (which are among the sources of information about ancient Egypt) were from the pyramid temples.
81. (b) B has to follow E. Further A would be the last sentence of the passage as it talks about caste, whereas EBDC talk about class.
82. (b) The passage must open with E, as it initiates the idea followed by B. Further C follows D and A culminates the passage as the author compares to what has been said in EBDC his view point.
83. (d) Definitely E has to follow C which is shown in options (a) and (d) only. D must follow CE and A is a conclusive statement.
84. (e) EB and CD are keys. The opening statement draws a comparison between highly qualified and less qualified women in America with respect to their position and rates of marriage. Statement E should follow this statement because it further draws a connection between evolution of family structure and economic factors. It also mentions the existence of enormous literature validating this prediction. It should be followed by statement B which talks about the work of Becker thesis. Statement C follows this because B talks that some support and some contradict Becker thesis and C states that it is difficult to draw any conclusion on this prediction. Finally D ends the passage which clearly states that it is difficult to establish connection between family changes and economic factors. The correct sequence is EBCD, so option (e) is correct.
85. (a) AED and BC are keys. A introduces the two official discourses about good mothers and E talks about the third. D follows E as it talks about a common factor of all the three discourses mentioned in A and E. It also talks about the predisposition of a woman to care her child and B should follow E because it talks about the need for medical expert guidance as another factor required for motherhood. C follows B as B ends with stating different contexts about good mothering and C mentions the similarity of it to historical work. So the logical sequence is EDBC.
86. (b) AC and BDE are keys. C follows the opening statement A. Author has introduced the passage with some experiences of Indonesia due to dramatical shifts in its formal governance after the fall of President Soeharto. Statement C continuing with the changes in mass-media by stating its condition under Soeharto's rule. D follows B, B talks about the changes taken place in political system in last 10 years and statement D throws light on the optimistic interpretation of some analysts about these political reforms. E should follow D because it represents an interpretation of different group of analysts. Hence, logical sequence forming coherent passage is CBDE.
87. (c) CB is the key and should follow A. Because in the opening statement author talks about squatters and C describes who are squatters and B talks about the land occupied by them and maize being grown by them. E should follow B as it also talks about maize and finally ending with sentence D which lists other crops grown by them. So, logical sequence is CBED.

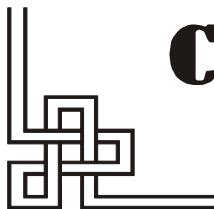
#### TYPE - C

1. (d) Clearly (d) is the correct option. Since 'believed' should be followed by 'that' for grammatical accuracy. Although option (a) also starts with 'that' but the order of the words is not correct.
2. (c) The answer is option (c). 'suggest' should be followed by an '-ing' form of verb. Therefore we can only consider option (b) and (c). The correct usage is 'incidence' and not 'incidents' of piracy. (a) beginning the sentence with 'to' is instantly eliminated.
3. (c) The sentence begins with past tense. Option (c) is the correct as it maintains the tense perfectly. In (a), the tense change to future ('must have'), in (b) to past perfect tense ('to have had') and in (d), it changes to present tense.
4. (b) Federer made a very humble statement, so (b) is the most appropriate. (c) is clearly wrong as he said that he is the best of this generation.
5. (b) It is the most appropriate choice. Option (c) is wrong as 'ours' is not the first generation to deal with the crisis, others have also dealt with it. (b) is correct as we might be the first generation to succeed. (a) do not make any sense. (d) is wrong as success was not illusory earlier as well.

6. (b) The option which fits perfectly in this situation is (b). As the passage says the experts are difficult to handle with, so organisations compromise and hire people who get along well (in teams). In the tone of the passage they can not be experts for sure and will do a mediocre job.
7. (a) The passage is clearly written by someone who feels crossword is superior as compared to Sudoku. The passage talks about the multi-dimensionality of crossword. So the contrasting sentence, in context to the passage, will be the one which shows Sudoku as a routine exercise.
8. (d) The paragraph has exploitation of opportunity and its relation with age as the central issue. The appropriate ending would, therefore, be one that draws conclusion on the same relationship. (a) does not talk of age and opportunity, neither does (b), so, these can be eliminated. The last line of the passage states that the 'willingness to bear risks declines in old age and the opportunity cost rises'. This suggests that at an advanced age, people are reluctant to exploit entrepreneurial opportunities as they involve high risk. So, the correct answer will be (d).
9. (c) The last lines of the passage are a suggestion made by the speaker to an art director. The suggestion is based on a research. Hence, the most appropriate ending will be (c). There may be some confusion between (a) and (c) but the speaker's statement should not be seen as a guidance but merely a suggestion.
10. (c) The comparison is being made between a map and a theory. A good map 'throws away a huge amount of much less valuable information' due to the concerns of representation. Thus, a good theory must as well balance detail and feasibility of representation. So the correct answer is (c).
11. (b) The most appropriate ending will be (b) because the paragraph builds from the beginning the oppositions between the apparent and real truth. While the rest of the endings also say the same thing. They do so with the referent 'Nation' which is not used in the passage. The passage is a general speculation or opinion and, thus, the conclusion must also take an objective tone.
12. (e) (e) is the most appropriate ending. The paragraph mentions the following as the lacking of the Factory-dealer-customer relations.
- (i) lack of long term commitment
  - (ii) maximizing of feeling of mistrust.
  - (iii) holding back of information both by dealer and customer.
- The result of all this will be a loss for everyone in the long run.
13. (e) Last three lines of the paragraph talk about the personification of whole organizations as actors in macro-level stories and it is difficult to tell these stories from the perspective of macro-level participants. And option 5 talks about the personification of organization at macro-level. So option (e) is most appropriate sentence completing the paragraph. Option 1 talks about social networks which has not been mentioned in the passage so cannot be a completing sentence.
14. (a) Passage states that photographs still allure people. And with the advancements in technology it became possible to capture each and every moment of life and without much efforts, results can be seen instantly. Option (a) logically completes the passage by emphasising the mentioned facts with reason.
15. (b) Paragraph deals about Mma Ramotswe, a private detective in Botswana and lists the assets/inventories she has in her office. Paragraph ends by stating that human institution and intelligence are the real tools of a detective agency. Option (b) mentions that no inventory can include such intangibles into it. So, it appropriately completes the passage.
16. (b) The passage talks about patient's psychology towards a doctor, especially when they see the doctors hands. (c) and (e) are ruled out as they do not help in completing the paragraph. The last sentence must talk about the patients observation, so (a) and (d) are ruled out. Hence (b) is the right option.
17. (d) The paragraph clearly emphasizes that due to the lackluster performance of OECD countries, and the emergence of new economic powers like China & India, the OECD countries are reflecting their concerns of change in their economic climate through Trade Protectionism. Hence (4) is the correct choice.
18. (b) The passage talks about the pastel colored lives of the Jews in India through their famous settlement, Mattancherry. (4) is ruled out because the paragraph does not show tolerance as a façade. (1) is wrong as it is not about the house but about the lives of the Jews. (5) is wrong as it is out of context and focuses on the tourists. Among (2) and (3), (2) seems to be more appropriate as the passage talks about the religious tolerance or peaceful existence of the Jews alike the Jews in other part of the world.
19. (e) The paragraph talks about the cultural and intellectual interconnection between the East and the West, because of which nothing can be classified as purely Western or purely Indian. (b) is wrong as it merely continues the idea and does not conclude it. (d) talks opposite to the idea expressed in the paragraph. (c) also does not conclude the paragraph as it reiterates the same thing in a different way as discussed in the paragraph. Among (a) and (e), (e) seems to be more appropriate because of the inclusion of the word 'purity' as used in the last sentence.

# 21

CHAPTER



# CRITICAL REASONING



**Directions for Questions 1 to 33 : Read the information in each question given below and answer the question that follows:**

1. But because the idea of private property has been permitted to override, with its selfishness, the common good of humanity, it does not follow that there are not limits within which that idea can function for the general convenience and advantage. Which of the following is most likely to weaken the argument? (1995)
  - (a) All the people of the society should progress at an equitable rate and there should be no disparities and private property does bring about a tremendous disparity.
  - (b) One should not strive for the common good of humanity at all, instead one should be concerned with maximising one's own wealth.
  - (c) One should learn from the experiences of former communist nations and should not repeat their mistakes at all.
  - (d) Even prosperous capitalist countries like the USA have their share of social problems.
2. The writer can only be fertile if he renews himself and he can only renew himself if his soul is constantly enriched by fresh experience. Which of the following is most likely to support the above thought ? (1995)
  - (a) Only out of fresh experience can the writer get germs for new writing.
  - (b) The writer can meet new people.
  - (c) The writer must see new places.
  - (d) None of these.
3. Unless you devote your whole life to it, you will never learn to speak the language of another country to perfection; you will never know its people and its literature with complete intimacy. Which of the following is likely to undermine the above argument? (1995)
  - (a) I can speak ten foreign languages already.
  - (b) I do not travel to foreign countries.
  - (c) I am happy with the languages I know and do not need to learn any other language.
  - (d) I should spend time to understand my own people and literature first, only then can I appreciate other languages and cultures.
4. I have been studying it, consciously and subconsciously, for forty years and I still find men unaccountable; people I know intimately can surprise me by some action of which I never thought them capable or by the discovery of some trait exhibit a side of themselves that I never even suspected. The idea in this sentence can be best summarised as (1995)
  - (a) Men are inconsistent and therefore one should not be confident even about one's closest friends.
  - (b) Men are unpredictable, one can never tell what they will do next, hence one should be very careful in one's dealings.
  - (c) No matter how closely you know somebody there still exists an unknown facet of his personality.
  - (d) None of these.
5. Now the audience is very curious animal. It is shrewd rather than intelligent. Its mental capacity is less than that of its most intellectual members. If these were graded from A to Z, decreasing with succeeding letters to the zero of the hysterical shop girl, I should say its mental capacity would come around about the letter O. According to the above statements (1995)
  - (a) Some members in the audience are more intelligent than any of its other members.
  - (b) The net intelligence of the audience is a little less than average.
  - (c) a only.
  - (d) a and b both.

6. Efficiency is all right in its place, in the shop, the factory, the store. The trouble with efficiency is that it wants to rule our play as well as our work; it won't be content to reign in the shop, it follows us home.

It can be inferred from the above passage that

(1998)

- (a) Efficiency can become all - pervading.
- (b) Efficiency does not always pay.
- (c) Efficiency can be more of a torture than a blessing.
- (d) None of these.

7. In order to ease the traffic congestion, the transport planners decided to have a sophisticated system of elevated monorail travel in the city. However, it was pointed out by somebody that a metro rail system would be a more effective solution to the traffic problem. The plan was thus stalled. Moreover, since a budget had not been drawn up for the project, it was deemed fit to stall the work of the monorail for some time. In the meanwhile, the traffic planners of the city decided to build an efficient system of subways and flyovers in the city with the aim of easing the same problem. At the instant when the planners were preparing to award the contracts to the concerned parties, the transport planners came up with the contention that the subways interfered with the site of a pillar of the monorail system. The traffic planners had to give up the idea and think of other possible solutions.

On the basis of the above passage it can be inferred that,

(1998)

- (a) The city authorities felt that the monorail system was essentially impractical,
- (b) There is a strong contention between the two groups of planners in the city.
- (c) The projects would be stalled for an indefinite period,
- (d) None of the above.

8. The company encourages its managers to interact regularly, without a pre-set agenda, to discuss issues concerning the company and society. This idea has been borrowed from the ancient Indian concept of religious congregation, called *satsang*. Designations are forgotten during these meetings; hence, it is not uncommon in these meetings to find a sales engineer questioning the CEO on some corporate policy or on his knowledge of customers

Based on the information provided in the above passage, it can be inferred that

(1998)

- (a) The company is concerned about its reputation with its employees.
- (b) The company believes in fostering the spirit of dialogue without degenerating it into a position-based debate.
- (c) The company has some inter-personnel problems in the past due to which it felt the need for these corporate *satsangs*.
- (d) All of the above.

9. From Cochin to Shimla, the new culture vultures are tearing down acres of India's architectural treasures. Ancestral owners often fobbed off with a few hundred rupees for an exquisitely carved door or window, which fetches fifty times that much from foreign dealers, and yet more from the drawing room sophisticates of Europe and the US. The reason for such shameless rape of the Indian architectural wealth can perhaps, not wrongly, be attributed to the unfortunate blend of activist disunity and local indifference.

It can be inferred from the above passage that

(1998)

- (a) The environment created by the meeting between activist disunity and local indifference is ideal for antique dealers to thrive in India.
- (b) Only Indians are not proud of their cultural heritage and are hungry for the foreign currency that is easily available in return of artifacts.
- (c) Most Indian families have heirlooms which can be sold at high prices to Europeans and Americans.
- (d) India provides a rich market for unscrupulous antique dealers.

10. Deepa Mehta's *Fire* is under fire from the country's self-appointed moral police. Their contention is that the film is a violation of the Indian cultural mores and cannot be allowed to influence the Indian psyche. According to them, such films ruin the moral fabric of the nation, which must be protected and defended against such intrusions at all cost, even at the cost of cultural dictatorship.

Based on the information in the above passage, it can be inferred that

(1998)

- (a) The assumption underlying the moral police's critique of *Fire* is that the Indian audience is vulnerable to all types of influence.
- (b) The assumption underlying the moral police's critique of *Fire* is that the Indian audience is impressionable and must be protected against 'immoral' influences.
- (c) The moral police thinks it has the sole authority to pass judgement on films screened in India.
- (d) None of the above

11. The dominant modern belief is that the soundest foundation of peace would be universal prosperity. One may look in vain for historical evidence that the rich have regularly been more peaceful than the poor, but then it can be argued that they have never felt secure against the poor; that their aggressiveness stemmed from fear; and that the situation would be quite different if everybody were rich.

It can be inferred from the above passage that

(1998)

- (a) Most aggression in the world stems from the desire of the haves to defend themselves against the have-nots.
- (b) Prosperity as a foolproof measure of peace can no longer be accepted.
- (c) Both a and b.
- (d) Neither a nor b.

12. The effect produced on the mind by travelling depends entirely on the mind of the traveller and on the way in which he conducts himself. The chief idea of one very common type of traveller is to see as many objects of interest as he possibly can. If he can only after his return home say that he has seen such and such a temple, castle, picture gallery, or museum, he is perfectly satisfied. Far different is the effect of travels upon those who leave their country with minds prepared by culture to feel intelligent admiration for all the beauties of nature and art to be found in foreign lands. When they visit a new place, instead of hurrying from temple to museum to picture gallery, they allow the spirit of the place to sink into their minds, and only visit such monuments as the time they have at their disposal allows them to contemplate without irreverent haste.

It can be inferred from the above passage that

(1998)

- (a) The writer prefers the second type of traveller
- (b) The first type of traveller is the lay traveller who does not understand the worth of any place he travels to
- (c) The objective of the second type of traveller is not to see much, but to see well.
- (d) None of the above

13. Whether we look at the intrinsic value of our literature, or at the particular situation of this country, we shall see the strongest reason to think that of all foreign tongues the English tongue is that which would be the most useful to our native subjects.

It can be inferred that

(1998)

- (a) The speaker is a die-hard colonist
- (b) The speaker has the good of the nation at heart
- (c) The speaker is addressing an issue related to a colonial empire
- (d) None of the above

14. Where the film Bombay loses out is where every commercial film congenitally goes awry- becoming too simplistic to address serious issues and failing to translate real life to reel.

Based on the information in the passage, it can be inferred that

(1998)

- (a) The film's director aimed at recreating real life on the silver screen
- (b) The film was too simplistic for the audience's taste
- (c) The film was successful in spite of its shortcomings
- (d) None of the above

15. Aspiration is nothing new. Neither is the debate over what the Indian middle class is, what it wants and what it buys. Since the mid - 80s, that has been the focus of the economic policy papers, so called pro and anti-poor budgets and marketing strategies that have successfully broken the barrier of urban selling and reached deeper into rural India with increasing income levels and aspirations.

Based on the above passage it can be inferred that

(1998)

- (a) The Indian middle class has been the focus of economic policies for a long time.
- (b) The Indian middle class has graduated from being the 'deprived' middle class to the 'pampered' middle class
- (c) Both a and b
- (d) Neither a nor b

16. Three airlines IA, JA and SA—operate on the Delhi-Mumbai route. To increase the number of seats sold, SA reduces the fare and this was emulated by IA and JA immediately. The general belief was that the volume of air travel between Delhi and Mumbai would increase as a result. Which of the following, if true, would add credence to the general belief ?

(1999)

- (a) Increase in profitability of the three airlines
- (b) Extension of the discount scheme to other routes
- (c) A study that shows that air travellers in India are price-conscious
- (d) A study that shows that as much as 80% of air travel in India is company-sponsored

17. According to McNeill, a Brahmin priest was expected to be able to recite at least one of the Vedas. The practice was essential for several centuries when the Vedas had not yet been written down. It must have had a selective effect, since priests would have been recruited from those able or willing to memorise long passages. It must have helped in the dissemination of the work, since a memorized passage can be duplicated many times.

Which one of the following can be inferred from the above passage?

(1999)

- (a) Reciting the Vedas was a Brahmin's obligation
- (b) The Vedic priest was like a recorded audio cassette
- (c) McNeill studied the behavior of Brahmin priests
- (d) Vedic hymns had not been scripted

18. Developed countries have made adequate provisions for social security for senior citizens. State insurers (as well as private ones) offer medicare and pension benefits to people who can no longer earn. In India, with the collapse of the joint family system, the traditional shelter of the elderly has disappeared. And a state faced with a financial crunch is not in a position to provide financial security. So, it is advisable that the working population give serious thought to building a financial base for itself.

Which one of the following, if it were to happen, weakens the conclusion drawn in the above passage the most?

(1999)

- (a) The investible income of the working population, as a proportion of its income, will grow in the future.
- (b) The insurance sector is under developed and trends indicate that it will be extensively privatized in the future.
- (c) India is on a path of development that will take it to a developed country status, with all its positive and negative implications.
- (d) If the working population builds a stronger financial base, there will be a revival of the joint family system.

19. Various studies have shown that our forested and hilly regions, in general, where biodiversity (as reflected in the variety of flora) is high, are places where poverty appears to be high. And these same areas are also the ones where educational performance seems to be poor. Therefore, it may be surmised that, even disregarding poverty status, richness in biodiversity goes hand in hand with educational backwardness.

Which one of the following statements, if true, can be said to best provide supporting evidence for the surmise mentioned in the passage?

(1999)

- (a) In regions where there is little variety in flora, educational performance is seen to be as good as in regions with high variety in flora when poverty levels are high.
- (b) Regions which show high biodiversity also exhibit poor educational performance, at low levels of poverty.
- (c) Regions which show high biodiversity reveal high levels of poverty and poor educational performance.
- (d) In regions where there is low biodiversity, at all levels of poverty, educational performance is seen to be good.

20. Cigarettes constitute a mere 20% of tobacco consumption in India. And fewer than 15% of the 200 million tobacco users consume cigarettes. Yet these 15% contribute nearly 90% of the tax revenues to the Exchequer from the tobacco sector. The punitive cigarette taxation regime has kept the tax base narrow, and reducing taxes will expand this base.

Which one of the following best bolsters the conclusion that reducing duties will expand the tax base?

(1999)

- (a) The cigarette manufacturers' association has decided to indulge in aggressive promotion.
- (b) There is a likelihood that tobacco consumers will shift to cigarette smoking if cigarette prices were to reduce.
- (c) The cigarette manufacturers are lobbying for reduction on duties.
- (d) An increase in duties on non-cigarette tobacco may lead to a shift in favour of cigarette smoking.

21. Thomas Malthus, the British clergyman turned economist, predicted that the planet would not be able to support the human population for long. His explanation was that human population grows at a geometric rate, while the food supply grows at an arithmetic rate.

Which one of the following, if true, would not undermine the thesis offered by Malthus?

(1999)

- (a) Population growth can be slowed down by the voluntary choices of the individuals and not by natural disasters.
- (b) The capacity of the planet to feed a growing human population can be enhanced through biotechnological means.
- (c) Human systems and natural systems like food supply, follow natural laws of growth which have remained constant, and will remain unchanged.
- (d) Human beings can colonize other planetary systems on a regular and on going basis to accommodate a growing population.

22. The company's coffee crop for 1998-99 totalled 8079 tonnes, an all time record. The increase over the previous year's production of 5830 tonnes was 38.58% . The previous highest crop was 6089 tonnes in 1970-71. The company had fixed a target to be realized by the year 2000-01, and this has been achieved two years earlier, thanks to the emphasis laid on the key areas of irrigation, replacement of unproductive coffee bushes, intensive refilling and improved agricultural practices. It is now our endeavour to reach the target of 10000 tonnes in the year 2001-02.

- Which one of the following would contribute most to making the target of 10000 tonnes in 2001-02 unrealistic? (1999)
- The potential of the productivity enhancing measures implemented up to now has been exhausted.
  - The total company land under coffee remained constant since 1969 when an estate in the Nilgiri Hills was acquired.
  - The sensitivity of the crop to climatic factors makes predictions about production uncertain.
  - The target-setting procedures in the company have been proved to be sound by the achievement of the 8000 tonne target.
23. Animals in general are shrewd in proportion as they cultivate society. Elephants and beavers show the greatest signs of this sagacity when they are together in large numbers, but when man invades their communities they lose all their spirit of industry. Among insects, the labours of the bee and the ant have attracted the attention and admiration of naturalists, but all their sagacity seems to be lost upon separation, and a single bee or ant seems destitute of every degree of industry. It becomes the most stupid insect imaginable, and it languishes and soon dies.
- Which of the following can be inferred from the above passage (1999)
- Humankind is responsible for the destruction of the natural habitat of the animals and insects.
  - Animals, In general, are unable to function effectively outside their normal social environment.
  - Naturalists have great admiration for bees and ants, despite their lack of industry upon separation.
  - Elephants and beavers are smarter than bees and ants in the presence of human beings.
24. In a recent report, the gross enrolment ratios at the primary level, that is the number of children enrolled in classes one to five as a proportion of all children aged 6 to 10, were shown to be very high for most states; in many cases they were way above 100 percent. These figures are not worth anything, since they are based on the official enrolment data complied from school records. They might as well stand for 'gross exaggeration ratios'.
- Which one of the following options best supports the claim that the ratios are exaggerated? (2000)
- The definition of gross enrolment ratio does not exclude, in its numerator, children below 6 years or above 10 years enrolled in classes one to five .
  - A school attendance study found that many children enrolled in the school records were not meeting a minimum attendance requirement of 80 percent.
  - A study estimated that close to 22 children enrolled in the class one records were below 6 years of age and still to start going to school.
  - Demographic surveys show shifts in the population profile which indicate that the number of children in the age group 6 to 10 years is declining.
25. Szymanski suggests that the problem of racism in football may be present even today. He begins by verifying an earlier hypothesis that clubs' wage bills explain 90% of their performance. Thus, if players' salaries were to be only based on their abilities, clubs that spend more should finish higher. If there is pay discrimination against some group of players-fewer teams bidding for black players thus lowering the salaries for blacks with the same ability as whites-that neat relation may no longer hold. He concludes that certain clubs seem to have achieved much less than what they could have, by not recruiting black players.
- Which one of the following findings would best support Szymanski's conclusion? (2000)
- Certain clubs took advantage of the situational hiring above-average shares of black players.
  - Clubs hired white players at relatively high wages and did not show proportionately good performance.
  - During the study period, clubs in towns with a history of discrimination against blacks, under performed relative to their wage bills
  - Clubs in one region, which had higher proportions of black players, had significantly lower wage bills than their counterparts in another region which had predominantly white players.
26. The pressure on Italy's 257 jails has been increasing rapidly. Those jails are old and overcrowded. They are supposed to hold up to 43,000 people ----9,000 fewer than now. San Vittore in Milan, which has 1,800 inmates, is designed for 800. The number of foreigners inside jails has also been increasing. The minister in charge of prisons fears that tensions may snap, and so has recommended to government an amnesty policy ?
- Which one of the following, if true, would have most influenced the recommendation of the minister? (2000)
- Opinion polls have indicated that many Italians favour a general pardon.
  - The opposition may be persuaded to help since amnesties must be approved by a two-thirds majority in parliament.
  - During a recent visit to a large prison, the Pope whose pronouncements are taken seriously, appealed for 'a gesture of clemency'
  - Shortly before the recommendation was made, 58 prisons reported disturbances in a period of two weeks.

27. The offer of the government to make iodised salt available at a low price of one rupee per kilo is welcome, especially since the government seems to be so concerned about the ill effects of non-iodised salt. But it is doubtful whether the offer will actually be implemented. Way back in 1994, the governmental methods for reducing the costs of iodisation to about five paise per kilo. But these reports have remained just those-reports on paper.

Which one of the following, if true most weakens the author's contention that it is doubtful whether the offer will be actually implemented? (2000)

- (a) The government proposes to save on costs by using the three methods it has already devised for iodisation.
  - (b) The chain of fair-price distribution outlets now covers all the districts of the state.
  - (c) Many small-scale and joint sector units have completed trials to use the three iodisation methods for regular production.
  - (d) The government which initiated the earlier effort is in place even today and has more information on the effects of no-iodised salt
28. About 96% of Scandinavian moths have ears tuned to the ultrasonic pulses that bats, their predators, emit. But the remaining 4% do not have ears and are deaf. However they have a larger wingspan than the hearing moths and also have higher wing-loadings - the ratio between wing's area and its weight- meaning higher manoeuvrability.

Which one of the following can be best inferred from the above passage? (2000)

- (a) A higher proportion of deaf moths than hearing moths fall prey to bats.
  - (b) Deaf moths may try to avoid bats by frequent changes in their flight direction.
  - (c) Deaf moths are faster than hearing moths, and so are less prone to becoming a bat's dinner than hearing moths.
  - (d) The large wingspan enables deaf moths to better receive and sense the pulses of their bat predators.
29. Argentina's beef cattle herd has dropped to under 50 million from 57 million ten years ago in 1990. The animals are worthless too: prices fell by over a third last year, before recovering slightly. Most local meat packers and processors are in financial trouble, and recent years has seen a string of plant closures. The Beef Producer's Association has now come up with a massive advertisement campaign calling upon Argentines to eat more beef - their "juicy, healthy, rotund, plate-filling steaks."

Which one of the following, if true, would contribute most to a failure of the campaign? (2000)

- (a) There has been a change in consumer preference towards eating leaner meats like chicken and fish.
  - (b) Prices of imported beef have been increasing, thus making locally grown beef more competitive in terms of policy.
  - (c) The inability to cross breed native cattle with improved varieties has not increased production to adequate levels.
  - (d) Animal rights pressure groups have come up rapidly, demanding better and humane treatment of farmyard animals like beef cattle
30. The problem of traffic congestion in Athens has been testing the ingenuity of politicians and town planners for years. But the measures adopted to date have not succeeded in decreasing the numbers of cars on the road in the city centre. In 1980, an odds and evens number-plate legislation was introduced under which odd and even plates were banned in the city centre on alternate days, thereby expecting to halve the number of cars in the city centre. Then in 1993 it was decreed that all cars in use in the city centre must be fitted with catalytic converters; a regulation had just then been introduced, substantially reducing import taxes on cars with catalytic converters, the only condition being that the buyer of such a 'clean' car offered for destruction a car atleast 15 years old.

Which one of the following options, if true, would best support the claim that the measures adopted to date have not succeeded. (2000)

- (a) In the 1980's, many families purchased second cars with the requisite odd or even number plate.
  - (b) In the mid-1990's, many families found it feasible to become first-time car owners by buying a car more than 15 years old and turning it in for a new car with catalytic converters.
  - (c) Post-1993, many families seized the opportunity to sell their more than 15 year-old cars and buy 'clean' cars from the open market, even if it meant forgoing the import tax subsidy.
  - (d) All of the above
31. Although in the limited sense of freedom regarding appointment and internal working, the independence of the Central Bank is unequivocally ensured, the same cannot be said of its right to pursue monetary policy without coordination with the central government. The role of the Central Bank has turned out to be subordinate and advisory in nature.

Which one of the following best supports the conclusion drawn in the passage? (2000)

- (a) The decision of the chairman of the Central Bank to increase the bank rate by two percentage points sent shock waves in industry, academic and government circles alike.  
 (b) Government has repeatedly resorted to monetisation of the debt despite the reservations of the Central Bank.  
 (c) The central Bank does not need the central government's nod for replacing soiled currency notes.  
 (d) The inability to remove coin shortage was a major shortcoming of this government.
32. The Shveta-chattr or the "White Umbrella" was a symbol of sovereign political authority placed over the monarch's head at the time of the coronation. The ruler so inaugurated was regarded not as a temporal autocrat but as the instrument of protective and sheltering firmament of supreme law. The white umbrella symbol is of great antiquity and its varied use illustrates the ultimate common basis of non-theocratic nature of states in the Indian traditions As such, the umbrella is found, although not necessarily a white one, over the head of Lord Ram, the Mohammedan sultans and Chatrapati Shivaji.

Which of the following best summarizes the above passage? (2000)

- (a) The placing of an umbrella over the ruler's head was a common practice in the Indian subcontinent.  
 (b) The white umbrella represented the instrument of firmament of the supreme law and non-theocratic nature of Indian states.  
 (c) The umbrella, not necessarily a white one, was a symbol of sovereign political authority.  
 (d) The varied use of the umbrella symbolized the common basis of the non-theocratic nature of states in the Indian tradition.
33. The theory of games is suggested to some extent by parlour games such as chess and bridge. Friedman illustrates two distinct features of these games. First in a parlour game played for money, if one wins the other (others) loses (lose). Second, these games are games involving a strategy. In a game of chess, while choosing what action is to be taken, a player tries to guess how his/ her opponent will react to the various actions he or she might take. In contrast, the card-pastime, 'patience' or 'solitaire' is played only against chance.

Which one of the following can best be described as a 'game'? (2000)

- (a) The team of Tenzing Norgay and Edmund Hillary climbing Mt. Everest for the first time in human history.  
 (b) A national level essay writing competition.  
 (c) A decisive war between the armed forces of India and Pakistan over Kashmir.  
 (d) Oil Exporter's Union deciding on world oil prices, completely disregarding the countries which have at most minimal oil production.

**Directions for the Questions 34 & 35 : For each of the two questions, indicate which of the statements given with that particular question is consistent with the description of the unseasonable man in the passage below.**

Unseasonableness is a tendency to do socially permissible things at the wrong time. The unseasonable man is the sort of person who comes to confide in you when you are busy. He serenades his beloved when she's ill. He asks a man who has just money by paying a bill for a friend to pay a bill for him. He invites a friend to go for a ride just after the friend has finished a long car trip. He is eager to offer services which are not wanted but which cannot be politely refused. If he is present at an arbitration, he stirs up dissension between the two parties, who were really anxious to agree, such is the unseasonable man.

34. He tends to (1999)

- (a) entertain women.  
 (b) be a successful arbitrator when dissenting parties are anxious to agree.  
 (c) be helpful when solicited.  
 (d) tell a long story to people who have heard it many times before.

35. The unseasonable man tends to (1999)

- (a) bring a higher bid to a salesman who has just closed a deal.  
 (b) disclose confidential information to others.  
 (c) sing the praises of the bride when he goes to a wedding.  
 (d) sleep late and rise early.

**Directions for Questions 36 to 44 :** Four alternative summaries are given below each text. Choose the option that best captures the essence of the text.

36. Some decisions will be fairly obvious - “no-brainers.” Your bank account is low, but you have a two week vacation coming up and you want to get away to some place warm to relax with your family. Will you accept your in-laws’ offer of free use of their Florida beachfront condo ? Sure. You like your employer and feel ready to move forward in your career. Will you step in for your boss for three weeks while she attends a professional development course? Of course (2003)

A. Some decisions are obvious under certain circumstances. You may, for example, readily accept a relative’s offer of free holiday accommodation. Or step in for your boss when she is away.

B. Some decisions are no brainers. You need not think when making them. Examples are condo offers from in-laws and job offers from bosses when your bank account is low or boss is away.

C. Easy decisions are called “no-brainers” because they do not require any cerebral activity. Examples such as accepting free holiday accommodation abound in our lives.

D. Accepting an offer from in-laws when you are short on funds and want a holiday is a no-brainer. Another no-brainer is taking the boss’s job when she is away.

(a) A (b) B (c) C (d) D

37. Physically, inertia is a feeling that you just can’t move; mentally, it is a sluggish mind. Even if you try to be sensitive, if your mind is sluggish, you just don’t feel anything intensely. You may even see a tragedy enacted in front of your eyes and not be able to respond meaningfully. You may see one person exploiting another, one group persecuting another, and not be able to get angry. Your energy is frozen. You are not deliberately refusing to act; you just don’t have the capacity. (2003)

A. Inertia makes your body and mind sluggish. They become insensitive to tragedies, exploitation, and persecution because it freezes your energy and decapacitates it.

B. When you have inertia you don’t act although you see one person exploiting another or one group persecuting another. You don’t get angry because you are incapable.

C. Inertia is of two types – physical and mental. Physical inertia restricts bodily movements. Mental inertia prevents mental response to events enacted in front of your eyes.

D. Physical inertia stops your body from moving; mental inertia freezes your energy and stop your mind from responding meaningfully to events, even tragedies, in front of you.

(a) A (b) B (c) C (d) D

38. Try before you buy We use this memorable saying to urge you to experience the consequences of an alternative before you choose it, whenever this is feasible . If you are considering buying a van after having always owned sedans, rent one for a week or borrow a friend’s. By experiencing the consequences first hand, they become more meaningful. In addition, you are likely to identify consequences you had not even thought of before. May be you will discover that it is difficult to park the van in your small parking space at work, but that, on the other hand, your elderly father has a much easier time getting in and out of it (2003)

A. If you are planning to buy a van after being used to sedans, borrow a van or rent it and try it before deciding to buy it. Then you may realize that parking a van is difficult while it is easier for your elderly father to get in and out of it.

B. Before choosing an alternative, experience its consequences if feasible. If, for example, you want to change from sedans to a van, try one before buying it . You will discover aspects you may never have thought of.

C. Always try before you buy anything. You are bound to discover many consequences. One of the consequences of going in for a van is that it is more difficult to park than sedans at the office car park.

D. We urge you to try products such as vans before buying them. Then you can experience consequences you have not thought of such as parking problems. But your father may find vans more comfortable than cars.

(a) A (b) B (c) C (d) D

39. It is important for shipping companies to be clear about the objectives for maintenance and materials management - as to whether the primary focus is on service level improvement or cost minimization. Often when certain systems are set in place, the cost minimization objective and associated procedure become more important than the flexibility required for service level improvement. The problem really arises since cost minimization tends to focus on out of pocket costs which are visible, while the opportunity costs, often greater in value, are lost sight of. (2003)

A. Shipping companies have to either minimize costs or maximize service quality. If they focus on cost minimization, they will reduce quality. They should focus on service level improvement, or else opportunity costs will be lost sight of.

- B. Shipping companies should determine the primary focus of their maintenance and materials management. Focus on cost minimization may reduce visible costs, but ignore greater invisible costs and impair service quality.

C. Any cost minimization program in shipping is bound to lower the quality of service. Therefore, shipping companies must be clear about the primary focus of their maintenance and materials management before embarking on cost minimization.

D. Shipping companies should focus on quality level improvement rather than cost cutting . Cost cutting will lead to untold opportunity costs. Companies should have systems in place to make the service level flexible.

(a) A (b) B (c) C (d) D

40. You seemed at first to take no notice of your school-fellows, or rather to set yourself against them because they were strangers to you. They knew as little of you as you did of them; this would have been the reason for their keeping aloof from you as well, which you would have felt as a hardship. Learn never to conceive a prejudice against others because you know nothing of them. It is bad reasoning, and makes enemies of half the world. Do not think ill of them till they behave ill to you; and then strive to avoid the faults which you see in them. This will disarm their hostility sooner than pique or resentment or complaint. (2004)

(a) The discomfort you felt with your school fellows was because both sides knew little of each other. You should not complain unless you find others prejudiced against you and have attempted to carefully analyze the faults you have observed in them.

(b) The discomfort you felt with your school fellows was because both sides knew little of each other. Avoid prejudice and negative thoughts till you encounter bad behaviour from others, and then win them over by shunning the faults you have observed.

(c) You encountered hardship amongst your school fellows because you did not know them well. You should learn to not make enemies because of your prejudices irrespective of their behaviour towards you.

(d) You encountered hardship amongst your school fellows because you did not know them well. You should learn to not make enemies because of your prejudices unless they behave badly with you.

41. The human race is spread all over the world, from the polar regions to the tropics. The people of whom it is made up eat different kinds of food, partly according to the climate in which they live, and partly according to the kind of food which their country produces. In hot climates, meat and fat are not much needed; but in the Arctic regions they seem to be very necessary for keeping up the heat of the body. Thus, in India, people live chiefly on different kinds of grains, eggs, milk, or sometimes fish and meat. In Europe, people eat more meat and less grain. In the regions, where no grains and fruits are produced, the Eskimo and other races live almost entirely on meat and fish. (2004)

(a) Food eaten by people in different regions of the world depends on the climate and produce of the region, and varies from meat and fish in the Arctic to predominantly grains in the tropics.

(b) Hot climates require people to eat grains while cold regions require people to eat meat and fish.

(c) In hot countries people eat mainly grains while in the Arctic, they eat meat and fish because they cannot grow grains.

(d) While people in Arctic regions like meat and fish and those in hot regions like India prefer mainly grains, they have to change what they eat depending on the local climate and the local produce.

42. Although almost all climate scientists agree that the Earth is gradually warming, they have long been of two minds about the process of rapid climate shifts within larger periods of change. Some have speculated that the process works like a giant oven or freezer, warming or cooling the whole planet at the same time. Others think that shifts occur on opposing schedules in the Northern and Southern Hemispheres, like exaggerated seasons. Recent research in Germany examining climate patterns in the Southern Hemisphere at the end of the last Ice Age strengthens the idea that warming and cooling occurs at alternate times in the two hemispheres. A more definitive answer to this debate will allow scientists to better predict when and how quickly the next climate shift will happen. (2004 - 2marks)

(a) Scientists have been unsure whether rapid shifts in the Earth's climate happen all at once or on opposing schedules in different hemispheres; research will help find a definitive answer and better predict climate shifts in future.

(b) Scientists have been unsure whether rapid shifts in the Earth's climate happen all at once or on opposing schedules in different hemispheres; finding a definitive answer will help them better predict climate shifts in future.

(c) Research in Germany will help scientists find a definitive answer about warming and cooling of the Earth and predict climate shifts in the future in a better manner.

(d) More research rather than debates on warming or cooling of the Earth and exaggerated seasons in its hemispheres will help scientists in Germany predict climate changes better in future.

43. Modern bourgeois society, said Nietzsche, was decadent and enfeebled - a victim of the excessive development of the rational faculties at the expense of will and instinct. Against the liberal-rationalist stress on the intellect, Nietzsche urged recognition of the dark mysterious world of instinctual desires- the true forces of life. Smother the will with excessive intellectualizing and you destroy the spontaneity that sparks cultural creativity and ignites a zest for living. The critical and theoretical outlook destroyed the creative instincts. For man's manifold potential to be realized, he must forego relying on the intellect and nurture again the instinctual roots of human existence. **(2004 - 2marks)**
- (a) Nietzsche urges the decadent and enfeebled modern society to forego intellect and give importance to creative instincts.
  - (b) Nietzsche urges the decadent and enfeebled modern society to smother the will with excessive intellectualising and ignite a zest for living.
  - (c) Nietzsche criticizes the intellectuals for enfeebling the modern bourgeois society by not nurturing man's creative instincts.
  - (d) Nietzsche blames excessive intellectualization for the decline of modern society and suggests nurturing creative instincts instead.
44. Local communities have often come in conflict with agents trying to exploit resources, at a faster pace, for an expanding commercial - industrial economy. More often than not, such agents of resource intensification are given preferential treatment by the state, through the grant of generous long leases over mineral or fish stocks, for example, or the provision of raw material at an enormously subsidized price. With the injustice so compounded, local communities at the receiving end of this process have no recourse except direct action, resisting both the state and outside exploiters through a variety of protest techniques. These struggles might perhaps be seen as a manifestation of a new kind of class conflict. **(2004 - 2marks)**
- (a) A new kind of class conflict arises from preferential treatment given to agents of resource- intensification by the state which the local community sees as unfair.
  - (b) The grant of long leases to agents of resource- intensification for an expanding commercial - industrial economy leads to direct protests from the local community, which sees it as unfair.
  - (c) Preferential treatment given by the state to agents of resource- intensification for an expanding commercial - industrial economy exacerbates injustice to local communities and leads to direct protests from them, resulting in a new type of class conflict.
  - (d) Local communities have no option but to protest against agents of resource-intensification and create a new type of class conflict when they are given raw material at subsidized prices for an expanding commercial industrial - economy.

## ANSWERS WITH SOLUTIONS

1. (a) The idea of the passage is that, the idea of private property, within limits, can function for the general advantage. Option (a) would weaken the argument as it talks about equitable growth and says that private property brings disparity.
2. (a) The passage says that fresh experience gives new inputs to a writer which keeps him fertile. Clearly (a) supports the thought.
3. (d) Only (d) undermines the argument. To know a country you have to devote your life.
4. (c) The idea of the passage is very lucidly summarised in option (c).
5. (d) The passage clearly says - some members in the audience are more intelligent than any of its other members (which is clear from 2nd statement). (b) is also true from last statement as the mental capacity of the lot comes out to be 'O' (less than average).
6. (a) (a) is the correct choice as the passage says that "efficiency is present everywhere, this makes it all pervading". The passage does not suggest that efficiency does not pay or can be more of a torture.
7. (c) (c) is the best choice as the sophisticated system of elevated monorail travel was only decided, but another suggestion was given on the metro rail system thus no consensus was reached and the plan was stalled. Also from subsequent sentences we can infer that there were many later developments which caused a hindrance in the completion of the project. The final sentence suggests that the project will be stalled for a long time.
8. (b) (b) is the only option as according to the passage designations can be forgotten and even a subordinate like a sales engineer can question the CEO.
9. (b) The passage clearly talks about India's losing architectural wealth. It clearly says that foreigners are interested in our artifacts and the greed of foreign currency forces the localites to sell it off easily. The use of 'shameless rape' clearly shows that Indians are not proud of their cultural heritage.
10. (b) (b) is the best choice as can be assumed from the passage that 'the Indian audience is highly impressionable and as such films ruin the moral fabric of the nation, thus the audience must be protected', is the basis on which the moral police has critiqued the film.
11. (a) One can infer from the passage that the rich have never felt secure against the poor, and thus they desired to defend themselves against the have-nots. The correct option is (a).
12. (c) (c) is the correct option, as the passage very clearly states, that the second kind of traveller allows the spirit of the place to be sink in to their minds. They do not in any haste and they want quality of travelling.
13. (d) The passage refers to the usefulness of the English tongue and the intrinsic value of our literature. Since none of the choices infers anything from the passage, the correct option is (d). Although English is a colonial language, the passage does not link English to the colonial history.
14. (d) None of the options given, support any statement from the passage. Thus the correct choice is (d).
15. (a) (a) is the correct option as it is very clearly given in the passage, that the Indian middle class has been the focus of the economic policies since the mid-80's.
16. (c) The 3 airlines decreased the fare with the belief that volumes will increase as a result. This can happen only if the customers are price-conscious.
17. (b) The passage clearly talks about duplication of a memorised passage many times. This correlates the priest with a recorded audio cassette.
18. (c) As India will become a developed nation so the financial crunch problem will no longer persist.
19. (d) The passage clearly says that richness in biodiversity, disregarding poverty status, goes hand in hand with educational backwardness. So (c) is wrong and (d) is correct.
20. (b) As reducing taxes will reduce the price of cigarettes. Thus tobacco consumers will shift to cigarette smoking will bolster the conclusion.
21. (c) According to Malthus the human population will outgrow the food supply thus predicting an end of life on earth. Thus (c) which says that human and natural systems follow natural laws of growth (constant & unchanged) does not undermine the thesis.
22. (a) (a) is the best option as according to the passage the achievement of the 8000 tonne target was made two years earlier. Now, the achievement of 10000 tonnes would be unrealistic as the company would have exhausted all the enhancing measures implementing.
23. (b) (b) comes across as the only logical inference from the passage where it is shown that animals in general can function when they are in their normal social environment as explained through the examples of bees, ants, elephant & beavers who cannot work properly when separated or invaded by humans.
24. (c) (c) is the best option as it shows that children below 6 years of age were enrolled in class I, the age interval does not fit into this level, thus the ratio is exaggerated.
25. (b) Inferring from the passage (b) supports Szymanski's conclusion because the passage suggests that clubs that had spent more on hiring white players should have finished higher. However, there is pay discrimination. So high pay may not mean good performance.

26. (d) (d) is the only choice which make sense since the Minister in charge of prisons would be influenced by incidence of disturbance as he had already fears of tensions snapping and have recommended an amnesty policy to his government.
27. (c) (c) is the correct option as according to the passage the low price of one rupee per kilo can be brought about by small scale and joint sector units which have already completed trials for regular production. If the small scale sector can produce iodised salt at cheaper rate then selling the salt can be made practical through these sectors at a large scale.
28. (d) The passage does not talk about (a) - higher proportion of deaf moths and (b) - try to avoid bats. (c) is not correct as the passage does not talk about the proneness of becoming a prey. (d) is correct as the large wingspan enables the deaf moths to better receive and sense the pulses of their bat predators.
29. (a) Clearly (a) is correct. If the preference of the consumers will shift to leaner meats than the campaign to promote beef will definitely fail.
30. (a) With families purchasing second cars it can be easily supported that the measures adopted to date have not succeeded. Option (b) if true will oppose the claim.
31. (b) The government's resort to monetisation of debt despite reservations of the Central Bank supports the conclusion drawn in the passage. Option (a) opposes the conclusion. Option (c) & (d) do not make any sense.
32. (d) (d) best summarises the passage as can be inferred from the passage that the varied use of the Umbrella symbol illustrates the common bases of non-theocratic nature of states and represents the instrument of firmament of supreme law as mentioned in the passage.
33. (c) Climbing Mt. Everest is not a game as there is no loser because of lack of a competition. In an essay competition we have a winner and losers but the strategy of each competitor is independent of others. In a war both the conditions are satisfied.
34. (d) According to the passage unseasonableness is the tendency to do socially permissible things at the wrong time. Thus (d) is the right choice as he would tend to tell a long story to people who have heard it many times before.
35. (a) (a) comes across as a correct option. According to the unseasonable tendency the man would do a socially permissible thing at the wrong time, so he brings a higher bidder but after the deal has already been closed.
36. (a) (a) comes across is the only reasonable option as the decisions to be taken in the passage are fairly obvious i.e. with a low bank account a free holiday offer may be taken up or if we are ready to move forward in our career then we can step in for the boss, when she is away. A is the most appropriate choice as it mentions that some decisions are obvious under certain circumstances while other options.
37. (d) D is the correct option as it clearly defines inertia. A is wrong as it says inertia makes your body sluggish. B is wrong as the passage do not talk about capability. C does not capture the essence of the passage.
38. (b) B is the best choice as it captures the essence of the passage. The importance of being clear of its objective. It clearly tells the cost cutting may reduce visible costs but ignore invisible costs (opportunity costs) and impair service quality.
39. (d) (d) is the only option feasible because the passage refers to the primary focus being on quality level improvement. The passage also mentions that cost cutting tends to focus on out of pocket costs which are visible rather than an opportunity costs which are greater in value.
40. (b) (b) is the correct choice. It best summarises the points made in the passage and the advice given. The other options state one or the other thing incorrectly. In (a) the second statement is clearly wrong. In (c) & (d) statement 1 covers only one aspect of the passage. In second statement, 'learn to not make enemies' is not talked about in the passage.
41. (a) (a) is clearly the correct option. (b), (c) and (d) are only inferences but not the summary. (a) covers the complete scope of the passage. If offers the essence or the thematic of the passage while others merely offer citations.
42. (b) Option (b) is the answer because it talks about scientists being unsure about rapid shifts in earth's climate and how finding a definitive answer will help them to predict the future climatic changes. Option (a) cannot be the answer as it talks about research in general and the paragraph gives more emphasis on finding a "definitive answer" in terms of climate change. Option (c) is not considered as it gives emphasis only on research done in Germany. Option (d) is also ruled out because it specifically gives more importance to scientists of Germany.
43. (d) (d) is the most precise way to explain the passage. From the third sentence it is clear that excessive intellectualizing destroys creativity and the last line of the paragraph says that human beings should nurture their creative instincts. As on the whole the paragraph puts the blame on excessive rational thinking responsible for the decline of the modern society. While option (a) misses the point of critiquing modern society. (d) misses Nietzsche's advice to nurture creative instincts.
44. (c) (c) is the most appropriate option. Option (a) doesn't talk about the expanding commercial-industrial economy. (b) does not explain the effect of the struggles i.e. 'a new conflict', (d) is not correct as it talks specifically only of raw materials for expanding economy. Further it says local communities are creating new type of conflict, which is wrong.

# 22

CHAPTER

# READING COMPREHENSION

Based on

# SOCIAL SCIENCES

**Directions for Questions 1 to 195 :** This Section contains passages followed by questions based upon the contents of the passages. Read the passages and select the best option for the answers.

## PASSAGE - 1

(1994)

If American policy towards Europe in the postwar years had been a conspicuous success, and towards Asia a disappointing balance between success and failure, it could be said that the most conspicuous thing about relations with Latin America was the absence of any policy. Franklin Roosevelt, to be sure, had launched a "Good Neighbour" policy, but being a good neighbour was, it seemed, a negative rather than a positive affair, a matter of keeping hands off, of making the Monroe Doctrine, in form at least, multilateral. All through the postwar years, the states of Latin America -- Mexico and Chile were partial exceptions -- were in the throes of major economic and social crises. Population was growing faster than in any other part of the globe, without a comparable increase in wealth or productivity; the gap between the poor and the rich was widening; and as the rich and powerful turned to the military for the preservation of order and privilege, the poor turned to revolution.

Deeply involved in other quarters of the globe, the United States paid little attention to the fortunes or misfortunes of her neighbours to the south, and when she did intervene, it appeared to be on the side of order and the status quo rather than on the side of reform. So frightened was the United States of "Communism" in Latin America that it preferred military dictatorship to reformers who might drift too far to the "left", and sustained a Batista in Cuba, a Trujillo in the Dominican Republic, a Peron in Argentina, and a Jimenez in Venezuela.

In his last two years, President Eisenhower had tried to mend his Latin American fences. Though rejecting a Brazilian proposal of a Marshall Plan for Latin America, he did take the initiative in setting up an Inter-American development Bank with a capital of one billion dollars, almost half of it supplied by the United States. Other government investments in Latin America ran to some four billion dollars, while private investment exceeded nine billion. Yet, though to most Americans, all this seemed a form of economic aid, many Latin Americans regarded it as economic imperialism. In September 1960, came a co-operative plan that could not be regarded as other than enlightened: the Act of Bogota, which authorized a grant of half a billion dollars to subsidize not only economic but social and educational progress in Latin America. "We are not saints", said President Eisenhower when he visited Santiago de Chile, "We know we make mistakes, but our heart is in the right place".

But was it? President Kennedy was confronted by the same dilemma that had perplexed his predecessors. Clearly it was essential to provide a large-scale aid to the countries south of Rio Grande, but should this aid go to bolster up established regimes and thus help maintain status quo, or should it be used to speed up social reform, even at the risk of revolt? As early as 1958, the then Senator Kennedy has asserted that "the objective of our aid program in Latin America should not be to purchase allies, but to consolidate a free and democratic Western Hemisphere, alleviating those conditions which might foster opportunities for communistic infiltration and uniting our peoples on the basis of constantly increasing living standard".

This conviction that raising the standards of living was the best method of checking Communism now inspired President Kennedy's bold proposal for the creation of the Alliance for Progress -- a ten year plan designed to do for Latin America what Marshall Plan had done for Western Europe. It was to be "a peaceful revolution on a hemispheric scale, a vast co-operative effort, unparalleled in magnitude and nobility of purpose, to satisfy the basic needs of the American people for homes, work, land, health and schools." To achieve this, the United States pleaded an initial grant of one billion dollars, with the promise of additional billions for the future.

1. Following World War II, which problem was the United States most concerned with regarding Latin America?  
(a) economic stability      (b) political ideology      (c) religious persecution      (d) military dictatorship
2. A key reason why Latin America rejected the Inter-American development Bank was that  
(a) it primarily provided money for social reform subsidies  
(b) the moneys provided were only for specific performance projects  
(c) it constituted an extension of the Marshall Plan into Latin America  
(d) it was being used as a means to control the economic destiny of Latin America

3. Which of the following is most closely associated with the concept of a Marshall Plan for Latin America?
- (a) The Good Neighbour Policy
  - (b) The Alliance for Progress
  - (c) The Act of Bogota
  - (d) The Monroe Doctrine
4. According to the passage, the fundamental change in U.S. foreign policy directed toward Latin America
- (a) resulted in a deterioration of U.S.-Latin American relations
  - (b) was responsible for Peron remaining as a dictator in Peru
  - (c) recognized that economic aid alone would not prevent social revolutions
  - (d) provided for increased military and economic aid to prevent the spread of communism in Latin America
5. Which of the following statements is not true?
- (a) Mexico and Chile did not experience the general social crises that were common to the majority of Latin American countries
  - (b) President Eisenhower continued in practice the theory that economic aid was the best defense against communist incursion into Latin America
  - (c) The Good Neighbour Policy favoured a multilateral interpretation of the Monroe Doctrine
  - (d) The traditional U.S. approach in Latin America was to protect the status quo
6. Which of the inferences can be drawn if everything said in the passage were assumed to be true?
- (a) Rebellions are fuelled by social reforms and avoided by supporting established authorities or continuing the present state of affairs.
  - (b) The American policy towards Asia can be called an overall success, though small in magnitude.
  - (c) Kennedy, in 1958, wanted America to aid South American countries to acquire more support in their fight against communism.
  - (d) Eisenhower rejected the Marshall Plan, whereas Kennedy implemented a similar one.

## PASSAGE - 2

(1994)

In order to better understand conservatism in China, it is essential that one has a grasp of what the term "Chinese conservatism" means. Chinese conservatism is markedly different from the conservatism of the modern West. The political term "conservative" came about during the French Revolution and inspired men who were determined to preserve Christian and aristocratic elements in European society. Chinese conservatism began around the time of the Taiping Rebellion and had as its primary objectives the preservation of both Confucian society and nonfeudal strains of pre-Opium War Chinese society. While western conservatism believes in sacredness of private property and distrust of cosmopolitanism, the Chinese conservatism is the defense of a rational cosmopolitan order. Thus, the only common area of agreement between European and Chinese conservatism is the intent to conserve.

During the Tung-chin Restoration, the great aim was the revival of Confucian values and institutions. But these aims had to be modified so that they might endure. Restoration statesmen had no desire to create a new society - they wanted to restore a society that they believed had been based on truth. The statesmen of the Restoration stretched the traditional ideology to its limits in an effort to make the Confucian system under new conditions. They were true conservatives in a great tradition, living in an age when revolutionary change was unavoidable. The aim of the Restoration was to restore to their original vitality the best of the ancient institutions. During the Restoration, the two immediate problems were the suppression of rebellion and the stabilization of foreign relations. In addition, the people were striving for a restoration of the system of government by superior civil officials.

The men in the hierarchy of the Restoration rose to prominence through proven ability in both civil and military affairs. They emphasized human and social training - that is, indoctrination, morality, and the art of leadership through the cultivation of character. The great majority of the officials rose through the examination system.

During the chaos of this period, the examination system had lost much of its effectiveness. This is important and must be noted because the examination system was the traditional avenue for selecting officials. The senior officials of Restoration realized that their policies would be ineffective unless the quality of the junior officials was improved, so it was their duty to weed out the officials who had attained office in irregular ways and to promote the examination system as the only way to high position. But these men of the Restoration had enough foresight to determine that it was impossible to select officials automatically on the basis of objective tests alone. As a result, the system of recommendation was ushered in, whereby, a high official sponsored the career of a promising young man. This acted as an important supplement to the examination system.

7. The traditional method for selecting officials was
- (a) approximately by the civil government
  - (b) the examination system
  - (c) through a subjective testing system
  - (d) sponsorship by a high government official

## PASSAGE - 3

(1994)

Every state has a constitution, since every state functions on the basis of certain rules and principles. It has often been asserted that the United States has a written constitution, but that the constitution of Great Britain is unwritten. This is true only in the sense that, in the United States, there is a formal document called the Constitution, whereas there is no such document in Great Britain. In fact, however, many parts of the British constitution exist in written form, whereas important aspects of the American constitution are wholly unwritten. The British constitution includes the Bill of Rights (1689), the Act of Settlement (1700-01), the Parliament Act of 1911, the successive Representation of the People Acts (which extended the suffrage), the statutes dealing with the structure of the courts, the various local government acts, and many others. These are not ordinary statutes, even though they are adopted in the ordinary legislative way, and they are not codified within the structure of single orderly document. On the other hand, such institutions in the United States as the presidential cabinet and the system of political parties, though not even mentioned in the written constitution, are most certainly of constitutional significance. The presence or absence of a formal written document makes a difference, of course, but only one of degree. A single-document constitution has such advantages as greater precision, simplicity, and consistency. In a newly developing state as Israel, on the other hand, the balance of advantage has been found to lie with an uncodified constitution evolving through the growth of custom and the medium of statutes. Experience suggests that some codified constitutions are much too detailed. An overlong constitution invites disputes and litigation is rarely read or understood by the ordinary citizen, and injects too much rigidity in cases in which flexibility is often preferable. Since a very long constitution says too many things on too many subjects, it must be amended often, and this makes it still longer. The United States Constitution of 7,000 words is a model of brevity, whereas many of that country's state constitutions are much too long -- the longest being that of the state of Louisiana, whose constitution now has about 255,000 words. The very new, modern constitutions of the recently admitted states of Alaska and Hawaii and the Commonwealth of Puerto Rico have, significantly, very concise constitutions ranging from 9,000 to 15,000 words. The 1949 constitution of India, with 395 articles, is the wordiest of all national constitutions. In contrast, some of the world's new constitutions, such as those of Japan and Indonesia, are very short indeed.

Some constitutions are buttressed by powerful institutions such as an independent judiciary, whereas others, though committed to lofty principles, are not supported by governmental institutions endowed with the authority to defend these principles in concrete situations. Accordingly, many juristic writers distinguish between “normative” and “nominal” constitutions. A normative constitution is the one that not only has the status of supreme law but is also fully activated and effective; it is habitually obeyed in the actual life of the state. A nominal constitution may express high aspirations, but it does not, in fact, reflect the political realities of the state. Article

125 of the 1936 constitution of the Soviet Union and the article 87 of the 1954 constitution of the People's Republic of China both purport to guarantee freedom of speech, but in those countries even mild expressions of dissent are likely to be swiftly and sternly repressed. Where the written constitution is only nominal, behind the verbal facade will be found the real constitution containing the basic principles according to which power is exercised in actual fact. Thus in the Soviet Union, the rules of the Communist Party describing its organs and functioning are more truly the constitution of that country than are the grand phrases of the 1936 Stalin constitution. Every state, in short has a constitution, but in some, real constitution operates behind the facade of a nominal constitution.

14. The lengthiest constitution in the world is that of
 

(a) Great Britain	(b) India	(c) Puerto Rico	(d) Soviet Union
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15. The instance of a country without a written constitution mentioned in the passage is
 

(a) People's Republic of China	(b) Japan
(c) Israel	(d) Indonesia
16. The unwritten parts of the US constitution deal with
 

(a) courts	(b) presidential cabinet
(c) relationship between the Centre and the States	(d) fundamental rights
17. In the United States
 

(a) the newly admitted states have lengthy constitutions	(b) the newly admitted states have concise constitutions
(c) the political parties have no constitutional significance	(d) the constitution can be termed 'nominal'
18. In countries with 'normative' constitutions
 

(a) there will be very little freedom of speech	(b) one that contains lofty ideals
(b) there are effective instruments to enforce their provisions	(d) a constitution that is not being enforced
(c) political realities are different from what are enshrined in them	
(d) there are frequent amendments to them	
19. By 'nominal' constitution, the author means
 

(a) a written constitution	(b) one that contains lofty ideals
(c) a lengthy constitution	(d) a constitution that is not being enforced
20. One of the drawbacks of a long constitution is
 

(a) its publication is expensive	(b) it is difficult to understand
(c) it may require to be amended frequently	(d) it is difficult to enforce
21. According to the author, the difference between a written and an unwritten constitution
 

(a) has no significance	(b) is just one of degree
(c) has been exaggerated by politicians	(d) cannot be defined

## PASSAGE - 4

(1994)

The Japanese want their Emperor to reign for long, very long, but their Prime Ministers to have very short tenures. During the 61 years Hirohito has been on the Chrysanthemum throne, 38 Prime Ministers have come and gone (or at least 32, if returns to power are left out of account). Eisaku Sato's eight uninterrupted years as Prime Minister in the Sixties and early Seventies provoked fears about the possible ill-effects of one-man leadership on Japanese democracy, and led the dominant Liberal Democratic Party (LDP) to lay down the norm of a two-year for a party chief and head of Government. Mr. Yasuhiro Nakasone, now bowing out, has served for an unusual five years. His success as Prime Minister was evidenced by the ruling party's re-electing him leader more than once. But his plan to push through the Diet a Bill to levy a 5% indirect tax as part of financial reforms failed, in spite of the LDP majority in both the chambers. It was time then for him to go.

The quick turnover of Prime Ministers has contributed to the functioning of the LDP through factions. In the party that has ruled Japan for 32 years continuously, factionalism is not something unseemly. The leader is chosen by hard bargaining — some foreigners call it horse-trading — among the faction leaders, followed, if necessary, by a party election. For the decision in favour of Noboru Takeshita as the next President of the LDP and Prime Minister of Japan, voting was not necessary. His hopes were stronger than those of the other two candidates — Finance Minister Kiichi Miyazawa and former Foreign Minister, Shintaro Abe — if only because he had proved himself more skillful in the game of factional politics. A one-time protege of Mr. Kakuei Tanaka, he thrust himself forward when the leader was disgraced on a charge of accepting bribes for sale of Lockheed aircraft to Japan and debilitated by physical ailments. Mr. Takeshita took away most of Mr. Tanaka's following and now leads the biggest faction in the LDP. Mr. Nakasone persuaded Mr. Miyazawa and Mr. Abe to accept Mr. Takeshita's leadership. An election would most probably have led to the same result. Mr. Takeshita seemed to have forged a firm alliance with at least two other factions and put in his bag the votes necessary for a win.

How Mr. Takeshita will fare after taking over the reins of Government in 1987 is not so certain. He will be Japan's first Prime Minister with a humble rural origin. A dichotomy in his nature shows through his record of teaching English in a junior high school and not trying to speak that language in public later. When he was the Minister of Finance, he gave the impression of an extremely cautious man with a reverence for consensus but challenging titled a book on his ideas *Going My Way*. Mr. Takeshita says that continuing Mr. Nakasone's programmes would be the basis of his policy. This is not saying enough. Japan faces two main issues : tax reforms and relations with United States. Mr. Nakasone's plan to impose an indirect tax ran into effective opposition, and the friction with the U.S. over trade continue. Mr. Takeshita cannot be facing any easy future as Japan's next leader and there is nothing to show yet that he will be drawing on secret reserves of dynamism.



## PASSAGE - 5

(1995)

The Republican Party has lost its mind. To win elections, a party needs votes, obviously, and constituencies. First however, it needs ideas. In 1994 -95, the Republican Party had after a long struggle advanced a coherent, compelling set of political ideas expressed in a specific legislative agenda. The political story of 1996 is that this same party, within the space of six weeks, then became totally, shockingly intellectually deranged.

Think back. The singular achievement of the House Speaker Newt Gingrich's '94 revolution was that it swept into power united behind one comprehensive ideological goal: dismantling the welfare state. Just about everything in the contract with America and the legislative agenda of the 104th Congress is a mere subheading: welfare reform, tax cuts, entitlement reform, returning power to the states, the balanced budget (a supremely powerful means for keeping the growth of government in check ).

The central Republican idea was that the individual, the family, the church, the schools - civil society - were being systematically usurped and strangled by the federal behemoth. Republicans were riding into Washington to slay it.

With this idea they met Clinton head-on in late 1995. And although they were tactically defeated - the government shutdown proved a disaster of Republicans - they won philosophically. Clinton conceded all their principles. He finally embraced their seven year balanced budget. Then, in a State of the Union speech that might have been delivered by a moderate Republican, he declared, "The era of Big Government is over," the dominant theme of the Gingrich revolution.

It seems so long ago. Because then, astonishingly, on the very morrow of their philosophical victory, just as the Republicans prepared to carry these ideas into battle in November, came cannon fire from the rear.

The first Republican renegade to cry “Wrong” and charge was Steve Forbes. With his freelunch, tax-cutting flat tax, he declared the balanced budget, the centrepiece of the Republican revolution, unnecessary. Then, no sooner had the Forbes mutiny been put down than Pat Buchanan declared a general insurrection. He too declared war on the party’s central ideology - in the name not supply-side theory but of class warfare, the democratic weapon of choice against Republicanism.

The enemy, according to Buchanan, is not the welfare state. It is that conservative icon, capitalism, with its ruthless captains of industry, greedy financiers and political elite (Republicans included, or course). All three groups collaborate to let foreigners - immigrants, traders, parasitic foreign-aid loafers - destroy the good life of the ordinary American worker.

Buchananism holds that what is killing the little guy in America is the big guy, not Big Government. It blames not an overreaching government that tries to insulate citizens from life’s buffeting to the point where it creates deeply destructive dependency. But an uncaring government that does not protect its victim-people enough from that buffeting. Buchanan would protect and wield a mighty government apparatus to do so, government that builds trade walls and immigrant-repelling fences, that imposes punitive taxes on imports, that polices the hiring and firing practices of business with the arrogance of the most zealous affirmative action enforcer.

This is Reaganism standing on its head.

Republicans have focused too much on the mere tactical dangers posed by this assault. Yes, it gives ammunition to the Democrats. Yes it puts the eventual nominee through a bruising campaign and delivers him tarnished and drained into the ring against Bill Clinton.

But the real danger is philosophical, not tactical. It is axioms, not just policies, that are under fire. The Republican idea of smaller government is being ground to dust - by Republicans. In the middle of an election year, when they should be honing their themes against Democratic liberalism, Buchanan’s rise is forcing a pointless rearguard battle against a philosophical corpse, the obsolete Palaeo-conservatism - a mix of nativism, protectionism and isolationism of the 1930s.

As the candidates’ debate in Arizona last week showed, the entire primary campaign will be fought on Buchanan’s grounds, fending off his Smoot-Hawley-Franco populism. And then what? After the convention, what does the nominee to? Try to resurrect the anti-welfare state themes of the historically successful ‘94 congressional campaign?

Well, yes but with a terrible loss of energy and focus- and support. Buchanan’s constituency, by then convinced by their leader that the working man’s issues have been pushed aside, may simply walk on Election Day or, even worse, defect to the Democrats. After all, Democrats do class war very well.

Political parties can survive bruising primary battles. They cannot survive ideological meltdown. Dole and Buchanan say they are fighting for the heart and soul of the Republican party. Heart and soul, however, will get you nowhere when you’ve lost your way and your mind .

31. Assuming the passage to be truthful, what does a party not need to win elections ?
  - (a) Votes
  - (b) Money
  - (c) Constituencies
  - (d) Ideas
32. Which broad ideology helped Newt Gingrich lead the Republican revolution of 1994 ?
  - (a) Tax cuts
  - (b) Entitlement reform
  - (c) Welfare reform
  - (d) Welfare state dismantling.
33. The Republicans were tactically defeated by the Democrats because
  - (a) of the shutdown of the government
  - (b) the balanced budget plan failed
  - (c) Steve Forbes led a revolution
  - (d) Bill Clinton pre-empted them
34. Which of the following are not Republicans ?
  - (a) Newt Gingrich
  - (b) Pat Buchanan
  - (c) Bob Dole
  - (d) None of the above
35. Which of the following would be a suitable title for the passage ?
  - (a) The democrats : victory in sight
  - (b) Follies and foibles of the Republican party
  - (c) Republicans- Are you crazy ?
  - (d) Mutinies on the Republican Bounty
36. Which of the following, according to Buchanan, is not an enemy ?
  - (a) Big government.
  - (b) Immigrants
  - (c) Captains of industry
  - (d) Foreign-aid requesters
37. What according to the author, is the real danger for Republicans ?
  - (a) The fact that small government is being ground to dust
  - (b) The fact Bill Clinton is gaining popularity
  - (c) The fact that it is axioms, and not just policies that are under fire
  - (d) The fact that the eventual nominee would be too tired to fight an election against Clinton
38. The word ‘obsolete’ in the context of the passage means
  - (a) antiquated
  - (b) absolute
  - (c) boring
  - (d) miasmic

## PASSAGE - 6

(1995)

Among those who call themselves Socialists, two kinds of persons may be distinguished. There are, in the first place, those whose plans for a new order of society, in which private property and individual competition are to be superseded and other motives to action substituted, are on the scale of a village community or township, and would be applied to an entire country by the multiplication of such self-acting units; of this character are the systems of Owen, of Fourier, and the more thoughtful and philosophic Socialists generally. The other class, who are more a product of the Continent than of Great Britain and may be called the revolutionary Socialists, propose to themselves a much bolder stroke. Their scheme is the management of the whole productive resources of the country by one central authority, the general government. And with this view some of them avow as their purpose that the working classes, or somebody in their behalf, should take possession of all the property of the country, and administer it for the general benefit.

Whatever be the difficulties of the first of these two forms of Socialism, the second must evidently involve the same difficulties and many more. The former, too has the great advantage that it can be brought into operation progressively, and can prove its capabilities by trial. It can be tried first on a select population and extended to others as their education and cultivation permit. It need not, and in the natural order of things would not, become an engine of subversion until it had shown itself capable of being also a means of reconstruction. It is not so with the other : the aim of that is to substitute the new rule for the old at a single stroke, and to exchange the amount of good realized under the present system, and its large possibilities of improvement, for a plunge without any preparation into the most extreme form of the problem of carrying on the whole round of the operations of social life without the motive power which has always hitherto worked the social machinery. It must be acknowledged that those who would play this game on the strength of their own private opinion, unconfirmed as yet by any experimental verification — who would forcibly deprive all who have now a comfortable physical existence of their only present means of preserving it, and would brave the frightful bloodshed and misery that would ensue if the attempt was resisted — must have a serene confidence in their own wisdom on the one hand and a recklessness of other people's sufferings of the other, which Robespierre and St. Just, hitherto the typical instances of those united attributes, scarcely came up to. Nevertheless this scheme has great elements of popularity which the more cautious and reasonable form of Socialism has not; because what it professes to do, it promised to do quickly, and holds out hope to the enthusiastic of seeing the whole of their aspirations released in their own time and at a blow.

39. According to the author, the difference between the two kinds of socialists is that
- one consists of thinkers and the others are active people
  - the first have a definite philosophy and the second don't have any definite philosophy.
  - the first believe in gradual change while the others believe in revolutionary change.
  - the first are the products of Britain, while the others are products of Russia.
40. Which of the following is not a socialist ?
- Robespierre
  - Fourier
  - Owen
  - All are socialists
41. According to the philosophy of revolutionary socialism
- The government takes over the village first and then, gradually the whole country.
  - The government takes over all productive resources of the country at one stroke.
  - The government declares a police state and rules by decree
  - There is no government as such; the people rule themselves by the socialist doctrine
42. Which of the following, according to the author, is true ?
- The second form of socialism has more difficulties than the first.
  - The second form of socialism has the same difficulties than the first.
  - The second form of socialism has less difficulties than the first.
  - The author has not compared the difficulties of the two.
43. Which of the following were characteristics of St. Just and Robespierre ?
- Unconcern for other' suffering
  - Full confidence in their own wisdom
  - Both (a) and (b)
  - Neither (a) nor (b)
44. It may be inferred form the passage that the author's sympathies are on
- neither side
  - the side of socialist doctrine
  - the side of the second type of socialism
  - the first type of socialism
45. The word ' avow' in the context of the passage means....
- proclaim
  - vow
  - affirm
  - deny
46. Which of the following, according to the author, may not be the result of not verifying the desirability of socialism experimentally first?
- Bloodshed
  - Deprivation of current comfortable existence
  - Corruption in high places
  - Misery caused by resisting the change

## PASSAGE - 7

(1995)

The opinion polls had been wrong. Although they were signalling a weakening in Labour's lead in the days before the general election - which pointed to a hung parliament - many working-class voters had been embarrassed to tell middle-class pollsters that they were intending to vote Labour. The final result on April 9, 1992, which gave Neil Kinnock a working majority of 30, was the turnaround of the century.

As John Major cleared his desk in Downing Street, pundit after pundit lined up to criticise his lackluster campaign. The trouble was, they all agreed, that the conservative party no longer had a message or political purpose. Its representation in the north of England was decimated ; its future as a national party is doubt.

For Kinnock the victory was sweet reward for nine years of Herculean labour in making his party electable. Not only had he a working majority, but the divisions in Conservative ranks between anti-Europeans, free marketers and moderates- threatened to split the party. Having set himself the objective of heading a two-or-three-term government, Kinnock made his cabinet appointments with the long haul in mind. There were few surprises. John Smith, with whom he coexisted uneasily, was made Chancellor ; Roy Hattersley became Home Secretary ; Gerald Kaufmann went to the Foreign office ; inveterate Euro- sceptic Bryan Gould took over environment; and Gordon Brown went to trade. It was, as many commentators conceded, a much more heavy weight cabinet than any the Conservatives could have mustered.

But the new cabinet was to have its first trial of strength very soon, The problem was the foreign exchange markets. Although both Kinnock and Smith had, throughout the election campaign, reaffirmed their commitment to hold the pound's parity at 2.95DM inside the ERM, the foreign exchange markets simply did not believe them. Every previous Labour government had devalued; what reason was there to suppose this one would be different ?

The pressure built up immediately. On Friday, April 10, the Bank of England managed to hold the line only by spending £4 billion - around a sixth of its total reserves - to support the exchange rate. But late that night, as the New York markets closed, the governor of the bank of England led a deputation to a meeting at 11, Downing Street with Smith and the permanent secretary to the Treasury, Sir Terence Burns. If said the governor, the pound was to survive the coming week inside the ERM, then Smith would have to demonstrate his resolve by raising interest rates - by at least 2 percent. It would also help, added the officials, if the Government were to commit Britain to full monetary union and to meet the Maastricht criteria for single currency. This would mean that both the taxation from Smith's first budget would have to be used to reduce government borrowing and the manifesto promises to raise child benefit and pensions be postponed.

Smith listened to Eddie-George-number two at the bank of England and the arbiter of British exchange rate policy - explain that, at the current rate of reserve loss, Britain's reserves would have run out by the following weekend. The markets needed decisive action. And they needed to know, by the night of Sunday, April 12, at the very latest, what the Government would do when the far-eastern markets opened after the weekend. Sir Terence advised that once the markets recognised the Government was resolved to hold the exchange rate, pressure would quickly subside and the interest rate increases could be reversed. The name of the game was earning credibility.

Although Smith had been warned to expect a Treasury / Bank of England move to assert the canons of economic orthodoxy, he had hoped to have been more than a few hours into his chancellorship before the pressures started to mount. As it stood, he felt like the victim of a coup and wondered to what extent the foreign exchange market selling had been prompted by the Bank of England's ham-fisted intervention-almost designed to manufacture a run on the pound. In any case, he could do nothing without conferring with the Prime Minister.

In fact Kinnock had asked Smith to have the preliminary Bank of England meeting without him. Although he was not at one with his Chancellor over economic policy and distrusted his judgement, he wanted to complete his cabinet appointments - and confer with his own advisers about how to react to what he knew the Bank and Treasury recommendations would be. He was determined to avoid being bounced into decisions before he had decided his line.

The alternative was to apply to the EC for a realignment conference, in which many more currencies would be devalued. But that could hardly be done then; it would have to wait until the following weekend. And it was not clear if the pound would be devalued sufficiently, or if other countries would follow the British lead. Not only might Britain have to devalue alone, it might not secure a devaluation large enough to make a difference; and be accompanied by higher interest rates

47. Who, according to the passage, is the leader of the Labour party ?
  - (a) Neil Kinnock
  - (b) John Smith
  - (c) Gerald Kaufmann
  - (d) Roy Hattersley.
48. What was the main problem facing the new cabinet ?
  - (a) The dissension in the ranks of the party
  - (b) The devaluation of the currency
  - (c) The foreign exchange problem
  - (d) The monetary union problem
49. What, according to the treasury secretary, was the only way out of the exchange problem?
  - (a) Devaluation of the currency
  - (b) Raise in interest rates
  - (c) Government spending
  - (d) Raising taxes

50. Which of the following do not belong to the Labour cabinet ?  
 (a) Mr. John Smith      (b) Mr. Bryan Gould      (c) Mr. Masstricht      (d) Mr. G Brown
51. Why did Kinnock ask Smith to attend the Bank of England meeting without him ?  
 (a) Because he did not get alongwith Smith  
 (b) Because he wanted to use that time to confer with others  
 (c) Because he already met them and did not want to meet them again  
 (d) Because he was afraid of being censured by them
52. Why, according to the author, was a realignment conference not a viable option for the government ?  
 (a) Because other countries may not follow the British lead in devaluation.  
 (b) Because the higher interest rates to be given by British lead in devaluation.  
 (c) Both (a) and (b)  
 (d) neither (a) nor (b)
53. It may be inferred from the passage that...  
 (a) the bank of England would go along with whatever the government decided  
 (b) the Prime Minister was a puppet in the hands of the bank of England  
 (c) the Bank of England was completely independent of the government  
 (d) the Bank of England could put enormous pressure on the government to formulate policy
54. What, according to the passage, was not a reason for the defeat of the Conservative party ?  
 (a) A lackluster campaign      (b) Wrong policies      (c) No special message      (d) No political purpose.
55. The word 'pundit', in the context of the passage, means ...  
 (a) a religious leader      (b) a psychologist      (c) an expert      (d) a paleontologist

## PASSAGE - 8

(1996)

Governments looking for easy popularity have frequently been tempted into announcing give-aways of all sorts; free electricity, virtually free water, subsidised food, cloth at half price, and so on. The subsidy culture has gone to extremes : cooking gas (used mostly by the top 10% of income-earners) has been sold at barely half its cost. The wealthiest people in the country have had access for years to subsidised sugar. The riches farmers in the country get subsidised fertiliser. University education, typically accessed by the wealthier sections, is charged at a fraction of cost. Postal services are subsidised, and so are railway passengers. Bus fares cannot be raised to economical levels because there will be violent protests, so bus travel subsidised too. In the past, price control on a variety of items, from steel to cement, meant that industrial consumers of these items got them at less than cost, while the losses of the public sector companies that produced them were borne by the taxpayer! One study, done a few years ago, came to the conclusion that subsidies in the Indian economy total as much as 14.5% of gross domestic product. At today's level, that would work out to about Rs. 150,000 crore.

And who pays the bill? The theory — and the political fiction on the basis of which it is sold to unsuspecting voters — is that subsidies go to the poor, and are paid for by the rich. The fact is that most subsidies go to the "rich" (defined in the Indian context as those who are above the poverty line), and much of the tab goes indirectly to the poor. Because the hefty subsidy bill results in fiscal deficits, which in turn push up rates of inflation -- which, as everyone knows, hits the poor the hardest of all. Indeed, that is why taxation call inflation the most regressive form of taxation.

The entire subsidy system is built on the thesis that people cannot help themselves, therefore governments must do so. That people cannot afford to pay for a variety of goods and services, and therefore the government must step in. This thesis has been applied not just in the poor countries but in the rich ones as well; hence the birth of the welfare state in the West, and an almost Utopian social security system : free medical care, food aid, old age security, et al. But with the passage of time, most of the wealthy nations have discovered that their economies cannot sustain this social safety net, that it in fact reduces the desire among people to pay their own way, and takes away some of the incentive to work. In short, the bill was unaffordable, and their societies were simply not willing to pay. To the regret of many, but because the laws of economics are harsh, most Western societies have been busy pruning the welfare bill .

In India, the lessons of this experience — over several decades, and in many countries — do not seem to have been learnt. Or, they are simply ignored in the pursuit of immediate votes. People who are promised cheap food or clothing do not in most cases look beyond the gift horses — to the question of who picks up to the tab. The uproar over higher petrol, diesel and cooking gas prices ignored this basic question : if the user of cooking gas does not want to pay for its cost, who should pay? Diesel in the country is subsidised, and if the trucked or owner of a diesel generator does not want to pay for its full cost, who does he or she think should pay the balance of the cost? It is a simple question, nevertheless it remains unasked.

The Deve Gowda government has shown courage in biting the bullet when it comes to the price of petroleum products. But it has been bitten by a much bigger subsidy bug. It wants to offer food at half its cost to everyone below the poverty line, supposedly estimated at some 380 million people. What will this cost? And, of course, who will pick up the tab? The Andhra Pradesh government has been bankrupted by selling rice at Rs 2 per kg. Should the central government to bankrupted too before facing up to the question of what is affordable and what is not? Already, India is perennially short of power because the subsidy on electricity has bankrupted most electricity boards, and made private investment wary unless it gets all manner of state guarantees. Delhi subsidised bus fares have bankrupted the Delhi Transport Corp., whose buses have slowly disappeared from the capital's streets. It is easy to be soft and sentimental, by looking at programmes that will be popular. After all, who doesn't like a free lunch? But the evidence is surely mounting that the lunch isn't free at all. Somebody is paying the bill. And if you want to know who, take a look at the country's poor economic performance over the years.

56. Which of the following may not be subsidised now, according to the passage?
- (a) University education (b) Postal services (c) Steel (d) All of the above
57. It can be inferred from the passage that the author.....
- (a) believes that people can help themselves do not need the government  
 (b) believes that the theory of helping people with subsidy is destructive  
 (c) believes in democracy and free speech  
 (d) is not a successful politician
58. The statement that subsidies are paid for by the rich and go to the poor is .....
- (a) fiction (b) fact  
 (c) fact, according to the author (d) fiction, according to the author
59. Which of the following is not true, in the context of the passage?
- (a) Where subsidies are concerned, the poor ultimately pay the tab  
 (b) Inflation is caused by too much subsidies  
 (c) Experts call subsidies the most regressive form of taxation  
 (d) The dangerous reduction in fiscal deficits is another result of high subsidies
60. Why do you think that the author calls the Western social security system Utopian?
- (a) The countries' belief in the efficacy of the system was bound to turn out to be false  
 (b) The system followed by these countries is the best available in the present context  
 (c) Every thing under this system was supposed to be free but people were charging money for them  
 (d) The theory or system followed by these countries was devised by Dr. Utopia
61. What, according to the author, is a saving grace of the Deve Gowda government?
- (a) It has realised that it has to raise the price of petroleum products  
 (b) It has avoided been bitten by a bigger subsidy bug  
 (c) Both (a) and (b)  
 (d) Neither (a) nor (b)
62. A suitable title to the passage would be ....
- (a) There's no such thing as a free lunch (b) The Indian Economic overview  
 (c) Deve Gowda government and it's follies (d) It takes two to tango
63. Which of the following is not a victim of extreme subsidies ?
- (a) The poor (b) The Delhi Transport Corporation  
 (c) The Andhra Pradesh government (d) None of these

## PASSAGE - 9

(1996)

The conventional wisdom has become that this is an issue-less election. There is no central personality of whom voters have to express approval or dislike; no central matter of concern that makes this a one-issue referendum like so many elections in the past; no central party around which everything else revolves -- the congress has been displaced from its customary pole position, and no one else has been able to take its place. Indeed, given that all-seeing video cameras of the Election Commission, and the detailed pictures they are putting together on campaign expenditure, there isn't even much electioneering: no slogans on the walls, no loudspeakers blaring forth at all hours of the day and night, no cavalcades of cars heralding the arrival of a candidate at the local bazaar. Forget it being an issue-less election is this an election at all ?

Perhaps the “fun” of an election lies in its featuring someone whom you can love or hate. But Narasimha Rao has managed to reduce even a general election involving nearly 600 million voters, to the boring non-event that is the trademark of his election rallies, and indeed of everything else that he does. After all, the Nehru-Gandhi clan has disappeared from the political map, and the majority of voters will not even be able to name P. V. Narasimha Rao as India’s prime minister. There could be as many as a dozen prime ministerial candidates ranging from Jyoti Basu to Ramakrishna Hegde, and from Chandra Shekar to (believe it or not) K. R. Narayanan. The sole personality who stands out, therefore, is none of the players, but the umpire : T. N. Seshan.

As for the parties, they are like the blind men of Hindustan, trying in vain to gauge the contours of the animal they have to confront. But it doesn’t look as if it will be the mandir masjid, nor will it be Hindutva or economic nationalism. The Congress would like it to be stability, but what does that mean for the majority? Economic reform is a non-issue for most people and with inflation down to barely 4%, prices are not top of the mind either. In a strange twist, after the hawala scandal, corruption has been pushed off the map too.

But ponder for a moment. Isn’t this state of affairs astonishing, given the context? Consider that so many ministers have had to resign over the hawala issue; that a governor who was a cabinet minister has also had to quit, in the wake of judicial displeasure; that prime minister himself is under investigation for his involvement in not one scandal but two; that the main prime ministerial candidate from the opposition has had to bow out because he too has been charged in the hawala case; and that the head of the “third force” has his own little (or not so little) fodder scandal to face. Why then is corruption not an issue-not as a matter of competitive politics, but as an issue on which the contenders for power feel that they have to offer the prospect of genuine change ? If all this does not make the parties (almost all of whom have broken the law, in not submitting their audited accounts every year to the income tax authorities) realise that the country both needs -- and is ready for -- change in the Supreme Court; the assertiveness of the Election Commission, giving new life to a model code of conduct that has been ignored for a quarter century; the independence that has been thrust upon the **Central Bureau of Investigation**; and the fresh zeal on the part of tax collector out to nab corporate no-gooders. Think also that at no other point since the Emergency of 1975-77 have so many people in power been hounded by the system for their misdeeds.

This is just a case of a few individuals outside the political system doing their job, or is the country heading for a new era ? The seventies saw the collapse of the national consensus that marked the Nehruvian era, and ideology took over in the Indira Gandhi years. That too was buried by Rajiv Gandhi and his technocratic friends. And now, we have these issue-less elections. One possibility is that the country is heading for a period of constitutionalism, as the other arms of the state reclaim some of the powers they lost, or yielded to the political establishment. Economic reform freed on part of Indian society from the clutches of the political class. Now this could spread to other parts of the system. Against such a dramatic backdrop, it should be obvious that people (voters) are looking for accountability, for ways in which to make a corrupted system work again. And the astonishing thing is that no party has sought to ride this particular wave ; instead, all are on the defensive, desperately evading the real issues. No wonder this is an “issue-less” election.

64. A suitable title to the passage would be...
  - (a) Elections: A preview
  - (b) The country’s issue-less elections
  - (c) T. N. Seshan-the real hero
  - (d) Love or hate them, but vote for them
65. Which of the following are not under scrutiny for alleged corruption, according to the passage ?
  - (a) The opposition prime ministerial candidate
  - (b) P. V. Narasimha Rao
  - (c) The leader of the ‘third force’
  - (d) Ramakrishna Hegde
66. Why does the author probably say that the sole personality who stands out in the elections is T.N. Seshan ?
  - (a) Because all the other candidate are very boring
  - (b) Because all the other candidates do not have his charisma
  - (c) Because the shadow of his strictures are looming large over the elections
  - (d) None of the above
67. According to the passage, which of the following is not mentioned as even having the potential to be an issue in the current elections?
  - (a) The mandir/masjid issue
  - (b) The empowerment of women
  - (c) Economic Nationalism
  - (d) Hindutva
68. Why does the author say that almost all parties have broken the law ?
  - (a) Because they all indulge in corrupt electoral practices
  - (b) Because they all have more income than recorded sources
  - (c) Because they are all indicted on various charges
  - (d) Because they have failed to submit audited accounts to tax authorities
69. Which of the following has not been responsible for the winds of change blowing through the country, according to the passage.
  - (a) Greater awareness of the part of the general public
  - (b) Enforcement of a model code of conduct by the Election Commission
  - (c) Greater independence to the Central Bureau of investigation
  - (d) Fresh zeal on the part of tax collectors

## PASSAGE - 10

(1997)

I think that it would be wrong to ask whether 50 years of India's Independence is an achievement or a failure. It would be better to see things as evolving. It's not an either-or question. My idea of the history of India is slightly contrary to the Indian idea. India is a country that, in the north, outside Rajasthan, was ravaged and intellectually destroyed to a large extent, by the invasions that began in about 1000 A.D. by forces and religions that India had no means of understanding.

The invasions are in all the school books. But I don't think that people understand that every invasion, every war, every campaign, was accompanied by slaughter, a slaughter always of the most talented people in the country. So these wars, apart from everything else, led to a tremendous intellectual depletion of the country. I think that in the British period, and in the 50 years after the British period, there has been a kind of recruitment or recovery, a very slow revival of energy and intellect. This isn't an idea that goes with the vision of the grandeur of old India and all that sort of rubbish. That idea is great simplification and it occurs because it is intellectually, philosophically and emotionally easier for Indians to manage.

What they cannot manage, and what they have not yet come to terms with, is that ravaging of all the north of India by various conquerors. That was ruin not by an act of nature, but by the hand of man. It is so painful that few Indians have begun to deal with it. It's much easier to deal with British imperialism. That is the familiar topic, in India and Britain. What is much less familiar is the ravaging of India before the British.

What happened from 1000 AD on, really, is such a wound that it is almost impossible to face. Certain wounds are so bad that they can't be written about. You deal with that kind of pain by hiding from it. You retreat from reality. I do not think, for example, that the Incas of Peru or the native people of Mexico have ever got over their defeat by the Spaniards. In both places the head was cut off. I think the pre-British ravaging of India was as bad as that.

In the place of knowledge of history, you have various fantasies about the village republic and the Old Glory. There is one big fantasy that Indians have always found solace in: about India having the capacity for absorbing its conquerors. This is not so. India was laid low by its conquerors. I feel the past 150 years have been years of every kind of growth. I see the British period and what has continued after that as one period. In that time, there has been a very slow intellectual recruitment. I think every Indian should make the pilgrimage to the site of the capital of the Vijayanagar empire, just to see what the invasion of India led to. They will see a totally destroyed town. Religious wars are like that. People who see that might understand what the centuries of slaughter and plunder meant. War isn't a game. When you lost that kind of war, your towns were destroyed, the people who built the towns were destroyed, you are left with a headless population. That's where modern India starts from. The Vijayanagar capital was destroyed in 1565. It is only now that the surrounding region has begun to revive.

A great chance has been given to India to start up again, and I feel it has started up again. The questions about whether 50 years of India since Independence have been a failure or an achievement are not the questions to ask.

In fact, I think India is developing quite marvelously. People thought - even Mr. Nehru thought - that development and new institutions in a place like Bihar, for instance, would immediately lead to beauty. But it doesn't happen like that. When a country as ravaged as India, with all its layers of cruelty, begins to extend justice to people lower down, it's a very messy business. It's not beautiful, it's extremely messy. And that's what you have now, all these small politicians with small reputations and small parties. But this is part of growth, this is part of development. You must remember that these people, and the people they represent, have never had rights before. When the oppressed have the power to assert themselves, they will behave badly. It will need a couple of generations of security, and knowledge of institutions, and the knowledge that you can trust institutions - it will take at least a couple of generations before people in that situation begin to behave well.

People in India have known only tyranny. The very idea of liberty is a new idea. The rulers were tyrants. The tyrants were foreigners. And they were proud of being foreign. There's a story that anybody could run and pull a bell and the emperor would appear at his window and give justice. The child's idea of history. The slave's idea of the ruler's mercy. When the people at the bottom discover that they hold justice in their own hands, the earth moves a little. You have to expect these earth movements in India. It will be like this for a hundred years. But it is the only way. It's painful and messy and primitive and petty, but it's better that it should begin. It has to begin. If we were to rule people according to what we think fit, that takes us back to the past when people had no voices.

With self-awareness all else follows. People begin to make new demands on their leaders, their fellows, on themselves. They ask for more in everything. They have a higher idea of human possibilities. They are not content with what they did before or what their fathers did before. They want to move. That is marvelous. That is as it should be.

I think that within every kind of disorder now in India there is a larger positive movement. But the future will be fairly chaotic. Politics will have to be at the level of the people now. People like Nehru were colonial-style politicians. They were to a large extent created and protected by the colonial order. They did not begin with the people. Politicians now have to begin with the people. They cannot be too far above the level of the people. They are very much part of the people.

It is important that self-criticism does not stop. The mind has to work, the mind has to be active, there has to be an exercise of the mind. I think it's almost a definition of a living country that it looks at itself, analyses itself all times. Only countries that have ceased to live can say it's all wonderful.

70. The central thrust of the passage is that ...  
 (a) India is gearing up for a new awakening  
 (c) India is yet to understand itself  
 (b) India is going back to its past status  
 (d) India's glorious past is a figment of the imagination
71. The writer's attitude is ..  
 (a) excessively critical of India  
 (c) cynical  
 (b) insightful  
 (d) cold
72. The writer has given the example of the Vijayanagar kingdom in order to drive home the point that  
 (a) Indians should know their historical sites  
 (b) Indians should be aware of the existence of such a historical past  
 (c) It is time that India came to terms with the past  
 (d) All of the these
73. The writer is against  
 (a) The child's view of history  
 (c) Indulging in the details of the past  
 (b) Taking a critical stand on their history  
 (d) None of these
74. According to the writer, India's regenerating and revival took place  
 (a) in the British period  
 (c) during and after the British period  
 (b) after the British period  
 (d) a long time after the British left
75. According to the passage, self-awareness is followed by  
 (a) self-righteousness  
 (b) a desire for more in everything  
 (c) a higher idea of human possibilities  
 (d) both (b) and (c)
76. According to the passage, India's current situation is  
 (a) bleak  
 (b) horrific  
 (c) ancient and messy  
 (d) all wrong
77. For a country to be alive and progressive, it is important that  
 (a) self-criticism does not stop  
 (c) it feels that all is right with itself  
 (b) self-criticism does not exceed a certain limit  
 (d) None of the these
78. The writer's prognosis for India's future is that  
 (a) it will be stable  
 (c) it will reflect the manipulations of the present  
 (b) it will be chaotic  
 (d) it will give way to self-criticism
79. One of the main features of the tyranny of foreign rulers was  
 (a) the decimation of the country's artists  
 (b) the decimation of the country's wealth  
 (c) the decimation of the country's talented people  
 (d) All of these

## PASSAGE - 11

(1997)

When Deng Xiaoping died a few months ago, the Chinese leadership barely paused for a moment before getting on with the business of governing the country. Contrast that with the chaotic contortions on India's political stage during the past month, and it is easy to conclude that democracy and democratic freedoms are serious obstacles to economic progress.

When the Chinese leadership wants a power plant to be set up, it just goes ahead. No fears of protracted litigation, of environmental protests, or of lobbying by interested parties. It — or the economy — is not held to ransom by striking truckers or air traffic controllers. Certainly there is much that is alluring about an enlightened dictatorship.

But there the trouble begins. First, there is no guarantee that a dictatorship will be an enlightened one. Myanmar has been ruled by a dictator for decades, and no one would claim that it is better off than even Bangladesh which has itself suffered long stretches of dictatorship. Nor can Mobuto Sese Seko, much in the news these days, be described as enlightened by any reckoning. The people of Israel, almost the only democracy in a region where dictatorships (unenlightened ones) are the norm, are much better off than their neighbours.

Second, dictatorships can easily reverse policies. China was socialist as long as Mao Zedong was around. When Deng Xiaoping took over in what was essentially a palace coup, he took the country in the opposite direction. There is little to ensure that the process will not be repeated. In India such drastic reversals are unlikely.

Six years ago few Indian politicians agreed that industries should be delicensed, that imports should be freed or that investment decisions should be based on economic considerations. Now few think otherwise. Almost all politicians are convinced of the merits of liberalisation, though they may occasionally lose sight of the big picture in pandering to their constituencies. India has moved slower than China on liberalisation, but whatever moves it has made are more permanent.

Democracies are also less likely to get embroiled in destructive wars. Had Saddam Hussein been under the obligation of facing free elections every five years, he would have thought ten times before entangling his people in a long confrontation with the West. Germany, Italy and Japan were all dictatorships when they launched the Second World War. The price was paid by their economies.

Democracies make many small mistakes. But dictatorships are more susceptible to making huge ones and risking everything on one decision - like going to war. Democracies are the political equivalent of free markets. Companies know they can't fool the consumer too often; he will simply switch to the competition. The same goes for political parties. When they fail to live up to their promises in government, the political consumer opts for the competition.

Democratic freedoms too are important for the economy, especially now that information is supreme. Few doubt that the Internet will play an important part in the global economy in the decades to come. But China, by preventing free access to it, is already probably destroying its capabilities in this area. As service industries grow in importance, China may well be at a disadvantage though that may not be apparent today when its manufacturing juggernaut is rolling ahead.

India has stifled its entrepreneurs through its licensing policies. That was an example of how the absence of economic freedom can harm a country. But right-wing dictatorships like South Korea erred in the opposite direction. They forced their businesses to invest in industries which they (the dictators) felt had a golden future. Now many of those firms are trying to retreat from those investments. Statism is bad, no matter what the direction in which it applies pressure. At this moment, China and other dictatorships may be making foolish investment decisions. But as industries are subsidized and contrary voices not heard, the errors won't be realised until the investments assume gargantuan proportions.

India's hesitant ways may seem inferior to China's confident moves. But at least we know what the costs are. That is not the case with China. It was only years after the Great Leap Forward and other such experiments that the cost in human lives (millions of them) became evident to the world. What the cost of China's present experiment is we may not know for several years more. A 9 per cent rate of growth repeated year after year may seem compelling. But a 7 per cent rate of growth that will not falter is more desirable. India seems to be on such a growth curve, whatever the shenanigans of our politicians.

80. According to the passage .....
  - (a) India needs a benevolent dictatorship
  - (b) India has failed as a democracy
  - (c) India should go the way of China
  - (d) None of these
81. The passage says that .....
  - (a) benevolent dictators are not easy to find
  - (b) not all dictators will be enlightened
  - (c) dictators can make or break a country
  - (d) an enlightened dictatorship is better than a corrupt democracy
82. It can be implied from the passage that .....
  - (a) a lower rate of growth is preferred to a high rate of growth
  - (b) a higher rate of growth is preferred to a lower rate of growth
  - (c) a low but stable rate of growth is preferred to a high rate of growth
  - (d) a low but faltering rate of growth is a sign of stability amidst growth
83. Vis-a-vis democracies, dictatorships run the risk of
  - (a) losing all for a single mistake
  - (b) making bigger mistakes
  - (c) making huge mistakes and risking everything
  - (d) None of these
84. The writer's conclusion in the passage is that
  - (a) under no circumstances should a country encourage a corrupt democrat
  - (b) under no circumstances should statism be a welcome move
  - (c) a statist will not give due importance to the voice of the people
  - (d) a statist will always look to his own welfare
85. Democracy has been compared to the free market, as
  - (a) both have a high degree of competition
  - (b) both offer a multitude of options to choose from
  - (c) consumer satisfaction plays an important role in both
  - (d) All of the above
86. It can be inferred from the passage that .....
  - (a) China stands to lose out in the global market because it has blocked the Internet
  - (b) India stands to gain in the global market because of its policy vis-a-vis the Internet
  - (c) Internet will play a crucial role in the global market in the years to come
  - (d) All of the above
87. According to the passage, a democratic set up works as a check on the
  - (a) actions and decisions of its leaders
  - (b) functioning of its economy
  - (c) both (a) and (b) above
  - (d) None of these

88. India's moves on liberalisation are more permanent than China's because ....
- India's politicians are in agreement over the need for reforms
  - India is not at the mercy of dictators
  - Unlike China, India is unlikely to have drastic policy reversals
  - India is not in a hurry to reform
89. According to the passage ....
- |   |   |
|---|---|
| (a) Israel is the only democracy in West Asia | (b) Israel is better off than Bangladesh or Myanmar |
| (c) Israel does not face policy reversals     | (d) None of these                                   |

## PASSAGE - 12

(1997)

Of each of the great leaders, it is said by his followers, long after he has gone, he made us do it. If leadership is the art of persuading your people to follow your bidding, without their realising your involvement, the archetype of its practice is N. R. Narayana Murthy, the chairman and managing director of the Rs. 143.81 crore Infosys Technologies (Infosys). For, the 52 year old CEO of the globalised software corporation - which he founded with seven friends, and a combined capital of Rs. 10,000, in 1981 and which now occupies the front ranks of the country's most admired corporations - leads with the subtlest of weapons : personal example.

Infosys ranks only 578th among the country's listed companies, and sixth in the software sector, in terms of its turnover. But it is setting new standards for India Inc. through its practices of *inter alia* awarding stock options to its employees, putting the value of its intellectual assets and its brands on its balance-sheet, and conforming to the disclosure standards of the Securities and Exchange Commission (SEC) of the US. Behind all this is the stubborn personal subscription of its CEO to the underlying causes of wealth-creation, people-power and transparency. "What were choices earlier are compulsions now," asserts Murthy.

In fact, the mirror images of Murthy, The Man, can be found all over Infosys, His Company. His egalitarianism - which finds expression in such habits as using the same table and chair as anyone else in the organisation - is practiced firmly when it comes to charting a course for the company's future: everyone has a voice. "We have no hierarchy just for the sake of control."

Brimming with the conviction that customer satisfaction is the key to success, Murthy has built a fleet-footed human resource management system that treats employees as customers, using the resources of the organisation to meet their professional and personal needs. His instruments are not just top-of-the-market salaries, but also operational empowerment as well as every facility that an employee needs to focus on the job.

Just what methods does Murthy use to ensure that his DNA is replicated in his company? Not for him are the classical leadership genres - transactional or transformational, situational or visionary. His chosen style, instead, is to lead by example, ensuring that the CEO's actions set the template for all Infosysians.

Murthy believes that the betterment of man can be brought about through the "creation of wealth, legally and ethically". The personal example that he has set enabled his company to mirror those beliefs: tying his own rewards, and measuring his value to the company, to his ability to create wealth, and erecting systems for the company's wealth to be shared by its people. Sums up Nandan Nilekani, 41, deputy managing director, Infosys: "this is the future model of the corporation. Run an excellent company, and let the market increase its value to create wealth."

Although Murthy is one of the prime beneficiaries of the philosophy - his 10 percent stake in Infosys is worth Rs.130 crore today - in his book, the leader leads not by grabbing the booty but by teaching others to take what they deserve. That's why, on the Infosys' balance-sheet, the value of Murthy's intellectual capital is nowhere near the top, on the rationale, that the CEO, at 52, is worth far less to his company than, say, a bright young programmer of 26. To spread the company's wealth, Murthy has instituted stock options - the first to do so in the country - for employees, creating 300 millionaires already. By 2000, he wants the number to climb to 1000.

To act as a beacon for his version of the learning organisation, Murthy not only spends an hour a day trawling the Internet to learn about new technological developments in his field, he also makes as many luncheon appointments as he can with technical people and academicians - dons from the Indian Institutes of Technology for instance - systematically plumbing their depths for an understanding of new developments in infotech. Murthy's objective is not just to stay abreast of the state of the art, but also to find a way to use that knowledge for the company.

Following Murthy's example, Infosys has set up a technology advancement unit, whose mandate is to track, evaluate, and assimilate new techniques and methodologies. In fact, Murthy views learning not just as amassing data, but as a process that enables him to use the lessons from failure to achieve success. This self-corrective loop is what he demonstrates through his leadership during a crisis.

In 1995, for example, Infosys lost a Rs.15 crore account - then 20 per cent of its revenues - when the \$69 billion GE yanked its business from it. Instead of recriminations, Murthy activated Infosys' machinery to understand why the business was taken away, and to leverage the learning for getting new clients instead. Feeling determined instead of guilty, His employees went on to sign up high profile customers like the \$20 billion Xerox, the \$7 billion Levi Strauss, and the \$14 billion Nynex.

"You must have a multi-dimensional view of paradigms," says the multi-tasking leader. The objective is obvious: ensure that Infosys' perspective on its business and the world comes from as many vantage points as possible so that corporate strategy can be synthesised not from a narrow vision, but from a wide angle lens. Infact Murthy still regrets that, in its initial years, Infosys didn't distil a multi-pronged understanding of the environment into its strategies, which forced it onto an incremental path that led revenues to snake up from Rs. 0.02 crore to just Rs.5 crore in the first 10 years.

It was after looking around itself instead of focusing on its initial business of banking software, that Infosys managed to accelerate. Today the company operates with stretch targets, setting distance goals and working backwards to get to them. The crucial pillar on which Murthy bases his ethical leadership is openness. Transparency, he reckons, is the clearest signal that one has nothing to hide. The personal manifestations of that are *inter alia* the practice of always giving complete information whenever any employee, customer, or investor asks for it: the loudly proclaimed insistence that every Infosys employee pay taxes and file returns; and a perpetually open office into which anyone can walk.

But even as he tries to lead Infosys into cloning its own approach to enterprise, is Murthy choosing the best future for it? If Infosys grows with the same lack of ambition, the same softness of style, and the same absence of aggression, is it not cutting off avenues of growth that others may seize? As Infosys approaches the 21st Century, it is obvious that Murthy's leadership will have to set ever-improving role models for his ever-learning company. After all, men grow old; companies shouldn't.

90. One of the ways in which Infosys spreads the company's wealth among its employees is ....
  - (a) by awarding stock options
  - (b) by giving extravagant bonus at the end of each year
  - (c) both 1 and 2 above
  - (d) None of these
91. According to the passage ....
  - (a) at Infosys, control is exerted through a system of hierarchy
  - (b) control is not exerted through a system of hierarchy
  - (c) hierarchy does not have pride of place in Infosys
  - (d) popular opinion is the most respected voice in Infosys
92. Murthy believes in
  - (a) betterment of man through learning
  - (b) betterment of man through ethical creation of wealth
  - (c) betterment of man through experimentation
  - (d) All of these
93. The example of the Rs.15-crore account highlights
  - (a) Murthy's ability to see his company through a crisis
  - (b) Murthy's ability to turn failure into success
  - (c) Murthy's potential to handle a crisis
  - (d) All of these
94. According to Murthy, learning is ....
  - (a) a process
  - (b) the art of amassing data
  - (c) a process that helps him to learn from failure
  - (d) All of these
95. According to the passage ....
  - (a) Infosys could not have succeeded without working backward
  - (b) Infosys succeeded because it worked backwards
  - (c) working backwards contributed to Infosys' success
  - (d) working backwards is the hallmark of Infosys' functioning today
96. Openness at Infosys includes ....
  - (a) the payment of taxes
  - (b) giving complete information
  - (c) sharing secrets
  - (d) both (a) and (b)
97. It is evident from the passage that ....
  - (a) Infosys will have to devise new strategies to meet the challenges of the 21st century
  - (b) Infosys will stagnate if it does not become aggressive
  - (c) Infosys may have to become more aggressive in order to retain its market
  - (d) None of the above
98. The cornerstone of Murthy's human resource management system is
  - (a) the employee as god
  - (b) optimum utilisation of human potential
  - (c) customer satisfaction
  - (d) satisfaction of personal needs
99. According to the passage ...
  - (a) Infosys is a reflection of its CEO
  - (b) Infosys brings the best out in Murthy
  - (c) Infosys and Murthy are synonymous
  - (d) Murthy the man and Murthy the CEO are incompatible

## PASSAGE - 13

(1997)

Last fortnight, news of a significant development was tucked away in the inside pages of newspapers. The government finally tabled a bill in Parliament seeking to make education a fundamental right. A fortnight earlier, a Delhi-based newspaper had carried a report about a three-month interruption in the Delhi government's "Education for All" programme. The report made for distressing reading. It said that literacy centres across the city were closed down, volunteers beaten up and enrollment registers burnt. All because the state government had, earlier this year, made participation in the programme mandatory for teachers in government schools. The routine denials were issued and there probably was a wee bit of exaggeration in the report. But it still is a pointer to the enormity of the task at hand.

That economic development will be inherently unstable unless it is built on a solid base of education, specially primary education, has been said so often that it's in a danger of becoming a platitude. Nor does India's abysmal record in the field need much reiteration. Nearly 30 million children in the six-ten age group do not go to school - reason enough to make primary education not only compulsory but a fundamental right. But is that the solution? More importantly, will it work? Or will it remain a mere token, like the laws providing for compulsory primary education? It is not widely known that 14 states and four Union territories have this law on their statute books. Believe it or not, the list actually includes Bihar, Madhya Pradesh (MP) and Rajasthan, where literacy and education levels are miles below the national average. A number of states have not even notified the compulsory education law.

This isn't to belittle the decision to make education a fundamental right. As a statement of political will, a commitment by the decision-makers, its importance cannot be undervalued. Once this commitment is clear, a lot of other things like resource allocation will naturally fall into place. But the task of universalising elementary education (UEE) is complicated by various socio-economic and cultural factors which vary from region to region and within regions.

If India's record continues to appall, it is because these intricacies have not been adequately understood by the planners and administrators. The trouble has been that education policy has been designed by **grizzled mandarins** ensconced in Delhi and is totally out of touch with the ground reality. The key, then, is to decentralise education planning and implementation. What's also needed is greater community involvement in the whole process. Only then can school timings be adjusted for convenience, schoolchildren given a curriculum they can relate to and teachers made accountable.

For proof, one has only to look at the success of the district primary education programme, which was launched in 1994. It has met with a fair degree of success in the 122 districts it covers. Here the village community is involved in all aspects of education -- - allocating finances to supervising teachers to fixing school timings and developing curriculum and text books --- through district planning teams. Teachers are also involved in the planning and implementation process and are given small grants to develop teaching and learning materials, vastly improving motivational levels. The consequent improvement in the quality of education generates increased demand for education.

But for this demand to be generated, quality will first have to be improved. In MP, the village panchayats are responsible for not only constructing and maintaining primary schools but also managing scholarships, besides organising non-formal education. How well this works in practice remains to be seen (though the department of education claims the schemes are working very well) but the decision to empower panchayats with such powers is itself a significant development. Unfortunately, the Panchayat Raj Act has not been notified in many states. And delegating powers to the panchayats is not looked upon too kindly by vested interests. More specifically, by politicians, since decentralisation of educational administration takes away from them the power of transfer which they use to grant favours and build up a support base. But if the political leadership can push through the bill to make education a fundamental right, it should also be able to persuade the states to implement the laws on panchayat raj. For, UEE cannot be achieved without decentralisation. Of course, this will have to be accompanied by proper supervision and adequate training of those involved in the administration of education. But the devolution of powers to the local bodies has to come first.

100. One of the problems plaguing the education system in India is
  - (a) poverty
  - (b) diverse cultural and socio-economic factors
  - (c) male chauvinism
  - (d) All of these
101. In the context of the passage, the term 'grizzled mandarins' means
  - (a) old hags
  - (b) decrepit men
  - (c) ineffective old men
  - (d) None of these
102. One of the reasons contributing to India's poor performance on the education front is that ....
  - (a) its leaders do not have the conviction required to improve the education system
  - (b) male members of society do not want their female counterparts to be educated
  - (c) administrators in charge of education are out of touch with the ground realities
  - (d) the country does not have the law for implementation of education policies in its statute books

103. The only way in which the education system can be improved is by ...  
 (a) decentralising education planning and implementation (b) introduce fresh blood in the planning body  
 (c) inject funds into the exchequer solely for the purpose (d) educate the people on the need for primary education
104. Very low education levels are visible in  
 (a) Bihar, Rajasthan and Uttar Pradesh (b) Rajasthan, West Bengal and Madhya Pradesh  
 (c) Rajasthan, Bihar and Madhya Pradesh (d) West Bengal, Uttar Pradesh and Bihar
105. The district primary education programme  
 (a) was launched in 1994 in 22 states (b) was launched in 1994 in 12 states  
 (c) launched in 1994 has been successful in 122 districts (d) launched in 1994 has met with dubious success
106. The village panchayats in Madhya Pradesh are responsible for ...  
 (a) implementing adult education policies for the villages  
 (b) organising non-formal education  
 (c) scholarships and construction and maintenance of primary schools  
 (d) Both (b) and (c) above
107. The successful implementation of education policies is obstructed by  
 (a) vested interests (b) politicians (c) politicians especially (d) bureaucrats
108. Primary Education ....  
 (a) is a fundamental right (b) will be made a fundamental right  
 (c) is only for the privileged sections of society (d) None of these
109. One of the ways in which education policy can be successfully implemented, as mentioned in the passage, is ...  
 (a) greater community involvement (b) greater community development  
 (c) greater community awareness (d) both (a) and (b)

## PASSAGE - 14

(1998)

The end of mutual funds, when it came, was sudden but not unexpected. For over 10 years mutual fund has been scripting its own growth demise, embarking on a reckless course of high risk, unhealthy pastimes, and unchecked maladies. Ironically but fittingly too, the very hand that had supported and sustained it through the turbulent early period of its existence was the one that, finally wielded the euthanasian syringe. The individual investor it was who had made the mutual fund post-liberalisation India's most vibrant vehicle for individual investment. The individual investor it was who brought the curtain down on an act that had started with a virtuoso performance, only to putrefy into a show of ineptitude, imprudence, and irresponsibility.

The mutual fund, as we know it, may be dead. It died of many things. But primarily, of a cancer that ate away at its innards. A cancer that destroyed the value of the investments the mutual funds had made to service the Rs. 85,000 crore that India's investors had entrusted them with ever since they began life way back in 1964 as the Unit Trust of India (UTI) now-disgraced Unit Scheme 64 (US-64). A cancer that grew from the refusal of the men and women to manage the mutual fund to exercise a mixture of caution and aggression, but to adopt, instead, and indisciplined, unplanned, fire-from-the-hip approach to investment. A cancer that, ultimately, robbed the mutual funds of the resources they would have to use to pay back their investors, leaving them on Death Row.

Indeed, the scandal that US-64 had been brewing for years, was only one, but not the first, of the warning-bells that pointed to the near emptiness of many a mutual funds' coffers. In quick succession have emerged reports of more and more fund-schemes that have been laid bare, their corpuses empty, their ability to meet their promises of assured returns-to investors demolished. At least 37% of the 235 fund schemes in operation in the country have promised investors assured returns of over 15% for 5 years, and repurchase-prices well above their Net Asset Values (NAVs).

According to a study conducted by the Delhi based Value Research, at least 18 big schemes due for redemption over the next 3 years will be unable to service their investors, or even return their money at the time of redemption. The shortfall? Rs 4,685.10 crore, Or, 75.87% of the amount handed over by trusting investors to fund managers. Worries Ajai Kaul, 38 President, Alliance Capital Asset Management. "When an assured-returns scheme runs into problems, investors view it as one more let-down by the mutual funds."

Had they but known of the actual practices seen in the offices and hallways of the mutual funds, which have translated into these results, investors would have shown their disgust long ago. Take the case of a mutual fund company that manages more than a dozen schemes. According to an unwritten, but formalised, principle each scheme takes it in turn to sell some of its holdings to its sister-schemes, booking fat notional gains and posting NAVs. While investors responded by pouring in even more of their savings, the profits were, clearly, only on paper, In the offices of another asset management company half way across Mumbai, the demand for cellular phone peaked 6 months ago.

Its employees had, suddenly, realized that making their personal deals, using information gathered in the course of their professional work, was best done over cell phones so that the company's records wouldn't show the cell being made. Obviously, the hot tips went to fatten their - and not investors' -pockets. Earlier, quite a few merchant bankers entered the mutual funds industry to use the corpus to subscribe to the issues they were lead managing. It took a crash in the primary market-not ethics or investigation-for this practice to stop.

Filled with fear and loathing -and righteous anger- the investor has, therefore, decided to adjure the mutual fund. According to marketing and Development Research Associates (MDRA) opinion poll of 342 investors conducted last fortnight in the 5 metros of Bangalore, Calcutta, Chennai, Delhi, and Mumbai, mutual funds as an investment instrument now rank a lowly fourth on safety-after bank deposits, gold and real estate-and fifth on returns-ahead only of bank deposits and gold. And only 14.20% of the sample will even consider investing in a mutual fund in the future.

Still, it is the species that has died, not its every member. The ones that have survived are the bright performers who beat the market benchmark- the 100-scrip Bombay stock Exchange (BSE) National index- by the widest margins within their 3 genres, growth income and balance. However even their star turns have not been able to stave off the stench of death over the business. In fact, an autopsy of the late -- and, at the moment not particularly lamented -- mutual fund reveals a sordid saga of callousness and calumny.

Sheer disaster stares the mutual funds in the face, and a cataclysm could destroy the savings of lakhs of investors too. A Value Research estimate of probable shortfall that 18 assured-returns schemes will face at the time of their scheduled redemptions over the next 3 year adds up to a sense-numbing Rs. 4,685 crore. An independent audit of the 60 assured-returns schemes managed by the public sector mutual funds. Conducted by Price Waterhouse Coopers at the behest of the Securities and Exchange Board of India (SEB), estimated a shortfall of between Rs.2,500 crore and Rs.3,000 crore. In 1999 alone, judging from their present NAVs, the four schemes due for redemption-Canbank Asset Management Company's Cantriple, IndBank Asset Management Company's Ind Prakash, SBI Funds Managements's Magnum Triple Plus, and BOI Mutual Funds's (BOIMF) Double Square Plus---are heading for a collective shortfall of Rs. 1,639.55 crore.

As of June 30, 1998 the country's 252 fund-schemes managed assets with a market value of Rs.69,599 crore, with the UTI alone controlling the fate of Rs. 50.000 crore. That is Rs. 11,000 crore less than the money invested in these schemes as of June 30, 1997 which means that the mutual funds have wiped out Rs.11,000 crore from the investors' hard earned money in the intervening 12 months. Of course, every fund is paying for the sins of the black sheep. For, the villain of peace was the UTI and the 95 funds managed by the public sector banks and institutions, the value of whose corpuses fell from Rs. 66,748 crore to Rs. 57,350 crore in the past year. In fact these funds contributed 85.405 of the overall values-loss ,with the private sector funds boosting their corpuses form Rs. 4000 crore to lower the extent of the erosion.

For investors, that has translated into an option of either exiting at a loss- or holding on in vain hope. On Nov. 20,1998, a depressing 77% of the 58 listed fund schemes were quoting at discounts of between 5% and 40% to their NAVS. And what of the NAVs themselves? The units of a shoulder-slumping 15% of the schemes were worth less than their par values. And US-64 of course continued to languish, with an estimated NAV of Rs.9.68. Even if there are schemes that have performed individually well, that the mutual funds have collectively failed to deliver couldn't be more obvious. So investors' murderous mood can hardly be debated.

Their genesis and growth reveals just what blinded the mutual funds to the possibility of failure. 40 % of the banks-and -insurance companies promoted funds in operation were launched between 1987 and 1993, when the stock markets were bull-dominated. In a period that saw only one bear phase, the BSE Sensitivity index (a.k.a the Sensex) climbed by 346%. Being successful with equity investments required no skills; only investable funds. Nor was fund-raising a problem, as investors desperately sought ways to grab a piece of equity boom. Between 1984 and 1989, the mutual funds collected Rs. 13,455 crore as subscriptions, but in the next 5 years, they picked up Rs.45,573 crore.

In January, 1994, the UTI's Mastergain mopped up a stunning Rs. 4,700 crore while the most awaited Morgan Stanley Growth-a showcase for the fabled fund-management metier of the foreign mutual funds-took in Rs. 1000 crore in just 3 days. Low entry barriers - a so called sound track record, a general reputation of fairness and integrity, an application-fee of Rs. 25,000 a registration fee of Rs. 25 lakh and an annual fee of Rs. 2.50 lakh-made entering the business a snap. Explains Ajay Srinivasan, 34 CEO, Prudential ICICI Mutual fund: "Mutual funds were misunderstood by investors. Everyone thought they were a one way ticket to a jackpot."

Intoxicated fund-managers poured in more and more of their corpuses into equity, ignoring the down sides, confident that the boom would last forever. In the process, they ignored the very concept of risk-management. Blithely ignoring the safety net of fixed income instruments, and accusing those who advised caution of being cowards. In 1995, for instance, ABN estimated 70% of the money being managed by the mutual funds had been funneled into equity. Whether they knew it or not, they were breaking away from the trend set by the mutual funds in the US, where the industry began by investing primarily in the money market, with only 25% of their corpus set aside for stocks. Only in the past 15 years, after operating for more than 7 decades, have those funds ventured into equity.

Unfortunately, their success blinded the fund-mangers to the fact that they were riding a wave-not navigating the treacherous seas. As Vivek Reddy, 36, CEO, Kothari-Pioneer Mutual Fund, puts it: "It was the stock market conditions that helped the mutual funds deliver returns- not superior investment skills." Then, the stock markets collapsed and never quite recovered. Between July, 1997 and October, 1998, the sensex free fell from 4306 to 2812 finally nullifying the theory that if you wait long enough, share-prices are always bound to rise. And the mutual fund, unused to a diet of falling equity indices, collapsed too.

The quantum of money mopped by the mutual fund may suggest that the reports of its extinction have been greatly exaggerated. In 1997-98, Indians entrusted Rs. 18,701 crore to the mutual funds, with new schemes alone mopping up Rs. 12,279 crore. Questions R G Sharma, 58, CEO LIC Mutual fund : "How do you explain that Dhanvarsha 12 and Dhanvarsha 13, floated in April and September, 1998 managed to mop Rs.335 crore ?" Not quite a loss of faith, would you say? Think again. In those 12 months, those very investors also took away Rs. 16,227 crore in the form of repurchases and redemptions, leaving only Rs. 2,474 crore more in the hands of fund-managers. What's more, since none of the withdrawals could have been made from the new schemes, the old schemes, obviously, gave it all up, effectively yielding Rs. 9,0805 crore to angry investors who took away their money. It is same story this year. In the first quarter of 1998-99, old schemes collected Rs. 2,340 crore, compared to the new schemes' Rs. 1,735 crore but they gave up Rs. 2, 749 crore ending up Rs. 409 crore poorer.

Sure some people are still putting money into the mutual funds. The real reason : money is flowing in from two genres of investors- neither of whom is the quintessential urban. The first comprises people in the semi-urban and rural areas. For whom makes like LIC and GIC still represent safety and assured schemes of income importantly, this category investor isn't clued into the financial markets, and is not, accordingly aware of the problems that confront the mutual funds. Confirms Nikhil Khatau, 38 Managing director, Sun F&C Asset Management: "That market is fairly stable." However as soon as the fundamental problems hit their dividend paying ability, even the die hard mutual fund investor from India's villages and small towns- who don't forget, has already been singed by the disappearance of thousands of Non Banking Finance Companies- will swear off their favorite investment vehicle.

The second genre of investor explains why the private sector funds have been successful in soaking up large sums: 31.10% of the total takings in 1997-98, and 10.70% in the first quarter of 1998-99. They are the so called high net worth players- corporate and individuals who in Khatau's terms, " While their fastidiousness has forced them to pick the private sector mutual funds., whose disclosures and performance have both been ahead of their public sector cousins, their interest does not represent every investor's disillusionment.

110. The amount of money entrusted to the care of the mutual funds are
  - (a) Rs. 75,000 crore
  - (b) Rs. 80,000 crore
  - (c) Rs. 85,000 crore
  - (d) Rs. 82,000 crore
111. The end of mutual funds was carried out at the hands of
  - (a) the government
  - (b) non-banking finance companies
  - (c) the individual investor
  - (d) banks
112. According to the passage, the flaws of the mutual funds lay in their
  - (a) post -liberalisation syndrome
  - (b) imprudent and irresponsible attitude
  - (c) stagnation
  - (d) all of these
113. According to the passage, one of the reasons for the failure of the mutual funds was
  - (a) their indisciplined approach to investment
  - (b) their devil-may-care approach to the world of finance
  - (c) their ability to deceive investors
  - (d) their inability to read the pulse of their investors
114. According to the writer, one of the fallouts of the end of mutual funds is that
  - (a) Many of the big schemes due for redemption over the next three will be unable to service their investors.
  - (b) Only some of the big schemes due for redemption over the next three years will be unable to service their investors.
  - (c) Only some of the big schemes due for redemption over the next three years will be able to service their investors
  - (d) None of these
115. It can be inferred from the passage that
  - (a) Money was siphoned ways outside the country by the mutual funds
  - (b) many of the mutual fund offices indulged in malpractice
  - (c) money invested in the mutual fund schemes were never returned to the investors
  - (d) a sustained attack by the media exposed the anomalies in the mutual fund industry
116. The current rank of the mutual fund industry in terms of safety and returns on deposits respectively is
  - (a) third and fourth
  - (b) tenth and twelfth
  - (c) fourth and fifth
  - (d) it is not ranked at all
117. The increase in the number of cell-phone subscriptions in the office of an Asset Management company
  - (a) calls made by employees for personal deals couldn't be lodged in the company's records
  - (b) employees found it easier to deal with investors without involving the company
  - (c) the company was scrupulous about maintaining correct records
  - (d) the company was unscrupulous in granting personal deals to the employees
118. According to the passage mutual funds caused a loss of
  - (a) Rs. 10,000 crore from investors' money
  - (b) Rs. 11,000 crore of the investors' money
  - (c) Rs. 5,000 crore from investors' money
  - (d) Rs. 8,000 crore from investors' money

119. On the basis of the passage, it may be said that, in terms of retrieving their money, the investors
- are caught between the devil and the deep sea
  - have a no-exit route
  - have to make do with little or no gain
  - will trust the few bright stars in the mutual fund industry
120. According to the passage, one of the reasons for the euphoria in the mutual fund industry can be attributed to
- the stock market boom in the late eighties and early nineties
  - failure of the primary market
  - both (a) and (b)
  - neither (a) and nor (b)

### PASSAGE - 15

(1999)

The World Trade Organisation (WTO) was created in the early 1990s as a component of the Uruguay Round negotiation. However, it could have been negotiated as part of the Tokyo Round of the 1970s, since that negotiation was an attempt at a 'constitutional reform' of the General Agreement on Tariffs and Trade (GATT). Or it could have been put off to the future, as the US Government wanted. What factors led to the creation of the WTO in the early 1990s?

One factor was the pattern of multilateral bargaining that developed late into the Uruguay Round. Like all complex international agreements, the WTO was a product of a series of trade-offs between principal factors and groups. For the United States, which did not want a new organisation, the dispute settlement part of the WTO package achieved its longstanding goal of a more effective and a more legal dispute settlement less in political terms and more as a regime of legal obligations, the WTO package was acceptable as a means to discipline the resort to unilateral measures by the United States. Countries like Canada and other middle and smaller trading partners were attracted due to the provisions banning unilateral measures. Finally, and perhaps most important, many countries at the Uruguay Round came to put a higher priority on the export gains than on the import losses that the negotiation would produce, and they came to associate the WTO and a rule-based system with those gains. This reasoning — replicated in many countries — was contained in U.S. Ambassador Kantor's defence of the WTO, and it amounted to a recognition that international trade and its benefits cannot be enjoyed unless trading nations accept the discipline of a negotiated rules-based environment.

A second factor in the creation of the WTO was pressure from the lawyers and the legal process. The dispute settlement system of the WTO was seen as a victory of legalists over pragmatists but the matter went deeper than that. The GATT, and the WTO, are contract organisations based on rules, and it is inevitable that an organisation created to further rules will in turn be influenced by the legal process. Robert Hudec has written of the momentum of legal development', but what is this precisely? Legal development can be defined as promotion of technical legal values of consistency, clarity (or, certainty) and effectiveness; these are values that those responsible for administering any legal system will seek to maximise. As it played out in the WTO, consistency meant integrating under one roof the whole lot of separate agreements signed under GATT auspices; clarity meant removing ambiguities about the powers of contracting parties to make certain decisions or to undertake waivers; and effectiveness meant eliminating exceptions arising out of grandfather-right and resolving defects in dispute settlement procedures and institutional provisions. Concern for these values is inherent in any rule-based system of cooperation, since operation, since without these values rules would be meaningless in the first place. Rules, therefore, create their own incentive for fulfillment.

The momentum of legal development has occurred in other institutions besides the GATT, most notably in the European Union (EU). Over the past two decades the European Court of Justice (ECJ) has consistently rendered decisions that have expanded incrementally the EU's internal market, in which the doctrine of 'mutual recognition' handed down in the case *Cassi De Dijon* in 1979 was a key turning point. The court is now widely recognised as a major player in European integration, even though arguably such a strong role was not originally envisaged in the Treaty of Rome, which initiated the current European Union. On means the court used to expand integration was the 'teleological method of interpretation', whereby the actions of member states were evaluated against 'the accomplishment of the most elementary community goals set forth in the Preamble to the [Rome] treaty'. The teleological method represents an effort to keep current policies consistent with stated rules. In both cases legal concerns and procedures are an independent force for further cooperation.

In large part the WTO was an exercise in consolidation. In the context of a trade negotiation that created a near-revolutionary expansion of international trade rules, the formation of the WTO was a deeply conservative act needed to ensure that the benefits of the new rules would not be lost. The WTO was all about institutional structure and dispute settlement: these are the concerns of conservatives and not revolutionaries, which is why lawyers and legalists took the lead on these issues. The WTO codified the GATT institutional practice that had developed by custom over three decades, and it incorporated a new dispute settlement system that was necessary to keep both old and new rules from becoming sham. Both the international structure and the dispute settlement system were necessary to preserve and enhance the integrity of the multilateral trade regime that had been built incrementally from the 1940s to the 1990s.

121. What could be the closest reason why the WTO was not formed in the 1970s?
- The US government did not like it
  - Important players did not find it in their best interest to do so
  - Lawyers did not work for the dispute settlement system
  - The Tokyo Round negotiation was an attempt at constitutional reform

122. The most likely reason for the acceptance of the WTO package by nations was that
- It had the means to prevent the US from taking unilateral measures
  - They recognized the need for a rule-based environment to protect the benefits of increased trade
  - It settles disputes more legally and more effectively
  - Its rule-based system leads to export gains
123. According to the passage, WTO promoted the technical legal values partly through
- integrating under one roof the agreements signed under GATT
  - rules that create their own incentive for fulfillment
  - grandfather-rights exceptions and defects in dispute settlement procedures
  - ambiguities about the powers of contracting parties to make certain decisions
124. In the method of interpretation of the European Court of Justice,
- current policies needed to be consistent with stated goals
  - Contracting party practices needed to be consistent with stated rules
  - enunciation of the most elementary community goals needed to be emphasized
  - Actions of member states needed to be evaluated against the stated community goals
125. In the statement “....It amounted to a recognition that international trade and its benefits cannot be enjoyed unless trading nations accept the discipline of a negotiated rules based environment”, it refers to
- Ambassador Kantor’s defence of the WTO
  - The higher priority on export gains placed by many countries at the Uruguay Round
  - The export gains many countries came to associate with a rule-based system
  - The provision of a rule-based system by the WTO
126. The importance of *Cassis de Dijon* is that it.
- gave a new impetus to the momentum of legal development at the European Court of Justice
  - resulted in a decision that expanded incrementally the EU’s internal market
  - strengthened the role of the Court more than envisaged in the Treaty of Rome
  - led to a doctrine that was key turning point in European integration

## PASSAGE - 16

(1999)

Since World War II, the nation-state has been regarded with approval by every political system and every ideology. In the name of modernisation in the West, or socialism in the Eastern Bloc, and of development in the Third World, it was expected to guarantee the happiness of individuals as citizens and of people as societies. However, the state today appears to have broken down in many parts of the world. It has failed to guarantee either security or social justice, and has been unable to prevent either international wars or civil wars. Disturbed by the claims of communities within it, the nation-state tries to represent their demands and to proclaim itself as the only guarantor of security of all. In the name of national unity, territorial integrity, equality of all citizens and non-partisan secularism, the state can use its powerful resources to reject the demands of the communities; it may even go far as genocide to ensure that order prevails.

As one observes the awakening of communities in different parts of the world, one cannot ignore the context in which identity issues arise. It is no longer a context of sealed frontiers an isolated regions but is one of integrated global systems. In reaction to this trend towards globalisation, individuals and communities everywhere are voicing their desire to exist, to use their power of creation and to play an active part in national and international life.

There are two ways in which the current upsurge in demands for the recognition of identities can be looked at. On the positive side, the efforts by certain population groups to assert their identity can be regarded as “liberation movements”, challenging oppression and injustice. What these groups are doing—proclaiming that are different, rediscovering the roots of their culture or strengthening group solidarity—may accordingly be seen as legitimate attempts to escape from their state of subjugation and enjoy a certain measure of dignity. On the downside, however, militant action for recognition tends to make such groups more deeply entrenched in their attitude and make their cultural compartments even more watertight. The assertion of identity then starts turning into self absorption and isolation, and is liable to slide into intolerance of others and towards ideas of “ethnic cleansing”, xenophobia and violence.

Whereas continuous variations among peoples prevent drawing of clear dividing lines between the groups, those militating for recognition of their group’s identity arbitrarily choose a limited number of criteria such as religion, language, skin colour, and place of origin so that their members recognise themselves primarily in terms of the labels attached to the group whose existence is being asserted. The distinction between the group in question and other groups is established by simplifying the feature selected. Simplification also works by transforming groups into essences, abstractions endowed with the capacity to remain unchanged through time. In some cases, people actually act as though the group remained unchanged and talk for example, about the history of nations and communities as if these entities survived for centuries without changing, with the same way of acting and thinking the same desires, anxieties, and aspirations.

Paradoxically, precisely because identity represents a simplifying fiction, creating uniform groups out of disparate people, that identity performs a cognitive function. It enables us to put names to ourselves and others, from some idea of who we are and who others are, and ascertain the place we occupy along with others in the society. The current upsurge to assert the identity of groups can thus be partly explained by the cognitive function performed by identity. However, that said people can thus be partly explained by the cognitive function performed by identity. However, that said people would not go along as they do, often in large numbers, with the propositions put to them, in spite of the sacrifices they entail, if there was not a very strong feeling of need for identity, a need to take stock of things and know “ who we are “, where we come from”, and where we are going.

Identity is thus a necessity in a constantly changing world, but it can also be potent source of violence and disruption. How can these contradictory aspects of identity be reconciled? First, we must bear the arbitrary nature of identity categories in mind, not with the view to eliminating all forms of identification which would be unrealistic since identity is cognitive necessity- but simply to remind ourselves that each of has several identities at the same time. Second, since tears of nostalgia are being shed over the past, we recognise that culture is being constantly recreated by cobbling together fresh and original elements and counter-cultures. There are in our country a large number of syncretic cults wherein modern elements are blended with traditional values or people of different communities venerate saints or divinities of particular faiths. Such cults and movements are characterised by continual inflow and outflow of members which prevent them from taking a self perpetuating existence of their own and hold out hope for the future, indeed, perhaps for the only possible future. Finally, the nation state must respond to the identity urges of its constituent communities and to their legitimate quest for security and social justice. It must do so by inventing what the French philosopher and sociologist, Raymond Aron, called “peace through law”, That would guarantee justice to both the state as a whole and its parts, and respect the claims of both reasons and emotions. The problem is one of reconciling nationalist demands with exercise of democracy.

127. According to the author, happiness of individuals was expected to be guaranteed in the name of
- (a) Development in the third world
  - (b) Socialism in the third world.
  - (c) Development in the West
  - (d) Modernisation in Eastern Bloc
128. Demands for recognition of identities can be viewed
- (a) Positively and negatively
  - (b) As liberation movements and militant action
  - (c) As efforts to rediscover cultural roots which can slide towards intolerance of others
  - (d) All of the above
129. Going by the author’s exposition of the nature of identity, which of the following statements is untrue?
- (a) Identity represents creating uniform groups out of disparate people
  - (b) Identity is a necessity in the changing world
  - (c) Identity is a cognitive necessity
  - (d) None of the above
130. According to the author, the nation state
- (a) has fulfilled its potential
  - (b) is willing to do anything to preserve order
  - (c) generates security for all citizens
  - (d) has been a major force in preventing civil and international wars
131. Which of the following views of the nation state cannot be attributed to the author
- (a) It has not guaranteed peace and security
  - (b) It may go as far as genocide for self preservation
  - (c) It represents the demands of communities within it
  - (d) It is unable to prevent international wars

## PASSAGE - 17

(2000)

The story begins as the European pioneers crossed the Alleghenies and started to settle in the Midwest. The land they found was covered with forests. With incredible effort they felled the trees, pulled the stumps and planted their crops in the rich, loamy soil. When they finally reached the western edge of the place we now call Indiana, the forest stopped and ahead lay a thousand miles of the great grass prairie. The European were puzzled by this new environment. Some even called it the ‘Great Desert’. It seemed untillable. The earth was often very wet and it was covered with centuries of tangled and matted grasses. With their cast iron plows, the settlers found that the prairie sod could after a few years of tugging. The iron plow was a useless tool to farm the prairie soil. The pioneers were stymied for nearly two decades. Their western march was halted and they filled in the eastern regions of the Midwest.

In 1837, a blacksmith in the town of Grand Detour, Illinois, invented a new tool. His name was John Deere and the tool was a plow made of steel. It was sharp enough to cut through matted grasses and smooth enough to cast off the mud. It was sharp enough to cut through matted grasses and smooth enough to cast off the mud. It was a simple tool, the “sod buster” that opened the great prairies to agricultural development.

Sauk County, Wisconsin is the part of that prairie where I have a home. It is name after the Sauk Indians. In 1673, Father Marquette was the first European to lay his eyes upon their land. He found a village laid out in regular patterns on a plain beside the Wisconsin river. He called the place Prairie du sac. The village was surrounded by field that had provided maize, beans and squash for the Sauk people for generations reaching back into the unrecorded time.

When the European settlers arrived at the Sauk prairie in 1837, the government forced the native Sauk people west of the Mississippi river. The settlers came with John Deere’s new invention and used the tool to open the area to a new kind of agriculture. They ignored the traditional ways of the Sauk Indians and used their sod-busting tool for planting wheat. Initially, the soil was generous and the farmers thrived. However each year the soil lost more of its nurturing power. It was only thirty years after the Europeans arrived with their new technology that the land was depleted. Wheat farming become uneconomic and tens of thousands of farmers left Wisconsin seeking new land with sod to bust.

It took the European and their new technology just one generation to make their homeland into a desert. The Sauk Indians who knew how to sustain themselves on the Sauk prairie land were banished to another kind of desert called a reservation. And they even forgot about the techniques and tools that has sustained them on the prairie for generations unrecorded. And that is how it was that three deserts were created-Wisconsin, the reservation and the memories of a people. A century later, the land of the Sauks is now populated by the children of a second wave of European farmers who learned to replenish the soil through the regenerative powers of dairying, ground cover and animal manures. These third and fourth generation farmers and townspeople do not realise, however, that a new settler is coming soon with an invention as powerful as John Deere’s plow.

The new technology is called ‘bereavement counselling’. It is a tool forged at the great state university, an innovative technique to meet the needs of those experiencing the death of a loved one, a tool that can “process” the grief of the people who now live on the prairie of the Sauk. As one can imagine the final days of the village of the Sauk Indians before the arrival of the settlers with John Deere’s plow, one can also imagine these final days, before the arrival of the first bereavement counsellor at Prairie du Sac. In these final days, the farmers and the towns people mourn at the death of a mother, brother, son or friend. The bereaved is joined by neighbours and kin. They meet grief together in lamentation, prayer and song. They call upon the words of the clergy and surround themselves in community.

It is in these ways that they grieve and then go on with life. Through their mourning they are assured of the bonds between them and renewed in the knowledge that this death is a part of Prairie of the Sauk. Their grief is common property, an anguish from which the community draws strength and gives the bereaved the courage to move ahead.

It is into this prairie community that the bereavement counsellor arrives with the new grief technology. The counsellor calls the invention a service and assures the prairie folk of its effectiveness and superiority by invoking the name of the great university while displaying a diploma and certificate. At first, we can imagine that the local people will be puzzled by the bereavement counsellor’s claim. However, the counsellor will tell a few of them that the new technique is merely to assist the bereaved’s community at the time of death. To some other prairie folk who are isolated or forgotten, the counsellor will approach the County Board and advocate the right to treatment for these unfortunate souls. This right will be guaranteed by the Boards’s decision to reimburse those too poor to pay for counselling services. There will be others, schooled to believe in the innovative new tools certified by universities and medical centres, who will seek out the bereavement counsellor by force of habit. And one of these people will tell a bereaved neighbour who is unschooled that unless his grief is processed by a counsellor, he will probably have major psychological problems in later life. Several people will begin to use the bereavement counsellor because since the County Board now taxes them to insure access to the technology, they feel that to fail to be counselled is to waste their, and to be denied a benefit, or even a right.

Finally, one day, the aged father of a Sauk woman will die. And the next door neighbour will not drop by because he doesn’t want to interrupt the bereavement counsellor. The woman’s kin will stay home because they will have learned that only the bereavement counsellor known how to process grief the proper way. The local clergy will seek technical assistance form the bereavement counsellor to learn the correct form of service to deal with guilt and grief. And the grieving daughter will know that it is the best bereavement counsellor who really cares for her because only the bereavement counsellor comes when death visits this family on the Prairie of the Sauk.

It will be only one generation between the bereavement counsellor arrives and the community of mourners disappears. The counsellor’s new tool will cut through the social fabric, throwing aside kinship, care, neighbourly obligations and community ways of coming together and going on.

Like John Deere’s plow, the tools of bereavement counselling will create a desert where a community once flourished. And finally, even the bereavement counsellor will see this impossibility of restoring hope in clients once they are genuinely alone with nothing but a service for consolation. In the inevitable failure of the service, the bereavement counsellor will find the deserts even in herself.

132. Which one of the following best describes the approach of the author ?
- Comparing experiences with two innovations tried, in order to illustrate the failure of both
  - Presenting community perspective on two technologies which have had negative effects on people
  - Using the negative outcomes of one innovation to illustrate the likely outcomes of another innovation
  - Contrasting two contexts two contexts separated in time, to illustrate how 'deserts' have arisen
133. According to the passage, bereavement handling traditionally involves :
- the community bereavement counsellors working with the bereaved to help him/her overcome grief
  - the neighbours and kin joining the bereaved and meeting grief together in mourning and prayer
  - using techniques developed systematically in formal institutions of learning, a trained counsellor helping the bereaved cope with grief
  - the Sauk Indian leading the community with rituals and rites to help lessen the grief of the bereaved
134. Due to which of the following reasons, according to the author, will the bereavement counsellor find the deserts even in herself?
- Over a period of time, working with Sauk Indians who have lost their kinship and relationships, she becomes one of them.
  - She is working in an environment where the disappearance of community mourners makes her work place a social desert.
  - Her efforts at grief processing with the bereaved will fail as no amount of professional service can make up for the loss due to the disappearance of community mourners.
  - She has been working with people who have settled for a long time in the Great Desert.
135. According to the author, the bereavement counsellor is :
- a friend of the bereaved helping him or her handle grief
  - an advocate of the right to treatment for the community
  - a kin of the bereaved helping him/her handle grief
  - a formally trained person helping the bereaved handle grief
136. The Prairie was a great puzzlement for the European pioneers because
- it was covered with thick, untilable layers of grass over a vast stretch
  - it was a large desert immediately next to lush forests
  - it was rich cultivable land left fallow for centuries
  - it could be easily tilled with iron plows
137. Which of the following does the 'desert' in the passage refer to?
- Prairie soil depleted by cultivation of wheat
  - Reservations in which native Indians were resettled
  - Absence of, and emptiness in, community kinship and relationships
  - All of the above
138. According to the author, people will begin to utilise the service of the bereavement counsellor because;
- new Country regulations will make them feel it is a right, and if they don't use it, it would be a loss
  - the bereaved in the community would find her a helpful friend
  - she will fight for subsistence allowance from the County Board for the poor among the bereaved
  - grief processing needs tools certified by universities and medical centres
139. Which one of the following parallels between the plow and bereavement counselling is not claimed by the author?
- Both are innovative technologies
  - Both result in migration of the communities into which the innovations are introduced
  - Both lead to 'deserts' in the space of only one generation
  - Both are tools introduced by outsiders entering existing communities

### PASSAGE - 18

(2001)

The union government's present position vis-a-vis the upcoming United Nations conference on racial and related discrimination world-wide seems to be the following : discuss race please, not caste; caste is our very own and not at all as bad as you think. The gross hypocrisy of that position has been lucidly underscored by *Kancha Iliaiah*. Explicitly, the world community is to be cheated out of considering the matter on the technicality that caste is not, as a concept, tantamount to a racial category. Internally, however, allowing the issue to be put on agenda at the said conference would, we are patriotically admonished, damage the country's image. Somehow, India's virtual beliefs elbow out concrete actualities. Inverted representations, as we know, have often been deployed in human histories as balm for the forsaken - religion being the most persistent of such inversions. Yet, we would humbly submit that if

globalising our markets are thought good for the ‘national ‘pocket, globalising our social inequities might not be so bad for the mass of our people. After all, racism was as uniquely institutionalised in South Africa as caste discrimination has been within our society; why then can’t we permit the world community to express itself on the latter with a fraction of the zeal with which, through the years, we pronounced on the former?

As to the technicality about whether or not caste is admissible into an agenda about race (that the conference is also about ‘related discriminations’ tends to be forgotten ), a reputed sociologist has recently argued that where race is a ‘biological’ category caste is a ‘social’ one. Having earlier fiercely opposed implementation of the Mandal Commission Report, the said sociologist is at least to be complemented now for admitting, however tangentially, that caste discrimination is a reality, although, in his view ,incompatible with racial discrimination. One would like quickly to offer the hypothesis that biology ,in important ways that affect the lives of many millions, is in itself perhaps a social construction .But let us look at the matter in another way.

If it is agreed - as per the position today at which anthropological and allied scientific determinations rest -that the entire race of *homo sapiens* derived from an originary black African female (called ‘Eve’) then one is hard put to understand how, on some subsequent ground ,ontological distinctions are to be drawn either between races or castes. Let us also underline the distinction between the supposition that we are all god’s children and the rather more substantiated argument about our descent from ‘Eve’ lest both positions are thought to be equally diversionary. It than stands to reason that all subsequent distinctions are, in modern parlance, ‘constructed’ ones, and, like all ideological constructions, attributable to changing equations between knowledge and power among human communities contested histories here, there elsewhere.

This line of thought receives ,thankfully ,extremely consequential butters from the findings of the Human Genome project. Contrary to earlier (chiefly 19th century colonial) persuasions on the subject of race, as well as, one might add, the somewhat infamous Jensen offerings in the 20th century from America ,those findings deny genetic difference between ‘races’ .If anything, they suggest that environmental factors impinge on gene-function, as a dialectic seems to unfold between nature and culture. It would thus seem that ‘biology’ as the constitution of pigmentation enters the picture first only as a part of that dialectic. Taken together, the originary mother stipulations the Genome findings ought indeed to furnish ground for human equality across the board, as well as yield policy initiatives towards equitable material dispensations aimed at building a global order where, in Hegel’s stirring formulation, only the rational constitutes the right. Such ,sadly, is not the case as everyday fresh arbitrary grounds for discrimination are constructed in the interests of sectional dominance.

140. When the author writes “globalising our social inequities” the reference is to :
  - (a) going beyond an internal deliberation on social inequity
  - (b) dealing with internal poverty through the economic benefits of globalisation
  - (c) going beyond an internal delimitation of social inequity
  - (d) achieving disadvantaged people’s empowerment, globally
141. According to the author, ‘inverted ‘representations as balm for the forsaken
  - (a) is good for the forsaken and often deployed in human histories
  - (b) is good for the forsaken ,but not often deployed historically for the oppressed
  - (c) occurs often as a means of keeping people oppressed
  - (d) occurs often to invert the *status quo*
142. Based on the passage, which broad areas unambiguously fall under the purview of the UN conference being discussed ?
 

A. Racial prejudice	B. Racial pride		
C. Discrimination, racial or otherwise	D. Caste related discrimination		
E. Race related discrimination			
(a) A, E	(b) C, E	(c) A, C, E	(d) B, C, D
143. According to the author, the sociologist who argued that race is a ‘biological’ category and caste is a ‘social’ one:
  - (a) generally shares the same orientation as the author’s on many of the central issues discussed
  - (b) tangentially admits to the existence of “caste” as a category
  - (c) admits the incompatibility between the people of different race and caste
  - (d) admits indirectly that both caste-based prejudice and racial discrimination exist
144. As important message in the passage, of one accepts a dialectic between nature and culture, is that :
  - (a) the results of the Human Genome Project reinforces racial differences
  - (b) race is at least partially a social construct
  - (c) discrimination is at least partially a social construct
  - (d) caste is at least partially a social construct

## PASSAGE - 19

(2001)

Democracy rests on a tension between two different principles. There is, on the one hand, the principle of equality before the law, or, more generally, of equality, and, on the other, what may be described as the leadership principle. The first gives priority to rules and the second to persons. No matter how skilfully we contrive our schemes, there is a point beyond which the one principle cannot be promoted without some sacrifice of the other.

Alexis de Tocqueville, the great nineteenth century writer on democracy, maintained that the age of democracy, whose birth he was witnessing would also be the age of mediocrity: in saying this he was thinking primarily of a regime of equality governed by impersonal rules. Despite his strong attachment to democracy, he took great pains to point out what he believed to be its negative side: a dead level plane of achievement in practically every sphere of life. The age of democracy would, in his view be an unheroic age, there would not be room in it for either heroes or hero-worshippers.

But modern democracies have not been able to do without heroes: this too was foreseen, with much misgiving, by Tocqueville. Tocqueville viewed this with misgiving because he believed, rightly, that unlike in aristocratic societies there was no proper place in a democracy for heroes and, hence, when they arose they would sooner or later turn into despots. Whether they require heroes or not, democracies certainly require leaders, and, in the contemporary age, breed them in great profusion; the problem is to know what to do with them.

In a world preoccupied with scientific rationality the advantages of a system based on an impersonal rule of law should be a recommendation with everybody. There is something orderly and predictable about such a system. When life is lived mainly in small self-contained communities, men are able to take finer personal distinctions into account in dealing with their fellow men. They are unable to do this in a large and amorphous society, and organised living would be impossible here without a system of impersonal rules. Above all, such a system guarantees a kind of equality to the extent that everybody, no matter in what station of life, is bound by the same explicit, often written, rules and nobody is above them.

But a system governed solely by impersonal rules can at best ensure order and stability; it cannot create any shinning vision of a future in which mere formal equality will be replaced by real equality and fellowship. A world governed by impersonal rules cannot easily change itself, or when it does, the change is so gradual as to make the basic and fundamental feature of society appear unchanged. For any kind of basic or fundamental change, a push is needed from within, a kind of individual initiative which will create new rules, new terms and conditions of life.

The issue of leadership thus acquires crucial significance in the context of change. If the modern age is preoccupied with scientific rationality, it is no less preoccupied with change. To accept what exists on its own terms is traditional not modern and it may be all very well to appreciate tradition in music, dance and drama, but for society as a whole the choice has already been made in favour of modernisation and development. Moreover, in some countries the gap between ideal and reality has become so great that the argument for development change is now irresistible.

In these countries no argument for development has greater appeal or urgency than the one which shows development to be the condition for the mitigation, if not the elimination, of inequality. There is something contradictory about the very presence of large inequalities in a society which professes to be democratic foes not take people too long to realise that democracy by itself can guarantee only formal equality; beyond this, it can only whet people's appetite for real or substantive equality. From this arises their continued preoccupation with plans and schemes that will help to bridge the gap between the ideal of equality and the reality which is so contrary to it .

When preexisting rules give no clear directions of change, leadership comes into its own. Every democracy invests its leadership with a measure of charisma' and expects from it a corresponding measure of energy and vitality. Now, the greater the urge for change in a society the stronger the appeal of a dynamic leadership in it. A dynamic leadership seeks to free itself from the constraints of existing rules; in a sense that is the test of its dynamism .In this process it may take a turn at which a turn at which it ceases to regard itself as being bound by these rules, placing itself above them. There is always a tension between 'charisma' and 'discipline' in the case of a democratic leadership, and when this leadership puts forward revolutionary claims, the tension tends to be resolved at the expense of discipline.

Characteristically, the legitimacy of such a leadership rests on its claim to be able to abolish or at least substantially reduce the existing inequalities in society. From the argument that formal equality or equality before the law is but a limited good, it is often one short step to the argument that it is a hindrance or an obstacle to the establishment of real or substantive equality. The conflict between a 'progressive' executive and a 'conservative' judiciary is but one aspect of this larger problem. This conflict naturally acquires added piquancy when the executive is elected and the judiciary appointed.

145. Dynamic leaders are needed in democracies because :

- (a) they have adopted the principles of 'formal' equality rather than 'substantive' equality
- (b) 'formal' equality whets people's appetite for 'substantive' equality
- (c) Systems that rely on the impersonal rules of 'formal' equality lose their ability to make large changes
- (d) of the conflict between a 'progressive' executive and a 'conservative' judiciary

146. What possible factor would a dynamic leader consider a ‘hindrance’ in achieving the development goals of a nation

  - (a) Principle of equality before the law
  - (b) Judicial activism
  - (c) A conservative judiciary
  - (d) Need for discipline

147. Which of the following four statements can be inferred from the above passage?

  - A. Scientific rationality is an essential feature of modernity
  - B. Scientific rationality result in the development of impersonal rules
  - C. Modernisation and development have been chosen over traditional music, dance and drama
  - D. Democracies aspire to achieve substantive equality
  - (a) A, B, D but not C
  - (b) A, B but not C, D
  - (c) A, D but not B, C
  - (d) A, B, C but not D

148. Tocqueville believed that the age of democracy would be an un-heroic age because

  - (a) democratic principles do not encourage heroes
  - (b) there is not urgency for development in democratic countries
  - (c) heroes that emerged in democracies would become despots
  - (d) aristocratic society had a greater ability to produce heroes

149. A key argument the author is making is that

  - (a) in the context of extreme inequality, the issue of leadership has limited significance
  - (b) democracy is incapable of eradicating inequality
  - (c) formal equality facilitate development and change
  - (d) impersonal rules are good for avoiding instability but fall short of achieving real equality

150. Which of the following four statements can be inferred form the above passage?

  - A. There is conflict between the pursuit of equality and individuality
  - B. The disadvantages of impersonal rules can be overcome in small communities
  - C. Despite limitations, impersonal rules are essential in large systems
  - D. Inspired leadership, rather than plans and schemes, is more effective in bridging inequality
  - (a) B, D but not A, C
  - (b) A, B but not C, D
  - (c) A, D but not B, C
  - (d) A, C but not B, D

## PASSAGE - 20

(2002)

There are a seemingly endless variety of laws, restrictions, customs and traditions that affect the practice of abortion around the world. Globally, abortion is probably the single most controversial issue in the whole area of women's rights and family matters. It is an issue that inflames women's right groups, religious institutions, and the self-proclaimed "guardians" of public morality. The growing worldwide belief is that the right to control one's fertility is a basic human right. This has resulted in a worldwide trend towards liberalization of abortion laws. Forty percent of the world's population live in countries where induced abortion is permitted on request. An additional 25 percent live in countries where it is allowed if the woman's life would be endangered if she went to full term with her pregnancy. The estimate is that between 26 and 31 million legal abortions were performed in 1987. However, there were also between 10 and 22 million illegal abortions performed in that year.

Feminists have viewed the patriarchal control of women's bodies as one of the prime issues facing the contemporary women's movement. They observe that the definition and control of women's reproductive freedom have always been the province of men. Patriarchal religion, as manifest in Islamic fundamentalism, traditionalist Hindu practice, orthodox Judaism, and Roman Catholicism, has been an important historical contributory factor for this and continues to be an important presence in contemporary societies. In recent times, governments, usually controlled by men, have "given" women the right to contraceptive use and abortion access when their countries were perceived to have an overpopulation problem. When these countries are perceived to be underpopulated, the right has been absent. Until the nineteenth century, a woman's rights to an abortion followed English common law; it could only be legally challenged if there was a "quickening", when the first movements of the foetus could be felt. In 1800, drugs to induce abortions were widely advertised in local newspapers. By 1900, abortion was banned in every state except to save the life of the mother. The change was strongly influenced by the medical profession, which focussed its campaign ostensibly on health and safety issues for pregnant women and the sanctity of life. Its position was also a means of control of non-licensed medical practitioners such as midwives and women healers who practice abortion.

The anti-abortion campaign was also influenced by political considerations. The large influx of eastern and southern European immigrants with their large families was seen as a threat to the population balance of the future United States. Middle and Upper class Protestants were advocates of abortion as a form of birth control. By supporting abortion prohibitions the hope was that these Americans would have more children and thus prevent the tide of immigrant babies from overwhelming the demographic characteristics of Protestant America.

The anti-abortion legislative position remained in effect in the United States through the first sixty-five years of the twentieth century. In the early 1960s, even when it was widely known that the drug thalidomide taken during pregnancy to alleviate anxiety was shown to contribute to the formation of deformed “flipper-like” hands or legs of children, abortion was illegal in the United States. A second health tragedy was the severe outbreak of rubella during the same time period, which also resulted in major birth defects. These tragedies combined with a change of attitude towards a woman’s right to privacy lead a number of states to pass abortion-permitting legislation.

On one side of the controversy are those who call themselves “pro-life”. They view the foetus as a human life rather than as an unformed complex of cells; therefore they hold to the belief that abortion is essentially murder of an unborn child. These groups cite both legal and religious reasons for their opposition to abortion. Pro-lifers point to the rise in legalized abortion figures and see this as morally intolerable. On the other side of the issue are those who call themselves “pro-choice”. They believe that women, not legislators or judges, should have the right to decide whether and under what circumstances they will bear children. Pro-choicers are of the opinion that laws will not prevent women from having abortions and cite the horror stories of the past when many women died at the hands of “backroom” abortionists and in desperate attempts to self-abort. They also observe that legalized abortion is especially important for rape victims and incest victims who became pregnant. They stress physical and mental health reasons why women should not have unwanted children.

To get a better understanding of the current abortion controversy, let us examine a very important work by Kristin Luker titled *Abortion and the Politics of Motherhood*. Luker argues that female pro-choice and pro-life activists hold different world views regarding gender, sex, and the meaning of parenthood. Moral positions on abortions are seen to be tied intimately to views on sexual behaviour, the care of children, family life, technology, and the importance of the individual. Luker identifies “pro-choice” women as educated, affluent, and liberal. Their contrasting counterparts “pro-life” women, support traditional concepts of women as wives and mothers. It would be instructive to sketch out the differences in the world views of these two sets of women. Luker examines California, with its liberalized abortion law, as a case history. Police documents and newspaper accounts over a twenty-year period were analyzed and over 200 interviews were held with both pro-life and pro-choice activists.

Luker found that pro-life and pro-choice activists have intrinsically different views with respect to gender. Pro-life women have a notion of public and private life. The proper place for men is in the public sphere of work; for women, it is the private sphere of the home. Men benefit through the nurturance of women; women benefit through the protection of men. Children are seen to be the ultimate beneficiaries of this arrangement by having the mother as a full-time loving parent and by having clear role models. Pro-choice advocates reject the view of separate spheres. They object to the notion of the home being the “women’s sphere”. Women’s reproductive and family roles are seen as potential barriers to full equality. Motherhood is seen as a voluntary, not a mandatory or “natural” role.

In summarizing her findings, Luker believes that women become activists in either of the two movements as the end result of lives that center around different conceptualizations of motherhood. Their beliefs and values are rooted to the concrete circumstances of their lives, their educations, incomes, occupations, and the different marital and family choices that they have made. They represent two different world views of women’s roles in contemporary society and as such the abortion issues represents the battleground for the justification of their respective views.

151. According to your understanding of the author’s arguments which countries are more likely to allow abortion?
  - (a) India and China
  - (b) Australia and Mongolia
  - (c) Cannot be inferred from the passage
  - (d) Both (a) and (b)
152. Which amongst these was **not** a reason for banning of abortions by 1900?
  - (a) Medical professionals stressing the health and safety of women
  - (b) Influx of eastern and southern European immigrants
  - (c) Control of unlicensed medical practitioners
  - (d) A tradition of matriarchal control
153. A pro-life woman would advocate abortion if
  - (a) the mother of an unborn child is suicidal
  - (b) bearing a child conflicts with a woman’s career prospects
  - (c) the mother becomes pregnant accidentally
  - (d) None of these
154. Pro-choice women object to the notion of the home being the “women’s sphere” because they believe
  - (a) that the home is a “joint sphere” shared between men and women
  - (b) that reproduction is a matter of choice for women
  - (c) that men and women are equal
  - (d) both (b) and (c)
155. Two health tragedies affecting U.S. Society in the 1960s led to
  - (a) a change in attitude to women’s right to privacy
  - (b) retaining the anti-abortion laws with some exceptions
  - (c) scrapping of anti-abortion laws
  - (d) strengthening of the pro-life lobby
156. Historically, the pro-choice movement has got support from, among others
  - (a) major patriarchal religions
  - (b) countries with low population density
  - (c) medical profession
  - (d) None of these

## PASSAGE - 21

(2002)

If translated into English, most of the ways economists talk among themselves would sound plausible enough to poets, journalists, business people, and other thoughtful though *non-economical* folk. Like serious talk anywhere-among boat designers and baseball fans, say - the talk is hard to follow when one has not made a habit of listening to it for a while. The culture of the conversation makes the words arcane. But the people in the unfamiliar conversation are not Martians. Underneath it all (the economist's favorite phrase) conversational habits are similar. Economics uses mathematical models and statistical tests and market arguments, all of which look alien to the literary eye. But looked at closely they are not so alien. They may be seen as figures of speech-metaphors, analogies, and appeals to authority.

Figures of speech are not mere frills. They think for us. Someone who thinks of a market as an “invisible hand” and the organization of work as a “production function” and his coefficients as being “significant”, as an economist does, is giving the language a lot of responsibility. It seems a good idea to look hard at his language.

If the economic conversation were found to depend a lot on its verbal forms, this would not mean that economics would be not a science, or just a matter of opinion, or some sort of confidence game. Good poets, though not scientists, are serious thinkers about symbols; good historians, though not scientists, are serious thinkers about data. Good scientists also use language. What is more (though it remains to be shown) they use the cunning of language, without particularly meaning to. The language used is a social object, and using language is a social act. It requires cunning (or, if you prefer, consideration), attention to the other minds present when one speaks.

The paying of attention to one's audience is called "rhetoric", a word that I later exercise hard. One uses rhetoric, of course, to warn of a fire in a theatre or to arouse the xenophobia of the electorate. This sort of yelling is the vulgar meaning of the word, like the president's "heated rhetoric" in a press conference or the "mere rhetoric" to which our enemies stoop. Since the Greek flame was lit, though, the word has been used also in a broader and more amiable sense, to mean the study of all the ways of accomplishing things with language: inciting a mob to lynch the accused, to be sure, but also persuading readers of a novel that its characters breathe, or bringing scholars to accept the better argument and reject the worse.

The question is whether the scholar - who usually fancies himself an announcer of "results" or a stater of "conclusions" free of rhetoric - speaks rhetorically. Does he try to persuade? It would seem so. Language, I just said, is not a solitary accomplishment. The scholar doesn't speak into the void, or to himself. He speaks to a community of voices. He desires to be heeded, praised, published, imitated, honored, en-Nobed. These are the desires. The devices of language are the means.

Rhetoric is the proportioning of means to desires in speech. Rhetoric is an economics of language, the study of how scarce means are allocated to the insatiable desires of people to be heard. It seems on the face of it a reasonable hypothesis that economists are like other people in being talkers, who desire listeners when they go to the library or the laboratory as much as when they go to the office on the polls. The purpose here is to see if this is true, and to see if it is useful: to study the rhetoric of economic scholarship.

The subject is scholarship. It is not the economy, or the adequacy of economic theory as a description of the economy, or even mainly the economist's role in the economy. The subject is the conversation economists have among themselves, for purposes of persuading each other that the interest elasticity of demand for investment is zero or that the money supply is controlled by the Federal Reserve.

Unfortunately, though, the conclusions are of more than academic interest. The conversations of classicists or of astronomers rarely affect the lives of other people. Those of economists do so on a large scale. A well known joke describes a May Day parade through Red Square with the usual mass of soldiers, guided missiles, rocket launchers. At last come rank upon rank of people in gray business suits. A bystander asks, "Who are those?" "Aha!" comes the reply, "those are economists: you have no idea what damage they can do!" Their conversations do it.

159. As used in the passage, which of the following is the closest meaning to the statement “The culture of the conversation makes the words *arcane*”?
- (a) Economists belong to a different culture
  - (b) Only mathematicians can understand economists
  - (c) Economists tend to use terms unfamiliar to the lay person, but depend on familiar linguistic forms.
  - (d) Economists use similes and adjectives in their analysis
160. As used in the passage, which of the following is the closest alternative to the word ‘*arcane*’?
- (a) Mysterious
  - (b) Secret
  - (c) Covert
  - (d) Perfidious
161. Based on your understanding of the passage, which of the following conclusions would you agree with?
- (a) The geocentric and the heliocentric views of the solar system are equally tenable
  - (b) The heliocentric view is superior because of better rhetoric
  - (c) Both views use rhetoric to persuade
  - (d) Scientists should not use rhetoric

## PASSAGE - 22

(2003C)

At the heart of the enormous boom in wine consumption that has taken place in the English-speaking world over the last two decades or so is a fascinating, happy paradox. In the days when wine was exclusively the preserve of a narrow cultural elite, bought either at auctions or from gentlemen wine merchants in wing collars to be stored in rambling cellars and decanted to order by one's butler, the ordinary drinker didn't get a look of wine. Wine was considered a highly technical subject, in which anybody without the necessary ability could only get flat on his or her face in embarrassment. It wasn't just that you needed a refined aesthetic sensibility for the consumption of wine if it wasn't to be hopelessly wasted on you. It required an intimate knowledge of what came from where, and what it was supposed to taste like.

Those were times, however, when wine appreciation essentially meant a familiarity with the great French classics, with perhaps a smattering of other wines- like sherry and port. That was what the wine trade dealt in. These days, wine is bought daily in supermarkets and high-street chains to be consumed that evening, hardly anybody has a cellar to store it in and most don't even possess a decanter. Above all, the wines of literally dozens of countries are available on our market. When a supermarket offers its customers a couple of fruity little numbers from Brazil, we scarcely raise an eyebrow.

It seems, in other words, that the commercial jungle that wine has now become has not in the slightest deterred people from plunging adventurous into the thickets in order to taste and see. Consumers are no longer intimidated by the thought of needing to know their Pouilly-Fusse, just at the very moment when there is more to know than ever before.

The reason for this new mood of confidence is not hard to find. It is on every wine label from Australia, New Zealand, South Africa and the United States : the name of the grape from which the wine is made. At one time that might have sounded like a fairly technical approach in itself. Why should native English speakers know what Cabernet Sauvignon or Chardonnay were? The answer lies in the popularity that wines made from those grape varieties now enjoy. Consumers effectively recognize them as brand names, and have acquired a basic lexicon of wine that can serve them even when confronted with those Brazilian upstarts.

In the wine heartlands of France, they are scared to death of that trend-not because they think their wine isn't as good as the best from California or South Australia (what French winemaker will ever admit that? ) but because they don't traditionally call their wines Cabernet Sauvignon or Chardonnay. They call them Chateau Ducru- Beaucaillou or Corton-Charlemagne, and they aren't about to change. Some areas, in the middle of southern France, have now produced a generation of growers using the varietal names on their labels and are tempting consumers back to French wine. It will be an uphill struggle, but there is probably no other way if France is to avoid simply becoming a speciality source of old- fashioned wines for old-fashioned connoisseurs.

Wine consumption was also given a significant boost in the early 1990s by the work of Dr. Serge Renaud, who has spent many years investigating the reasons for the uncannily low incidence of coronary heart disease in the south of France. One of his major findings is that the fat-derived cholesterol that builds up in the arteries and can eventually lead to heart trouble, can be dispersed by the tannins in wine. Tannin is derived from the skins of grapes, and is therefore present in higher levels in red wines, because they have to be infused with their skins to attain the red colour. That news caused a huge upsurge in red wine consumption in the United States. It has not been accorded the prominence it deserves in the UK, largely because the medical profession still sees all alcohol as a menace to health, and is constantly calling for it to be made prohibitively expensive. Certainly, the manufacturers of anticoagulant drugs might have something to lose if we all got the message that we would do just as well by our hearts by taking half a bottle of red wine every day!

162. What according to the author should the French do to avoid becoming a producer of merely old-fashioned wines?
- Produce the wines that have become popular in the English-speaking world
  - Introduce fruity wines as Brazil has done
  - Give their wines English names
  - Follow the labelling strategy of the English-speaking countries
163. The development which has created fear among winemakers in the wine heartlands of France is the
- ability of consumers to understand a wine's qualities when confronted with "Brazilian upstarts"
  - new generation of local winegrowers who use labels that show names of grape varieties
  - 'education' that consumers have derived from wine labels from English-speaking countries
  - tendency not to name wines after the grape varieties that are used in the wines
164. Which one of the following, if true, would provide most support for Dr. Renaud's findings about the effect of tannins?
- Long-term surveys in southern France showed that the incidence of coronary heart disease was significantly lower in red wine drinkers than in those who did not drink red wine
  - Data showed a positive association between sales of red wine and incidence of coronary heart disease
  - Measurements carried out in southern France showed red wine drinkers had significantly higher levels of coronary heart incidence than white wine drinkers did
  - A survey showed that film celebrities based in France have a low incidence of coronary heart disease
165. Which one of the following CANNOT be reasonably attributed to the labelling strategy followed by wine producers in English-speaking countries ?
- Consumers buy wines on the basis of their familiarity with a grape variety's name
  - Even ordinary customers now have more access to technical knowledge about wine
  - Some non-English speaking countries like Brazil indicate grape variety names on their labels
  - Consumers are able to appreciate better quality wines
166. The tone that the author uses while asking "What French winemaker will ever admit that" is best described as
- Critical
  - Satirical
  - hypocritical
  - caustic

### PASSAGE - 23

(2003C)

Right through history, imperial powers have clung to their possessions to death. Why, then, did Britain in 1947 give up the jewel in its crown, India? For many reasons. The independence struggle exposed the hollowness of the white man's burden. Provincial self-rule since 1935 paved the way for full self-rule, Churchill resisted independence, but the Labour government of Atlee was anti-imperialist by ideology. Finally, the Royal Indian Navy mutiny in 1946 raised fears of a second Sepoy mutiny, and convinced British waverers that it was safer to withdraw gracefully. But politico-military explanations are not enough. The basis of empire was always money. The end of empire had much to do with the fact that British imperialism had ceased to be profitable. World War II left Britain victorious but deeply indebted, needing Marshal Aid and loans from the World Bank. This constituted a strong financial case for ending the no-longer-profitable empire.

Empire building is expensive. The US is spending one billion dollars a day in operations in Iraq that fall well short of full-scale imperialism. Through the centuries, empire building was costly, yet constantly undertaken because it promised high returns. The investment was in armies and conquest. The returns came through plunder and taxes from the conquered.

No immorality was attached to imperial loot and plunder. The biggest conquerors were typically revered (hence titles like Alexander the Great, Akbar the Great, and Peter the Great). The bigger and richer the empire, the more the plunderer was admired. This mindset gradually changed with the rise of new ideas about equality and governing for the public good, ideas that culminated in the French and American revolutions. Robert Clive was impeached for making a little money on the side, and so was Warren Hastings. The white man's burden came up as a new moral rationale for conquest. It was supposedly for the good of the conquered. This led to much muddled hypocrisy. On the one hand, the empire needed to be profitable. On the other hand, the white man's burden made brazen loot impossible.

An additional factor deterring loot was the 1857 Sepoy Mutiny. Though crushed, it reminded the British vividly that they were a tiny ethnic group who could not rule a gigantic subcontinent without the support of important locals. After 1857, the British stopped annexing one princely state after another, and instead treated the princes as allies. Land revenue was fixed in absolute terms, partly to prevent local unrest and partly to promote the notion of the white man's burden. The empire proclaimed itself to be a protector of the Indian peasant against exploitation by Indian elites. This was denounced as hypocrisy by nationalists like Dadabhoi Naoroji in the 19th century, who complained that land taxes led to an enormous drain from India to Britain. Objective calculations by historians like Angus Maddison suggest a drain of perhaps 1.6 percent of Indian Gross National Product in the 19th century. But land revenue was more or less fixed by the Raj in absolute terms, and so its real value diminished rapidly with inflation in the 20th century. By World War II, India had ceased to be a profit for the British Empire.

Historically, conquered nations paid taxes to finance fresh wars of the conqueror. India itself was asked to pay a large sum at the end of World War I to help repair Britain's finances. But, as shown by historian Indivar Kamtekar, the independence movement led by Gandhiji changed the political landscape and made mass taxation of India increasingly difficult. By World War II, this had become politically impossible. Far from taxing India to pay for World War II, Britain actually began paying India for its contribution of men and goods. Troops from white dominions like Australia, Canada and New Zealand were paid for entirely by these countries, but Indian costs were shared by the British government. Britain paid in the form of non-convertible sterling balances, which mounted swiftly. The conqueror was paying the conquered undercutting the profitability on which all empire is founded. Churchill opposed this, and wanted to tax India rather than owe it money. But he was over-ruled by Indian hands who said India would resist payment, and paralyze the war effort. Leo Amery, Secretary of State for India, said that when you are driving in a taxi to the station to catch a life-or-death train, you do not loudly announce that you have doubts whether to pay the fare. Thus, World War II converted India from a debtor to a creditor with over one billion pounds in sterling balances. Britain meanwhile, became the biggest debtor in the world. It's not worth ruling over people you are afraid to tax.

167. Why didn't Britain tax India to finance its World War II efforts?
- The British empire was built on the premise that the conqueror pays the conquered
  - It was afraid that if India refused to pay, Britain's war efforts would be jeopardised
  - India had already paid a sufficiently large sum during World War I
  - Australia, Canada and New Zealand had offered to pay for Indian Troops
168. What was the main lesson the British learned from the Sepoy Mutiny of 1857?
- That India would be increasingly difficult to rule
  - That the British were a small ethnic group
  - That the land revenue from India would decline dramatically
  - That the local princes were allies, not foes
169. Which of the following best captures the meaning of the 'white man's burden', as it is used by the author?
- An imperative that made open looting of resources impossible
  - The resource drain that had to be borne by the home country's white population
  - The inspiration for the French and American revolution
  - The British claim to a civilizing mission directed at ensuring the good of the natives
170. Which of the following was NOT a reason for the emergence of the 'white man's burden' as a new rationale for empire building in India?
- A growing awareness of the idea of equality among peoples
  - The weakening of the immorality attached to an emperor's looting behaviour
  - The decreasing returns from imperial loot and increasing costs of conquest
  - The emergence of the idea of the public good as an element of governance
171. Which one of the following best expresses the main purpose of the author?
- To illustrate how erosion of the financial basis of an empire supports the granting of independence to an empire's constituents.
  - To highlight the contradictory impulse underpinning empire building which is a costly business but very attractive at the same time
  - To point out the critical role played by the 'white man's burden' in making a colonizing power give up its claims to native possessions
  - To present the various reasons that can lead to the collapse of an empire and the granting of independence to the subjects of an empire

## PASSAGE - 24

(2003C)

Social life is an outflow and meeting of personality, which means that its end is the meeting of character, temperament, and sensibility, in which our thoughts and feelings, and sense perceptions are brought into play at their lightest and yet keenest.

This aspect, to my thinking, is realized as much in large parties composed of casual acquaintances of even strangers, as in intimate meetings of old friends. I am not one of those superior persons who hold cocktail parties in contempt, looking upon them as barren or at best as very tryingly kaleidoscopic places for gathering, because of the strangers one has to meet in them; which is no argument, for even our most intimate friends must at one time have been strangers to us. These large gatherings will be only what we make of them—if not anything better, they can be as good places to collect new friends from as the slavemarkets of Istanbul were for beautiful slaves or New Market for race horses.

But they do offer more immediate enjoyment. For one thing, in them one can see the external expression of social life in appearance and behaviour at its widest and most varied – where one can admire beauty of body or air, hear voices remarkable either for sweetness or refinement, look on elegance of clothes or deportment. What is more these parties are schools for training in sociability, for in them we have to treat strangers as friends. So, in them we see social sympathy in widest commonality spread, or at least should. We show an atrophy of the natural human instinct of getting pleasure and happiness out of other human beings if we cannot treat strangers as friends for the moment. And I would go further and paraphrase Pater to say that not to be able to discriminate every moment some passionate attitude in those about us. Even when we meet them casually, is on this short day of frost and sun which our life is, to sleep before evening.

So, it will be seen that my conception of social life is modest, for it makes no demands on what we have, though it does make some on what we are. Interest, wonder, sympathy, and love, the first two leading to the last two, are the psychological prerequisites for social life; and the need for the first two must not be underrated. We cannot make the most even of our intimate social life unless we are able to make strangers of our oldest friends everyday by discovering unknown areas in their personality, and transform them into new friends, In sum, social life is a function of vitality.

It is tragic, however to observe that it is these very natural springs of social life which are drying up among us. It is becoming more and more difficult to come across fellow-feeling for human beings as such in our society—and in all its strata. In the poor middle class, in the course of all my life, I have hardly seen any social life properly so called. Not only has the grinding routine of making a living killed all desire for it in them, it has also generated a standing mood of peevish hostility to other human beings. Increasing economic distress in recent years has infinitely worsened this state of affairs, and has also brought a sinister addition-class hatred. This has become the greatest collective emotional enjoyment of the poor middle class, and indeed they feel most social when they form a pack and snarl or' howl at people who are better off than they.

Their most innocent exhibition of sociability is seen when they spill out from their intolerable homes into the streets and bazaars. I was astonished to see the milling crowds in the poor suburbs of Calcutta. But even there a group of flippant young loafers would put on a conspiratorial look if they saw a man in good clothes passing by them either on foot or in a car. I had borrowed a car from a relative to visit a friend in one of these suburbs, and he became very anxious when I had not returned before dusk. Acid and bombs, he said, were thrown at cars almost every evening in that area. I was amazed. But I also know as a fact that my brother was blackmailed to pay five rupees on a trumped up charge when passing in a car through one such locality.

The situation is differently in human, but not a whit more human, among the well-to-do. Kindliness for fellow human beings has been smothered in them, taken as a class, by the arrogance of worldly position, which among the Bengalis who show this snobbery is often only a third class position.

172. The word 'discriminate' in the last sentence of the third paragraph means
  - (a) recognise
  - (b) count
  - (c) distinguish
  - (d) analyse
173. What is the author trying to show through the two incidents in the paragraph beginning, "Their most innocent exhibition of sociability ...."?
  - (a) The crowds in poor Calcutta suburbs can turn violent without any provocation
  - (b) Although poor, the people of poor Calcutta suburbs have a rich social life
  - (c) It is risky for rich people to move around in poor suburbs
  - (d) Achieving a high degree of sociability does not stop the poor from hating the rich
174. The word 'they' in the first sentence of the third paragraph refers to
  - (a) Large parties consisting of casual acquaintances and strangers
  - (b) Intimate meetings of old friends
  - (c) New friends
  - (d) Both a & b
175. The author's conception of 'social life' requires that
  - (a) people attend large gatherings
  - (b) people possess qualities like wonder and interest
  - (c) people do not spend too much time in the company of intimate friends
  - (d) large parties consist of casual acquaintances and intimate friends
176. In this passage the author is essentially
  - (a) showing how shallow our social life is
  - (b) poking fun at the lower middle class people who howl at better off people.
  - (c) lamenting the drying up of our real social life
  - (d) criticizing the upper class for lavish showy parties

## PASSAGE - 25

(2003)

At first sight, it looks as though panchayati raj, the lower layer of federalism in our polity, is as firmly entrenched in our system as is the older and higher layer comprising the Union government and the States. Like the democratic institutions at the higher level, those at the panchayat level, the panchayati raj institutions (PRIs), are written into and protected by the Constitution. All the essential features, which distinguish a unitary system from a federal one, are as much enshrined at the lower as at the upper level of our federal system. But look closely and you will discover a fatal flaw. The letter of the Constitution as well as the spirit of the present polity have exposed the intra-State level of our federal system to a dilemma of which the inter-State and Union-State layers are free. The flaw has many causes. But all of them are rooted in an historical anomaly, that while the dynamics of federalism and democracy have given added strength to the rights given to the States in the Constitution, they have worked against the rights of panchayats.

At both levels of our federal system there is the same tussle between those who have certain rights and those who try to encroach upon them if they believe they can. Thus the Union Government was able to encroach upon certain rights given to the States by the Constitution. It got away with that because the single dominant party system, which characterised Centre-State relations for close upon two decades, gave the party in power at the Union level many extra-constitutional political levers. Second, the Supreme Court had not yet begun to extend the limits of its power. But all that has changed in recent times. The spurt given to multi-party democracy by the overthrow of the Emergency in 1977 became a long-term trend later on because of the ways in which a vigorously democratic multi-party system works in a political society which is as assertively pluralistic as Indian society is. It gives political clout to all the various segments which constitute that society. Secondly, because of the linguistic reorganisation of States in the 1950s, many of the most assertive segments have found their most assertive expression as States. Thirdly, with single-party dominance becoming a thing of the past at the Union level, governments can be formed at that level only by multi-party coalitions in which State-level parties are major players. This has made it impossible for the Union government to do much about anything unless it also carries a sufficient number of State-level parties with it. Indian federalism is now more real than it used to be, but an unfortunate side-effect is that India's panchayati raj system, inaugurated with fanfare in the early 1980s, has become less real.

By the time the PRIs came on the scene, most of the political space in our federal system had been occupied by the Centre in the first 30 years of Independence, and most of what was still left after that was occupied by the States in the next 20. PRIs might have hoped to wrest some space from their immediate neighbour, the States, just as the States had wrested some from the Centre. But having at last managed to checkmate the Centre's encroachments on their rights, the States were not about to allow the PRIs to do some encroaching of their own.

By the 1980s and early 1990s, the only national party left, the Congress, had gone deeper into a siege mentality. Finding itself surrounded by State-level parties, it had built walls against them instead of winning them over. Next, the States retaliated by blocking Congress proposals for panchayati raj in Parliament, suspecting that the Centre would try to use panchayats to bypass State Governments. The suspicion fed on the fact that the powers proposed by the Congress for panchayats were very similar to many of the more lucrative powers of State Governments. State-level leaders also feared, perhaps, that if panchayat-level leaders captured some of the larger PRIs, such as district-level panchayats, they would exert pressure on State-level leaders through intra-State multi-party federalism.

It soon became obvious to Congress leaders that there was no way the panchayati raj amendments they wanted to write into the Constitution would pass muster unless State-level parties were given their pound of flesh. The amendments were allowed only after it was agreed that the powers of panchayats could be listed in the Constitution. Illustratively, they would be defined and endowed on PRIs by the State Legislature acting at its discretion.

This left the door wide open for the States to exert the power of the new political fact that while the Union and State Governments could afford to ignore panchayats as long as the MLAs were happy, the Union Government had to be sensitive to the demands of State-level parties. This has given State-level actors strong beachheads on the shores of both inter-State and intra-State federalism. By using various administrative devices and non-elected parallel structures, State Governments have subordinated their PRIs to the state administration and given the upper hand to State Government officials against the elected heads of PRIs. Panchayats have become local agencies for implementing schemes drawn up in distant state capitals. And their own volition has been further circumscribed by a plethora of "Centrally-sponsored schemes". These are drawn up by even more distant Central authorities but at the same time tie up local staff and resources on pain of the schemes being switched off in the absence of matching local contribution. The "foreign aid" syndrome can be clearly seen at work behind this kind of "grass roots development".

177. Which of the following best captures the current state of Indian federalism as described in the passage ?

- (a) The Supreme Court has not begun to extend the limits of its power
- (b) The multi-party system has replaced the single party system
- (c) The Union, state and panchayati raj levels have become real
- (d) There is real distribution of power between the Union and State level parties

178. The central theme of the passage can be best summarized as
- Our grassroots development at the panchayat level is now driven by the “foreign aid” syndrome
  - Panchayati raj is firmly entrenched at the lower level of our federal system of governance
  - A truly federal polity has not developed since PRIs have not been allowed the necessary political space
  - The union government and State-level parties are engaged in a struggle for the protection of their respective rights
179. The sentence in the last paragraph, “And their own volition has been further circumscribed .....”, refers to
- The weakening of the local institutions’ ability to plan according to their needs
  - The increasing demands made on elected local leaders to match central grants with local contributions
  - The empowering of the panchayat system as implementers of schemes from State Capitals
  - The process by which the prescribed Central schemes are reformulated by local elected leaders
180. What is the “dilemma” at the intra-State level mentioned in the first paragraph of the passage?
- Should the state governments wrest more space from the Union, before considering the panchayati system?
  - Should rights similar to those that the States managed to get be extended to panchayats as well?
  - Should the single party system which has withered away be brought back at the level of the States?
  - Should the States get “their pound of flesh” before allowing the Union government to pass any more laws?
181. Which of the following most closely describes the ‘fatal flaw’ that the passage refers to?
- The ways in which the democratic multi-party system works in an assertively pluralistic society like India’s are flawed
  - The mechanisms that our federal system uses at the Union government level to deal with States are imperfect
  - The instruments that have ensured federalism at one level, have been used to achieve the opposite at another
  - The Indian constitution and the spirit of the Indian polity are fatally flawed

## PASSAGE - 26

(2003)

While I was in class at Columbia, struggling with the *esoterica du jour*, my father was on a bricklayer’s scaffold not far up the street, working on a campus building. Once we met up on the subway going home – he was with his tools, I with my books. My father wasn’t interested in Thucydides, and I wasn’t up on arches. My dad has built lots of places in New York city he can’t get into : colleges, condos, office towers. He made his living on the outside. Once the walls were up, a place took on a different feel for him, as though he wasn’t welcome anymore. Related by blood, we’re separated by class, my father and I. Being the white-collar child of a blue-collar parent means being the hinge on the door between two ways of life. With one foot in the working-class, the other in the middle class, people like me are Straddlers, at home in neither world, living a limbo life.

What drove me to leave what I knew ? Born blue-collar, I still never felt completely at home among the tough guys and anti-intellectual crowd of my neighbourhood in deepest Brooklyn. I never did completely fit in among the preppies and suburban royalty of Columbia, either. It’s like that for Straddles. It was not so smooth jumping from Italian old-world style to US professional in a single generation. Others who were the first in their families to go to college, will tell you the same thing : the academy can render you unrecognisable to the very people who launched you into the world. The ideas and values absorbed in college challenge the mom-and-pop orthodoxy that passed for truth for 18 years. Limbo folk may eschew polyester blends for sea-isle cotton, prefer Brie to Kraft slices. They marry outside the neighbourhood and raise their kids differently. They might not be in church on Sunday.

When they pick careers (not *jobs*), it’s often a kind of work their parents never heard of or can’t understand. But for the white-collar kids of blue-collar parents, the office is not necessarily a sanctuary. In corporate America, where the rules are based on notions foreign to working-class people, a straddler can get lost. Social class counts at the office, even though nobody likes to admit it. Ultimately, corporate norms are based on middle-class values, business types say. From an early age, middle-class people learn how to get along, using diplomacy, nuance, and politics to grab what they need. It is as though they are following a set of rules laid out in a manual that blue-collar families never have the chance to read.

People born into the middle class to parents with college degrees have lived lives filled with what French sociologist Pierre Bourdieu calls ‘cultural capital’. Growing up in an educated environment, they learn about Picasso and Mozart, stock portfolios and *creme brulee*. In a home with cultural capital, there are networks : someone always has an aunt or golfing buddy with the inside track for an internship or some entry-level job. Dinner-table talk could involve what happened that day to mom and dad at the law firm, the doctor’s office, or the executive suits. Middle-class kids can grow up with a sense of entitlement that will carry them through their lives. This ‘belongingness’ is not just related to having material means, it also has to do with learning and possessing confidence in your place in the world. Such early access and direct exposure to culture in the home is the more organic, can learn it, but never as well. Something is always a little off about us, like an engine with imprecise timing. There’s a greater match between middle-class lives and the institutions in which the middle class works and operates - universities or corporations. Children of the middle and upper classes have been speaking the language of the bosses and supervisors forever.

Blue-collar kids are taught by their parents and communities to work hard to achieve, and that merit is rewarded. But no blue-collar parent knows whether such things are true in the middle-class world. Many professionals born to the working-class report feeling out of place and outmanoeuvred in the office. Soon enough, Straddlers learn that straight talk won't always cut. Resolving conflicts head-on-and speaking your mind doesn't always work, no matter how educated the straddler is.

In the working-class, people perform jobs in which they are closely supervised and are required to follow orders and instruction. That, in turn, affects how they socialise their children. Children of the working-class are brought up in a home in which conformity, obedience and intolerance for back talk are the norm – the same characteristics that make a good factory worker.

182. According to the passage, which of the following statement about 'cultural capital' is NOT true.
- (a) It socializes children early into the norms of middle class institutions
  - (b) It helps them learn the language of universities and corporations
  - (c) It creates a sense of enlightenment in middle-class children
  - (d) It develops bright kids into Straddlers
183. According to the passage, the patterns of socialization of working-class children make them most suited for jobs that require
- (a) diplomacy
  - (b) Compliance with orders
  - (c) enterprise and initiative
  - (d) high risk taking
184. When Straddlers enter white collar jobs, they get lost because :
- (a) they are thrown into an alien value system
  - (b) their families have not read the rules in corporate manuals
  - (c) they have no one to guide them through the corporate maze
  - (d) they miss the 'mom and pop orthodoxy'
185. What does the author's statement, "My father wasn't interested in Thucydides, and I wasn't up on arches", illustrate?
- (a) Organic cultural capital
  - (b) Professional arrogance and social distance
  - (c) Evolving social transformation
  - (d) Breakdown of family relationships
186. Which of the following statements about Straddlers does the passage NOT support explicitly?
- (a) Their food preferences may not match those of their parents
  - (b) They may not keep up some central religious practices of their parents
  - (c) They are at home neither in the middle class nor in the working-class
  - (d) Their political ideologies may differ from those of their parents

## PASSAGE - 27

(2003)

Pure love of learning, of course, was a less compelling motive for those who became educated for careers other than teaching. Students of law in particular had a reputation for being materialistic careerists in an age when law was becoming known as "the lucrative science" and its successful practice the best means for rapid advancement in the government of both church and state. Medicine too had its profit-making attractions. Those who did not go on to law or medicine could, if they had been well trained in the arts, gain position at royal courts or rise in the clergy. Eloquent testimony to the profit motive behind much of twelfth-century education was the lament of a student of Abelard around 1150 that "Christians educate their sons... for gain, in order that the one brother, if he be a clerk, may help his father and mother and his other brothers, saying that a clerk will have no heir and whatever he has will be ours and the other brothers." With the opening of positions in law, government, and the church, education became a means for advancement not only in income but also in status. Most who were educated were wealthy, but in the twelfth century, more often than before, many were not and were able to rise through the ranks by means of their education. The most often than before, many were not and were able to rise through the ranks by means of their education. The most familiar examples are Thomas Becket, who rose from a humble background to become chancellor of England and then archbishop of Canterbury, and John of Salisbury, who was born a "plebeian" but because of his reputation for learning died as bishop of Chartres.

The instances of Becket and John of Salisbury bring us to the most difficult question concerning twelfth-century education : To what degree was it still a clerical preserve ? Despite the fact that throughout the twelfth century the clergy had a monopoly of instruction, one of the outstanding medievalists of our day, R. W. Southern, refers with good reason to the institution, staffed by the clergy as "secular schools." How can we make sense out of the paradox that twelfth-century schools were clerical and yet "secular"?

Let us look at the clerical side first. Not only were all twelfth-century teachers except professionals and craftsmen in church orders, but in northern Europe students in schools had clerical status and looked like priests. Not that all really were priests, but by virtue of being students all were awarded the legal privileges accorded to the clergy. Furthermore, the large majority of twelfth-century students, outside of the possible exception of Italy, if not already priests became so after their studies were finished. For these reasons, the term “cleric” was often used to denote a man who was literate and the term “layman” one who was illiterate. The English word for cleric, clerk, continued for a long time to be a synonym for student or for a man who could write, while the French word *clerc* even today has the connotation of intellectual.

Despite all this, twelfth-century education was taking on many secular qualities in its environment, goals, and curriculum. Student life obviously became more secular when it moved out from the monasteries into the bustling towns. Most students wandered from town to town in search not only of good masters but also of worldly excitement, and as the twelfth century progressed they found the best of each in Paris. More important than environment was the fact that most students, even though they entered the clergy, had secular goals. Theology was recognized as the “queen of the sciences,” but very few went on to it. Instead they used their study of the liberal arts as a preparation for law, medicine, government service, or advancement in the ecclesiastical hierarchy.

This being so, the curriculum of the liberal arts became more sophisticated and more divorced from religion. Teaching was still almost exclusively in Latin, and the first book most often read was the *Psalter*, but further education was no longer similar to that of a choir school. In particular, the discipline of rhetoric was transformed from a linguistic study into instruction in how to compose letters and documents; there was a new stress on logic; and in all the liberal arts and philosophy texts more advanced than those known in the early Middle Ages were introduced.

Along with the rise of logic came the translation of Greek and Arabic Philosophical and scientific works. Most important was the translation of almost all the writing of Aristotle, as well as his sophisticated Arabic commentators, which helped to bring about an intellectual revolution based on Greek rationalism. On a more prosaic level, contact with Arabs resulted in the introduction in the twelfth century of the Arabic numeral system and the concept of Zero. Though most westerners first resisted this and made crude jokes about the zero as an ambitious number “that counts for nothing and yet wants to be counted,” the system steadily made its inroads first in Italy and then throughout Europe, thereby vastly simplifying the arts of computation and record keeping.

187. According to the passage, which of the following is the most noteworthy trend in education in twelfth-century Europe?
- Secularization of education
  - Flowering of theology as the queen of the sciences
  - Wealthy people increasingly turning to education
  - Rise of the clergy's influence on the curriculum
188. What does the sentence “Christians educate their sons ..... will be our and the other brother's” imply?
- The Christian family was a close-knit unit in the twelfth century
  - Christians educated their sons not so much for the love of learning as for material gain
  - Christians believed very strongly in educating their sons in the church
  - The relationship between Christian parents and their sons was exploitative in the twelfth century
189. According to the passage, twelfth century schools were clerical and yet secular because
- many teachers were craftsmen and professionals who did not form part of the church
  - while the students had the legal privileges accorded to the clergy and looked like priests, not all were really priests
  - the term ‘cleric’ denoted a literate individual rather than a strict association with the church
  - though the clergy had a monopoly in education, the environment, objectives and curriculum in the schools were becoming secular
190. According to the author, in the twelfth century, individuals were motivated to get higher education because it
- was a means for material advancement and higher status
  - gave people with wealth an opportunity to learn
  - offered a coveted place for those with a love of learning
  - directly added to the income levels of people
191. According to the passage, what led to the secularization of the curriculum of the liberal arts in the twelfth century?
- It was divorced from religion and its influences
  - Students used it mainly as base for studying law and medicine
  - Teaching could no longer be conducted exclusively in Latin
  - Arabic was introduced into the curriculum

## PASSAGE - 28

(2004)

The viability of the multinational corporate system depends upon the degree to which people will tolerate the unevenness it creates. It is well to remember that the 'New Imperialism' which began after 1870 in a spirit of Capitalism Triumphant, soon became seriously troubled and after 1914 was characterised by war, depression, breakdown of the international economic system and war again, rather than Free Trade, Pax Britannica and Material Improvement. A major reason was Britain's inability to cope with the by-products of its own rapid accumulation of capital; i.e., a class-conscious labour force at home; a middle class in the hinterland; and rival centres of capital on the Continent and in America. Britain's policy tended to be atavistic and defensive rather than progressive --- more concerned with warding off new threats than creating new areas of expansion. Ironically, Edwardian England revived the paraphernalia of the landed aristocracy it had just destroyed. Instead of embarking on a 'big push' to develop the vast hinterland of the Empire, colonial administrators often adopted policies to arrest the development of either a native capitalist class or a native proletariat which could overthrow them.

As time went on, the centre had to devote an increasing share of government activity to military and other unproductive expenditures, they had to rely on alliances with an inefficient class of landlords, officials and soldiers in the hinterland to maintain stability at the cost of development. A great part of the surplus extracted from the population was thus wasted locally.

The New Mercantilism (as the Multinational Corporate System of Special alliances and privileges, aid and tariff concessions is sometimes called) faces similar problems of internal and external division. The centre is troubled excluded groups revolt and even some of the affluent are dissatisfied with the roles. Nationalistic rivalry between major capitalist countries remains an important divisive factor. Finally, there is the threat presented by the middle classes and the excluded groups of the undeveloped countries.

The national middle classes in the underdeveloped countries came to power when the centre weakened but could not, through their policy of import substitution manufacturing, establish a viable basis for sustained growth. They now face a foreign exchange crisis and an unemployment (or population) crisis --- the first indicating their inability to function in the international economy and the second indicating their alienation from the people they are supposed to lead. In the immediate future, these national middle classes will gain a new lease of life as they take advantage of the spaces created by the rivalry between American and non-American oligopolists striving to establish global market positions.

The native capitalists will again become the champions of national independence as they bargain with multinational corporations. But the conflict at this level is more apparent than real, for in the end the fervent nationalism of the middle class asks only for promotion within the corporate structure and not for a break with that structure. In the last analysis their power derives from the metropolis and they cannot easily afford to challenge the international system. They do not command the loyalty of their own population and cannot really compete with the large, powerful, aggregate capitals from the centre. They are prisoners of the taste patterns and consumption standards set at the centre.

The main threat comes from the excluded groups. It is not unusual in underdeveloped countries for the top 5 percent to obtain between 30 and 40 percent of the total national income, and for the top one-third to obtain anywhere from 60 to 70 percent. At most, one-third of the population can be said to benefit in some sense from the dualistic growth that characterizes development in the hinterland. The remaining two-thirds, who together get only one-third of the income, are outsider, not because they do not contribute to the economy, but because they do not share in the benefits. They provide a source of cheap labour which helps keep exports to the developed world at a low price and which has financed the urban-biased growth of recent years. In fact, it is difficult to see how the system in most underdeveloped could survive without cheap labour since removing it (e.g. diverting it to public works projects as is done in socialist countries) would raise consumption costs to capitalists and professional elites.

192. The author is in a position to draw parallels between New Imperialism and New Mercantilism because
  - (a) both originated in the developed Western capitalist countries.
  - (b) New Mercantilism was a logical sequel to New Imperialism.
  - (c) They create the same set of outputs---a labour force, middle classes and rival centres of capital.
  - (d) both have comparable uneven and divisive effects.
193. According to the author, the British policy during the 'New Imperialism' period tended to be defensive because
  - (a) it was unable to deal with the fallouts of a sharp increase in capital.
  - (b) its cumulative capital had undesirable side-effects.
  - (c) its policies favoured developing the vast hinterland.
  - (d) it prevented the growth of a set-up which could have been capitalistic in nature.
194. In sentence, "They are prisoners of the taste patterns and consumption standards set at the centre." (fourth paragraph), what is the meaning of 'centre'?
  - (a) National government
  - (b) Native capitalists
  - (c) New capitalists
  - (d) None of the above
195. Under New Mercantilism, the fervent nationalism of the native middle classes does not create conflict with the multinational corporations because they (the middle classes)
  - (a) negotiate with the multinational corporations.
  - (b) are dependent on the international system for their continued prosperity.
  - (c) are not in a position to challenge the status quo.
  - (d) do not enjoy popular support.

## PASSAGE - 29

(2005)

A game of strategy, as currently conceived in game theory, is a situation in which two or more “players” make choices among available alternatives (moves). The totality of choices determines the outcomes of the game, and it is assumed that the rank order of preferences for the outcomes is different for different players. Thus the “interests” of the players are generally in conflict. Whether these interests are diametrically opposed or only partially opposed depends on the type of game.

Psychologically, most interesting situations arise when the interests of the players are partly coincident and partly opposed, because then one can postulate not only a conflict among the players but also inner conflicts within the players. Each is torn between a tendency to cooperate, so as to promote the common interests, and a tendency to compete, so as to enhance his own individual interests.

Internal conflicts are always psychologically interesting. What we vaguely call “interesting” psychology is in very great measure the psychology of inner conflict. Inner conflict is also held to be an important component of serious literature as distinguished from less serious genres. The classical tragedy, as well as the serious novel, reveals the inner conflict of central figures. The superficial adventure story, on the other hand, depicts only external conflict; that is, the threats to the person with whom the reader (or viewer) identifies stem in these stories exclusively from external obstacles and from the adversaries who create them. On the most primitive level this sort of external conflict is psychologically empty. In the fisticuffs between the protagonists of good and evil, no psychological problems are involved or, at any rate, none are depicted in juvenile representations of conflict.

The detective story, the “adult” analogue of a juvenile adventure tale, has at times been described as a glorification of intellectualized conflict. However, a great deal of the interest in the plots of these stories is sustained by withholding the unraveling of a solution to a problem. The effort of solving the problem is in itself not a conflict if the adversary (the unknown criminal) remains passive, like Nature, whose secrets the scientist supposedly unravels by deduction. If the adversary actively puts obstacles in the detective’s path toward the solution, there is genuine conflict. But the conflict is psychologically interesting only to the extent that it contains irrational components such as a tactical error on the criminal’s part or the detective’s insight into some psychological quirk of the criminal or something of this sort. Conflict conducted in a perfectly rational manner is psychologically no more interesting than a standard Western. For example, Tic-tac-toe, played perfectly by both players, is completely devoid of psychological interest. Chess may be psychologically interesting but only to the extent that it is played not quite rationally. Played completely rationally, chess would not be different from Tic-tac-toe.

In short, a pure conflict of interest (what is called a zero-sum game) although it offers a wealth of interesting conceptual problems, is not interesting psychologically, except to the extent that its conduct departs from rational norms.

196. According to the passage, which of the following options about the application of game theory to a conflict-of-interest situation is true?
- Assuming that the rank order of preferences for options is different for different players.
  - Accepting that the interests of different players are often in conflict.
  - Not assuming that the interests are in complete disagreement.
  - All of the above.
197. The problem solving process of a scientist is different from that of a detective because
- scientists study inanimate objects, while detectives deal with living criminals or law offenders.
  - scientists study known objects, while detectives have to deal with unknown criminals or law offenders.
  - scientists study phenomena that are not actively altered, while detectives deal with phenomena that have been deliberately influenced to mislead.
  - scientists study psychologically interesting phenomena, while detectives deal with “adult” analogues of juvenile adventure tales.
198. According to the passage, internal conflicts are psychologically more interesting than external conflicts because
- internal conflicts, rather than external conflicts, form an important component of serious literature as distinguished from less serious genres.
  - only juveniles or very few “adults” actually experience external conflict, while internal conflict is more widely prevalent in society.
  - in situations of internal conflict, individuals experience a dilemma in resolving their own preferences for different outcomes.
  - there are no threats to the reader (or viewer) in case of external conflicts.
199. Which, according to the author, would qualify as interesting psychology?
- A statistician’s dilemma over choosing the best method to solve an optimisation problem.
  - A chess player’s predicament over adopting a defensive strategy against an aggressive opponent.
  - A mountaineer’s choice of the best path to Mt. Everest from the base camp.
  - A finance manager’s quandary over the best way of raising money from the market.

## PASSAGE - 30

(2005)

Crinoline and croquet are out. As yet, no political activists have thrown themselves in front of the royal horse on Derby Day. Even so, same historians can spot the parallels. It is a time of rapid technological change. It is a period when the dominance of the world's superpower is coming under threat. It is an epoch when prosperity masks underlying economic strain. And, crucially, it is a time when policy-makers are confident that all is *for* the best in the best of all possible worlds. Welcome to the Edwardian Summer of the second age of globalisation.

Spare a moment to take stock of what's been happening in the past *few* months. Let's start with the oil price, which has rocketed to more than \$65 a barrel, more than double its level 18 months ago. The accepted wisdom is that we shouldn't worry our little heads about that, because the incentives are there *for* business to build new production and refining capacity, which will effortlessly bring demand and supply back into balance and bring crude prices back to \$25 a barrel. As Tommy Cooper used to say, 'just like that'.

Then there is the result of the French referendum on the European Constitution, seen as thick-headed luddites railing vainly against the modern world. What the French needed to realise, the argument went, was that there was no alternative to the reforms that would make the country more flexible, more competitive, more dynamic. Just the sort of reforms that allowed Gate Gourmet to sack hundreds of its staff at Heathrow after the sort of ultimatum that used to be handed out by Victorian mill owners. An alternative way of looking at the French "non" is that our neighbours translate "flexibility" as "you're fired".

Finally, take a squint at the United States. Just like Britain a century ago, a period of unquestioned superiority is drawing to a close. China is still a long way from matching America's wealth, but it is growing at a stupendous rate and economic strength brings geo-political clout. Already, there is evidence of a new scramble *for* Africa as Washington and Beijing compete *for* oil stocks. Moreover, beneath the surface of the US economy, all is not well. Growth looks healthy enough, but the competition *from* China and elsewhere has meant the world's biggest economy now imports far more than it exports. The US is living beyond its means, but in this time of studied complacency a current account deficit worth 6 percent of gross domestic product is seen as a sign of strength, not weakness.

In this new Edwardian summer, comfort is taken *from* the fact that dearer oil has not had the savage inflationary consequences of 1973-74, when a fourfold increase in the cost of crude brought an abrupt end to a postwar boom that had gone on uninterrupted *for* a quarter of a century. True, the cost of living has been affected by higher transport costs, but we are talking of inflation at 2.3 per cent and not 27 percent. Yet the idea that higher oil prices are of little consequence is fanciful. If people are paying more to fill up their cars it leaves them with less to spend on everything else, but there is a reluctance to consume less. In the 1970s unions were strong and able to negotiate large, compensatory pay deals that served to intensify inflationary pressure. In 2005, that avenue is pretty much closed off, but the abolition of all the controls on credit that existed in the 1970s means that households are invited to borrow more rather than consume less. The knock-on effects of higher oil prices are thus felt in different ways - through high levels of indebtedness, in inflated asset prices, and in balance of payments deficits.

There are those who point out, rightly, that modern industrial capitalism has proved mightily resilient these past 250 years, and that a sign of the enduring strength of the system has been the way it apparently shrugged off everything - a stock market crash, 9/11, rising oil prices - that have been thrown at it in the half decade since the millennium. Even so, there are at least three reasons *for* concern. First, we have been here before. In terms of political economy, the first era of globalisation mirrored our own. There was a belief in unfettered capital flows, in *free* trade, and in the power of the market. It was a time of massive income inequality and unprecedented migration. Eventually, though, there was a backlash, manifested in a struggle between *free* traders and protectionists, and in rising labour militancy.

Second, the world is traditionally at its most fragile at times when the global balance of power is in flux. By the end of the nineteenth century, Britain's role as the hegemonic power was being challenged by the rise of the United States, Germany, and Japan while the Ottoman and Hapsburg empires were clearly in rapid decline. Looking ahead from 2005, it is clear that over the next two or three decades, both China and India - which together account for half the world's population - will flex their muscles.

Finally, there is the question of what rising oil prices tell us. The emergence of China and India means global demand for crude is likely to remain high at a time when experts say production is about to top out. If supply constraints start to bite, any declines in the price are likely to be short-term cyclical affairs punctuating a long upward trend.

200. Which of the following best represents the key argument made by the author?
- The rise in oil prices, the flux in the global balance of power and historical precedents should make us question our belief that the global economic prosperity would continue.
  - The belief that modern industrial capitalism is highly resilient and capable of overcoming shocks will be belied soon.
  - Widespread prosperity leads to neglect of early signs of underlying economic weakness, manifested in higher oil prices and a flux in the global balance of power.
  - A crisis is imminent in the West given the growth of countries like China and India and the increase in oil prices.

201. What can be inferred about the author's view when he states, 'As Tommy Cooper used to say "just like that"'''?
- Industry has incentive to build new production and refining capacity and therefore oil prices would reduce.
  - There would be a correction in the price levels of oil once new production capacity is added.
  - The decline in oil prices is likely to be short-term in nature.
  - It is not necessary that oil prices would go down to earlier levels.
202. What, according to the author, has resulted in a widespread belief in the resilience of modern capitalism?
- Growth in the economies of Western countries despite shocks in the form of increase in levels of indebtedness and inflated asset prices.
  - Increase in the prosperity of Western countries and China despite rising oil prices.
  - Continued growth of Western economies despite a rise in terrorism, an increase in oil prices and other similar shocks.
  - The success of continued reforms aimed at making Western economies more dynamic, competitive and efficient.
203. By the expression 'Edwardian Summer', the author refers to a period in which there is
- unparalleled luxury and opulence.
  - a sense of complacency among people because of all-round prosperity.
  - a culmination of all-round economic prosperity.
  - an imminent danger lurking behind economic prosperity.

## PASSAGE - 31

(2006)

**Directions for Questions 204 to 208 :** The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

Our propensity to look out for regularities, and to impose laws upon nature, leads to the psychological phenomenon of dogmatic thinking or, more generally, dogmatic behaviour: we expect regularities everywhere and attempt to find them even where there are none; events which do not yield to these attempts we are inclined to treat as a kind of 'background noise'; and we stick to our expectations even when they are inadequate and we ought to accept defeat. This dogmatism is to some extent necessary. It is demanded by a situation which can only be dealt with by forcing our conjectures upon the world. Moreover, this dogmatism allows us to approach a good theory in stages, by way of approximations: if we accept defeat too easily, we may prevent ourselves from finding that we were very nearly right.

It is clear that this *dogmatic attitude*, which makes us stick to our first impressions, is indicative of a strong belief; while a critical attitude, which is ready to modify its tenets, which admits doubt and demands tests, is indicative of a weaker belief. Now according to Hume's theory, and to the popular theory, the strength of a belief should be a product of repetition; thus it should always grow with experience, and always be greater in less primitive persons. But dogmatic thinking, an uncontrolled wish to impose regularities, a manifest pleasure in rites and in repetition as such, is characteristic of primitives and children; and increasing experience and maturity sometimes create an attitude of caution and criticism rather than of dogmatism.

My logical criticism of Hume's psychological theory, and the considerations connected with it, may seem a little removed from the field of the philosophy of science. But the distinction between dogmatic and critical thinking, or the dogmatic and the critical attitude, brings us right back to our central problem. For the dogmatic attitude is clearly related to the tendency to verify our laws and schemata by seeking to apply them and to confirm them, even to the point of neglecting refutations, whereas the critical attitude is one of readiness to change them - to test them; to refute them; to falsify them, if possible. This suggests that we may identify the critical attitude with the scientific attitude, and the dogmatic attitude with the one which we have described as pseudo-scientific. It further suggests that genetically speaking the pseudo-scientific attitude is more primitive than, and prior to, the scientific attitude: that it is a pre-scientific attitude. And this primitivity or priority also has its logical aspect. For the critical attitude is not so much opposed to the dogmatic attitude as super-imposed upon it: criticism must be directed against existing and influential beliefs in need of critical revision - in other words, dogmatic beliefs. A critical attitude needs for its raw material, as it were, theories or beliefs which are held more or less dogmatically.

Thus, science must begin with myths, and with the criticism of myths; neither with the collection of observations, nor with the invention of experiments, but with the critical discussion of myths, and of magical techniques and practices. The scientific tradition is distinguished from the pre-scientific tradition in having two layers. Like the latter, it passes on its theories; but it also passes on a critical attitude towards them. The theories are passed on, not as dogmas, but rather with the challenge to discuss them and improve upon them.

The critical attitude, the tradition of free discussion of theories with the aim of discovering their weak spots so that they may be improved upon, is the attitude of reasonableness, of rationality. From the point of view here developed, all laws, all theories, remain essentially tentative, or conjectural, or hypothetical, even when we feel unable to doubt them any longer. Before a theory has been refuted we can never know in what way it may have to be modified.

204. In the context of science, according to the passage, the interaction of dogmatic beliefs and critical attitude can be best described as:
- A duel between two warriors in which one has to die
  - The effect of a chisel on a marble stone while making a sculpture
  - The feedstock (natural gas) in fertilizer industry being transformed into fertilizers
  - A predator killing its prey.
  - The effect of fertilizers on a sapling.
205. According to the passage, the role of a dogmatic attitude or dogmatic behaviour in the development of science is
- critical and important, as, without it, initial hypothesis or conjectures can never be made.
  - positive, as conjectures arising out of our dogmatic attitude become science.
  - negative, as it leads to pseudo-science.
  - neutral, as the development of science is essentially because of our critical attitude.
  - inferior to critical attitude, as a critical attitude leads to the attitude of reasonableness and rationality.
206. Dogmatic behaviour, in this passage, has been associated with primitives and children. Which of the following best describes the reason why the author compares primitives with children?
- Primitives are people who are not educated, and hence can be compared with children, who have not yet been through school
  - Primitives are people who, though not modern, are as innocent as children.
  - Primitives are people without a critical attitude, just as children are.
  - Primitives are people in the early stages of human evolution; similarly, children are in the early stages of their lives.
  - Primitives are people who are not civilized enough, just as children are not.
207. Which of the following statements best supports the argument in the passage that a critical attitude leads to a weaker belief than a dogmatic attitude does?
- A critical attitude implies endless questioning, and, therefore, it cannot lead to strong beliefs.
  - A critical attitude, by definition, is centred on an analysis of anomalies and “noise”.
  - A critical attitude leads to questioning everything, and in the process generates “noise” without any conviction.
  - A critical attitude is antithetical to conviction, which is required for strong beliefs.
  - A critical attitude leads to questioning and to tentative hypotheses.
208. According to the passage, which of the following statements best describes the difference between science and pseudo-science?
- Scientific theories or hypothesis are tentatively true whereas pseudo-sciences are always true.
  - Scientific laws and theories are permanent and immutable whereas pseudo-sciences are contingent on the prevalent mode of thinking in a society.
  - Science always allows the possibility of rejecting a theory or hypothesis, whereas pseudo-sciences seek to validate their ideas or theories.
  - Science focuses on anomalies and exceptions so that fundamental truths can be uncovered, whereas pseudo-sciences focus mainly on general truths.
  - Science progresses by collection of observations or by experimentation, whereas pseudo-sciences do not worry about observations and experiments.

## PASSAGE - 32

(2006)

**Directions for Questions 209 to 213 : The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.**

Fifteen years after communism was officially pronounced dead, its spectre seems once again to be haunting Europe. Last month, the Council of Europe's parliamentary assembly voted to condemn the “crimes of totalitarian communist regimes,” linking them with Nazism and complaining that communist parties are still “legal and active in some countries.” Now Goran Lindblad, the conservative Swedish MP behind the resolution, wants to go further. Demands that European Ministers launch a continent-wide anti-communist campaign - including school textbook revisions, official memorial days, and museums - only narrowly missed the necessary two-thirds majority. Mr. Lindblad pledged to bring the wider plans back to the Council of Europe in the coming months.

He has chosen a good year for his ideological offensive: this is the 50th anniversary of Nikita Khrushchev's denunciation of Josef Stalin and the subsequent Hungarian uprising, which will doubtless be the cue for further excoriation of the communist record. Paradoxically, given that there is no communist government left in Europe outside Moldova, the attacks have if anything, become more extreme as time has gone on. A clue as to why that might be can be found in the rambling report by Mr. Lindblad that led to the Council of Europe declaration. Blaming class struggle and public ownership, he explained "different elements of communist ideology such as equality or social justice still seduce many" and "a sort of nostalgia for communism is still alive." Perhaps the real problem for Mr. Lindblad and his right-wing allies in Eastern Europe is that communism is not dead enough - and they will only be content when they have driven a stake through its heart.

The fashionable attempt to equate communism and Nazism is in reality a moral and historical nonsense. Despite the cruelties of the Stalin terror, there was no Soviet Treblinka or Sobibor, no extermination camps built to murder millions. Nor did the Soviet Union launch the most devastating war in history at a cost of more than 50 million lives - in fact it played the decisive role in the defeat of the German war machine. Mr. Lindblad and the Council of Europe adopt as fact the wildest estimates of those "killed by communist regimes" (mostly in famines) from the fiercely contested Black Book of Communism, which also underplays the number of deaths attributable to Hitler. But, in any case, none of this explains why anyone might be nostalgic in former communist states, now enjoying the delights of capitalist restoration. The dominant account gives no sense of how communist regimes renewed themselves after 1956 or why Western leaders feared they might overtake the capitalist world well into the 1960s. For all its brutalities and failures, communism in the Soviet Union, Eastern Europe, and elsewhere delivered rapid industrialization, mass education, job security, and huge advances in social and gender equality. Its existence helped to drive up welfare standards in the West, and provided a powerful counterweight to Western global domination.

It would be easier to take the Council of Europe's condemnation of communist state crimes seriously if it had also seen fit to denounce the far bloodier record of European colonialism - which only finally came to an end in the 1970s. This was a system of racist despotism, which dominated the globe in Stalin's time. And while there is precious little connection between the ideas of fascism and communism, there is an intimate link between colonialism and Nazism. The terms *lebensraum* and *konzentrationslager* were both first used by the German colonial regime in south-west Africa (now Namibia), which committed genocide against the Herero and Nama peoples and bequeathed its ideas and personnel directly to the Nazi party.

Around 10 million Congolese died as a result of Belgian forced labour and mass murder in the early twentieth century; tens of millions perished in avoidable or enforced famines in British-ruled India; up to a million Algerians died in their war for independence, while controversy now rages in France about a new law requiring teachers to put a positive spin on colonial history. Comparable atrocities were carried out by all European colonialists, but not a word of condemnation from the Council of Europe. Presumably, European lives count for more.

No major twentieth century political tradition is without blood on its hands, but battles over history are more about the future than the past. Part of the current enthusiasm in official Western circles for dancing on the grave of communism is no doubt about relations with today's Russia and China. But it also reflects a determination to prove there is no alternative to the new global capitalist order - and that any attempt to find one is bound to lead to suffering. With the new imperialism now being resisted in the Muslim world and Latin America, growing international demands for social justice and ever greater doubts about whether the environmental crisis can be solved within the existing economic system, the pressure for alternatives will increase.

209. Among all the apprehensions that Mr. Goran Lindblad expresses against communism, which one gets admitted, although indirectly, by the author?
  - (a) There is nostalgia for communist ideology even if communism has been abandoned by most European nations.
  - (b) Notions of social justice inherent in communist ideology appeal to critics of existing systems.
  - (c) Communist regimes were totalitarian and marked by brutalities and large scale violence.
  - (d) The existing economic order is wrongly viewed as imperialistic by proponents of communism.
  - (e) Communist ideology is faulted because communist regimes resulted in economic failures.
210. What, according to the author, is the real reason for a renewed attack against communism?
  - (a) Disguising the unintended consequences of the current economic order such as social injustice and environmental crisis.
  - (b) Idealising the existing ideology of global capitalism.
  - (c) Making communism a generic representative of all historical atrocities, especially those perpetrated by the European imperialists.
  - (d) Communism still survives, in bits and pieces, in the minds and hearts of people.
  - (e) Renewal of some communist regimes has led to the apprehension that communist nations might overtake the capitalists.
211. The author cites examples of atrocities perpetrated by European colonial regimes in order to
  - (a) compare the atrocities committed by colonial regimes with those of communist regimes.
  - (b) prove that the atrocities committed by colonial regimes were more than those of communist regimes.
  - (c) prove that, ideologically, communism was much better than colonialism and Nazism.
  - (d) neutralise the arguments of Mr. Lindblad and to point out that the atrocities committed by colonial regimes were more than those of communist regimes.
  - (e) neutralise the arguments of Mr. Lindblad and to argue that one needs to go beyond and look at the motives of these regimes.

212. Why, according to the author, is Nazism closer to colonialism than it is to communism?
- (a) Both colonialism and Nazism were examples of tyranny of one race over another.
  - (b) The genocides committed by the colonial and the Nazi regimes were of similar magnitude.
  - (c) Several ideas of the Nazi regime were directly imported from colonial regimes.
  - (d) Both colonialism and Nazism are based on the principles of imperialism.
  - (e) While communism was never limited to Europe, both the Nazis and the colonialists originated in Europe.
213. Which of the following cannot be inferred as a compelling reason for the silence of the Council of Europe on colonial atrocities?
- (a) The Council of Europe being dominated by erstwhile colonialists.
  - (b) Generating support for condemning communist ideology.
  - (c) Unwillingness to antagonize allies by raking up an embarrassing past.
  - (d) Greater value seemingly placed on European lives.
  - (e) Portraying both communism and Nazism as ideologies to be condemned.

### PASSAGE - 33

(2007)

**Directions for Questions 214 to 216 :** The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

The difficulties historians face in establishing cause-and-effect relations in the history of human societies are broadly similar to the difficulties facing astronomers, climatologists, ecologists, evolutionary biologists, geologists, and paleontologists. To varying degrees each of these fields is plagued by the impossibility of performing replicated, controlled experimental interventions, the complexity arising from enormous numbers of variables, the resulting uniqueness of each system, the consequent impossibility of formulating universal laws, and the difficulties of predicting emergent properties and future behaviour. Prediction in history, as in other historical sciences, is most feasible on large spatial scales and over long times, when the unique features of millions of small-scale brief events become averaged out. Just as I could predict the sex ratio of the next 1,000 newborns but not the sexes of my own two children, the historian can recognize factors that made inevitable the broad outcome of the collision between American and Eurasian societies after 13,000 years of separate developments, but not the outcome of the 1960 U.S. presidential election. The details of which candidate said what during a single televised debate in October 1960 could have given the electoral victory to Nixon instead of to Kennedy, but no details of who said what could have blocked the European conquest of Native Americans.

How can students of human history profit from the experience of scientists in other historical sciences? A methodology that has proved useful involves the comparative method and so-called natural experiments. While neither astronomers studying galaxy formation nor human historians can manipulate their systems in controlled laboratory experiments, they both can take advantage of natural experiments, by comparing systems differing in the presence or absence (or in the strong or weak effect) of some putative causative factor. For example, epidemiologists, forbidden to feed large amounts of salt to people experimentally, have still been able to identify effects of high salt intake by comparing groups of humans who already differ greatly in their salt intake; and cultural anthropologists, unable to provide human groups experimentally with varying resource abundances for many centuries, still study long-term effects of resource abundance on human societies by comparing recent Polynesian populations living on islands differing naturally in resource abundance.

The student of human history can draw on many more natural experiments than just comparisons among the five inhabited continents. Comparisons can also utilize large islands that have developed complex societies in a considerable degree of isolation (such as Japan, Madagascar, Native American Hispaniola, New Guinea, Hawaii, and many others), as well as societies on hundreds of smaller islands and regional societies within each of the continents. Natural experiments in any field, whether in ecology or human history, are inherently open to potential methodological criticisms. Those include confounding effects of natural variation in additional variables besides the one of interest, as well as problems in inferring chains of causation from observed correlations between variables. Such methodological problems have been discussed in great detail for some of the historical sciences. In particular, epidemiology, the science of drawing inferences about human diseases by comparing groups of people (often by retrospective historical studies), has for a long time successfully employed formalized procedures for dealing with problems similar to those facing historians of human societies.

In short, I acknowledge that it is much more difficult to understand human history than to understand problems in fields of science where history is unimportant and where fewer individual variables operate. Nevertheless, successful methodologies for analyzing historical problems have been worked out in several fields. As a result, the histories of dinosaurs, nebulae, and glaciers are generally acknowledged to belong to fields of science rather than to the humanities.

214. Why do islands with considerable degree of isolation provide valuable insights into human history?

- (a) Isolated islands may evolve differently and this difference is of interest to us.  
 (b) Isolated islands increase the number of observations available to historians.  
 (c) Isolated islands, differing in their endowments and size may evolve differently and this difference can be attributed to their endowments and size.  
 (d) Isolated islands, differing in their endowments and size, provide a good comparison to large islands such as Eurasia, Africa, Americas and Australia.  
 (e) Isolated islands, in so far as they are inhabited, arouse curiosity about how human beings evolved there.
215. According to the author, why is prediction difficult in history?  
 (a) Historical explanations are usually broad so that no prediction is possible.  
 (b) Historical outcomes depend upon a large number of factors and hence prediction is difficult for each case.  
 (c) Historical sciences, by their very nature, are not interested in a multitude of minor factors, which might be important in a specific historical outcome.  
 (d) Historians are interested in evolution of human history and hence are only interested in long-term predictions.  
 (e) Historical sciences suffer from the inability to conduct controlled experiments and therefore have explanations based on a few long-term factors.
216. According to the author, which of the following statements would be true?  
 (a) Students of history are missing significant opportunities by not conducting any natural experiments.  
 (b) Complex societies inhabiting large islands provide great opportunities for natural experiments.  
 (c) Students of history are missing significant opportunities by not studying an adequate variety of natural experiments.  
 (d) A unique problem faced by historians is their inability to establish cause and effect relationships.  
 (e) Cultural anthropologists have overcome the problem of confounding variables through natural experiments.

### PASSAGE - 34

(2007)

**Directions for Questions 217 to 219 :** The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

Human Biology does nothing to structure human society. Age may enfeeble us all, but cultures vary considerably in the prestige and power they accord to the elderly. Giving birth is a necessary condition for being a mother, but it is not sufficient. We expect mothers to behave in maternal ways and to display appropriately maternal sentiments. We prescribe a clutch of norms or rules that govern the role of a mother. That the social role is independent of the biological base can be demonstrated by going back three sentences. Giving birth is certainly not sufficient to be a mother but, as adoption and fostering show, it is not even necessary!

The fine detail of what is expected of a mother or a father or a dutiful son differs from culture to culture, but everywhere behaviour is coordinated by the reciprocal nature of roles. Husbands and wives, parents and children, employers and employees, waiters and customers, teachers and pupils, warlords and followers; each makes sense only in its relation to the other. The term 'role' is an appropriate one, because the metaphor of an actor in a play neatly expresses the rule-governed nature or scripted nature of much of social life and the sense that society is a joint production. Social life occurs only because people play their parts (and that is as true for war and conflicts as for peace and love) and those parts make sense only in the context of the overall show. The drama metaphor also reminds us of the artistic licence available to the players. We can play a part straight or, as the following from J. P. Sartre conveys, we can ham it up.

Let us consider this waiter in the café. His movement is quick and forward, a little too precise, a little too rapid. He comes towards the patrons with a step a little too quick. He bends forward a little too eagerly; his voice, his eyes express an interest a little too solicitous for the order of the customer. Finally there he returns, trying to imitate in his walk the inflexible stiffness of some kind of automaton while carrying his tray with the recklessness of a tightrope walker.... All his behaviour seems to us a game....But what is he playing? We need not watch long before we can explain it: he is playing at being a waiter in a café.

The American sociologist Erving Goffman built an influential body of social analysis on elaborations of the metaphor of social life as drama. Perhaps his most telling point was that it is only through acting out a part that we express character. It is not enough to be evil or virtuous; we have to be seen to be evil or virtuous.

There is distinction between the roles we play and some underlying self. Here we might note that some roles are more absorbing than others. We would not be surprised by the waitress who plays the part in such a way as to signal to us that she is much more than her occupation. We would be surprised and offended by the father who played his part 'tongue in cheek'. Some roles are broader and more far-reaching than others. Describing someone as a clergyman or faith healer would say far more about that person than describing someone as a bus driver.

217. What is the thematic highlight of this passage?
- In the absence of strong biological linkages, reciprocal roles provide the mechanism for coordinating human behaviour.
  - In the absence of reciprocal roles, biological linkages provide the mechanism for coordinating human behaviour.
  - Human behaviour is independent of biological linkages and reciprocal roles.
  - Human behaviour depends on biological linkages and reciprocal roles.
  - Reciprocal roles determine normative human behaviour in society.
218. Which of the following would have been true if biological linkages structured human society?
- The role of mother would have been defined through her reciprocal relationship with her children.
  - We would not have been offended by the father playing his role 'tongue in cheek'.
  - Women would have adopted and fostered children rather than giving birth to them.
  - Even if warlords were physically weaker than their followers, they would still dominate them.
  - Waiters would have stronger motivation to serve their customers.
219. It has been claimed in the passage that "some roles are more absorbing than others". According to the passage, which of the following seem(s) appropriate reason(s) for such a claim?
- Some roles carry great expectations from the society preventing manifestation of the true self.
  - Society ascribes so much importance to some roles that the conception of self may get aligned with the roles being performed.
  - Some roles require development of skill and expertise leaving little time for manifestation of self.
- A only
  - B only
  - C only
  - A & B
  - B & C

### PASSAGE - 35

(2008)

**Directions for Questions 220 to 224 :** The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

To summarize the Classic Maya collapse, we can tentatively identify five strands. I acknowledge, however, that Maya archaeologists still disagree vigorously among themselves - in part, because the different strands evidently varied in importance among different parts of the Maya realm; because detailed archaeological studies are available for only some Maya sites; and because it remains puzzling why most of the Maya heartland remained nearly empty of population and failed to recover after the collapse and after re-growth of forests.

With those caveats, it appears to me that one strand consisted of population growth outstripping available resources: a dilemma similar to the one foreseen by Thomas Malthus in 1798 and being played out today in Rwanda, Haiti and elsewhere. As the archaeologist David Webster succinctly puts it, "Too many farmers grew too many crops on too much of landscape." Compounding that mismatch between population and resources was the second strand: the effects of deforestation and hillside erosion, which caused a decrease in the amount of usable farmland at a time when more rather than less farmland was needed, and possibly exacerbated by an anthropogenic drought resulting from deforestation, by soil nutrient depletion and other soil problems, and by the struggle to prevent bracken ferns from overrunning the fields.

The third strand consisted of increased fighting, as more and more people fought over fewer resources. Maya warfare, already endemic, peaked just before the collapse. That is not surprising when one reflects that at least five million people, perhaps many more, were crammed into an area smaller than the US state of Colorado (104,000 square miles). That warfare would have decreased further the amount of land available for agriculture, by creating no-man's lands between principalities where it was now unsafe to farm. Bringing matters to a head was the strand of climate change. The drought at the time of the Classic collapse was not the first drought that the Maya had lived through, but it was the most severe. At the time of previous droughts, there were still uninhabited parts of the Maya landscape, and people at a site affected by drought could save themselves by moving to another site. However, by the time of the Classic collapse the landscape was now full, there was no useful unoccupied land in the vicinity on which to begin anew, and the whole population could not be accommodated in the few areas that continued to have reliable water supplies.

As our fifth strand, we have to wonder why the kings and nobles failed to recognize and solve these seemingly obvious problems undermining their society. Their attention was evidently focused on their short-term concerns of enriching themselves, waging wars, erecting monuments, competing with each other, and extracting enough food from the peasants to support all those activities. Like most leaders throughout human history, the Maya kings and nobles did not heed long-term problems, insofar as they perceived them.

Finally, while we still have some other past societies to consider before we switch our attention to the modern world, we must

already be struck by some parallels between the Maya and the past societies. As on Mangareva, the Maya environmental and population problems led to increasing warfare and civil strife. Similarly, on Easter Island and at Chaco Canyon, the Maya peak population numbers were followed swiftly by political and social collapse. Paralleling the eventual extension of agriculture from Easter Island's coastal lowlands to its uplands, and from the Mimbres floodplain to the hills, Copan's inhabitants also expanded from the floodplain to the more fragile hill slopes, leaving them with a larger population to feed when the agricultural boom in the hills went bust. Like Easter Island chiefs erecting ever larger statues, eventually crowned by pukao, and like Anasazi elite treating themselves to necklaces of 2,000 turquoise heads. Maya kings sought to outdo each other with more and more impressive temples, covered with thicker and thicker plaster - reminiscent in turn of the extravagant conspicuous consumption by modern American CEOs. The passivity of Easter chiefs and Maya kings in the face of the real big threats to their societies completes our list of disquieting parallels.

220. According to the passage, which of the following best represents the factor that has been cited by the author in the context of Rwanda and Haiti?
- Various ethnic groups competing for land and other resources
  - Various ethnic groups competing for limited land resources
  - Various ethnic groups fighting with each other
  - Various ethnic groups competing for political power
  - Various ethnic groups fighting for their identity
221. By an anthropogenic drought, the author means
- a drought caused by lack of rains.
  - a drought caused due to deforestation.
  - a drought caused by failure to prevent bracken ferns from overrunning the fields.
  - a drought caused by actions of human beings.
  - a drought caused by climate changes.
222. According to the passage, the drought at the time of Maya collapse had a different impact compared to the droughts earlier because
- the Maya kings continued to be extravagant when common people were suffering.
  - it happened at the time of collapse of leadership among Mayas.
  - it happened when the Maya population had occupied all available land suited for agriculture.
  - it was followed by internecine warfare among Mayans.
  - irreversible environmental degradation led to this drought.
223. According to the author, why is it difficult to explain the reasons for Maya collapse?
- Copan inhabitants destroyed all records of that period.
  - The constant deforestation and hillside erosion have wiped out all traces of the Maya kingdom.
  - Archaeological sites of Mayas do not provide any consistent evidence.
  - It has not been possible to ascertain which of the factors best explains as to why the Maya civilization collapsed.
  - At least five million people were crammed into a small area.
224. Which factor has not been cited as one of the factors causing the collapse of Maya society?
- Environmental degradation due to excess population
  - Social collapse due to excess population
  - Increased warfare among Maya people
  - Climate change
  - Obsession of Maya population with their own short-term concerns

## PASSAGE - 36

(2008)

**Directions for Questions 225 to 229 :** The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

Language is not a cultural artifact that we learn the way we learn to tell time or how the federal government works. Instead, it is a distinct piece of the biological makeup of our brains. Language is a complex, specialized skill, which develops in the child spontaneously, without conscious effort or formal instruction, is deployed without awareness of its underlying logic, is qualitatively the same in every individual, and is distinct from more general abilities to process information or behave intelligently. For these reasons some cognitive scientists have described language as a psychological faculty, a mental organ, a neural system, and a computational module. But I prefer the admittedly quaint term "instinct". It conveys the idea that people know how to talk in more or less the sense that spiders

know how to spin webs. Web-spinning was not invented by some unsung spider genius and does not depend on having had the right education or on having an aptitude for architecture or the construction trades. Rather, spiders spin spider webs because they have spider brains, which give them the urge to spin and the competence to succeed. Although there are differences between webs and words, I will encourage you to see language in this way, for it helps to make sense of the phenomena we will explore.

Thinking of language as an instinct inverts the popular wisdom, especially as it has been passed down in the canon of the humanities and social sciences. Language is no more a cultural invention than is upright posture. It is not a manifestation of a general capacity to use symbols: a three-year-old, we shall see, is a grammatical genius, but is quite incompetent at the visual arts, religious iconography, traffic signs, and the other staples of the semiotics curriculum. Though language is a magnificent ability unique to *Homo sapiens* among living species, it does not call for sequestering the study of humans from the domain of biology, for a magnificent ability unique to a particular living species is far from unique in the animal kingdom. Some kinds of bats home in on flying insects using Doppler sonar. Some kinds of migratory birds navigate thousands of miles by calibrating the positions of the constellations against the time of day and year. In nature's talent show, we are simply a species of primate with our own act, a knack for communicating information about who did what to whom by modulating the sounds we make when we exhale.

Once you begin to look at language not as the ineffable essence of human uniqueness but as a biological adaptation to communicate information, it is no longer as tempting to see language as an insidious shaper of thought, and, we shall see, it is not. Moreover, seeing language as one of nature's engineering marvels - an organ with "that perfection of structure and co-adaptation which justly excites our admiration," in Darwin's words - gives us a new respect for your ordinary Joe and the much-maligned English language (or any language). The complexity of language, from the scientist's point of view, is part of our biological birthright; it is not something that parents teach their children or something that must be elaborated in school - as Oscar Wilde said, "Education is an admirable thing, but it is well to remember from time to time that nothing that is worth knowing can be taught." A preschooler's tacit knowledge of grammar is more sophisticated than the thickest style manual or the most state-of-the-art computer language system, and the same applies to all healthy human beings, even the notorious syntax - fracturing professional athlete and the, you know, like, inarticulate teenage skateboarder. Finally, since language is the product of a well-engineered biological instinct, we shall see that it is not the nutty barrel of monkeys that entertainer-columnists make it out to be.

225. According to the passage, which of the following does not stem from popular wisdom on language?
- (a) Language is a cultural artifact.
  - (b) Language is a cultural invention.
  - (c) Language is learnt as we grow.
  - (d) Language is unique to *Homo sapiens*.
  - (e) Language is a psychological faculty.
226. Which of the following can be used to replace the "spiders know how to spin webs" analogy as used by the author?
- (a) A kitten learning to jump over a wall
  - (b) Bees collecting nectar
  - (c) A donkey carrying a load
  - (d) A horse running a Derby
  - (e) A pet dog protecting its owner's property
227. According to the passage, which of the following is unique to human beings?
- (a) Ability to use symbols while communicating with one another.
  - (b) Ability to communicate with each other through voice modulation.
  - (c) Ability to communicate information to other members of the species.
  - (d) Ability to use sound as means of communication.
  - (e) All of the above.
228. According to the passage, complexity of language cannot be taught by parents or at school to children because
- (a) children instinctively know language.
  - (b) children learn the language on their own.
  - (c) language is not amenable to teaching.
  - (d) children know language better than their teachers or parents.
  - (e) children are born with the knowledge of semiotics.
229. Which of the following best summarizes the passage?
- (a) Language is unique to *Homo sapiens*.
  - (b) Language is neither learnt nor taught.
  - (c) Language is not a cultural invention or artifact as it is made out.
  - (d) Language is instinctive ability of human beings.
  - (e) Language is use of symbols unique to human beings.

## ANSWERS WITH SOLUTIONS

### PASSAGE - 1

1. (b) (b) is the correct choice as it is clear from the second paragraph that the United States was more concerned with communism in Latin America which is the political ideology.
2. (d) (d) is the only logical choice, as according to the third paragraph many Latin Americans regarded the Inter-American Development Bank as economic imperialism.
3. (b) The fifth paragraph clearly mentions that President Kennedy's alliance for progress was associated with the concept of a marshal plan for Latin America. Thus, the answer is (b).
4. (c) As is evident from the passage, the US policy towards Latin America had to be more than economic aid alone as Latin Americans would regarded as economic imperialism and nothing else. Thus (c) is the only option that makes sense.
5. (b) (b) is the only option which can be regarded as according to third paragraph President Eisenhower subsidised not only economic but social and educational progress too.
6. (a) Options (b), (c) and (d) can't be regarded as complete truths and only option (a) comes across as an inference which can be drawn if everything given is true.

### PASSAGE - 2

7. (b) (b) is the correct option as according to paragraph third the majority of the officials rose through the examination system
8. (a) (a) is the correct option as according to the passage the statesmen try to modify the traditional society and not create a new one.
9. (a) (a) is the right option as given in paragraph one as the only common area of agreement between Chinese and Western conservatism is the attempt to conserve or preserve traditions.
10. (d) (d) is the correct choice as none of the three philosophers given in (a), (b) and (c) have been mentioned in the passage.
11. (c) (c) is the best option as according to paragraph second the aim of the restoration was to bring about a changed society but based on tradition.
12. (c) (c) is the correct option as in the first paragraph it is given that Western conservatism had a distrust of Cosmopolitanism.
13. (b) (b) is the correct option as the whole passage is about Chinese Conservatism.

### PASSAGE - 3

14. (b) (b) is the correct option as given in the first paragraph that the Indian constitution is the wordiest of all the national constitutions.
15. (c) According to the first paragraph Israel does not have a written constitution thus (c) is the correct option.
16. (b) According to the passage the Presidential cabinet has not been mentioned in the American Constitution. Thus, (b) is the right option.

17. (b) (b) is the correct option, as can be inferred from the first paragraph that the very new modern constitutions of the recently admitted states have very concise constitutions.
18. (b) (b) is the right option as it explained in second paragraph that a normative constitutions not only has the status of supreme law but is also fully activated and fully effective. In other words
19. (d) (d) is the correct answer, as is given in the second paragraph that a nominal constitution does not reflect the political realities of the state and that where the written constitution is only nominal, behind the verbal facade will be found the real constitution containing the basic principles according to which power is exercised in actual fact.
20. (c) Paragraph one says that since a very long constitution says too many things and too many subjects it must be amended often and this makes it still longer. Thus, the correct option is (c).
21. (b) The correct option is (b) as is given in the first paragraph that the presence or absence of a formal written document makes a difference but only of degree.

### PASSAGE - 4

22. (d) The correct choice is (d), as is evidently clear in the first paragraph of Eisaku Sato's uninterrupted eight years as Prime Minister in the sixties and early seventies (i.e. since the Second World War).
23. (b) The correct choice is (b), as the passage clearly mentioned in the third paragraph that it was written in 1987. Thus, as he reigned for 61 years, he ascended the throne in 1926.
24. (c) (c) is the correct option, as is mentioned in the second paragraph that Mr. Tanaka was disgraced on the charge of accepting bribes.
25. (b) (b) as the correct choice is evidently clear from the first paragraph which mentions Mr. Nakasone bowing out.
26. (c) (c) is the correct choice over here as can be inferred from the second paragraph which mentions that Takeshita has forged a firm alliance with atleast two of the faction and put in his bag the votes necessary for a win.
27. (c) (c) is the correct choice, as in the third paragraph the author shows that he is not sure how Mr. Takeshita will fare after becoming the Prime Minister and has thus recent about this in an objective manner.
28. (d) (d) is the correct choice, as can be seen in the second paragraph which mentions the fact that the quick turnover of Prime Minister's as contributed to the functioning of the LDP through factions.
29. (c) The third paragraph clearly shows that Takashita will be Japan's first Prime Minister with the rural origin which means that the erstwhile Prime Ministers of Japan had urban backgrounds. Thus the correct option is (c).
30. (b) (b) is the correct choice, as there is 3 Prime Ministers mentioned by name in the passage. These are Mr. Yasuhiro Nakasone, Mr. Eisaku Sato and Mr. Kakue Tanka.

PASSAGE - 5

31. (b) The correct choice is (b), as is given in the first paragraph that to win elections a party needs votes and constituencies.
32. (d) (d) is the correct option which can be inferred from the second paragraph, which mentions that Gingrich's 1994 revolution swept into power united behind one comprehensive ideological goal dismantling the welfare state.
33. (a) (a) is the correct choice, this can be seen in the fourth paragraph where was given that the government shutdown prove the disaster of the Republicans.
34. (d) (d) is the correct choice, as Newt Gingrich, Pat Buchanan and Bob Dole all three are republicans.
35. (b) (b) is the correct choice, as the whole passage refers to the Republican party and its follies.
36. (a) (a) is the correct choice as according to the seventh paragraph Buchanan says that the welfare state is not the enemy.
37. (c) (c) is the correct option, as is given in paragraph ten that the real danger is philosophical, not tactical and that i.e. axioms, not just policies that are under fire.
38. (a) (a) is the correct answer as in the context of the passage 'obsolete' means antiquated.

PASSAGE - 6

39. (c) (c) is the only option which is correct as given in the first paragraph is that the only difference between them is their attitude towards change.
40. (d) According to the passage, all the three are socialists.
41. (b) (b) is the correct option, as can be seen in the first paragraph that revolutionary socialists propose a central authority and that either the working class or somebody in the behalf should take possession of all the property of the country.
42. (a) (a) is definitely correct, as the second paragraph clarifies that the second type of socialism i.e. the revolutionary socialists involve many more difficulties than the first one.
43. (c) (c) is the correct choice, as is given in the second paragraph that both are their characteristics.
44. (a) (a) is the correct choice, as after reading the passage it may inferred that the author is on neither side. He is presenting his point of view on both the sides.
45. (a) The correct choice is (a), as it evidently clear from the first paragraph that 'avow' means 'proclaim'.
46. (c) (c) is the correct choice as corruption in high places has not been mentioned at all in the passage.

PASSAGE - 7

47. (a) (a) is the correction choice, as has been given in paragraph one that Neil Kinnock was a leader of the Labour Party in 1992.
48. (c) (c) is the right answer, as according to paragraph fourth the problem was the foreign exchange markets.
49. (b) (b) is the correct choice, as is given in paragraph five that if the pound was to survive then the interest rate would have to be raised by atleast two percent.

50. (c) The correct option is (c), and this is clear from paragraph fifth which says that "it would also help, added the officials, if the Government were to commit Britain to full monetary union and to meet the Maastricht criteria for single currency".
51. (b) (b) is the correct option, as is given in paragraph eight which says that Kinnock had asked Smith to have that preliminary Bank of England meeting without him as he wanted to complete his cabinet appointments and conferred with his own advisers.
52. (a) (a) is the right choice as paragraph nine says that it was not clear if the pound would be devalued sufficiently, or if other countries would follow the British lead.
53. (d) (d) is the correct option, as the whole passage refers to the pressure because the Bank of England could put enormous pressure on the government.
54. (b) Wrong policies was never a reason for the defeat of the Conservative party as given in the second paragraph. Thus (b) is the correct answer.
55. (c) Option (c) is the right choice, as the word appears in the second paragraph.

PASSAGE - 8

56. (d) (d) is the right option, as is mentioned in the first paragraph that these subsidies are not reaching the one they are meant for. The economic condition of the country is still poor even after years of subsidies.
57. (b) Option (b) is the right choice, as through out the passage the author leads upto the fact that it is self destruction for a government to help people with subsidy.
58. (d) (d) is the right option as it is clear from the second paragraph which says that most subsidies go to the rich and much of the tab goes indirectly to the poor.
59. (c) The 2nd paragraph clearly states that inflation (not subsidies) is the most regressive form of taxation.
60. (a) (a) comes across as a right option because paragraph three says that "with the passage of time most of the wealthy nations had discovered that their economies cannot sustain this social safety net".
61. (a) (a) is the right option as according to the fifth paragraph it says that the Deva Gowda government has shown courage in biting the bullet when it comes to the price of petroleum products.
62. (a) The topic that can be inferred after treading the whole passage is that "Nothing in the world ever comes across as free". Thus (a) is the correct choice.
63. (d) (d) is the right choice, as according to the passage the poor, the Andhra Pradesh government and the Delhi Transport Corporation, all three are the victims of extreme subsidies.

PASSAGE - 9

64. (b) (b) is the right choice, as the passage is about issueless elections which is given in the last line of the passage.
65. (d) (d) is the correct choice as Ramakrishna Hegde has not been shown as under scrutiny for alleged corruption in the passage. The 4th para clearly shows

that the Prime Minister (P V Narsimha Rao), the opposition's PM candidate and the head of the third force are under investigation.

66. (c) (c) comes across is the right choice, as is given in the last line of the second paragraph.
67. (b) As a possible issue of the elections the empowerment of women has not been mentioned in the passage. Thus (b) is the correct option.
68. (d) According to the fourth paragraph all the parties are failed to submit audited accounts to tax authority, and have thus broken the law. So, the correct choice is option (d).
69. (a) (a) is the right option, as the passage does not credit greater awareness among the people with the changes coming in the system.

#### PASSAGE - 10

70. (a) The correct option is (a), as the central thrust of the passage is that 'there is a new awakening in India and India is gearing upto it'. The last 3 paras support the answer.
71. (b) (b) is the right option, as the whole passage is an insight into the development of the India and the writer's attitude is insightful.
72. (c) (c) is the correct option over here as can be inferred from paragraph fifth, that India had to come to terms with the past and understand that war is not a game.
73. (a) The right option is (a), as it is clear from paragraph eighth, where the writer gives the example of a story where anybody could run and pull a bell and the emperor would appear at his window and give justice, which is a child's idea of history.
74. (c) (c) is the correct option, as according to paragraph second India's regeneration and revival took place during the British period and the fifty odd years after the British period.
75. (d) According to paragraph nine self awareness is followed by a desire for more in everything and a higher idea of human possibilities. Thus, the correct answer is (d).
76. (c) (c) is the only option which comes across is because according to paragraph eighth, the current situation in India is painful, messy, primitive and petty.
77. (a) (a) is the right choice, as the last paragraph says that "it is important that self-criticism does not stop".
78. (b) (b) is correct as, in paragraph ten the writer says that the future will be fairly chaotic.
79. (c) (c) is the right option over here as tyranny of the foreign rulers was featured by the senseless killings of the country's talented people.

#### PASSAGE - 11

80. (d) (d) is the right option, as the passage talks about advantages of democracy rather than choices (a), (b) and (c).
81. (b) According to the passage there is no guarantee that a dictatorship will be enlightened one. Thus (b) is the right option which is also mentioned in paragraph third.
82. (c) (c) is the only viable option, as the writer sees that a low but stable rate of growth is a sign of stability. This is also clear in the last 2 lines of the passage.

83. (c) According to the seventh paragraph dictatorship is more susceptible to making huge mistakes and risking everything on one decision. Thus option (c) is comes across as right choice.
84. (b) In paragraph nine, the writer concludes that statism is bad no matter what direction in which it applies pressure. Thus, option (b) is the right choice.
85. (d) According to the passage, a democracy is like a free market as a consumer satisfaction plays an important role in both. (a) & (b) are implied from a free market. Thus, (d) is the right option.
86. (c) (c) is the correct choice, as according to the eighth paragraph "that the internet will play an important part in the global economy in the decades to come".
87. (c) (a) is clear from the seventh paragraph, which shows that when democratic setups fail to live up to their promises, the political consumer opts for the competition. Thus the setup works as a check on the actions and decisions of its leaders. (b) is clear as a democracy has a lot of problems as mentioned in the 2nd paragraph thus keeping a check on the progress of the economy.
88. (b) India's moves are more permanent as India is not at the mercy of the dictators.
89. (d) (d) is the best option, as options (a), (b) and (c) do not give us a viable choice.

#### PASSAGE - 12

90. (a) The second paragraph categorically states that Infosys awards stock options to its employees. Thus (a) is the correct option.
91. (b) (b) is the correct option as according to the passages, Infosys does not believe in the classical leadership genres. Thus, hierarchy has no place in Infosys. Although (c) is correct but (b) is more appropriate as it conveys a bigger message.
92. (b) According to the sixth paragraph Murthy believes that the betterment of man can be brought about through the creation of wealth, legally and ethically. Thus (b) is the right option.
93. (d) (d) is the right option as we can inferred (a), (b) and (c) from the example given in the tenth paragraph.
94. (c) According to the ninth paragraph "learning is not just amassing data but a process that enables him to use the lessons from failure to achieve success". Thus, (c) is the correct answer.
95. (d) The correct option is (d), as we can be inferred from paragraph twelve.
96. (d) Infosys believes in the payment of taxes as well as giving complete information. Thus the correct choice is (d).
97. (a) Refer the 11th and the last paragraph. It is clear that Infosys has not progressed much in its initial 10 years because it didn't devised strategies. The same shall not be repeated as Infosys approaches the 21st century.
98. (c) The correct answer is (c), as the fourth paragraph says "Brimming with the conviction that customer satisfaction is the key to success".
99. (a) Passage puts across the message that "Infosys is a reflection of its CEO Murthy". Thus the correct choice would be (a).

**PASSAGE - 13**

100. (b) (b) comes across as the right choice, as the third paragraph says that universalising elementary education is complicated by various socio-economic and cultural factors.
101. (d) According to the fourth paragraph, the term 'grizzled mandarins' can be taken as inexperienced old govt. officials who are far from reality.
102. (c) The correct answer is (c), as according to paragraph four it is clear that the intricacies have not been adequately understood by the planners and administrators.
103. (a) (a) is the correct option as is given in fourth paragraph the key is to decentralize education planning and implementation.
104. (c) (c) is the correct choice, as according to second paragraph in Bihar, Madhya Pradesh and Rajasthan literacy and education levels are miles below the national average.
105. (c) (c) is the correct option, and is evidently clear from paragraph five where it is mentioned.
106. (d) (d) is the right choice, as is clearly given in sixth paragraph that in MP, the village panchayats are responsible for organising non-formal education, managing scholarship, constructing and maintaining primary schools.
107. (c) (c) is the right choice as has been given in sixth paragraph.
108. (d) (d), i.e. None of the other options is a choice as they are not given in the passage.
109. (a) Education policy can be successfully implemented through greater community involvement as is given in the fifth paragraph. Thus (a) is the right choice.

**PASSAGE - 14**

110. (c) (c) is the correct choice and is given in paragraph two.
111. (c) (c) is the right choice and has been given in the first paragraph.
112. (b) According to the passage imprudent and irresponsible attitude of the mutual fund companies are the main flaws. Thus, (b) is the right choice.
113. (a) The second paragraph says the mutual funds have an undisciplined approach to investment. Which led to the failure of the mutual funds. Thus (a) is the right option.
114. (d) (d) is the right option, as the none of the three other options are given in the passage.
115. (b) (b) is the right choice as the passage shows that mutual fund companies have indeed indulged in malpractices. And this can be inferred from fifth and sixth paragraphs.
116. (c) (c) is the correct option and this can be inferred from paragraph seven.
117. (a) (a) is the right choice as it clearly given in the last sentence of fifth paragraph, and the first two sentences of the sixth paragraph.
118. (b) According to the tenth paragraph there has been a loss of Rs.11,000 crores from the investors money. Thus (b) is the correct option.
119. (a) On the basis of the passage (a) comes across is the only viable option.

120. (a) (a) comes across as the only right option as the euphoria in the mutual fund industry was due to the stock market boom as given in the passage.

**PASSAGE - 15**

121. (b) WTO could not be formed in 1970s Tokyo Round as important players like the US did not show interest.
122. (b) (b) comes across as the only viable option as has been given in the last sentence of the second paragraph that international trade and its benefits cannot be enjoyed unless trading nations accept the discipline of a negotiated rules-based environment.
123. (a) Option (a) is evidently clear from the third paragraph which says that 'The GATT, and the WTO, are contract organisations based on rules, and it is inevitable that an organisation created to further rules will in turn be influenced by the legal process'.
124. (d) (d) is the right choice as can be inferred from the fourth paragraph where it is given that the actions of member states were evaluated against the accomplishment of the most elementary community goals set forth in the preamble to the treaty.
125. (c) (c) is the right option as has been given in the second last and last line of the second paragraph.
126. (d) (d) is the right option as is given in the paragraph fourth that the doctrine of 'mutual recognition' handed down in the case *Cassi De Dijon* in 1979 was a key turning point.

**PASSAGE - 16**

127. (a) (a) is the only viable option as has been mentioned in the first paragraph that development in the third world was expected to guarantee the happiness of individuals as citizens and of people as societies.
128. (d) (d) is the right option as all the three other options i.e. (a), (b) and (c) are given in the third paragraph.
129. (d) None of the statements are false as all have been mentioned in the passage. Thus, (d) is the correct option.
130. (b) (b) is the correct option as according to the first paragraph 'In the name of national unity, territorial integrity, equality of all citizens and non-partisan secularism, the state can use its powerful resources to reject the demands of the communities; it may even go far as genocide to ensure that order prevails'.
131. (c) (c) is the right option as the other three options i.e. (a), (b) and (d) are clearly mentioned in the passage by the author.

**PASSAGE - 17**

132. (c) (c) is the only viable option, as can be inferred from the last paragraph.
133. (b) (b) is the right choice, as is given in paragraph six where it is given that the bereaved is joined by neighbours and kin. They meet to grieve together in lamentation, prayer and song.
134. (c) (c) is the right option as is given in the second last paragraph that it will be only one generation between the bereavement counsellor arrives and the community of mourners disappears.

135. (d) (d) is the right option as has been given in the sixth paragraph which says that the bereavement counsellor is a person train to handle the grief of the bereaved.
136. (a) (a) comes across as the only viable option as it is given in the first paragraph that the Europeans were puzzled with the great green Prairie. It seemed untillable.
137. (d) (d) is the right choice as all (a), (b) and (c) have been mentioned in paragraph five.
138. (a) According to paragraph eighth the County regulations will make the people feel that the service of the bereavement counsellor is a right. Thus (a) is the correct option.
139. (b) (b) is the only viable option as the other three i.e. (a), (c) and (d) are claimed by the author and nowhere in the passage doesn't say that 'the plow and bereavement counselling' both resulted in migration of the communities into which the innovations are introduced.

#### PASSAGE - 18

140. (a) (a) is the right choice as has been mentioned in the first paragraph
141. (c) (c) comes across as the only viable option which is given in paragraph one.
142. (a) (a) is the correct choice as can be inferred from paragraph one where it is given about the upcoming UN conference on racial and related discrimination.
143. (d) Option (d) can be inferred directly from the second paragraph.
144. (b) (b) is the viable option which can be seen in paragraph third, last sentence.

#### PASSAGE - 19

145. (c) (c) is the correct choice as is given in the fifth paragraph.
146. (c) (c) is the only viable option and can be inferred from the last paragraph which categorically mentions it.
147. (a) All the four statements can be inferred from the passage thus (a) is the right choice.
148. (a) The correct choice would be (a) as can be inferred from the third paragraph.
149. (d) The fifth paragraph mentions that "But a system governed solely by impersonal rules can at best ensure order and stability; it cannot create any shining vision of a future in which mere formal equality will be replaced by real equality and fellowship". Thus the correct choice is (d).
150. (c) (c) comes across as a right option, because sentences A and D are mentioned in the passage whereas B and C are not mentioned anywhere.

#### PASSAGE - 20

151. (c) (c) is the correct choice as the statement cannot be inferred from the passage.
152. (d) (d) is the correct option the statement as it give in the second paragraph.
153. (c) Option (c) can be inferred directly from paragraph five.
154. (d) (d) is the right option as both (a) and (b) are given in the seventh paragraph.

155. (a) (a) is the correct choice as it can inferred from the fourth paragraph.
156. (c) (c) is the correct option as it can be directly inferred from fifth paragraph.

#### PASSAGE - 21

157. (c) (c) is the correct option as A and C are the best set of reasons for which one needs to "look hard" at an economist's language.
158. (d) (d) is the correct choice as it can be inferred from last paragraph jokes.
159. (c) (c) is the best option as in can be taken from paragraph one.
160. (b) Secret is the closest alternative for the word 'arcane'. Thus (b) is the correct choice.
161. (c) (c) is best choice as it can be inferred from paragraph four.

#### PASSAGE - 22

162. (d) (d) is the correct choice as it can be inferred from paragraph five.
163. (c) Option (c) is correct because it has been taken from paragraphs four and five.
164. (a) (a) is true as it mentioned in paragraph 6.
165. (b) Option (b) is correct, as paragraph four states clearly.
166. (b) (b) is correct choice, as Satirical mean 'the use of humour'.

#### PASSAGE - 23

167. (b) (b) is correct option as it can be inferred directly from paragraph five.
168. (a) (a) is the correct choice as it clearly given in the fourth paragraph.
169. (d) Option (d) is correct, it can be inferred from paragraph three.
170. (c) (c) is the best choice as in can be inferred from paragraph three.
171. (d) (d) is the correct choice, as can be inferred from the passage and the main example of the end of British rule over India.

#### PASSAGE - 24

172. (c) (c) is the best option, as 'discriminate' means 'distinguish'.
173. (c) (c) is best option as it evidently clear from the examples.
174. (c) (a) is the correct choice as it can also be inferred from second paragraph.
175. (b) (b) is the correct option as it can be inferred from fourth paragraph.
176. (c) (c) is the correct option as it can be inferred from fifth paragraph.

#### PASSAGE - 25

177. (d) (d) is the correct choice as the first two lines of first paragraph mentioned the same.
178. (c) (c) is correct option, as it can be inferred from last paragraph.
179. (a) Option (a) is the correct option, is clear from the previous sentence.
180. (b) (b) is the best choice as it can be given in last three lines.
181. (c) (c) is the best choice as it can be given in last four lines of the passage.

**PASSAGE - 26**

182. (d) (d) is the best option, as it is not mentioned in passage.  
 183. (b) (b) is the correct option, as it can be inferred from last paragraph of the passage.  
 184. (a) Option (a) is the correct choice, as it can be inferred from third paragraph.  
 185. (b) (b) is the correct option, because the statement had taken from paragraph one.  
 186. (d) (d) is the correct choice, as (a), (b) and (c) option had given in second and third paragraphs.

**PASSAGE - 27**

187. (a) Option (a) is the correct option as it can be inferred from second paragraph.  
 188. (b) (b) is the correct option as can be inferred from the passage.  
 189. (d) (d) is the best option as it can be taken from fourth paragraph.  
 190. (a) (a) is the correct option, as it can be inferred from first paragraph.  
 191. (b) (b) is the correct choice, as it can be inferred from fourth paragraph.

**PASSAGE - 28**

192. (d) The answer is clear from the third paragraph which talks of similar problems of division and instability.  
 193. (b) The answer is clear from the first paragraph, 'A major reason was Britain's inability to cope with the by products of its own rapid accumulation of capital...'.  
 194. (d) The answer is given in the 4th paragraph, 3rd sentence - "In the last analysis ..... they cannot easily afford to challenge the international system".  
 195. (b) The answer is given in the 4th paragraph. Refer to the last 2 lines of the fourth paragraph.

**PASSAGE - 29**

196. (d) The first para of the passage clearly talks about all the first three options. Refer, 'The totality of choices.....type of game.' So the answer is (d).  
 197. (c) The problem solving process of the scientist and detective has been talked about in the second last para. The third and the fourth sentence, " The effort of ..... genuine conflict", clearly says that scientists study phenomena like nature, which are not altered with. Whereas when the criminal is actively involved, as in the case of detectives, he puts so many obstacles in the detectives path.  
 198. (c) Internal conflicts involves psychological dilemma, as talked in para 3, and are thus more interesting.  
 199. (b) The second para talks about psychologically interesting situations. Further the fourth para says, " Chess may be ..... Tic-tac-toe". The situation given in option 2 makes it a psychologically interesting because of the irrational behaviour of one of the players.

**PASSAGE - 30**

200. (a) It is the correct choice as discussed in the first three paragraphs of the passage. (b) & (c) are broad generalisations. (a) encapsulates the key arguments of the writer.

201. (d) The writer uses Tommy Cooper's statement in a sarcastic tone. In the 2nd para the writer says, that the oil prices have doubled but demand and supply will make its way to bring back the prices, in a sarcastic way. So (d) is correct which says that it is not necessary.

202. (c) Refer paragraph 6 of passage, the first line talks about modern capitalism, "There are those .....he millennium".  
 203. (b) The para 1 and 5 talks about 'Edwardian Summer', which shows a sense of complacency among people because of all round development.

**PASSAGE - 31**

204. (c) Third paragraph of the passage discusses the relationship between dogmatic beliefs and critical attitude in the content of science. The last line of the paragraph states that critical attitude needs, as its raw material, dogmatic beliefs. This interaction is best described by the option (c). While (b) also appears as a probable answer but chisel although helps in formation of a sculpture but it is not a raw material. Thus, the most appropriate answer will be (c).  
 205. (a) The third and fourth paragraphs are relevant for the question. According to these two paragraphs dogmatic attitude is the raw material or starting point for scientific research. Thus, dogmatic attitude has an important place in science. It is neither inferior to critical attitude as critical attitude is reached at through dogmatic beliefs, nor is it negative, since they are very significant in scientific development. So, the choice is to be made between (a) and (b). It is not necessary that all conjectures arising out of our dogmatic attitude becomes science, whereas, it is true that through criticism of dogmatic attitudes, the initial hypothesis are made.  
 206. (c) The comparison between the primitives and children has been done in the context of dogmatic behaviour which, in turn, is related to critical attitude and not education, innocence, evolution or civilization. Dogmatic attitude precedes critical attitude i.e. in absence of critical attitude, we are certain to find dogmatic attitude. Thus, the most appropriate reason for comparison between a child and primitives is lack of critical attitude in both. Thus, the answer is (c).  
 207. (d) The second paragraph of the passage is relevant for this question. The passage clarifies that dogmatic attitude leads to a stronger belief as compared to critical attitude. Critical attitude 'admits doubt and demands tests' and therefore lacks the conviction one can find in dogmatic attitude and which is important for strong belief. (d) and (e) both appear as possible answers but (d) is a more appropriate explanation as it supports the statement in the question by linked reasoning.  
 208. (c) The third paragraph states that "dogmatic attitude is clearly related to the tendency to verify our laws and schemata by seeking to apply them and confirm them...., whereas critical attitude is one of readiness to change them, to refute them....". Further, in the paragraph critical attitude has been called scientific and dogmatic attitude the pseudo scientific. Thus, it is clear that the real difference between scientific and pseudo scientific as given by the paragraph is best stated in (c).

**PASSAGE - 32**

209. (b) Option (c) is correct as author admits, though indirectly, in the last para of para three. Saying "For all its brutalities and failures, communism in Soviet Union...."
210. (b) The author gives the opinion of a conservative European MP. The renewed attack on communism is being made because the now existing ideology of global capitalism can be idealised only through an attack on communism. Though (a) might also appear as a correct alternative but (b) states the reason most appropriately.
211. (d) The reason to cite the atrocities committed by European colonial region is to neutralise the argument of Lindblad against communism on the ground of violence perpetrated in communist regimes. His intention is not to compare atrocities but to neutralise the attack on communism and prove that colonial atrocities were more than communist violence. Thus, the most appropriate answer will be (d).
212. (c) The author compares Nazism with colonialism rather than communism in the fourth paragraph of the passage. Towards the end of the paragraph, the author states that many ideas coined by the German colonial regime were later inherited by the Nazi party. Thus, (c) is the right answer. Even the first option is correct factually but it is not the reason given by the author and so is not the most appropriate answer.
213. (a) Option (d) is correct as is said in second last para "Comparable atrocities were ..... presumably European lives count for more."

**PASSAGE - 33**

214. (c) Option (c) is correct as is mentioned in para three "The student of human history can draw more natural experiments.....societies within each of the continents.
215. (e) In the first paragraph, the answer of the question lies. It lists a no. of factors due to which it is difficult to predict in history which are also listed in the option (e) with conclusion. Option (a), (b) and (c) mention only specific or general factors. Option 4 cannot be inferred from the passage so correct answer is option (e).
216. (c) Option (c) is correct through the process of elimination. Option (a) is false as it says "not conducting" which is not true.  
Option (b) is also false as nothing in para says complex societies provide opportunities for natural experiments.  
Option (d) "Unique problem" as said in option (d) is incorrect.  
Option (e) para does not mention anything about cultural anthropologists. Hence this is also false.

**PASSAGE - 34**

217. (e) Author has talked about what determines the social behaviour in the whole passage. Option (a) is incorrect because irrespective of presence or absence of biological linkages, human behaviour is coordinated by reciprocal roles. Option (b) is contradictory to passage hence incorrect. Option (c) and (d) negate the passage. According to second paragraph, although expected social roles differ from culture to culture but behaviour is coordinated by reciprocal nature of roles. This is clearly stated in option (e).

218. (b) Options (a, c, d, e) are not according to passage hence incorrect. Referring to last paragraph, it is mentioned that we will be surprised and offended by the father who played his part 'tongue in cheek'. This is true when reciprocal roles coordinate behaviour. And opposite of this statement will be true when biological linkages structured human society. Option (b) is correct, it states the opposite.

219. (d) Referring to last paragraph, it gives appropriate reasons for claim that 'some roles are more absorbing than others'. Both statements A and B can be inferred from the paragraph. Some specific role expectations restrain people from expressing their true selves from the example of clergyman. And example of father represents that 'self' of a person gets mixed or aligned with the occupation, i.e. occupation (being father in this case) becomes self.

**PASSAGE - 35**

220. (a) On referring to the first sentence of para 2 of the passage, it is clear that Rwanda and Haiti faced a dilemma similar to the first strand, i.e. population growth outstripping available resources. Further the author talks specifically about land resources in the next sentence. Hence (a) is the right choice.
221. (d) Anthropogeny is the evolution or genesis of the human race. Hence 'anthropogenic drought' means a drought caused due to the evolution/ actions of human beings.
222. (c) On referring to the last sentence of para 3 of the passage, it is clear that (c) is the right choice.
223. (d) On referring to the 1st and 2nd sentence of para 1 of the passage, it is clear that (d) is the right choice.
224. (e) The fourth paragraph clearly explains that Maya kings and nobles were focused on their short-term concerns and did not heed long-term problems. So clearly (e) is the wrong factor as it mentions the population of Maya and not its kings and nobles.

**PASSAGE - 36**

225. (e) The opening line of the 1st para, 'Language is not an artifact', the second line of the 2nd para, 'Language is no more a cultural invention', clearly infers (a) and (b) as stemming from the popular wisdom on language. The third line of the 1st para, 'Language is a complex .....in the child spontaneously', which is the present days version of Language indicates (c) as popular wisdom of language. Also (d) is not the correct option as is clear from the 4th sentence of the 2nd para, 'Though language is ..... among living species. The 4th sentence of the 1st para, 'For these reasons ..... as a psychological faculty,' clearly indicates that (e) does not stem from popular wisdom on language.
226. (b) An analogy similar to 'Spiders knowing how to spin webs', from among the given options is 'Bees collecting nectar'. As it is spider's instinct to spin webs (refer para 1) so is the Bees' to collect nectar.
227. (b) On referring to the last sentence of para 2 of the passage, "In nature's talent show ..... we make when we exhale", it is clear that (2) is the right choice.
228. (a) On referring the line 3 of para 1, 'Language ..... develops in the child spontaneously, without conscious effort (self-learning) or formal instruction (being taught)". Thus children do not learn language on their own but simply possess it instinctively.
229. (d) The central idea of the passage is that language is an instinctive ability of human beings.

# 23

CHAPTER

# READING COMPREHENSION

Based on

# NATURAL SCIENCES

*Directions for Questions 1 to 95 : This Section contains passages followed by questions based upon the contents of the passages. Read the passages and select the best option for the answers.*

## PASSAGE - 1

(1994)

The communities of ants are sometimes very large, numbering even up to 500,000 individuals; and it is a lesson to us that no one has ever yet seen a quarrel between any two ants belonging to the same community. On the other hand, it must be admitted that they are in hostility not only with most other insects, including ants of different species, but even with those of the same species if belonging to different communities. I have over and over again introduced ants from one of my nests into another nest of the same species; and they were invariably attacked, seized by a leg or an antenna, and dragged out.

It is evident, therefore, that the ants of each community all recognize one another, which is very remarkable. But more than this, I several times divided a nest into two halves and found that even after separation of a year and nine months they recognized one another and were perfectly friendly, while they at once attacked ants from a different nest, although of the same species.

It has been suggested that the ants of each nest have some sign or password by which they recognize one another. To test this I made some of them insensible, First I tried chloroform; but this was fatal to them, and I did not consider the test satisfactory. I decided therefore to intoxicate them. This was less easy than I had expected. None of my ants would voluntarily degrade themselves by getting drunk. However, I got over the difficulty by putting them into whiskey for a few moments. I took fifty specimens-twenty five percent from one nest and twenty five percent from another made them dead drunk, marked each with a spot of paint, and put them on a table close to where other ants from one of the nests were feeding. The table was surrounded as usual with a moat of water to prevent them from straying. The ants which were feeding, soon noticed those which I had made drunk. They seemed quite astonished to find their comrades in such a disgraceful condition, and as much at a loss to know what to do with their drunkards as we were. After a while, however, they carried them all away; the strangers they took to the edge of the moat and dropped into the water, while they bore their friends home into the nest, where by degrees they slept off the effects of the spirits. Thus it is evident that they know their friends even when incapable of giving any sign or password.

1. The good title for this passage might be
  - (a) Nature's Mysteries
  - (b) Human Qualities in the insect world
  - (c) Drunken Ants
  - (d) Communication in Ant Communities
2. Attitude of ants toward strangers of the same species may be categorized as
  - (a) indifferent
  - (b) curious
  - (c) hostile
  - (d) passive
3. The author's anecdotes of the inebriated ants would support all the following induction except the statement that
  - (a) ants take unwillingly to intoxicants
  - (b) ants aid comrades in distress
  - (c) ants have invariable recognition of their community members
  - (d) ants recognize their comrades by a mysterious password
4. According to the passage chloroform was less successful than alcohol for inhibiting communication because of
  - (a) its expense
  - (b) its unpredictable side effects
  - (c) its unavailability
  - (d) its fatality
5. Although the author is a scientist, his style of writing also exhibits a quality of
  - (a) sophistry
  - (b) whimsicality
  - (c) hypocrisy
  - (d) tragedy

## PASSAGE - 2

(1994)

Compared with other experimental sciences, astronomy has certain limitations. First, apart from meteorites, the Moon, and the nearer planets, the objects of study are inaccessible and cannot be manipulated, although nature sometimes provides special conditions, such as eclipse and other temporary effects. The astronomer must content himself with studying radiation emitted or reflected from celestial bodies.

Second, from the Earth's surface these are viewed through a thick atmosphere that completely absorbs most radiation except within certain "windows", wavelength regions in which the radiation can pass through the atmosphere relatively freely in the optical, near-infrared, and radio bands of the electromagnetic spectrum; and even in these windows the atmosphere has considerable effects. For light, these atmospheric effects are as follows : (1) some absorption that dims the radiation somewhat, even in a clear sky; (2) refraction, which causes slight shift in the direction so that the object appears in a slightly different place; (3) scintillation (twinkling); i.e., fluctuation in brightness of effectively point-like sources such as stars, fluctuations that are, however, averaged out for objects with larger images, such as planets (the ionosphere, an ionized layer high in the atmosphere, and interplanetary medium have similar effects on radio sources); (4) image movement because of atmospheric turbulence ("bad seeing") spreads the image of a tiny point over an angle of nearly one arc second or more on the celestial sphere (one arc second equals  $1/3,600$  degrees); and (5) background light from the night sky. The obscuring effects of the atmosphere and its clouds are reduced by placing observing stations on mountains, preferably in desert regions (e.g., Southern California and Chile), and away from city lights. The effects are eliminated by observing from high-altitude aircraft, balloons, rockets, space probes, and artificial satellites. From stations outside all or most of the atmosphere, gamma rays and X-rays that is, high-energy radiation at extremely short wave-lengths and far-ultraviolet and far-infrared radiation, all completely absorbed by the atmosphere at ground level observatories can be measured. At radio wave-lengths between about one centimeter and 20 meters, the atmosphere (even when cloudy) has little effect, and man-made radio signals are the chief interference.

Third, the Earth is a spinning, shifting, and wobbling platform. Spin on its axis causes alternation of day and night and an apparent rotation of the celestial sphere with stars moving from east to west. Ground-based telescopes use a mounting that makes it possible to neutralize the rotation of Earth relative to the stars; with an equatorial mounting driven at a proper speed, the direction of the telescope tube can be kept constant for hours while the Earth turns under the mounting. Large radio telescopes usually have vertical and horizontal axes (altazimuth mounting), with their pointing continuously controlled by a computer.

In addition to the daily spin, there are much more gradual effects, called precession and nutation. Gravitational action of the Sun and Moon on the Earth's equatorial bulge causes the Earth's axis to precess like a top or gyroscope, gradually tracing out a circle on the celestial sphere in about 26,000 years, and also to nutate or wobble slightly in a period of 18.6 years. The Earth's rotation and orbital motion provide the basic standard of directions of stars, so that uncertainties in the rate of these motions can lead to quite small but important uncertainties in measurements of stellar movements.

6. One of the types of radiation that cannot pass through the atmospheric "windows" without distortion is
 

(a) near infra-red spectrum	(b) far-ultraviolet spectrum
(c) optical band in the spectrum	(d) radio band in the spectrum
7. One of the atmospheric effects that affects earth-based experiments that is not mentioned in the passage is
 

(a) twinkling	(b) refraction	(c) image movement	(d) clouds from volcano eruptions
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8. The purpose of telescope mounting is to neutralize
 

(a) atmospheric interference	(b) the effect of precession
(c) the effect of nutation	(d) the effect of diurnal spinning
9. The precession period of Earth is
 

(a) 24 hours	(b) 365.25 days	(c) 18.6 years	(d) 26,000 years
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10. Gravitational action of the Sun and the Moon on Earth causes
 

I. diurnal spinning	II. Precession	III. nutation	
(a) I only	(b) I and II only	(c) II and III only	(d) I, II and III
11. The orbital motion of the Earth
 

(a) is partly caused by the Moon	(b) can have uncertain rates
(c) has a periodicity of 18.6 years	(d) is neutralized by telescope mounting
12. The man-made radio signals have wave-lengths of
 

(a) more than 20 meters	(b) less than one centimeter
(c) between one centimeter and 20 meters	(d) gamma rays

## PASSAGE - 3

(1995)

Icicles- two meters long and, at their tips, as bright and sharp as needless- hang from the eaves: wild ice stalactites, dragon's teeth. I peer through them to see the world transformed to abstract whiteout. Little dervish snow tornadoes twirl across the blank. The car is out there somewhere, represented by a subtle bump in the snow-field. The old jeep truck, a larger beast, is up to its door handles, like a sinking remnant: dinosaur yelding to ice age. The town's behemoth snow-plow passes on the road, dome light twirling, and casts aside a frozen doe that now lies, neck broken, upon the roadisde snow-bank, soon to vanish under the snowfall still to come.

There is double-jointed consciousness at work in the dramatics of big weather. Down in the snowstorm, we are as mortal as the deer. I sink to my waist in a drift, I panic, my arms claw for an instant, like a drowning swimmer's in the powder. Men up and down the storm collapse with cornoaries, snow shovels in their hands, gone a deathly colour, like frost-bitten plums.

Yet when we go upstairs to consult the Weather Channel, we settle down, as cosy gods do, to hover high above the earth and watch the play with a divine perspective. Moist air labelled L for low rides up the continent from the Gulf of Mexico and collides with the high that has slid down from the North Pole. And thus is whipped up the egg-white fluff on the studio map that, down in the frozen, messy world, buries mortals.

An odd new metaphysics of weather: It is not that weather has necessarily grown more apocalyptic. The famous "Winter of the Blue Snow" of 1886-87 turned rivers of the American West into glaciers that when they thawed, carried along inundation of dead cattle. President Theodore Roosevelt was virtually ruined as a rancher by the weather that destroyed 65% of his herd. In 1811 Mississippi River flowed northward briefly because of the New Madrid earthquake.

What's new in America is the theatre of it. Television does not create weather any more than it creates contemporary politics. However, the ritual ceremonies of televised weather have endowed a subject often previously banal with an amazing life as mass entertainment, nationwide interactive preoccupation and a kind of immense performance art.

What we have is weather as electronic American Shintosim , a casual but almost mystic daily religion wherein nature is not inert but restless, stirring alive with kinetic fronts and meanings and turbulent expectations (forecasts, variables, prophecies). We have installed an elaborate priesthood and technology of interpretation: acolytes and satellites preside over snow and circuses. At least major snowstorms have about them an innocence and moral neutrality that is more refreshing than the last national television spectacle, the O.J. Simpson trial.

One attraction is the fact that these large gestures of nature are apolitical. The weather in its mirabilis mode can, of course, be dragged into the op-ed page to start a macro-argument about global warning or amicro-spat over a mayor's fecklessness in deploying snowplows. Otherwise, traumas of weather do not admit of political interpretation. The snow Shinto reintroduces an element of what is almost charmingly uncontrollable in life. And, as shown last week, surprising , even as the priests predict it. This is welcome- a kind of idiosyncrasy in a rather stupidly politicised society living under the delusion that everything in life (and death) is arguable, politicised society living under the delusion that everything in life (and death) is arguable, political and therefore manipulable - from diet to DNA . None of the old earthbound Marxist who-Whom here in meteorology, but rather sky gods that bang around at higher altitudes and leave the earth in its misery, to submit to the sloppy collateral damage.

The moral indifference of weather, even when destructive, is somehow stimulating. Why ? The sheer levelling force is pleassing. It overrides routine and organises people into a shared moment that will become a punctuating memory in their lives (" Lord, remember the blizzard in '96?" ).

Or perhaps one's reaction is no more complicated than a child's delight in dramatic disruption. Anyone loves to stand on the beach with a hurricane coing- a darkly lashing Byronism in surf and wind gets the blood up. The god's or child , part of the mind welcomes big weather -floods and blizzards. The coping, grown-up-human part curses it, and sinks.

The paradox of big weather: it makes people feel important even while it dramatised their insignificance. In some ways, extreme weather is a brief moral equivalent of war- as stimulating as war can sometimes be, though without most of the carnage.

The sun rises upon diamond- scattered snow-fields and glistens upon the lucent dragon's teeth. In the distance , three deer, roused from their shelter under pines, venture forth. They struggle and plunge undulously through the opulent white.

Upstairs, I switch on the Shinto Weather Channel and the priests at the map show me the next wave - white swirls and eddies over Indiana, heading ominously east.

13. The author's reaction to the snowstorm may be said to be  
(a) fascinated. (b) scared. (c) cynical. (d) deadpan.
14. How many vehicles does the author mention in the passage ?  
(a) One. (b) Two. (c) Three. (d) Four
15. Which of the following was not the result of the 'Winter of Blue Snow' ?  
(a) It almost ruined Theodore Roosevelt (b) It made the Mississippi flow northward  
(c) It turned rivers into glaciers (d) It killed a lot of cattle

16. The author compares the weather bulletin channel reportage to  
 (a) a war (b) the O.J. Simpson trial. (c) a ritual ceremony (d) a theatre.
17. According to the author, one of the greatest attractions of the weather is that  
 (a) it is politicised (b) it is a political (c) it is reckless (d) it is beautiful
18. The moral indifference of the weather is stimulating in spite of being destructive because  
 (a) it shows no mercy (b) it organises people into a shared moment  
 (c) Both (a) and (b) (d) Neither (a) and (b)
19. Which of the following is not true of the weather ?  
 (a) it is a moral equivalent of war (b) it is pleasantly manipulable.  
 (c) it is a levelling force (d) it dramatised man's insignificance
20. What is most probably the physical position of the author of the passage ?  
 (a) In his house (b) In a snowstorm (c) In his office (d) In a funk
21. The word 'undulately' in the context of the passage means  
 (a) unduly (b) indomitable (c) powerful (d) curved

## PASSAGE - 4

(1996)

That the doctrines connected with the name of Mr. Darwin are altering our principles has become a sort of commonplace thing to say. And moral principles are said to share in this general transformation. Now, to pass by other subjects, I do not see why Darwinism need change our ultimate moral ideas. It will not modify our conception of the end, either for the community of the individual, unless we have been holding views which long before Darwin were out of date. As to the principles of ethics I perceive, in short, no sign of revolution. Darwinism has indeed helped many to truer conception of the end, but I cannot admit that it has either originated or modified that conception.

And yet in ethics Darwinism after all may perhaps be revolutionary. I may lead not to another view about the end, but to a different way regarding the relatively importance of the means. For in the ordinary moral creed those means seem estimated on no rational principle. Our creed appears rather to be an irrational mixture of jarring elements. We have the moral code of Christianity, accepted in part; rejected practically by all save a few fanatics. But we do not realise how in its very principle the Christian ideals is false. And when we reject this code for another and in part a sounder morality, we are in the same condition of blindness and of practical confusion. It is here that Darwinism, with all the tendencies we may group under that name, seems destined to intervene. It will make itself felt, I believe, more and more effectually. It may force on us in some points a correction of our moral views, and a return to a non-Christian and perhaps a Hellenic ideal. I propose to illustrate here these general statements by some remarks on Punishment.

Darwinism, I have said, has not even modified our ideas of the Chief Good. We may take that as - the welfare of the community realised in its members. There is, of course, a question as to meaning to be given to welfare. We may identify that with mere pleasure, or gain with mere system, or may rather view both as inseparable aspects of perfection and individuality. And the extent and nature of the community would once more be a subject for some discussion. But we are forced to enter on these controversies here. We may leave welfare undefined, and for present purpose need not distinguish the community from the state. The welfare of this whole exists, of course, nowhere outside the individuals, and the individuals again have rights and duties only as members in the whole. This is the revived Hellenism — or we may call it the organic view of things — urged by German idealism early in the present century.

22. According to the author, the doctrines of Mr. Darwin.....  
 (a) have changed our physical and moral principles (b) have to be reevaluate to correct the faults endemic in them  
 (c) do not have to change our moral ideas (d) are actually new versions of old moral rules
23. What is most probably the author's opinion of the existing moral principles of the people?  
 (a) He thinks they have to be revamped in the light of Darwinism  
 (b) He thinks that they are okay as they are and do not need any major change  
 (c) He thinks that it may be a good idea to have modicum of the immoral Darwinism in us  
 (d) Cannot be determined from the passage
24. According to the author, the moral code of Christianity.....  
 (a) is not followed by most people (b) is in danger due to opposition to Darwinism  
 (c) is followed by a vast majority of people (d) is totally ignored by all true Christians

25. It is implied in the passage that.....
- a Hellenic ideal is not a proper substitute of the Christian ideal
  - what mankind needs is a Hellenic ideal rather than a Christian one
  - Darwinism is more Christian than Hellenic
  - fanatics do not understand what Darwinism really is
26. What, according to the passage, is the Chief Good?
- Being good and kind to all fellow human beings
  - The greatest good of the greatest number
  - The welfare of the community realised in its members
  - Cannot be determine from the passage

### PASSAGE - 5

(1996)

The membrane-bound nucleus is the most prominent feature of the eukaryotic cell. Schleiden and Schwann, when setting forth the cell doctrine in the 1830's, considered that it had a central role in growth and development. Their belief has been fully supported even though they had only vague notions as to what that role might be, and how the role was to be expressed in some cellular action. The membraneless nuclear area of the prokaryotic cell, with its tangle of fine threads, is now known to play a similar role.

Some cells, like the sieve tubes of vascular plants and the red blood cells of mammals, do not possess nuclei during the greater part of their existence, although they had nuclei when in a less differentiated state. Such cells can no longer divide and their life span is limited. Other cells are regularly multinucleate. Some, like the cells of striated muscles or the latex vessels of higher plants, become so through cell fusion. Some, like the unicellular protozoan Paramecium, are normally binucleate, one of the nuclei serving as a source of hereditary information for the next generation, the other governing the day-to-day metabolic activities of the cell. Still other organisms, such as some fungi, are multinucleate because cross walls, dividing the mycelium into specific cells, and it would appear that this is the most efficient and most economical manner of partitioning living substance into manageable units. This point of view is given credence not only by the prevalence of uninucleate cells, but because for each kind of cell there is a ration maintained between the volume of the nucleus and that of the cytoplasm. If we think of the nucleus as the control centre of the cell, this would suggest that for a given kind of performing a given kind of work, one nucleus can "take care of" a specific volume of cytoplasm and keep it in functioning order. In terms of materials and energy, this must mean providing the kind of information needed to keep flow of materials and energy moving at the correct rate and in channels. With the multitude of enzymes in the cell, materials and energy can of course be channelled in a multitude of ways; it is the function of some informational molecules to make channels of use more preferred than others at any given time. How this regulatory control is exercised is not entirely clear.

The nucleus is generally a rounded body. In plant cells, however, where the centre of the cell is often occupied by a large vacuole, the nucleus may be pushed against the cell wall, causing it to assume a lens shape. In some white blood cells, such as polymorphonucleated leukocytes, and in cells of the spinning gland of some insects and spiders, the nucleus is very much lobed. The reason for this is not clear, but it may relate to the fact that for a given volume of nucleus, a lobate form provides a much greater surface area nuclear-cytoplasmic exchanges, possibly affecting both the rate and the amount of metabolic reactions. The nucleus, whatever its shape, is segregated from the cytoplasm by a double membranes, the nuclear envelope, with the two membranes separated from each other by a perinuclear space of varying width. The envelope is absent only during the time of cell division, and then just for a brief period. The outer membrane is often continuous with the membranes of the endoplasmic reticulum, a possible retention of an earlier relationship, since the envelope, at least in part, is formed at the end of cell division by coalescing fragments of the endoplasmic reticulum. The cytoplasmic side of the nucleus is frequently coated with ribosomes, another fact that stresses the similarity and relation of the nuclear envelope to the endoplasmic reticulum. The inner membranes seem to possess a crystalline layer where it abuts the nucleoplasm, but its function remains to be determined.

Everything that passes between the cytoplasm and the nucleus in the eukaryotic cell must transverse the nuclear envelope. This includes some fairly large molecules as well as bodies such as ribosomes, which measure about 25 nm in diameter. Some passageway is, therefore, obviously necessary since there is no indication of dissolution of the nuclear envelope in order to make such movement possible. The nuclear pores appear to be reasonable candidates for such passageway. In plant cells these are irregularly and rather sparsely distributed over the surface of the nucleus, but in the amphibian oocyte, for example, the pores are numerous, regularly arranged, and octagonal and are formed by the fusion of the outer and inner membrane.

27. According to the first paragraph, the contention of Schleiden and Schwann that the nucleus is the most important part of the cell has .....
- been proved to be true
  - has been true so far but false in the case of the prokaryotic cell
  - is only partially true
  - has been proved to be completely false.

28. Which of the following kinds of the cells do not have nuclei?
- (a) Sieve Tubes
  - (b) Red blood cells of mammals
  - (c) Prokaryotic cells
  - (d) None of the above
29. What is definitely a function of the nuclei of the normally binucleate cell?
- (a) To arrange for the growth and nourishment if the cell
  - (b) To hold hereditary information for the next generation
  - (c) To make up the physical structure of the organism
  - (d) To fight the various foreign diseases attacking the body
30. It may be inferred from the passage that the vast majority of cells are ....
- (a) Multinucleate.
  - (b) Binucleate.
  - (c) Uninucleate.
  - (d) Anucleate.
31. Why, according to the passage, are fungi multinucleate?
- (a) Because they need more food to survive
  - (b) Because they frequently lack walls dividing the mycelium
  - (c) Because the mycelium is area-wise much bigger than other cells
  - (d) Cannot be determined from the passage
32. Why, according to the passage, is polymorphonucleated leukocyte probably lobed?
- (a) Because it is quite convoluted in its functions
  - (b) Because it is a red blood cell which is the most important cell in the body
  - (c) Because it provides a greater area for metabolic reactions
  - (d) Because it provides greater strength to the spider web due to greater area.
33. The function of the crystalline layer of the inner membrane of the nucleus is .....
- (a) generation of nourishment of the cell
  - (b) holding together the disparate structures of the endoplasmic reticulum
  - (c) helping in transversal of the nuclear envelope
  - (d) Cannot be determined from the passage

## PASSAGE - 6

(1998)

From ancient times, men have believed that, under certain peculiar circumstances, life could arise spontaneously: from the ooze of rivers could eels and from the entrails of dead bulls, bees; worms form mud, and maggots from dead meat. This belief was held by Aristotle, Newton and Desecrates, among many others, and apparently the great William Harvey too. The weight of centuries gradually disintegrated men's beliefs in the spontaneous origin of maggots and mice, but the doctrine of spontaneous generation clung tenaciously to the question of bacterial origin.

In association with Buffon, the Irish Jesuit priest John Needham declared that he could bring about at will that creation of living microbes in heat-sterilized broths, and presumably, in propitiation, theorized that God did not create living things directly but bade the earth and water to bring them forth. In his *Dictionnaire Philosophique*, Voltaire reflected that it was odd to read of Father Needham's claim while atheists conversely 'should deny a Creator yet attribute to themselves the power of creating eels. But wrote Thomas Husley, 'The great tragedy of science-the slaying of a beautiful hypothesis by an ugly fact-which is so constantly being enacted under the eyes of philosophers, was played almost immediately, for the benefit of Buffon and Needham.'

The Italian Abbe Spallanzani did an experiment. He showed that a broth sealed from the air while boiling never develops bacterial growths and hence never decomposes. To Needham's objection that Spallanzani had ruined his broths and the air above them by excessive boiling, the Abbe replied by breaking the seals of his flasks. Air rushed in and bacterial growth began but the essential conflict remained. Whatever Spallanzani had his followers did to remove seeds and contaminants was regarded by the spontaneous generationists as damaging to the 'vital force' from whence comes new life.

Thus, doubt remained, and into the controversy came the titanic figure of Louis Pasteur. Believing that a solution to this problem was essential to the development of his theories concerning the role of bacteria in nature, Pasteur freely acknowledged the possibility that living bacteria very well might be arising anew from inanimate matter. To him, the research problem was largely a technical one: to repeat the work of those who claimed to have observed spontaneous generation but to employ infinite care to discover and exclude every possible concealed portal of bacterial entry. For the one that contended that life did not enter from the outside, the proof had to go to the question of possible contamination, Pasteur worked logically. After prolonged boiling broth would ferment only when air was admitted to it. Therefore, either air contained a factor necessary for the spontaneous generation of life or viable germs were borne in by the air and seeded in the sterile nutrient broth. Pasteur designed ingenious flasks whose long S-shaped necks could be left open. Air were trapped in the sinuous glass tube. Broths boiled in these glass tubes remained sterile. When their necks were snapped to admit ordinary air, bacterial growth would then commence-but not in every case. An occasional flask would remain sterile presumably because the bacterial population of the air is unevenly distributed. The forces of spontaneous generation would not be so erratic.

Continuous scepticism drove Pasteur almost to fanatical efforts to control the ingredients of his experiments to destroy the doubts of the most sceptical. He ranged from the mountain air of Montanvert, which he showed to be almost sterile, to those deep, clear wells whose waters had been rendered germ free by slow filtration through sandy soil. The latter discovery led to the familiar porcelain filters of the bacteriology laboratory. With pores small enough to exclude bacteria, solutions allowed to percolate through them could be reliably sterilised.

The argument raged on and soon spilled beyond the boundaries of science to become a burning religious and philosophical questions of the day. For many, Pasteur's conclusions caused conflict because they seemed simultaneously to support the Biblical account of creation while denying a variety of other philosophical systems.

The public was soon caught up in the crossfire of a vigorous series of public lectures and demonstrations by leading exponents of both views, novelists, clergymen, their adjuncts and friends. Perhaps the most famous of these evening in the theatre - was Pasteur's public with a great debate between Huxley and Bishop Wiberforce for elegance of rhetoric-was Pasteur's public lecture at the Sorbonne of 7 April, 1864. Having shown his audience the swan necked flasks containing sterile broths, he concluded, "And, therefore, gentlemen, I could point to that liquid and say to you, I have taken my drop of water from the immensity of creation, and I have taken it full of the elements appropriated to the development of inferior beings. And I wait, I watch, I question it - begging it to recommence for new the beautiful spectacle of the first creation. But it is dumb, dumb since these experiments were begun several years ago; it is dumb because I have kept it from the only thing man does not know how to produce : form the germs that float in the air, from Life, for Life is a germ and a germ is Life. Never will the doctrine of spontaneous generation recover from the mortal blow of this simple experiment ." And it has not Today these same flasks stand immutable : they are still free of microbial life.

It is an interesting fact that despite the ringing declaration of Pasteur, the issue did not die completely. And although far from healthy, it is not yet dead. In his fascinating biography of Pasteur, Rene Dubos has traced the later developments which saw new technical progress and criticism, and new energetic figures in the breach of the battle such as Bastion, for, and the immortal Tyndall, against, the doctrine of spontaneous generation. There was also new 'sorrow' for Pasteur as he read years later, in 1877, the last jottings of the great physiologist Claude Bernard and saw in them the 'mystical' suggestion that yeast may arise from grape juice. Even at this late date, Pasteur was stirred to new experiments again to prove to the dead Bernard and his followers the correctness of his position.

It seems to me that spontaneous generation is not a possibility, but a completely reasonable possibility which should never be relinquished from scientific though. Before men knew of bacteria, they accepted the doctrine of spontaneous generation as the 'only reasonable alternative' to a belief in supernatuarl creation. But today, as we look for saisfaction at the downfall of the spontaneous generation hypothesis, we must not forget that science has rationaqlly concluded that *life once did originate on earth by spontaneous generation*. If was really Pasteur's evidence against spontaneous generation that for the first time brought the whole difficult question of the origin of life before the scientific world. . In the above controversy, what was unreasonable was the parade of men who claimed to have 'proved' or who resolutley 'believed in' spontaneous generation on the face of proof not that spontaneous generation that for the first time brought the whole difficult question of the origin of life before the scientific world. In the above controversy, what was unreasonable was the parade of men who claimed to have 'proved' or who resolutely 'believed in' spontaneous generation on the face of proof not that spontaneous generation cannot occur-but that their work was shot thorugh with experimentaal error. The acceptabel evidence also makes it clear that spontaneous generation, if it does not occur, must obviously be a highly improbable even under present conditions. Logic tells us that science can only prove an event improbable : It can never prove it impossible - and Gamow has appropriately remarked that nobody is really certain what would happen if a hermetically sealed can were opened after a couple of million years. Modern science agrees that it was highly improbable for life to have arisen in the pre-Cambrian seas, but it concluded, nevertheless, that there it did occur. with this, I think, Pasteur would agree.

Aside from their theoretical implications, these researchers had the great practical result of putting bacteriology on a solid footing. It was now clear how precisely careful one had to be to avoid bacterial contamination in the laboratory. We now knew what 'sterile' meant and we knew that there could be no such thing as 'partial sterillisation'. The discovery of bacteria high in the upper atmosphere, in the mud of the deep sea bottom, in the waters of hot springs, and in the Arctic glaciers established bacterial ubiquity as almost absolute. It was the revolution in techinique alone that made possible modern bacteriology and the subsequent research connecting bacteria to phenomena of human concern, research which today is more prodigious than ever. We are just beginning to understand the relationship of bacteria to certain human diseases , to soil chemistry, nutrition, and the phenomenon of antibiosis, wherein a product of one organism (e.g. penicillin ) is detrimental to another.

It is not an exaggeration then to say the emergence of the cell theory represents biology's most significant and fruitful advance. The realisation that all plants and animals are composed of cells which are essentially alike, that cells are all formed by the same fundamental division process, that the total organism is a whole made up of the activities and inter-relations of its individual cells, opened up horizons are have not even begun to approach. The cell is a microcosm of life, for in its origin, nature and continuity resides the entire problem of biology.

34. Needham's theory that 'God did not create living things directly' was posited as  
 (a) an attempt to support his assertion by religious doctrine  
 (b) an attempt at placating his religious peers  
 (c) an attempt at propitiating a possibly offended God or the religious psyche of the time.  
 (d) all of the above
35. It can be inferred from the passage that  
 (a) Huxley, Buffon and Needham were contemporaries      (b) Buffon, Needham, Voltaire and Huxley were contemporaries  
 (c) Voltaire wrote a treatise on Needham's claim      (d) none of above
36. According to the passage  
 (a) Pasteur's precursors in the field worked on the basis of spontaneous generation.  
 (b) unlike his predecessors, Pasteur worked on logical premises rather than arbitrary and spontaneous discoveries.  
 (c) Pasteur stood to benefit largely from the work of his predecessors.  
 (d) Pasteur developed the ideas set forth by Voltaire and Needham.
37. Pasteur began his work on the basis of the contention that  
 (a) either air contained a factor necessary for the spontaneous generation of life or viable germs were borne in by the air and seeded in the sterile nutrient broth.  
 (b) after prolonged boiling, a broth would ferment only when air was admitted to it.  
 (c) both (a) and (b)  
 (d) neither (a) and (b)
38. The porcelian filters of the bacteriology laboratories owed their descent to  
 (a) Pasteur's homeland  
 (b) the well water of Montanvert that had been rendered germ free by slow filtration through sandy soil  
 (c) both (a) and (b)  
 (d) none of the above
39. What according to the passage was Pasteur's declaration to the world ?  
 (a) nobody could deny the work done by him  
 (b) science would forever be indebted to his experiments in bacteriology  
 (c) the doctrine of spontaneous generation would never recover the mortal blow dealt to it by his experiments  
 (d) those who refused to acknowledge his experiments would regret their scepticism
40. What according to the writer, was the problem with the proponents of Spontaneous generation?  
 (a) their work had no scientific basis  
 (b) their work was ruined by experimental errors  
 (c) both (a) and (b)  
 (d) neither (a) and (b)
41. One of the results of the theoretical cross fire regarding bacteriology was that  
 (a) partial sterilisation as a possibility was ruled out      (b) aseptic technique was introduced in surgery  
 (c) the meaning of sterile was clear to all      (d) all of the above
42. One of the reasons for the conflict caused by Pasteur's experiments was that  
 (a) they denied the existence of God as the Creator  
 (b) They seemed simultaneously to support the Biblical account of creation while denying a variety of other philosophical systems  
 (c) academicians and scientists refused to accept his theories  
 (d) there were too many debates on the topic this left the people confused
43. According to the author  
 (a) it is an exaggeration to say that cell theory represents biology's most significant and fruitful advance  
 (b) Pasteur could not hold his own against the contenders  
 (c) cell theory rendered null and void all the other bacteriological theories of the time  
 (d) the emergence of the cell theory represents biology's most significant and fruitful advance

**PASSAGE - 7**

(2000)

The current debate on intellectual property rights (IPRs) raises a number of important issues concerning the strategy and politics for building a more dynamic national agricultural research system, the relative roles of public and private sectors, and the role of agribusiness multinational corporations (MNCs). This debate has been stimulated by the international agreement on Trade Related Intellectual Property (TRIPs), negotiated as part of the Uruguay Round. TRIPs for the first time, seeks to bring innovations in agricultural technology under a new worldwide IPR regime. The agribusiness MNCs (along with pharmaceutical companies) played a leading part in lobbying for such a regime during the Uruguay Round negotiations. The argument was that incentives are necessary to stimulate innovations, and that this calls for a system of patents which gives innovators the sole right to use (or sell/lease the right to use) their innovations for a specified period and protects them against unauthorized copying or use. With strong support of their national governments, they were influential in shaping the agreement on TRIPs which eventually emerged from the Uruguay Round.

The current debate on TRIPs in India—as indeed elsewhere—echoes wider concerns about ‘privatisation’ of research and allowing a free field for MNCs in the sphere of biotechnology and agriculture. The agribusiness corporations, and those with unbounded faith in the power of science to overcome all likely problems, point to the vast potential that new technology holds for solving the problems of hunger, malnutrition and poverty in the world. The exploitation of this potential should be encouraged and this is best done by the private sector for which patents are essential. Some, who do not necessarily accept this optimism argue, that fears of MNC domination are exaggerated and that farmers will accept their products only if they decisively outperform the available alternatives. Those who argue against agreeing to introduce an IPR regime in agriculture and encouraging private sector research are apprehensive that this will work to the disadvantage of farmers by making them more dependent on monopolistic MNCs. A different, though related apprehension is that extensive use of hybrids and genetically engineered new varieties might increase the vulnerability of agriculture to outbreaks of pests and diseases. The larger, longer-term consequences of reduced biodiversity that may follow from the use of specially bred varieties are also another cause for concern. Moreover, corporations, driven by the profit motive, will necessarily tend to underplay, if not ignore, potential adverse consequences, especially those which are unknown and which may manifest themselves only over a relatively long period. On the other hand, high pressure advertising and aggressive sales campaigns by private companies can seduce farmers into accepting varieties without being aware of potential adverse effects and possibility of disastrous consequences for their livelihood if these varieties happen to fail. There is no provision under the laws, as they now exist, for compensating users against such eventualities.

Excessive preoccupation with seeds and seed material has obscured other important issues involved in reviewing the research policy. We need to remind ourselves that improved varieties by themselves are not sufficient for sustained growth of yields. In our own experience, some of the early high yielding varieties (HYVs) of rice and wheat were found susceptible to widespread post attacks; and some had problems of grain quality. Further research was necessary to solve these problems. This largely successful research was almost entirely done in public research institutions. Of course, it could in principle have been done by private companies, but whether they choose to do so depends crucially on the extent of the loss in market for their original introductions on account of the above factors and whether the companies are financially strong enough to absorb the ‘losses’, invest in research to correct the deficiencies and recover the lost market. Public research, which is not driven by profit, is better placed to take corrective action. Research for improving common poll resource management, maintaining ecological health and ensuring sustainability is both critical and also demanding in terms of technological challenge and resource requirements. As such research is crucial to the impact of new varieties, chemicals and equipment in the farmer’s field, private companies should be interested in such research. But their primary interest is in the sale of seed materials, chemicals, equipment and other inputs produced by them. Knowledge and techniques --- can only do such work.

The public sector must therefore continue to play a major role in the national research system. It is both wrong and misleading to pose the problem in terms of public sector versus private sector or of privatisation of research. We need to address problems likely to arise on account of the public-private sector complementarily, and ensure that public research system performs efficiently. Complementarily between various elements of research raises several issues in implementing an IPR regime. Private companies do not produce new varieties and inputs entirely as a result of their own research. Almost all technological improvement is based on knowledge and experience accumulated from the past, and the results of basic and applied research in public and quasi-public institutions (universities, research organization). Moreover, as is increasingly recognized, accumulated stock of knowledge does not reside only in the scientific community and its academic publications, but is also widely diffused in traditions and folk knowledge of local communities all over.

The deciphering of the structure and functioning of DNA forms the basis of much of modern biotechnology. But this fundamental breakthrough is ‘public good’, freely accessible in the public domain and usable free of any charge. Varieties/techniques developed using that knowledge can however be, and are, patented for private profit. Similarly, private corporations draw extensively, and without any charge, on germ plasm available in varieties of plants species (neem and turmeric are now famous examples). Publicly funded gene banks as well as new varieties bred by public sectors research stations can also be used freely by private enterprises for developing their own varieties and seek patent protecting them. Should private breeders be allowed free use of basic scientific discoveries? Should

the repositories of traditional knowledge and germ plasm be collected which are maintained and improved by publicly funded institutions? Or should users be made to pay for such use? If they are to pay, what should be the basis of compensation? Should the compensations be for individuals or for communities/institutions to which they belong? Should individuals/institutions be given the right of patenting their innovations? These are some of the important issues that deserve more attention than they now get and need serious detailed study to evolve reasonably satisfactory, fair and workable solutions. Finally, the tendency to equate the public sector with the government is wrong. The public space is much wider than government departments and includes co-operatives, universities, public trusts and a variety of non governmental organizations (NGOs). Giving greater autonomy to research organizations from government control and giving non-government public institutions the space and resources to play a larger, more effective role in research, is therefore an issue of direct relevance in restructuring the public research system.

44. Which one of the following statements describes an important issue, or important issues, not being raised in the context of the current debate on IPRs?
  - (a) The role of MNCs in the sphere of biotechnology and agriculture.
  - (b) The strategy and policies for establishing an IPR regime for Indian agriculture.
  - (c) The relative roles of public and private sectors.
  - (d) Wider concerns about 'privatisation' of research.
45. The fundamental breakthrough in deciphering the structure and functioning of DNA has become a public good. This means that:
  - (a) breakthroughs in fundamental research on DNA are accessible by all without any monetary considerations.
  - (b) the fundamental research on DNA has the characteristic of having beneficial effects for the public at large.
  - (c) due to the large scale of fundamental research on DNA, it falls in the domain of public sector research institutions.
  - (d) the public and other companies must have free access to such fundamental breakthroughs in research.
46. In debating the respective roles of the public and private sectors in the national research system, it is important to recognize :
  - (a) the private companies do not produce new varieties and inputs entirely on their own research.
  - (b) that almost all technological improvements are based on knowledge and experience accumulated from the past
  - (c) the complementary role of public and private sector research.
  - (d) that knowledge repositories are primarily the scientific community and its academic publications.
47. Which one of the following may provide incentives to address the problem of potential adverse consequences of biotechnology?
  - (a) Include IPR issues in the TRIPs agreement
  - (b) Nationalize MNCs engaged in private research in biotechnology
  - (c) Encourage domestic firms to patent their innovations
  - (d) Make provisions in the law for user compensation against failure of newly developed varieties
48. Which of the following sentences is not a likely consequence of emerging technologies in agriculture?
  - (a) Development of newer and newer varieties will lead to increase in biodiversity
  - (b) MNCs may underplay the negative consequences of the newer technology on environment
  - (c) Newer varieties of seeds may increase vulnerability of crops to pests and diseases
  - (d) Reforms in patent laws and user compensation against crop failures would be needed to address new technology problems
49. The TRIPs agreement emerged from the Uruguay Round to
  - (a) address the problem of adverse consequences of genetically engineered new varieties of grain
  - (b) fulfil the WTO requirement to have an agreement on the trade related property rights
  - (c) provide incentives to innovators by way of protecting their intellectual property
  - (d) give credibility to the innovations made by MNCs in the field of pharmaceuticals and agriculture
50. Public or quasi-public research institutions are more likely, than private companies, to address the negative consequences of new technologies, because of which of the following reasons?
  - (a) Public research is not driven by profit motive
  - (b) Private companies may not be able to absorb losses arising out of the negative effects of the new technologies
  - (c) Unlike new technology products, knowledge and techniques for resource management are not amenable to simple market transactions
  - (d) All of the above
51. While developing a strategy and policies for building a more dynamic national agricultural research system, which one of the following statements needs to be considered?
  - (a) Public and quasi-public institutions are interested in making profits.
  - (b) Public and quasi-public institutions have a broader and long-term outlook than private companies.
  - (c) Private companies are incapable of building products based on traditional and folks knowledge.
  - (d) Traditional and folk knowledge cannot be protected by patents.

**PASSAGE - 8**

(2000)

In a modern computer, electronic and magnetic storage technologies play complementary roles. Electronic memory chips are fast but volatile (their contents are lost when the computer is unplugged). Magnetic tapes and hard disks are slower, but have the advantage that they are non-volatile, so that they can be used to store software and documents even when the power is off.

In laboratories around the world, however researchers are hoping to achieve the best of both worlds. They are trying to build magnetic memory chips that could be used in place of today's electronic ones.

These magnetic memories would be non-volatile; but they would also be faster, would consume less power, and would be able to stand up to hazardous environments more easily. Such chips would have obvious applications in storage cards for digital cameras and music-players; they would enable handheld and laptop computer to boot up more quickly and to operate for longer; they would allow desktop computers to run faster; they would doubtless have military and space faring advantages too. But although the theory behind them looks solid; there are tricky practical problems and need to be overcome.

Two different approaches, based on different magnetic phenomena, are being pursued. The first, being investigated by Gary Prinz and his colleagues at the Naval Research Laboratory (NRL) in Washington, D.C., exploits the fact that the electrical resistance of some materials changes in the presence of a magnetic field—a phenomenon known as magneto-resistance. For some multi-layered materials this effect is particularly powerful and is, accordingly, called “giant” magneto-resistance (GMR). Since 1997, the exploitation of GMR has made cheap multi-gigabyte hard disks commonplace. The magnetic orientations of the magnetised spots on the surface of a spinning disk are detected by measuring the changes they induce in the resistance of a tiny sensor. This technique is so sensitive that it means the spots can be made smaller and packed closer together than was previously possible, thus increasing the capacity and reducing the size and cost of a disk drive.

Dr. Prinz and his colleagues are now exploiting the same phenomenon on the surface of memory chips rather than spinning disks. In a conventional memory chip each binary digit (bit) of data is represented using a capacitor reservoir of electrical charge that is either empty or full—to represent a zero or a one. In a NRL's magnetic design, by contrast each bit is stored in a magnetic element in the form of a vertical pillar of magnetisable material. A matrix of wires passing above and below the elements allows each to be magnetised, either clockwise, to represent zero or one. Another set of wires allows current to pass through any particular element. By measuring an element's resistance you can determine its magnetic orientation, and hence whether it is storing a zero or a one. Since the elements retain their magnetic orientation even when the power is off, the result is Non-Volatile memory. Unlike the elements of an electronic memory, a magnetic memory's elements are not easily disrupted by radiation. And compared with electronic memories, whose capacitors need constant topping up, magnetic memories are simpler and consume less power. The NRL researchers plan to commercialise their device through a company called Non-Volatile Electronics, which recently began work on the necessary processing and fabrication techniques. But it will be some years before the first chips roll the production line.

Most attention in the field is focused on an alternative approach based on magnetic tunnel-junctions (MTJs), which are being investigated by researchers at chip market such as IBM, Motorola, Siemens and Hewlett-Packard. IBM's research team, led by Stuart Parkin, has already created a 500-element working prototype that operates at 20 times the speed of conventional memory chips and consumes 1% of the power. Each element consists of a sandwich of two layers of magnetisable material separated by a barrier of aluminium oxide just four or five atoms thick. The polarisation of lower magnetisable layer is fixed in one direction, but that of the upper layer can be set (again, by passing a current through a matrix of control wires) either to the left or to the right, to store a zero or a one. The polarisations of the two layers are then in either the same or opposite directions.

Although the aluminium-oxide barrier is an electrical insulator, it is so thin that electrons are able to jump across it via a quantum-mechanical effect called tunneling. It turns out that such tunnelling is easier when the two magnetic layers are polarised in the same direction than when they are polarised in opposite directions. So, by measuring the current that flows through the sandwich, it is possible to determine the alignment of the topmost layer, and hence whether it is storing a zero or a one.

To build a full-scale memory chip based on MTJs is however no easy matter. According to Paulo Freitas, an expert on chip manufacturing at the Technical University of Lisbon, magnetic memory elements will have to become far smaller and more reliable than current prototypes if they are to compete with electronic memory. At the same time, they will have to be sensitive enough to respond when a neighbouring element is changed. Despite these difficulties, the general consensus is that MTJs are the more promising ideas. Dr Parkin says his group evaluated the GMR approach and decided not to pursue it, despite the fact that IBM pioneered GMR in hard disks. Dr Prinz, however, contends that his plans will eventually offer higher storage densities and lower production costs.

Not content with shaking up the multi-dollar market for computer memory, some researchers have even more ambitious plans for magnetic computing. In a paper published last month in *Science*, Russell Cowburn and Mark Welland of Cambridge University outlined research that could form the basis of magnetic microprocessor—a chip capable of manipulating (rather than merely storing) information magnetically. In place of conducting wires, a magnetic processor would have rows of magnetic dots, each of which could be polarised

in one of the two directions. Individual bits of information would travel down the rows as magnetic pulses, changing the orientation of the dots as they went. Dr. Cowburn and Dr. Welland have demonstrated how a logic gate (the basic of a microprocessor) could work in such a scheme. In their experiment, they fed a signal in at one end of the chain of dots and used a second signal to control whether it propagated along the chain.

It is admittedly, a long way from a single logic gate to full microprocessor, but this was true also when the transistor was first invented. Dr Cowburn is now searching for backers to help commercialise the technology, says he believes it will be at least ten years before the first magnetic microprocessor is constructed. But other researchers in the field agree that such a chip is the next logical step. Dr. Prinz says that once magnetic memory is stored out “the target is to go after the logic circuits.” Whether all magnetic computers will ever be able to compete with other contenders that are jostling to knock electronics off its perch-such as optical, biological and quantum computing-remains to be seen. Dr. Cowburn suggests that the future lies with hybrid machines that use different technologies. But computing with magnetism evidently has an attraction all its own

52. In developing magnetic memory chips to replace the electronic ones, two alternative research paths are being pursued. These are approaches based on
  - (a) Volatile and non-volatile memories
  - (b) Magneto-resistance and magnetic tunnel junctions
  - (c) Radiation-disruption and radiation-neutral effects
  - (d) Orientation of magnetised spots on the surface of a spinning disk and alignment of magnetic dots on the surface of a conventional memory chip
53. A binary digit or bit is represented in the magneto-resistance based magnetic chip using:
 

(a) A layer of aluminium oxide	(b) A capacitor
(c) A vertical pillar of magnetised material	(d) A matrix of wires
54. In the magnetic tunnel-junctions (MTJs) tunnelling is easier when :
  - (a) two magnetic layers are polarised in the same direction
  - (b) two magnetic layers are polarised in the opposite directions
  - (c) two aluminium-oxide barriers are polarised in the same directions
  - (d) two aluminium -oxide barriers are polarised in opposite directions
55. A major barrier on the way to build a full-scale memory chip based on MTJs is
  - (a) the low sensitivity of the magnetic memory elements
  - (b) the thickness of aluminium oxide barriers
  - (c) the need to develop more reliable and far smaller magnetic memory chips
  - (d) all of the above
56. In the MTJs approach, it is possible to identify whether the topmost layer of the magnetised memory element is storing a zero or one by
  - (a) measuring an element's resistance and thus determining its magnetic orientation
  - (b) measuring the degree of disruption caused by radiation in the elements of the magnetic memory
  - (c) magnetising the elements either clockwise or anti-clockwise
  - (d) measuring the current that flows through the sandwich
57. A line of research which is trying to build a magnetic chip that can both store and manipulate information is being pursued by :
 

(a) Paul Freitas	(b) Stuart Parkin	(c) Gary Prinz	(d) none of the above
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58. Experimental research currently underway, using rows of magnetic dots, each of which could be polarised in one of the two directions, has led to the demonstration of
 

(a) working of a microprocessor	(b) working of a logic gate
(c) working of a magneto-resistance based chip	(d) working of a magneto tunnelling-junction (MTJ) based chip
59. From the passage, which of the following cannot be inferred?
  - (a) Electronic memory chips are faster and non-volatile
  - (b) Electronic and magnetic storage technologies play a complementary role
  - (c) MTJs are the more promising idea, compared to the magneto-resistance approach
  - (d) Non-volatile Electronics is the company set up to commercialise the GMR chips

**PASSAGE - 9**

(2001)

In the modern scientific story, light was created not once but twice. The first time was in the Big Bang, when the universe began its existence as a glowing, expanding, fireball, which cooled off into darkness after a few million years. The second time was hundreds of millions of years later, when the cold material condensed into dense nuggets under the influence of gravity, and ignited to become the first stars.

Sir Martin Rees, Britain's astronomer royal, named the long interval between these two enlightenments the cosmic "Dark Age". The name describes not only the poorly lit conditions, but also the ignorance of astronomers about that period. Nobody knows exactly when the first stars formed, or how they organised themselves into galaxies - or even whether stars were the first luminous objects. They may have been preceded by quasars, which are mysterious, bright spots found at the centres of some galaxies.

Now, two independent groups of astronomers, one led by Robert Becker of University of California, Davis, and the other by George Djorgovski of the Caltech, claim to have peered far enough into space with their telescopes (and therefore backwards enough in time) to observe the closing days of the Dark Age.

The main problem that plagued previous efforts to study the Dark Age was not the lack of suitable telescopes, but rather the lack of suitable things at which to point them. Because these events took place over 13 billion years ago, if astronomers are to have any hope of unravelling them they must study objects that are at least 13 billion light years away. The best prospects are quasars, because they are so bright and compact that they can be seen across vast stretches of space. The energy source that powers a quasar is unknown, although it is suspected to be the intense gravity of a giant black hole. However, at the distances required for the study of Dark Age, even quasars are extremely rare and faint.

Recently some members of Dr. Becker's team announced their discovery of the four most distant quasars known. All the new quasars are terribly faint, a challenge that both teams overcame by peering at them through one of the twin Keck telescopes in Hawaii. These are the world's largest, and can therefore collect the most light. The new work by Dr. Becker's team analysed the light from all four quasars. Three of them appeared to be similar to ordinary, less distant quasars. However, the fourth and most distant, unlike any other quasar ever seen, showed unmistakable signs of being shrouded in a fog of hydrogen gas. This gas is leftover material from the Big Bang that did not condense into stars or quasars. It acts like fog because new-born stars and quasars emit mainly ultraviolet light, and hydrogen gas is opaque to ultra violet. Seeing this fog had been the goal of would-be Dark Age astronomers since 1965, when James Gunn and Bruce Peterson spelled out the technique for using quasars as backlighting beacons to observe the fog's ultraviolet shadow.

The fog prolonged the period of darkness until the heat from the first stars and quasars had the chance to ionise the hydrogen (breaking it into constituent parts, protons and electrons). Ionised hydrogen is transparent to ultraviolet radiation, so at that moment the fog lifted and the universe became the well-lit place it is today. For this reason, the end of the Dark Age is called "Epoch of Re-ionisation". Because the ultraviolet shadow is visible only in the most distant of the four quasars. Dr. Becker's team concluded that the fog had dissipated completely by the time the universe was about 900 million years old, and one-seventh of its current size.

60. In the passage, the Dark Age refers to
  - (a) the period when the universe became cold after the Big Bang
  - (b) a period about which astronomers know very little
  - (c) the medieval period when cultural activity seemed to have come to an end
  - (d) the time that the universe took to heat up after the Big Bang
61. Astronomers find it difficult to study the Dark Age because
  - (a) suitable telescopes are few
  - (b) the associated events took place ages ago
  - (c) the energy source that powers a quasar is unknown
  - (d) their best chance is to study quasars, which are faint objects to begin with
62. The four most distant quasars discovered recently
  - (a) could only be seen with the help of large telescopes
  - (b) appear to be similar to other ordinary quasars
  - (c) appear to be shrouded in a fog of hydrogen gas
  - (d) have been sought to be discovered by Dark Age astronomers since 1965
63. The fog of hydrogen gas seen through the telescopes
  - (a) is transparent to hydrogen radiation from stars and quasars in all stars
  - (b) was lifted after heat from stars and quasars ionised it
  - (c) is material which eventually became stars and quasars
  - (d) is broken into constituent elements when stars and quasars are formed

## PASSAGE - 10

(2002)

Cells are the ultimate multitaskers: they can switch on genes and carry out their orders, talk to each other, divide in two, and much more, all at the same time. But they couldn't do any of these tricks without a power source to generate movement. The inside of a cell bustles with more traffic than Delhi roads, and, like all vehicles, the cell's moving parts need engines. Physicists and biologists have looked "under the hood" of the cell - and laid out the nuts and bolts of molecular engines.

The ability of such engines to convert chemical energy into motion is the envy of nanotechnology researchers looking for ways to power molecule-sized devices. Medical researchers also want to understand how these engines work. Because these molecules are essential for cell division, scientists hope to shut down the rampant growth of cancer cells by deactivating certain motors. Improving motor-driven transport in nerve cells may also be helpful for treating diseases such as Alzheimer's, Parkinson's or ALS, also known as Lou Gehrig's disease.

We wouldn't make it far in life without motor proteins. Our muscles wouldn't contract. We couldn't grow, because the growth process requires cells to duplicate their machinery and pull the copies apart. And our genes would be silent without the services of messenger RNA, which carries genetic instructions over to the cell's protein-making factories. The movements that make these cellular activities possible occur along a complex network of threadlike fibers, or polymers, along which bundles of molecules travel like trams. The engines that power the cell's freight are three families of proteins, called myosin, kinesin and dynein. For fuel, these proteins burn molecules of ATP, which cells make when they break down the carbohydrates and fats from the foods we eat. The energy from burning ATP causes changes in the proteins' shape that allow them to heave themselves along the polymer track. The results are impressive: In one second, these molecules can travel between 50 and 100 times their own diameter. If a car with a 5-foot-wide engine were as efficient, it would travel 170 to 340 kmph.

Ronald Vale, a researcher at the Howard Hughes Medical Institute and the University of California at San Francisco, and Ronald Milligan of the Scripps Research Institute have realized a long-awaited goal by reconstructing the process by which myosin and kinesin move, almost down to the atom. The dynein motor, on the other hand, is still poorly understood. Myosin molecules, best known for their role in muscle contraction, form chains that lie between filaments of another protein called actin. Each myosin molecule has a tiny head that pokes out from the chain like oars from a canoe. Just as rowers propel their boat by stroking their oars through the water, the myosin molecules stick their heads into the actin and hoist themselves forward along the filament. While myosin moves along in short strokes, its cousin kinesin walks steadily along a different type of filament called a microtubule. Instead of using a projecting head as a lever, kinesin walks on two "legs". Based on these differences, researchers used to think that myosin and kinesin were virtually unrelated. But newly discovered similarities in the motors' ATP-processing machinery now suggest that they share a common ancestor - molecule. At this point, scientists can only speculate as to what type of primitive cell-like structure this ancestor occupied as it learned to burn ATP and use the energy to change shape. "We'll never really know, because we can't dig up the remains of ancient proteins, but that was probably a big evolutionary leap", says Vale.

On a slightly larger scale, loner cells like sperm or infectious bacteria are prime movers that resolutely push their way through to other cells. As L. Mahadevan and Paul Matsudaira of the Massachusetts Institute of Technology explain, the engines in this case are springs or ratchets that are clusters of molecules, rather than single proteins like myosin and kinesin. Researchers don't yet fully understand these engines' fueling process or the details of how they move, but the result is a force to be reckoned with. For example, one such engine is a springlike stalk connecting a single-celled organism called a vorticellid to the leaf fragment it calls home. When exposed to calcium, the spring contracts, yanking the vorticellid down at speeds approaching 3 inches (8 centimeters) per second.

Springs like this are coiled bundles of filaments that expand or contract in response to chemical cues. A wave of positively charged calcium ions, for example, neutralizes the negative charges that keep the filaments extended. Some sperm use springlike engines made of actin filaments to shoot out a barb that penetrates the layers that surround an egg. And certain viruses use a similar apparatus to shoot their DNA into the host's cell. Ratchets are also useful for moving whole cells, including some other sperm and pathogens. These engines are filaments that simply grow at one end, attracting chemical building blocks from nearby. Because the other end is anchored in place, the growing end pushes against any barrier that gets in its way.

Both springs and ratchets are made up of small units that each move just slightly, but collectively produce a powerful movement. Ultimately, Mahadevan and Matsudaira hope to better understand just how these particles create an effect that seems to be so much more than the sum of its parts. Might such an understanding provide inspiration for ways to power artificial nano-sized devices in the future? "The short answer is absolutely," says Mahadevan. "Biology has had a lot more time to evolve enormous richness in design for different organisms. Hopefully, studying these structures will not only improve our understanding of the biological world, it will also enable us to copy them, take apart their components and re-create them for other purposes."

64. According to the author, research on the power source of movement in cells can contribute to
- control over the movement of genes within human systems
  - the understanding of nanotechnology
  - arresting the growth of cancer in a human being
  - the development of cures for a variety of diseases

65. The author has used several analogies to illustrate his arguments in the article. Which of the following pairs of words are examples of the analogies used?

(A) Cell activity and vehicular traffic (B) Polymers and tram tracks  
(C) Genes and canoes (D) Vorticellids and ratchets  
(a) A and B (b) B and C (c) A and D (d) A and C

66. Read the five statements below : A, B, C, D and E. From the options given, select the one which includes a statement that is **not** representative of an argument presented in the passage

(A) Sperms use spring like engines made of actin filament  
(B) Myosin and kinesin are unrelated  
(C) Nanotechnology researchers look for ways to power molecule-sized devices  
(D) Motor proteins help muscle contraction  
(E) The dynein motor is still poorly understood  
(a) A, B and C (b) C, D and E (c) A, D and E (d) A, C and D

67. Read the four statements below : A, B, C and D. From the options given, select the one which includes only statement(s) that are representative of arguments presented in the passage.

(A) Protein motors help growth processes  
(B) Improved transport in nerve cells will help arrest tuberculosis and cancer  
(C) Cells, together, generate more power than the sum of power generated by them separately  
(D) Vorticellid and the leaf fragment are connected by a calcium engine  
(a) A & B but not C (b) A & C but not D (c) A & D but not B (d) C & D but not B

68. Read the four statements below : A, B, C & D. From the options given, select the one which include statement(s) that are representative of arguments presented in the passage.

(A) Myosin, kinesin and actin are three types of protein  
(B) Growth processes involve a routine in a cell that duplicates their machinery and pulls the copies apart  
(C) Myosin molecules can generate vibrations in muscles  
(D) Ronald and Mahadevan are researchers at Massachusetts Institute of Technology  
(a) A & B but not C & D (b) B & C but not A (c) B & D but not A & C (d) A, B & C but not D

## PASSAGE - 11

(2003C)

The controversy over genetically-modified food continues unabated in the West. Genetic modification (GM) is the science by which the genetic material of a plant is altered, perhaps to make it more resistant to pests or killer weeds, or to enhance its nutritional value. Many food biotechnologists claim that GM will be a major contribution of science to mankind in the 21st century. On the other hand, large numbers of opponents, mainly in Europe, claim that the benefits of GM are a myth propagated by multinational corporations to increase their profits, that they pose a health hazard, and have therefore called for governments to ban the sale of genetically-modified food.

The anti-GM campaign has been quite effective in Europe, with several European Union member countries imposing a virtual ban for five years over genetically modified food imports. Since the genetically modified food industry is particularly strong in the United States of America, the controversy also constitutes another chapter in the US-Europe skirmishes which have become particularly acerbic after the US invasion of Iraq.

To a large extent, the GM controversy has been ignored in the Indian media, although Indian biotechnologists have been quite active in GM research. Several groups of Indian biotechnologists have been working on various issues connected with crops grown in India. One concrete achievement which has recently figured in the news is that of a team led by the former vice-chancellor of Jawaharlal Nehru University, Asis Datta—it has successfully added an extra gene to potatoes to enhance the protein content of the tuber by at least 30 percent. Not surprisingly, the new potato has been called the protato. The protato is now in its third year of field trials. It is quite likely that the GM controversy will soon hit the headlines in India since a spokesperson of the Indian Central government has recently announced that the government may use the protato in its midday meal programme for school as early as next year.

Why should “scientific progress”, with huge potential benefits to the poor and malnourished, be so controversial. The anti-GM lobby contends that pernicious propaganda has vastly exaggerated the benefits of GM and completely evaded the costs which will have to be incurred if the genetically-modified food industry is allowed to grow unchecked. In particular, they allude to different types of costs.

This group contends that the most important potential cost is that the widespread distribution and growth of genetically-modified food will enable the corporate world (alias the multinational corporations - MNCs) to completely capture the food chain. A "Small" group of biotech companies will patent the transferred genes as well as the technology associated with them. They will then buy up the competing seed merchants and seed-breeding centres, thereby controlling the production of food at every possible level. Independent farmers, big and small, will be completely wiped out of the food industry. At best, they will be reduced to the status of being sub-contractors.

This line of argument goes on to claim that the control of the food chain will be disastrous for the poor since the MNCs guided by the profit motive, will only focus on the high-value food items demanded by the affluent. Thus, in the long run, the production of basic staples which constitute the food basket of the poor will taper off.

However, this vastly overestimates the power of the MNCs. Even if the research promoted by them does focus on the high-value food items, much of biotechnology research is also funded by governments in both developing and developed countries. Indeed, the potato is a by product of this type of research. If the potato passes the field trials, there is no reason to believe that it cannot be marketed in the global potato market. And this type of success story can be repeated with other basic food items.

The second type of cost associated with the genetically modified food industry is environmental damage. The most common type of "genetic engineering" involves gene modification in plants designed to make them resistant to applications of weed-killers. This then enables farmers to use massive dosages of weed-killers so as to destroy or wipe out all competing varieties of plants in their fields. However, some weeds through genetically-modified pollen contamination may acquire resistance to a variety of weedkillers. The only way to destroy these weeds is through the use of ever-stronger herbicides which are poisonous and linger on in the environment.

69. According to the passage, biotechnology research
  - (a) addresses the concerns of rich and poor countries
  - (b) allows multinational corporations to control the food basket of the poor
  - (c) is funded only by multinational corporations
  - (d) is of utility only for high value food items
70. Genetic modification makes plants more resistant to killer weeds. However, this can lead to environment damage by
  - (a) not allowing growth of any weeds, thus reducing soil fertility
  - (b) forcing application of stronger herbicides to keep the competing plants weed-free
  - (c) forcing application of stronger herbicides to kill weeds which have become resistant to weak herbicides
  - (d) wiping out competing varieties of plants which now fall prey to killer weeds
71. Which of the following about the Indian media's coverage of scientific research does the passage seem to suggest?
  - (a) Indian media only highlights scientific research which is funded by the government
  - (b) Indian media, in partnership with the government, is actively involved in publicizing the results of scientific research
  - (c) Indian media's coverage of scientific research is generally dependent on MNCs' interests
  - (d) Indian media generally covers a subject of scientific importance when its mass application is likely
72. The author doubts the anti-GM lobby's contention that MNC control of the food chain will be disastrous for the poor because
  - (a) MNCs will focus on high-value food items
  - (b) MNCs are driven by the motive of profit maximization
  - (c) MNCs are not the only group of actors in genetically modified food research
  - (d) economic development will help the poor buy MNC produced food
73. Using the clues in the passage, which of the following countries would you expect to be in the forefront of the anti-GM campaign
  - (a) USA and Spain
  - (b) India and Iraq
  - (c) Germany and France
  - (d) Australia and New Zealand

## PASSAGE - 12

(2003C)

Modern science, exclusive of geometry, is a comparatively recent creation and can be said to have originated with Galileo and Newton. Galileo was the first scientist to recognize clearly that the only way to further our understanding of the physical world was to resort to experiment. However, obvious Galileo's contention may appear in the light of our present knowledge, it remains a fact that the Greeks, in spite of their proficiency in geometry, never seem to have realized the importance of experiment. To a certain extent this may be attributed to the crudeness of their instruments of measurement. Still, an excuse of this sort can scarcely be put forward when the elementary nature of Galileo's experiments and observations is recalled. Watching a lamp oscillate in the cathedral of Pisa, dropping bodies from the leaning tower of Pisa, rolling balls down inclined planes, noticing the magnifying effect of water in a spherical glass vase, such was the nature of Galileo's experiments and observations. As can be seen, they might just as well have been performed by the Greeks. At any rate, it was thanks to such experiments that Galileo discovered the fundamental law of dynamics, according to which the acceleration imparted to a body is proportional to the force acting upon it.

The next advance was due to Newton, the greatest scientist of all time if account be taken of his joint contributions to mathematics and physics. As a physicist, he was of course an ardent adherent of the empirical method, but his greatest title to fame lies in another direction. Prior to Newton, mathematics, chiefly in the form of geometry, had been studied as a fine art without any view to its physical applications other than in very trivial cases. But with Newton all the resources of mathematics were turned to advantage in the solution of physical problems. Thenceforth mathematics appeared as an instrument of discovery, the most powerful one known to man, multiplying the power of thought just as in the mechanical domain the lever multiplied our physical action. It is this application of mathematics to the solution of physical problems, this combination of two separate fields of investigation, which constitutes the essential characteristic of the Newtonian method. Thus problems of physics were metamorphosed into problem of mathematics.

But in Newton's day the mathematical instrument was still in a very backward state of development. In this field again Newton showed the mark of genius by inventing the integral calculus. As a result of this remarkable discovery, problems, which would have baffled Archimedes, were solved with ease. We know that in Newton's hands this new departure in scientific method led to the discovery of the law of gravitation. But here again the real significance of Newton's achievement lay not so much in the exact quantitative formulation of the law of attraction, as in his having established the presence of law and order at least in one important realm of nature, namely in the motion of heavenly bodies. Nature thus exhibited rationality and was not mere blind chaos and uncertainty. To be sure, Newton's investigations had been concerned with but a small group of natural phenomena, but it appeared unlikely that this mathematical law and order should turn out to be restricted to certain special phenomena; and the feeling was general that all the physical processes of nature would prove to be unfolding themselves according to rigorous mathematical laws.

When Einstein, in 1905, published his celebrated paper on the electrodynamics, together with the negative experiments of Michelson and others, would be obviated if we extended the validity of the Newtonian principle of the relativity of Galilean motion, which applied solely to mechanical phenomena, so as to include all manner of phenomena : electrodynamics, optical etc. When extended in this way the Newtonian principle of relativity became Einstein's special principle of relativity. Its significance lay in its assertion that absolute Galilean motion or absolute velocity must ever escape all experimental detection. Henceforth absolute velocity should be conceived of as physically meaningless, not only in the particular realm of mechanics, as in Newton's day, but in the entire realm of physical phenomena. Einstein's special principle, by adding increased emphasis to this relativity of velocity, making absolute velocity metaphysically meaningless, created a still more profound distinction between velocity and accelerated or rotational motion. This latter type of motion remained absolute and real as before. It is most important to understand this point and to realize that Einstein's special principle is merely an extension of the validity of the classical Newtonian principle to all classes of phenomena.

74. Which of the following statements about modern science best captures the theme of the passage?
  - (a) Modern science rests firmly on the platform built by the Greeks
  - (b) We need to go back to the method of enquiry used by the Greeks to better understand the laws of dynamics
  - (c) Disciplines like Mathematics and physics function best when integrated into one
  - (d) New knowledge about natural phenomena builds on existing knowledge
75. The significant implication of Einstein's special principle of relativity is that
  - (a) absolute velocity was meaningless in the realm of mechanics
  - (b) Newton's principle of relativity needs to be modified
  - (c) there are limits to which experimentation can be used to understand some physical phenomena
  - (d) it is meaningless to try to understand the distinction between velocity and accelerated or rotational motion
76. The statement "Nature thus exhibited rationality and was not mere blind chaos and uncertainty" suggests that
  - (a) problems that had baffled scientists like Archimedes were not really problems
  - (b) only a small group of natural phenomena was chaotic
  - (c) physical phenomena conformed to mathematical laws
  - (d) natural phenomena were evolving towards a less chaotic future
77. Newton may be considered one of the greatest scientists of all time because he
  - (a) discovered the law of gravitation
  - (b) married physics with mathematics
  - (c) invented integral calculus
  - (d) started the use of the empirical method in science
78. According to the author, why did the Greeks NOT conduct experiments to understand the physical world?
  - (a) Apparently they did not think it necessary to experiment
  - (b) They focused exclusively on geometry
  - (c) Their instruments of measurement were very crude
  - (d) The Greeks considered the application of geometry to the physical world more important

## PASSAGE - 13

(2003)

The invention of the gas turbine by Frank Whittle in England and Hans von Ohain in Germany in 1939 signalled the beginning of jet transport. Although the French engineer Lorin had visualized the concept of jet propulsion more than 25 years earlier, it took improved materials and the genius of Whittle and von Ohain to recognize the advantages that a gas turbine offered over a piston engine, including speeds in excess of 350 miles per hour. The progress from the first flight of liquid propellant rocket and jet-propelled aircraft in 1939 to the first faster-than sound (supersonic) manned airplane (the Bell X-1) in 1947 happened in less than a decade. This then led very rapidly to a series of supersonic fighter and bombers, the first of which became operational in the 1950s. World War II technology foundation and emerging Cold War imperatives then led us into space with the launch of sputnik in 1957 and the placing of the first man on the moon only 12 years later - a mere 24 years after the end of World War II.

Now, a hypersonic flight can take you anywhere in the planet in less than four hours. British Royal Air Force and Royal Navy, and the air forces of several other countries are going to use a single engine cousin to the F/A-22 called the F-35 joint Strike fighter. These planes exhibit stealthy angles and coating that make it difficult for radar to detect them, among aviation's most cutting-edge advances in design. The V-22, known as tilt-rotor, part helicopter, part airplane, take off vertically, then tilts its engine forward for winged flight. It provides speed, three times, the payload, five times the range of the helicopters it's meant to replace. The new fighter, F/A-22 Raptor, with more than a million parts, shows a perfect amalgamation of stealth, speed, avionics and agility.

It seems conventional forms, like the predator and Global Hawk are passe, the stealthier unmanned aerial vehicles (UAVs) are in. They are shaped like kites, bits and boomerang, all but invisible to the enemy radar and able to remain over hostile territory without any fear of getting grilled if shot down. Will the UAVs take away pilots' jobs permanently? Can a computer-operated machine take a smarter and faster decision in a war like situation? The new free-flight concept will probably supplement the existing air traffic control system by computers on each plane to map the altitude, route, weather and other planes; and a decade from now, there will be no use of radar any more.

How much bigger can the airplanes get? In the '50s they got speed, in the '80s they became stealthy. Now, they are getting smarter thinks to computer automation. The change is quite huge: from the four-seater to the A380 airplane. It seems we are now trading speed for size as we build a new superjumbo jet, the 555 seater A380, which will fly at almost the same speed of the Boeing 707, introduced half a century ago, but with an improved capacity, range, greater fuel economy. A few years down the line will come the truly larger model, to be known as 747X. In the beginning of 2005, the A380, the world's first fully double-decked superjumbo passenger jet, weighing 1.2 million pounds, may carry a load of about 840 passengers.

Barring the early phase, civil aviation has always lagged behind the military technologies (of jet engines, lightweight composite material etc.). There are two fundamental factors behind the decline in commercial aeronautics in comparison to military aeronautics. There is no collective vision of our future such as the one that drove us in the past. There is also a need for a more aggressive pool of airplane design talents to maintain an industry that continues to find a multibillion dollar a year market for its product.

Can the history of aviation technology tell us something about the future of aeronautics? Have we reached a final state in our evolution to a mature technology in aeronautics? Are the challenges of coming out with the 'better, cheaper, faster' designs somehow inferior to those that are suited for 'faster, higher, further'? Safety should improve greatly as a result of the forthcoming improvements in airframes, engines, and avionics. Sixty years from now, aircraft will recover on their own if the pilot loses control. Satellites are the key not only to GPS (global positioning system) navigation but also to in flight communications, uplinked weather, and even in flight e-mail. Although there is some debate about what type of engines will power future airplanes- lightweight turbines, turbocharged diesels, or both-there is little debate about how these power plants will be controlled. Pilots of the future can look forward to more and better on board safety equipment.

79. According to the first paragraph of the passage, which of the following statements is NOT false?
  - (a) Frank Whittle and hans von Ohain were the first to conceive of jet propulsion
  - (b) Supersonic fighter planes were first used in the Second World War
  - (c) No man had traveled faster than sound until the 1950s
  - (d) The exploitation of jet propulsion for supersonic aviation has been remarkably fast
80. What is the fourth paragraph of the passage, starting, "How much bigger .....," about?
  - (a) Stealth, speed, avionics and agility of new aircraft
  - (b) The way aircraft size has been growing
  - (c) Use of computer automation in aircraft
  - (d) Super-jumbo jets that can take more than 500 passengers
81. What is the most noteworthy difference between V-22 and a standard airplane?
  - (a) It can take off vertically
  - (b) It has winged flight
  - (c) It has excellent payload
  - (d) Its range is very high

82. Why might radars not be used a decade from now?
- Stealth technology will advance so much that it is pointless to use radar to detect aircraft
  - UAVs can remain over hostile territory without any danger of being detected
  - Computers on board may enable aircraft to manage safe navigation on their own
  - It is not feasible to increase the range of radars
83. According to the author, commercial aeronautics, in contrast to military aeronautics, has declined because, among other things,
- speed and technology barriers are more easily overcome in military aeronautics
  - the collective vision of the past continues to drive civil and commercial aeronautics
  - though the industry has a huge market, it has not attracted the right kind of aircraft designers
  - there is a shortage of materials, like light weight composites, used in commercial aeronautics

## PASSAGE - 14

(2004)

Recently I spent several hours sitting under a tree in my garden with the social anthropologist William Ury, a Harvard University professor who specializes in the art of negotiation and wrote the bestselling book, *Getting to Yes*. He captivated me with his theory that tribalism protects people from their fear of rapid change. He explained that the pillars of tribalism that humans rely on for security would always counter any significant cultural or social change. In this way, he said, change is never allowed to happen too fast. Technology, for example, is a pillar of society. Ury believes that every time technology moves in a new or radical direction, another pillar such as religion or nationalism will grow stronger - in effect, the traditional and familiar will assume greater importance to compensate for the new and untested. In this manner, human tribes avoid rapid change that leaves people insecure and frightened.

But we have all heard that nothing is as permanent as change. Nothing is guaranteed. Pithy expressions, to be sure, but no more than clichés. As Ury says, people don't live that way from day-to-day. On the contrary, they actively seek certainty and stability. They want to know they will be safe.

Even so, we scare ourselves constantly with the idea of change. An IBM CEO once said: 'We only re-structure for a good reason, and if we haven't re-structured in a while, that's a good reason.' We are scared that competitors, technology and the consumer will put out of business – so we have to change all the time just to stay alive. But if we asked our fathers and grandfathers, would they have said that they lived in a period of little change? Structure may not have changed much. It may just be the speed with which we do things.

Change is over-rated, anyway. Consider the automobile. It's an especially valuable example, because the auto industry has spent tens of billions of dollars on research and product development in the last 100 years. Henry Ford's first car had a metal chassis with an internal combustion, gasoline-powered engine, four wheels with rubber tyres, a foot operated clutch assembly and brake system, a steering wheel, and four seats, and it could safely do 18 miles per hour. A hundred years and tens of thousands of research hours later, we drive cars with a metal chassis with an internal combustion, gasoline-powered engine, four wheels with rubber tyres, a foot operated clutch assembly and brake system, a steering wheel, four seats – and the average speed in London in 2001 was 17.5 miles per hour!

That's not a hell of a lot of return for the money. For evidently doesn't have much to teach us about change. The fact that they're still manufacturing cars is not proof that Ford Motor Co. is a sound organization, just proof that it takes very large companies to make cars in great quantities – makes for an almost impregnable entry barrier.

Fifty years after the development of the jet engine, planes are also little changed. They've grown bigger, wider and can carry more people. But those are incremental, largely cosmetic changes.

Taken together, this lack of real change has come to mean that in travel – whether driving or flying – time and technology have not combined to make things much better. The safety and design have of course accompanied the times and the new volume of cars and flights, but nothing of any significance has changed in the basic assumptions of the final product.

At the same time, moving around in cars or aeroplanes becomes less and less efficient all the time. Not only has there been no great change, but also both forms of transport have deteriorated as more people clamour to use them. The same is true for telephones, which took over hundred years to become mobile, or photographic film, which also required an entire century to change.

The only explanation for this is anthropological. Once established in calcified organizations, humans do two things: sabotage changes that might render people dispensable, and ensure industry-wide emulation. In the 1960s, German auto companies developed plans to scrap the entire combustion engine for an electrical design (the same existed in the 1970s in Japan, and in the 1980s in France). So for 40 years we might have been free of the wasteful and ludicrous dependence on fossil fuels. Why didn't it go anywhere? Because auto executives understood pistons and carburetors and would be loath to cannibalize their expertise, along with most of their factories.

84. According to the passage, which of the following statements is true?
- Executives of automobile companies are inefficient and ludicrous.
  - The speed at which an automobile is driven in a city has not changed much in a century.
  - Anthropological factors have fostered innovation in automobiles by promoting use of new technologies.
  - Further innovation in jet engines has been more than incremental.
85. Which of the following views does the author fully support in the passage?
- Nothing is as permanent as change.
  - Change is always rapid.
  - More money spent on innovation leads to more rapid change.
  - Over decades, structural changes has been incremental.
86. Which of the following best describes one of the main ideas discussed in the passage?
- Rapid change is usually welcomed in society.
  - Industry is not as innovative as it is made out to be.
  - we should have less change than what we have now.
  - Competition spurs companies into radical innovation.
87. According to the passage, the reason why we continued to be dependent on fossil fuels is that:
- Auto executives did not wish to change.
  - No alternative fuels were discovered.
  - Change in technology was not easily possible.
  - German, Japanese and French companies could not come up with new technologies.

## PASSAGE - 15

(2004)

Throughout human history the leading causes of death have been infection and trauma. Modern medicine has scored significant victories against both, and the major causes of ill health are now the chronic degenerative diseases, such as coronary artery disease, arthritis, osteoporosis, Alzheimer's, macular degeneration, cataract and cancer. These have a long latency period before symptoms appear and a diagnosis is made. It follows that the majority of apparently healthy people are pre-ill.

But are these conditions inevitably degenerative? A truly preventive medicine that focused on the pre-ill, analysing the metabolic errors which lead to clinical illness, might be able to correct them before the first symptom. Genetic risk factors are known for all the chronic degenerative diseases, and are important to the individuals who possess them. At the population level, however, migration studies confirm that these illnesses are linked for the most part to lifestyle factors --- exercise, smoking and nutrition. Nutrition is the easiest of these to change, and the most versatile tool for affecting the metabolic changes needed to tilt the balance away from disease.

Many national surveys reveal that malnutrition is common in developed countries. This is not the calorie and/or micronutrient deficiency associated with developing nations (Type A malnutrition); but multiple micronutrient depletion, usually combined with calorific balance or excess (Type B malnutrition). The incidence and severity of Type B malnutrition will be shown to be worse if newer micronutrient groups such as the essential fatty acids, xanthophylls and flavonoids are included in the surveys. Commonly ingested levels of these micronutrients seem to be far too low in many developed countries.

There is now considerable evidence that Type B malnutrition is a major cause of Chronic degenerative diseases. If this is the case, then it is logical to treat such diseases not with drugs but with multiple micronutrient repletion, or pharmaco-nutrition'. This can take the form of pills and capsules --- 'nutraceuticals', or food formats known as 'functional foods'. This approach has been neglected hitherto because it is relatively unprofitable for drug companies --- the products are hard to patent --- and it is a strategy which does not sit easily with modern medical interventionism. Over the last 100 years, the drug industry has invested huge sums in developing a range of subtle and powerful drugs to treat the many diseases we are subject to. Medical training is couched in pharmaceutical terms and this approach has provided us with an exceptional range of therapeutic tools in the treatment of disease and in acute medical emergencies. However, the pharmaceutical model has also created an unhealthy dependency culture, in which relatively few of us accept responsibility for maintaining our own health. Instead, we have handed over this responsibility to health professionals who know very little about health maintenance, or disease prevention.

One problem for supporters of this argument is lack of the right kind of hard evidence. We have a wealth of epidemiological data linking disease risks, and a great deal of information on mechanism: how food factors interact with our biochemistry. But almost all international studies with micronutrients, with the notable exception of the omega 3 fatty acids, have so far produced conflicting or negative results. In other words, our science appears to have no predictive value. Does this invalidate the science? Or are we simply asking the wrong questions?

Based on pharmaceutical thinking, most intervention studies have attempted to measure the impact of a single micronutrient on the incidence of disease. The classical approach says that if you give a compound formula to test subjects and obtain positive results, you cannot know which ingredient is exerting the benefit, so you must test each ingredient individually. But in the field of nutrition, this does not work. Each intervention on its own will hardly make enough difference to be measured. The best therapeutic response must therefore combine micronutrients to normalise our internal physiology. So do we need to analyse each individual's nutritional status and then tailor a formula specifically for him or her? While we do not have the resources to analyse millions of individual cases, there is no need to do so. The vast majority of people are consuming suboptimal amounts of most micronutrients, and most of the micronutrients concerned are very safe. Accordingly, a comprehensive and universal program of micronutrient support is probably the most cost-effective and safest way of improving the general health of the nation.

88. Type-B malnutrition is a serious concern in developed countries because
  - (a) developing countries mainly suffer from Type-A malnutrition.
  - (b) it is a major contributor to illness and death.
  - (c) pharmaceutical companies are not producing drugs to treat this condition.
  - (d) national surveys on malnutrition do not include micronutrient groups.
89. Why are a large number of apparently healthy people deemed pre-ill?
  - (a) They may have chronic degenerative diseases.
  - (b) They do not know their own genetic risk-factors which predispose them to diseases.
  - (c) They suffer from Type-B malnutrition.
  - (d) There is a lengthy latency period associated with chronically degenerative diseases.
90. The author recommends micronutrient-repletion for large-scale treatment of chronic degenerative disease because
  - (a) it is relatively easy to manage.
  - (b) micronutrient deficiency is the cause of these diseases.
  - (c) it can overcome genetic risk factors.
  - (d) it can compensate for other lifestyle factors.
91. Tailoring micronutrient-based treatment plans to suit individual deficiency profiles is not necessary because
  - (a) it is very likely to give inconsistent or negative results.
  - (b) it is a classic pharmaceutical approach not suited to micronutrients.
  - (c) most people are consuming suboptimal amounts of safe-to-consume micronutrients.
  - (d) it is not cost effective to do so.

## PASSAGE - 16

(2004)

Fifty feet away three male lions lay by the road. They didn't appear to have a hair on their heads. Noting the color of their noses (leonine noses darken as they age, from pink to black), Craig estimated that they were six years old—young adults. "This is wonderful!" he said, after staring at them for several moments. "This is what we came to see. They really are maneless." Craig, a professor at the University of Minnesota is arguably the leading expert on the majestic Serengeti lion, whose head is mantled in long, thick hair. Hair and Peyton West, a doctoral student who has been working with him in Tanzania, had never seen the Tsavo lions that live some 200 miles east of the Serengeti. This scientists had partly suspected that the maneless males were adolescents mistaken for adults by amateur observers. Now they knew better.

The Tsavo research expedition was mostly Peyton's show. She had spent several years in Tanzania, compiling the data she needed to answer a question that ought to have been answered long ago: why do lions have manes? It's the only cat, wild or domestic that displays such ornamentation. In Tsavo she was attacking the riddle from the opposite angle. Why do its lions not have manes? (Some "maneless" lions in Tsavo East do have partial manes, but they rarely attain the regal glory of the Serengeti lions'.) Does environmental adaptation account for the trait? Are the lions of Tsavo, as some people believe, a distinct subspecies of their Serengeti cousins?

The Serengeti lions have been under continuous observation for more than 35 years, beginning with George Schaller's pioneering work in the 1960s. But the lions in Tsavo, Kenya's oldest and largest protected ecosystem, have hardly been studied. Consequently, legends have grown up around them. Not only do they look different, according to the myths, they *behave* differently, displaying greater cunning and aggressiveness. "Remember too," *Kenya: The Rough Guide* warns, "Tsavo's lions have a reputation of ferocity." Their fearsome image became well-known in 1898, when two males stalled construction of what is now Kenya Railways by allegedly killing and eating 135 Indian and African laborers. A British Army officer in charge of building a railroad bridge over the Tsavo River, Lt. Col. J. H. Patterson, spent nine months pursuing the pair before he brought them to bay and killed them. Stuffed and mounted, they now glare at visitors to the Fields Museum in Chicago. Patterson's account of the lionine, *The Man-Eaters of Tsavo*, was an international best-seller when published in 1907. Still in print, the book has made Tsavo's lions notorious. That annoys some scientists. "People

don't want to give up on mythology," Dennis King told me one day. The zoologist has been working in Tsavo off and on for four years. "I am so sick of this man-eater business. Patterson made a helluva lot of money off that story, but Tsavo's lions are no more likely to turn man-eater than lions from elsewhere."

But tales of their savagery and wiliness don't all come from sensationalist authors looking to make a buck. Tsavo lions are generally larger than lions elsewhere, enabling them to take down the predominant prey animal in Tsavo, the Cape buffalo, one of the strongest, most aggressive animals of Earth. The buffalo don't give up easily: They often kill or severely injure an attacking lion, and a wounded lion might be more likely to turn to cattle and humans for food.

And other prey is less abundant in Tsavo than in other traditional lion haunts. A hungry lion is more likely to attack humans. Safari guides and Kenya Wildlife Service rangers tell of lions attacking Land Rovers, raiding camps, stalking tourists. Tsavo is a tough neighborhood, they say, and it breeds tougher lions.

But are they really tougher? And if so, is there any connection between their manelessness and their ferocity? An intriguing hypothesis was advanced two years ago by Gnoske and Peterhans: Tsavo lions may be similar to the unmanned cave lions of the Pleistocene. The serengeti variety is among the most evolved of the species—the latest model, so to speak—while certain morphological differences in Tsavo lions (bigger bodies, smaller skulls, and maybe even lack of a mane) suggest that they are closer to the primitive ancestor of all lions. Craig and Peyton had serious doubts about this idea, but admitted that Tsavo lions pose a mystery to science.

92. The book *Man-Eaters of Tsavo* annoys some scientists because
- It revealed that Tsavo lions are ferocious.
  - Patterson made a helluva lot of money from the blood by sensationalism.
  - it perpetuated the bad name Tsavo lions had.
  - it narrated how two male Tsavo lions were killed.
93. According to the passage, which of the following has NOT contributed to the popular image of Tsavo lions as savage creatures?
- Tsavo lions have been observed to bring down one of the strongest and most aggressive animal—the Cape buffalo.
  - In contrast to the situation in traditional lion haunts, scarcity of non-buffalo prey in the Tsavo makes the Tsavo lions more aggressive.
  - The Tsavo lion is considered to be less evolved than the Serengeti variety.
  - Tsavo lions have been observed to attack vehicles as well as humans.
94. The sentence which concludes the first paragraph, "Now they knew better", implies that :
- The two scientists were struck by wonder on seeing maneless lions for the first time.
  - Though Craig was an expert on the Serengeti lion, now he also knew about the Tsavo lions.
  - Earlier, Craig and West thought that amateur observers had been mistaken.
  - Craig was now able to confirm that darkening of the noses as lions aged applied to Tsavo lions as well.
95. Which of the following, if true, would weaken the hypothesis advanced by Gnoske and Peterhans most?
- Craig and Peyton develop even more serious doubts about the idea that Tsavo lions are primitive.
  - The maneless Tsavo East lions are shown to be closer to the cave lions.
  - Pleistocene cave lions are shown to be far less violent than believed.
  - The morphological variations in body and skull size between the cave and Tsavo lions are found to be insignificant.

## PASSAGE - 17

(2007)

**Directions for Questions 95 to 98 :** The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

To discover the relation between rules, paradigms, and normal science, consider first how the historian isolates the particular loci of commitment that have been described as accepted rules. Close historical investigation of a given specialty at a given time discloses a set of recurrent and quasi-standard illustrations of various theories in their conceptual, observational, and instrumental applications. These are the community's paradigms, revealed in its textbooks, lectures, and laboratory exercises. By studying them and by practicing with them, the members of the corresponding community learn their trade. The historian, of course, will discover in addition a penumbral area occupied by achievements whose status is still in doubt, but the core of solved problems and techniques will usually be clear. Despite occasional ambiguities, the paradigms of a mature scientific community can be determined with relative ease.

That demands a second step and one of a somewhat different kind. When undertaking it, the historian must compare the community's paradigms with each other and with its current research reports. In doing so, his object is to discover what isolable elements, explicit or implicit, the members of that community may have abstracted from their more global paradigms and deploy it as rules in their research. Anyone who has attempted to describe or analyze the evolution of a particular scientific tradition will necessarily

have sought accepted principles and rules of this sort. Almost certainly, he will have met with at least partial success. But, if his experience has been at all like my own, he will have found the search for rules both more difficult and less satisfying than the search for paradigms. Some of the generalizations he employs to describe the community's shared beliefs will present more problems. Others, however, will seem a shade too strong. Phrased in just that way, or in any other way he can imagine, they would almost certainly have been rejected by some members of the group he studies. Nevertheless, if the coherence of the research tradition is to be understood in terms of rules, some specification of common ground in the corresponding area is needed. As a result, the search for a body of rules competent to constitute a given normal research tradition becomes a source of continual and deep frustration.

Recognizing that frustration, however, makes it possible to diagnose its source. Scientists can agree that a Newton, Lavoisier, Maxwell, or Einstein has produced an apparently permanent solution to a group of outstanding problems and still disagree, sometimes without being aware of it, about the particular abstract characteristics that make those solutions permanent. They can, that is, agree in their identification of a paradigm without agreeing on, or even attempting to produce, a full interpretation or rationalization of it. Lack of a standard interpretation or of an agreed reduction to rules will not prevent a paradigm from guiding research. Normal science can be determined in part by the direct inspection of paradigms, a process that is often aided by but does not depend upon the formulation of rules and assumption. Indeed, the existence of a paradigm need not even imply that any full set of rules exists.

96. What is the author attempting to illustrate through this passage?
  - (a) Relationships between rules, paradigms, and normal science
  - (b) How a historian would isolate a particular 'loci of commitment'
  - (c) How a set of shared beliefs evolves into a paradigm
  - (d) Ways of understanding a scientific tradition
  - (e) The frustrations of attempting to define a paradigm of a tradition
97. The term 'loci of commitment' as used in the passage would most likely correspond with which of the following?
  - (a) Loyalty between a group of scientists in a research laboratory
  - (b) Loyalty between groups of scientists across research laboratories
  - (c) Loyalty to a certain paradigm of scientific inquiry
  - (d) Loyalty to global patterns of scientific inquiry
  - (e) Loyalty to evolving trends of scientific inquiry
98. The author of this passage is likely to agree with which of the following?
  - (a) Paradigms almost entirely define a scientific tradition.
  - (b) A group of scientists investigating a phenomenon would benefit by defining a set of rules.
  - (c) Acceptance by the giants of a tradition is a sine qua non for a paradigm to emerge.
  - (d) Choice of isolation mechanism determines the type of paradigm that may emerge from a tradition.
  - (e) Paradigms are a general representation of rules and beliefs of a scientific tradition.

## ANSWERS WITH SOLUTIONS

### PASSAGE - 1

1. (d) Option (d) is the best choice, as is evident from the passage.
2. (c) (c) is the correct choice, as it can be inferred from paragraph two.
3. (d) (d) is the correct option, as this is not given in the passage.
4. (d) Option (d) is the correct choice, as it killed the ants and mentioned in paragraph three.
5. (a) Option (a) is the best choice, as the author has cleverly built up the passage.

### PASSAGE - 2

6. (b) (b) is the correct option, as is given in paragraph two.
7. (d) (d) is the correct option, as (a), (b) and (c) only are mentioned in the passage.
8. (d) (d) is the correct choice, as given in paragraph three.
9. (d) (d) is the correct option, as mentioned in paragraph four.
10. (c) (c) is correct answer, as is mentioned in paragraph four.
11. (b) (b) is the correct option, as can be inferred from fourth paragraph.
12. (c) Option (c) is correct, as it can be seen in the last sentence of second paragraph.

### PASSAGE - 3

13. (a) (a) is the correct option, it can be inferred from the language used by the author.
14. (c) (c) is the correct option, as the vehicles mentioned are A car, A jeep and Snow Plough.
15. (b) (b) is the correct choice, as the Mississippi flowed northwards due to an earthquake.
16. (c) (c) is the correct option, as it can be seen in paragraph five.
17. (b) (b) is the correct choice, as it can be given in paragraph seven.
18. (b) (b) is the best option, as it can be found in the eighth paragraph.
19. (b) Option (b) is the correct choice, as weather is not manipulable as can be inferred from paragraph seven.
20. (a) (a) is the correct option, as he is watching the weather channel in his house.
21. (d) (d) is the correct choice, as it can be inferred from the passage.

### PASSAGE - 4

22. (c) (c) is the correct option, as is given in the first paragraph.
23. (b) (b) is the correct choice, as is given in first paragraph. Where author says that he does not find any sign of revolution.
24. (a) (a) is the correct option, as author in second paragraph says that except for fanatics practically all have rejected the code.

25. (b) (b) is the best choice, as it can be inferred from second paragraph.
26. (c) (c) is the correct option, as is given in paragraph three, and refers to welfare of community.

### PASSAGE - 5

27. (a) (a) is the correct option, as it is a proven fact.
28. (d) (d) is the correct choice, as all the three other given have a nuclei.
29. (b) (b) is the correct option, as it can be inferred from second paragraph.
30. (c) (c) is the correct choice, as it is given in second paragraph, which says that there is prevalence of uninucleate cells.
31. (b) (b) is the correct answer, and it is given in paragraph two.
32. (c) (c) is the correct option, as it can be inferred from third paragraph.
33. (d) (d) is the correct choice, as it has not been mentioned in the passage.

### PASSAGE - 6

34. (c) (c) is the correct option, as it can be inferred from paragraph two.
35. (b) (b) is the best choice, as it is given in paragraph two.
36. (b) (b) is the correct choice, as it can be inferred from third paragraph.
37. (c) (c) is the correct option, as both (a) and (b) are correct and given in paragraph four.
38. (b) (b) is the best option, as it can be inferred from paragraph four.
39. (c) (c) is the correct option, as it is clearly given in the second last sentence of sixth paragraph.
40. (b) (b) is the correct option, as it can be inferred from paragraph eighth.
41. (a) (a) is the correct option, as it is given in the ninth paragraph.
42. (b) (b) is the correct option, as it can be inferred from fifth paragraph.
43. (d) (d) is the correct option, as it can be directly inferred from first line of last paragraph.

### PASSAGE - 7

44. (b) (b) is the correct option, as option (a) mentioned in second line of first paragraph and (c) & (d) are mentioned in first and second lines of second paragraph.
45. (a) (a) is the best choice, as it can be inferred from second line of fifth paragraph.
46. (c) (c) is the correct choice, as it is given in first three lines of fourth paragraph.
47. (d) (d) is the correct option, as it can be inferred from last lines (implied) of second paragraph.

48. (a) (a) is the correct option, as it is given in tenth line (reduced biodiversities) of second paragraph.
49. (c) (c) is the correct option as it can directly inferred from last four lines of first paragraph.
50. (d) (d) is the correct choice, as rest of the choice are given in paragraph three.
51. (b) (b) is the correct option, as it can be inferred from third and fourth paragraphs.

**PASSAGE - 8**

52. (b) (b) is the correct choice, as it can be inferred from third (last 4 lines) and sixth paragraph (first line).
53. (c) The answer can be found from the fifth paragraph, 4th line.
54. (a) The answer to this question is clearly given in the seventh paragraph, 2nd line.
55. (c) The answer can be found from the eighth paragraph, 2nd line, "According to Paulo ..... with electronic memory".
56. (d) The answer can be found from the seventh paragraph, last sentence, "So, by measuring ..... storing a zero or a one".
57. (d) Paragraph 9, 2nd line, clearly reads that Russell Cowburn and Mark Welland of Cambridge University pursued the mentioned research.
58. (b) It is evident from the Para 9, last 4 lines, "Individual bits of ..... along the chain".
59. (a) As the opening line of the paragraph says, In a modern computer, ..... but volatile". This clearly shows that Electronic memory chips are fast but volatile. Hence (a) is the correct option.

**PASSAGE - 9**

60. (b) Para 2, lines 1 & 2 clearly refers Dark Age to a period about which astronomers know a little.
61. (b) (b) is the correct option, as it can be inferred from the fourth para first four lines.
62. (a) Para 5, first 3 lines clearly says that the four quasars were terribly faint and could only be seen with the help of large telescopes.
63. (b) (b) is the correct option, as it can be inferred from the sixth paragraph, first four lines.

**PASSAGE - 10**

64. (d) The answer can be found from the fourth and seventh paragraph.
65. (a) The First paragraph clearly states, "The inside of a cell ..... moving parts need engines". This can be easily related to the analogy A. Further it is found that B is used in the second para, 3rd line, " The movements ..... travel like trams".
66. (a) Choices (A), (B) and (C) are the ones which do not represent arguments given in the passage. Hence (a) is the correct option.
67. (b) A is clearly true as is mentioned in para 3, first line and C is true as can be seen in para 7. Further D is clearly wrong, as can be found from the last line of para 5 that the engine joining vorticellid to the leaf fragment is not a calcium engine.

68. (a) A can be seen in paragraph 3 of the passage. B has a clear mention in para 3, first line. C is wrong as it has a mention in para 4, line 3, which says, Myosin has a role in muscle contraction and not vibrations. D is wrong as it is Matsudaira and Ronald from MIT, as mentioned in para 5.

**PASSAGE - 11**

69. (a) (a) is the correct option as it evidently clear from the passage.
70. (c) (c) can only be the correct option as discussed in the last para, last two lines, " However, some weeds ..... linger on in the environment".
71. (d) (d) is the correct option as can be inferred from para 3.
72. (c) (c) is the correct option as can be inferred from para 6.
73. (c) Germany and France are the correct choices as can be inferred from para 1. Germany and France both are members of European Union.

**PASSAGE - 12**

74. (c) (c) is the correct option as can be inferred from the passage and from para2, last line.
75. (a) Para 4, lines 4 and 5 clearly states option (a) as correct.
76. (c) The given statement is mentioned in para 3, line 4. In the light of the passage, (c) is the most appropriate option.
77. (b) Para 1, line 1 states that, "The next advance ..... Mathematics and Physics". Hence option (b) is the correct answer.
78. (a) (a) is the correct option as is clear from paragraph 1, lines 3 & 4 which says, "However obvious Galileo's ..... the importance of experiment".

**PASSAGE - 13**

79. (d) (a), (b) and (c) does not find a mention in the passage and hence are false.
80. (b) Out of the four options provided, (b) seem to be the most appropriate as is clear from the 2nd and 3rd line of the fourth para.
81. (a) (a) is the correct option as is clear from paragraph 2, line 4 which says, "The V-22, ..... winged flight".
82. (c) (c) is the correct option as is clear from paragraph 3, last 3 lines which says, "The new free flight ..... radar any more".
83. (c) (c) is the correct option as is clear from paragraph 5, lines 3 & 4 which says, "There is also a need for ..... market for its products".

**PASSAGE - 14**

84. (b) The answer can be inferred from the 4th paragraph which clears that the speed hasn't charged much. Henry Ford's first car did 18 miles per hour and in 2001 the average speed in London was 17.5 miles per hour as stated in the last line of the fourth paragraph.
85. (d) The answer can be inferred from the two lines in the 6th paragraph - "fifty years after...largely cosmetic changes." It clears that structural changes have been incremental.

86. (b) The answer can be inferred from the 4th and 6th paragraphs, where the author says that even after “a hundred years and tens of thousands of research hours later” little has changed in the auto industry and also changes in the aviation industry are incremental and largely cosmetic.
87. (a) The answer can be inferred from the last paragraph – “in the 1960s, the German auto companies..... their expertise, along with most of their factories”. It clears that the auto executives did not wish to change.

**PASSAGE - 15**

88. (b) The answer is (b). The first paragraph states that several degenerative diseases, contribute to ill-health and death. Further, paragraph 4, 1st line states that Type B malnutrition is a major cause of these diseases. Hence the answer.
89. (d) The answer is clear from the 2nd last line 1st paragraph – “these have a long latency period... people are pre-ill.”
90. (b) The answer can be inferred from the 2nd paragraph 2nd last line – “nutrition is the easiest of these... balance away from disease.”
91. (c) The answer can inferred from the last paragraph 3rd last line – “the vast majority of people.... concerned very safe.”

**PASSAGE - 16**

92. (c) The answer is clear from paragraph 3 last 4 lines which clearly depicts the wrong image of Tsavo lions as notorious.
93. (c) Other than (c) all the rest options contribute to the image of the Tsavo being ferocious as they are stated in the passage. Option (a) and (b) are present in the fourth paragraph of the passage. Option (d) is clearly stated in the fifth paragraph.

94. (c) The answer is clear from para 1, which clears that the scientists thought that amateurs had been mistaken about the age of lions.
95. (c) Gnoske and Peterhans says that Tsavo lions may be similar to the unmanned cave lions of the Pleistocene. Then the 5th line 3rd paragraph says that Tsavo lions have a reputation of ferocity. So logically the unmanned cave lions of the Pleistocene are ferocious. But option (c) says that the unmanned cave lions of the Pleistocene are shown to be far less violent than believed therefore weakening the assumption.

**PASSAGE - 17**

96. (a) First line of first paragraph clearly denotes that author is attempting to discover the relationship between rules, paradigms and normal science. He further continues with this search throughout the passage. Option (a) also states this. So the correct answer is option (a).
97. (c) In the second line of first paragraph, author has mentioned the phrase 'loci of commitment'. Second and last line of the passage gives the clue that according to author the term 'loci of commitment' refers to the loyalty to a certain paradigm of scientific inquiry. Hence, correct answer is option (c).
98. (e) Options (a), (b) and (c) negate the author. Paradigms help in defining a scientific tradition rather than almost entirely defining them hence option 1 is incorrect. Referring to last paragraph of the passage, options (b) and (c) are negated. Option (d) cannot be inferred from the passage, hence incorrect. Referring to third last line of last paragraph, option (e) can be inferred. Here, author states that normal science can be determined in part by direct inspection of paradigms which in turn is aided by rules, formulation of rules and beliefs. Hence, correct answer is option (e).

# 24

CHAPTER

## READING COMPREHENSION Based on HUMANITIES

**Directions for Questions 1 to 158 :** This Section contains passages followed by questions based upon the contents of the passages. Read the passages and select the best option for the answers.

### PASSAGE - 1

(1994)

An urgent problem is now threatening libraries throughout the world. Their collections, which are crucial for diverse purposes as economic development, educational research and recreational pursuits, are in danger of disintegrating.

The problem is mainly due to one cause -- the type of paper on which books have been printed for the past one and a half centuries. Until the 1850s, paper was produced from linen or cotton rags and proved to be relatively long-lasting. In the mid-19th century, however, the popular demand for paper and the commercial need for an economic method of production led to the use of mechanically ground wood pulp. Paper manufactured from wood pulp is highly acidic and therefore inherently unstable. It contains lignin - a major factor in causing paper to discolour and disintegrate. The useful lifespan of most 20th-century book papers has been estimated to be no more than a few decades.

Libraries comprise an important part of the market for printed books and they are increasingly aware of the fragility of this material. The extent of the deterioration of library collections is alarming. Surveys conducted at various major institutions reveal that 26% to 40% of the books they hold are seriously embrittled and thus unavailable for normal use.

Programmes are now being developed with two main aims in mind - on the one hand, to improve the physical condition of library collections, especially by the process called 'mass de-acidification' (which is designed to eliminate acid from the paper of published books and insert a buffer compound that will provide protection against future acid attack from the environment); and on the other, to transfer the contents of existing books to another medium (such as microfilm or optical disk).

Libraries will only be able to carry out these special tasks with the assistance of other experts such as book conservators and high-technology specialists. But here is another group with whom librarians have traditionally enjoyed strong affinities and whose co-operation will be crucial if the problem of decaying collections is to be arrested -- namely, the printing and publishing industries. The existing problem -- that of book collections already assembled in libraries -- is of vast proportions, but it is intensified by the continuing use of acid-based paper in book publishing. The key issue is how to preserve the books of the future, not simply those of the past.

If the future dimensions of the conservation problem are to be curbed, there will need to be widespread adoption of paper which is of archival quality.

This change does not relate to a narrowly perceived need because the long-term preservation of library collections is important -- both for the social benefits they bring as well as for the special advantages they bestow on the printing and publishing industries.

In the first place, libraries are of critical importance to the future well-being of citizens since they provide the knowledge base of society. They contain the record of humanity - the accumulation of ideas and insights and discoveries on which social effort and progress are possible. The destruction of libraries would represent an immense 'cultural loss, a form of amnesia which would affect every member of society.

In the second place, printers and publishers have an economic interest in turning to paper or archival quality. So long as the libraries are acquiring books with a short lifespan they will be forced to devote an increasing share of their budgets to conservation. These budgets are severely strained by the combined impact of inflation and currency devaluation, and there is scarcely any prospect of enlarged government funding. As a result, libraries will be compelled to balance the preservation of their collections against the expansion of those collections. In short, the choice will be between conservation and acquisition -- and the funds for conservation are likely to come from acquisition budgets. This unpalatable choice will damage both libraries and the printing and publishing industries and can only be minimized in its effects by a bold decision to convert to use of permanent paper.

1. The tone of the passage is one of
  - (a) informed concern
  - (b) destructive criticism
  - (c) derisive ridicule
  - (d) helpless alarm
2. The phrase 'archival quality' implies
  - (a) a smooth paper
  - (b) thick paper
  - (c) long-lasting paper
  - (d) alkaline paper

3. Wood-pulp as raw material for paper was developed because of  
 (a) the need to produce large quantities of paper      (b) the shortage of linen  
 (c) the need to develop non-acidic paper      (d) scientific research
4. If paper has to last long  
 (a) it should be made of cotton rags      (b) it should be non-acidic  
 (c) it should be alkaline      (d) preservatives must be used
5. One of the reasons not mentioned in the passage in favour of producing long-lasting paper is  
 (a) it will help preserve the knowledge-base of society  
 (b) it will enable more books to be bought by libraries  
 (c) it will lead to more governmental allocation to libraries  
 (d) it will help the publishing industry
6. Purchase of new books by libraries are bound to be curtailed because of all the following reasons except  
 (a) drastic reduction in governmental funding      (b) the need for spending more money for conservation of old books  
 (c) the need for microfilm books      (d) inflationary trends
7. Continued use of wood-pulp paper in book will affect  
 I. Libraries      II. General public      III. The publishing industry      IV. The Governments  
 (a) I and III only      (b) II and III only      (c) I, II, III and IV      (d) I, II, and III only
8. The substance which causes paper to discolour is  
 (a) acid      (b) linen      (c) lignin      (d) preservatives

## PASSAGE - 2

(1995)

What ever philosophy may be, it is in the world and must relate to it. It breaks through the shell of the world in order to move into the infinite. But it turns back in order to find in the finite its always unique historical foundation. It pushes into the eternal. But even the profoundest meditation acquires its meaning by relating back to man's existence here and now. Philosophy glimpses the highest criteria, the starry heaven of the possible, and seeks in the light of seemingly impossible the way to man's dignity in the phenomenon of his empirical existence. Philosophy addresses itself to individuals. It creates a free community of those who rely on each other in their will for truth. Into this community the philosophic man would like to enter. It is there in the world at any time, but cannot become a wordly institution without losing freedom of its truth. He cannot know whether he belongs to it. No authority acceptance possible. But how does the world relate to philosophy? There are chairs of philosophy at the universities. Nowadays they are an embarrassment. Philosophy is politely respected because of tradition, but despised in secret. The general opinion is: it has nothing of importance to say. Neither has it any practical value. It is named in public but does it really exist? Its existence is proved at least by the defence measures it provokes. We can see this in the form of comments like: Philosophy is too complicated. I don't understand it. It's beyond me. It's something for professionals. I have no gift for it. Therefore it doesn't concern me. -But that is like saying: I don't need to bother about the fundamental questions of life: I can diligently bury myself in some special field of work or scholarship without thinking or questioning its meaning, and, for the rest, have "opinions and be content with that. The defence becomes fanatical. A benighted vital instinct hates philosophy by something new and totally different. It is mistrusted as the utterly mendacious end product of a bankrupt theology. The meaninglessness of philosophical propositions is made fun of. Philosophy is denounced as the willing handmaiden of political and other powers. For many politicians, their wretched trade would be easier if philosophy did not exist at all. Masses and functionaries are easier to manipulate when they do not think but only have a regimented intelligence. People must be prevented from becoming serious. Therefore it is better of philosophy to be boring. Let the chairs of philosophy rot. The more piffle is taught, the sooner people will be blinkered against the light of philosophy. Thus philosophy is surrounded by enemies most of whom are not conscious of being such Bourgeois complacency, conventionality, the satisfactions of economic prosperity, the bonhomie of politiciansm the fanaticism of ideologies, the literary self-assertiveness of talented writers- in all these things people parade their anti- philosophy. They do not notice it because they do not realise what they are doing. They are unaware that their anti-philosophy is itself a philosophy, but a perverted one, and that this anti-philosophy, if elucidated, would annihilate itself.

9. A suitable title for the passage would be...  
 (a) Man and Philosophy      (b) Philosophical angst  
 (c) A Defence of philosophy      (d) The Enemies of Philosophy
10. Which of the following is not mentioned as a function of philosophy in the passage?  
 (a) It shows the way to man's dignity in the face of his empirical existence  
 (b) It breaks through the shell of the world in order to move into the infinite  
 (c) It pushes into the furthest horizons beyond being in the world  
 (d) It makes the world a better place to live in

11. Which of the following is true, keeping the passage in mind ?
  - (a) Philosophy is evidently respected
  - (b) Philosophy is secretly despised
  - (c) Both (a) and (b)
  - (d) Neither (a) nor (b)
12. The word 'chairs', in the context of the passage means
  - (a) wooden faced people
  - (b) departments
  - (c) separate chairs for philosophers
  - (d) reserved seats for students of philosophy
13. Which of the following is not a charge against philosophy?
  - (a) That it is obsolete
  - (b) That it is mendacious
  - (c) That it is the handmaiden of political powers
  - (d) That it is immoral
14. According to the author, the existence of philosophy is proved by
  - (a) the fact there are still chairs of philosophy in universities
  - (b) the defence measures it provokes
  - (c) the polite respect it gets
  - (d) the fact that it answers the fundamental questions of life
15. Why, according to the passage, would the politicians be happy if philosophy did not exist ?
  - (a) Masses would be easier to manipulate as they would not think for themselves
  - (b) They would not have to make false allegiances to ideologies
  - (c) They would not have to face allegations of ignoring philosophy
  - (d) They would not have to be philosophical about losing an election

### PASSAGE - 3

(1995)

Even if we're a bit snooty about them, we should go down on our knees and thank heaven for movies like Jurassic Park, and director like Steven Spielberg who make them. They fill the cinemas, if only because the hype is virtually irresistible. And because they do so, hundreds of maniacs all over the world continue to finance film. But is this a good example of a world-wide jackpot movie? Yes and no. Yes, because it delivers dinosaurs by the dozen, in as wizard a fashion as can have been seen on the screen before. And no, because the accompanying story, courtesy of Michael Crichton, has little of the real imagination that made Spielberg's ET and Close Encounters into the jackpot movies of their day. Technically it works like a dream but, as a cinematic dream, it's unmemorable. This may be because of its cardboard human characters, dwarfed by the assemblage of their prehistoric ancestors and service by a screenplay that makes the abortive mating calls of this weirdly asexual zoo seem eloquent in comparison. 'What kind of park is this?' enquires Sam Neil. 'Oh, it's right up your alley', says Richard Attenborough. More likely, though it has something to do with the development of the story which at no point engages us properly on the human level, except perhaps to hope that the kids and Neil's grumpy scientist who learns to love them will finally escape from the grasp of the velociraptors chasing them. We're looking at nothing but stunts, and they get tiresome laid end to end. Crichton's book was scarcely much better but at least it had a convincing villain in John Hammond, Jurassic Park's billionaire developer, whereas Attenborough's approximation seems merely enthusiastically misguided. And Crichton's warning of what might happen if we muck about with nature becomes weaker in the film. What we actually have in Jurassic Park is a Non-animated Disney epic with affiliations to Jaws which seems to amuse and frighten but succeeds in doing neither well enough to count. Its real interest lies in how Spielberg's obsession with childhood now manifests itself in his middle age. It looks like being on automatic pilot- gestural rather than totally convinced but determined to remain the subject of analytical study. The whole thing, of course, is perfectly adequate fun once the ludicrously simplistic explanation of DNA has been traversed in Hammond's costly futuristic, computerised den. Even I could understand it. Thereafter, the theme park's investment will work, leads to predictable disasters, proficiently worked out but never truly frightening. But then this is a film for children of all ages, except perhaps those under 12, and one shouldn't expect sophistication on other than the technological level. Jurassic Park is more of a roller-coaster ride than a piece of real cinema. It delivers, but only on a certain plane. Even the breaking of the barriers between our civilisation and a monstrous past hasn't the kick it might have had. Possibly one is asking for a different film which in the end would not have appealed across the box-office spectrum as well as this obviously does. But one still leaves it vaguely disappointed. All that work and just a mouse that roars. it's wonderful story, but told with more efficiency than inspiration - possibly a sign of the times, along with the merchandising spree which follows it so readily.

16. The passage is most probably...
  - (a) a book review
  - (b) a film critic's comments
  - (c) a film review
  - (d) a magazine article
17. The writer's opinion of the film Jurassic Park may be said to be ...
  - (a) very favourable
  - (b) very depressing
  - (c) excellent
  - (d) not very favourable
18. In which way does the author find the film inferior to the original book ?
  - (a) The book is more interesting
  - (b) The book had a more convincing villain
  - (c) The book is easier to understand
  - (d) The story had a good author but a bad director

## PASSAGE - 4

(1996)

I want to stress this personal helplessness we are all stricken with in the face of a system that has passed beyond our knowledge and control. To bring it nearer home, I propose that we switch off from the big things like empires and their wars to little familiar things. Take pins for example! I do not know why it is that I so seldom use a pin when my wife cannot get on without boxes of them at hand; but it is so; and I will therefore take pins as being for some reason specially important to women.

There was a time when pinmakers could buy the material; shape it; make the head and the point; ornament it; and take it to market or to your door and sell it to you. They had to know three trades: buying, making, and selling; and the making required skill in several operations. They not only knew how the thing was done from beginning to end, but could do it all by themselves. But they could not afford to sell you a paper of pins for a farthing. Pins cost so much that a woman's dress allowance was calling pin money.

By the end of the eighteenth century Adam Smith boasted that it took eighteen men to make a pin, each man doing a little bit of the job and passing the pin on to the next, and none of them being able to make a whole pin or to buy the materials or to sell it when it was made. The most you could say for them was that at least they had some idea of how it was made, though they could not make it. Now as this meant that they were clearly less capable and knowledgeable men than the old pinmakers, you may ask why Adam Smith boasted of it as a triumph of civilisation when its effect was so clearly a degrading effect. The reason was that by setting each man to do just one little bit of the work and nothing but that, over and over again, he became very quick at it. The men, it is said, could turn out nearly five thousand pins a day each; and thus pins became plentiful and cheap. The country was supposed to be richer because it had more pins, though it had turned capable men into mere machines doing their work without intelligence and being fed by the spare food of the capitalist as an engine is fed with coals and oil. That was why the poet Goldsmith, who was a farsighted economist as well as a poet, complained that 'wealth accumulates, and men decay'.

Nowadays, Adam Smith's eighteen men are as extinct as the diplodocus. The eighteen flesh-and-blood machines are replaced by machines of steel which spout out pins by the hundred million. Even sticking them into pink papers is done by machinery. The result is that with the exception of a few people who design the machines, nobody knows how to make a pin or how a pin is made: that is to say, the modern worker in pin manufacture need not be one-tenth so intelligent and skillful and accomplished as the old pinnemaker; and the only compensation we have for this deterioration is that pins are so cheap that a single pin has no expressible value at all. Even with a big profit stuck on to the cost-price you can buy dozens for a farthing; and pins are so recklessly thrown away and wasted that verses have to be written to persuade children (without success) that it is a sin to steal a pin.

Many serious thinkers, like John Ruskin and William Morris, have been greatly troubled by this, just as Goldsmith was, and have asked whether we really believe that it is an advance in wealth to lose our skill and degrade our workers for the sake of being able to waste pins by the ton. We shall see later on, when we come to consider the Distribution of Leisure, that the cure for this is not to go back to the old ways; for if the saving of time by modern machinery was equally divided among us, it would set us all free for higher work than pinmaking or the like. But in the meantime the fact remains that pins are now made by men and women who cannot make anything by themselves, and could not arrange between themselves to make anything even in little bits. They are ignorant and helpless, and cannot lift their finger to begin their day's work until it has all been arranged for them by their employer's who themselves do not understand the machines they buy, and simply pay other people to set them going by carrying out the machine maker's directions.

The same is true of clothes. Formerly the whole work of making clothes, from the shearing of the sheep to the turning out of the finished and washed garment ready to put on, had to be done in the country by the men and women of the household, especially the women; so that to this day an unmarried woman is called a spinster. Nowadays nothing is left of all this but the sheep-shearing; and even that, like the milking of cows, is being done by machinery, as the sewing is. Give a woman a sheep today and ask her to produce a woollen dress for you; and not only will she be quite unable to do it, but you are as likely as not to find that she is not even aware of any connection between sheep and clothes. When she gets her clothes, which she does by buying them at a shop, she knows that there is a difference between wool and cotton and silk, between flannel and merino, perhaps even between stockinet and other wefts; but as to how they are made, or what they are made of, or how they came to be in the shop ready for her to buy, she knows hardly anything. And the shop assistant from whom she buys is no wiser. The people engaged in the making of them know even less; for many of them are too poor to have much choice of materials when they buy their own clothes.

Thus the capitalist system has produced an almost universal ignorance of how things are made and done, whilst at the same time it has caused them to be made and done on a gigantic scale. We have to buy books and encyclopedias to find out what it is we are doing all day; and as the books are written by people who are not doing it, and who get their information from other books, what they tell us is from twenty to fifty years out of date, and impractical at that. And of course most of us are too tired of our work when we come home to want to read about it; what we need is a cinema to take our minds off it and feed our imagination.

It is a funny place, this world of Capitalism, with its astonishing spread of ignorance and helplessness, boasting all the time of its spread of education and enlightenment. There stand the thousands of property owners and the millions of wage workers; none of them able to make anything, none of them knowing what to do until somebody tells them, none of them having the least notion of how it is that they find people paying them money, and things in the shops to buy with it. And when they travel they are surprised to find that savages and Esquimaux and villagers who have to make everything for themselves are more intelligent and resourceful! The wonder would be if they were anything else. We should die of idiocy through disuse of our mental faculties if we did not fill our heads with romantic nonsense out of illustrated newspapers and novels and plays and films. Such stuff keeps us alive; but it falsifies everything for us so absurdly that it leaves us more or less dangerous lunatics in the real world.

Excuse my going on like this; but as I am writer of books and plays myself, I know the folly and peril of it better than you do. And when I see that this moment of our utmost ignorance and helplessness, delusion and folly, has been stumbled on by the blind forces of Capitalism as the moment for giving votes to everybody, so that the few wise women are hopelessly overruled by the thousands whose political minds, as far as they can be said to have any political minds at all, have been formed in the cinema, I realise that I had better stop writing plays for a while to discuss political and social realities in this book with those who are intelligent enough to listen to me.

25. A suitable title to the passage would be
  - (a) You can't hear a pin drop nowadays
  - (b) Capitalism and labour disintegration: pinning the blame
  - (c) The saga of the non-safety pins
  - (d) Reaching the pinnacle of capitalistic success
26. Which of the following is true as far as pins are concerned?
  - (a) The cost of pins is more now a days to produce
  - (b) Earlier, workmen made pins with a lot of love and care
  - (c) Pinball machines are the standard pin producing gadgets nowadays
  - (d) It took far longer to make a pin earlier
27. Why do you think that the author gives the example of Adam Smith?
  - (a) Because he thinks that Adam Smith was a boaster without any facts to back his utterance
  - (b) Because he wants to give us an example of something undesirable that Adam Smith was proud of
  - (c) Because he is proud to be a believer in a tenet of production that even a great man like Adam Smith boasted about
  - (d) Because he feels that Adam Smith was right when he said that it took eighteen men to make a pin
28. It may be inferred from the passage that the author..
  - (a) is a supporter of the craftsmanship over bulk mechanised production
  - (b) is a supporter of assembly line production over socialistic systems of the same
  - (c) is a defender of the faith in capitalistic production
  - (d) None of the above
29. The reason that children have to be taught that stealing a pin is wrong is that..
  - (a) they have an amazing proclivity to steal them right from childhood
  - (b) pins are so common and cheap that taking one would not even be considered stealing by them
  - (c) stealing a pin would lead to stealing bigger and bigger things in the future
  - (d) stealing an insignificant thing like a pin smacks of kleptomania
30. Which of the following is not against the modern capitalistic system of mass production ?
  - (a) John Ruskin
  - (b) Goldsmith
  - (c) Adam Smith
  - (d) William Morris

31. Which of the following can be a suitable first line to introduce the hypothetical next paragraph at the end of the passage?
- The distribution of leisure is not a term that can be explained in a few words
  - If people wear clothes they hardly seem to think about the method of production
  - Machines are the gods of our age and there seems to be no atheists
  - None of the above
32. When the author says that a woman now is not likely to know about any connection between sheep and clothes, he is probably being....
- vindictive
  - chauvinistic
  - satirical
  - demeaning
33. Goldsmith's dictum, "wealth accumulates, and men decay," in the context of the passage, probably means....
- the more wealthy people get, they become more and more corrupt
  - the more rich people get, they forget the nuances of individual ability
  - people may have a lot of money, but they have to die and decay someday
  - the more a company gets wealthy the less they take care of people

## PASSAGE - 5

(1996)

Now let us turn back to inquire whether sending our capital abroad, and consenting to be taxed to pay emigration fares to get rid of the women and men who are left without employment in consequence, is all that Capitalism can do when our employers, who act for our capitalist in Industrial affairs, and are more or less capitalists themselves in the earlier stages of capitalistic development, find that they can sell no more of their goods at a profit, or indeed at all, in their own country.

Clearly they cannot send abroad the capital they have already invested, because it has all been eaten up by the workers, leaving in its place factories and railways and mines and the like; and these cannot be packed into a ship's hold and sent to Africa. It is only the freshly saved capital that can be sent out of the country. This, as we have seen, does go abroad in heaps. But the British employer who is working with capital in the shape of works fixed to British land held by him on long lease, must, when once he has sold all the goods at home that his British customers can afford to buy either shut up his works until the customers have worn out their stock of what they have bought, which would bankrupt him (for the landlord will not wait), or else sell his superfluous goods somewhere else: that is, he must send them abroad. Now it is not easy to send them to civilised countries, because they practise Protection, which means that they impose heavy taxes (customs duties) on foreign goods. Uncivilised countries, without Protection, and inhabited by natives to whom gaudy calicoes and cheap showy brass ware are dazzling and delightful novelties, are the best places to make for at first.

But trade requires a settled government to put down the habit of plundering strangers. This is not a habit of simple tribes, who are often friendly and honest. It is what civilised man do where there is no law to restrain them. Until quite recent times it was extremely dangerous to be wrecked on our own coasts, as wrecking, which meant plundering wrecked ships and refraining from any officious efforts to save the lives of their crews, was a well-established business in many places on our shores. The Chinese still remember some astonishing outbursts of looting perpetrated by English ladies of high position, at moments when law was suspended and priceless works of art were to be had for the grabbing. When trading with aborigines begins with the visit of a single ship, the cannons and cutlasses it carries may be quite sufficient to overawe the natives if they are troublesome. The real difficulty begins when so many ships come that a little trading station of white men grows up and attracts the white ne'er-do-wells and violent roughs who are always being squeezed out of civilisation by the pressure of law and order. It is these riffraff who turn the place into a sort of hell in which sooner or later missionaries are murdered and traders plundered. Their home Governments are appealed to put a stop to this. A gunboat is sent out and inquiry made. The report after the inquiry is that there is nothing to be done but set up a civilised government, with a post office, police, troops, and a navy in the offing. In short, the place is added to some civilised Empire. And the civilised taxpayer pays the bill with out getting a farthing of the profits.

Of course the business does not stop there. The riffraff who have created the emergency move out just beyond the boundary of the annexed territory, and are as great a nuisance as ever to the traders when they have exhausted the purchasing power of the included natives and push on after fresh customers. Again they call on their home Government to civilise a further area; and so bit by bit the civilised Empire grows at the expense of the home taxpayers, without ny intention or approval on their part, until at last through all their real patriotism is centred on their own people and confined to their own country, their own rules, and their own religious faith, they find that the centre of their beloved realm has shifted to the other hemisphere. That is how we in the British Islands have found our centre moved from London to the Suez Canal, and are now in the position that out of every hundred of our fellow-subjects, in whose defence we are expected to shed the last drop of our blood, only eleven are whites or even Christians. In our bewilderment some of us declare that the Empire is a burden and a blunder, whilst other glory in it as a triumph. You and I need not argue with them just now, our point for the moment being that, whether blunder or glory, the British Empire was quite unintentional. What should have been undertaken only as a most carefully considered political development has been a series of commercial adventures thrust on us by capitalists forced by their own system to cater for foreign customers before their own country's needs were one-tenth satisfied.

34. It may be inferred that the passage was written.....  
 (a) when Britain was still a colonial power  
 (b) when the author was a bad mood  
 (c) when the author was working in the foreign service of Britain  
 (d) when the author's country was overrun by the British
35. According to the author, the main reason why capitalists go abroad to sell their goods is.....  
 (a) that they want to civilise the underdeveloped countries of the world by giving them their goods  
 (b) that they have to have a new places to sell their surplus goods somewhere in new markets  
 (c) that they actually want to rule new lands selling goods is an excuse  
 (d) None of the above
36. Which of the following does not come under aegis of capital already invested?  
 (a) Construction of factories (b) Development of a mine  
 (c) Trade of finished products (d) All of the above
37. Why do the capitalistic traders prefer the uncivilised countries to the civilised ones ?  
 (a) Because they find it easier to rule there  
 (b) Because civilised countries would make them pay protection duties  
 (c) Because civilised countries would make their own goods  
 (d) Because uncivilised countries like the cheap and gaudy goods of bad quality all capitalists produce
38. According to the author, the habit of plundering the strangers.....  
 (a) is usually not found in simple tribes but civilised people  
 (b) is usually found in the barbaric tribes of the uncivilised nations  
 (c) is a habit limited only to English ladies of high position  
 (d) is a usual habit with all white skinned people
39. Which of the following may be called the main complaint of the author?  
 (a) The race of people he belongs to are looters and plunderers  
 (b) The capitalists are taking over the entire world  
 (c) It is a way of life for English ladies to loot and plunder  
 (d) The English taxpayer has to pay for the upkeep of territories he did not want
40. The word 'officious' in the context of the passage, means.....  
 (a) self-important (b) official (c) rude (d) oafish

## PASSAGE - 6

(1996)

The second plan to have to examine is that of giving to each person what she deserves. Many people especially those who are comfortably off, think that this is what happens at present : that the industrious and sober and thrifty are never in want, and that poverty is due to idleness, improvidence, drink, betting, dishonesty, and bad character generally. They can point to the fact that a labour whose character is bad finds it more difficult to get employment than one whose character is good ; that a farmer or country gentlemen who gambles and bets heavily, and mortgages his land to live wastefully and extravagantly, is soon reduced to poverty; and that a man of business who is lazy and does not attend to it becomes bankrupt. But this proves nothing that you cannot eat your cake and have it too : it does not prove that your share of the cake was fair one. It shows that certain vices and weaknesses make us poor; but it forgets that certain other vices make us rich. People who are hard, grasping, selfish, cruel, and always ready to take advantage of their neighbors, become very rich if they are clear enough not to ever reach themselves. On the other hand, people who are generous, public-spirited friendly, and not always thinking of the main chance, stay poor when they are born poor unless they have extraordinary talents. Also as things are today, some are born poor and others are born with silver spoons in their mouths: that is to say, they are divided into rich and poor before they are old enough to have any character at all. The notion that our present system distributes wealth according to merit, even roughly, may be dismissed at once as ridiculous. Everyone can see that it generally has the contrary effect; it makes a few idle people very rich, and a great many woodworking people very poor.

On this, Intelligent Lady, your first thought may be that if wealth is not distributed according to merit, it ought to be; and that we should at once set to work to alter our laws so that in future the good people shall be rich in proportion to their goodness and the bad people poor in proportion to their badness. There are several objections to this; but the very first one settles the question for

good and all. It is, that the proposal is impossible. How are you going to measure anyone's merit in money? Choose any pair of human beings you like, male or female, and see whether you can decide how much each of them should have on her or his merits. If you live in the country, take the village blacksmith and the village clergyman, or the village washerwoman and the village schoolmistress, to begin with. At present the clergymen often gets less pay than the blacksmith: it is only in some villages he gets more. But never mind what they get at present : you are trying whether you can set up a new order of things in which each will get what he deserves. You need not fix a sum of money for them : all you have to do is to settle the proportion between them. Is the blacksmith to have as much as the clergymen? Or twice as much as the clergymen ? Or half as much as the clergymen? Or how much more or less? It is no use saying that one ought to have more the other less : you must be prepared to say exactly how much more or less in calculable proportion.

Well, think it out. The clergymen has had a college education; but that is not any merit on his part : he owns it to his father ; so you cannot allow him anything for that. But through it he is able to read the New Testament Greek; so that he can do something the blacksmith cannot do. On the other hand, the blacksmith can make a horse-shoe, which the parson cannot. How many verses of the Greek Testament are worth one horse-shoe ? You have only to ask the silly question to see that nobody can answer it.

Since measuring their merits is no use, why not try to measure their faults? Suppose the blacksmith swears a good deal, and gets drunk occasionally! Everybody in the village knows this; but the person has to keep his faults to himself. His wife knows them; but she will not tell you what they are if she known that you intend to cut off some of his pay for them. You know that as he is only a mortal human being he must have some faults; but you cannot find them out. However, suppose he has some faults that you can find out! Suppose he has what you call an unfortunate manner; that he is a hypocrite; that he is a snob; that he cares more for sport and fashionable society than for religion! Does that make him as bad as the blacksmith is to have a shilling, is the person to have six pence, or five pence and one-third, or two shillings? Clearly these are fools' questions: the moment they bring us down from moral generalities to business particulars it becomes plain to every sensible person that no relation can be established between human qualities, good or bad, and sums of money, large or small. It may seem scandalous that a prize-fighter, for hitting another prize-fighter so hard at wembley that he fell down and could not rise within ten seconds, received the same Sun that was paid to the Archbishop of Canterbury for acting as Primate of the Church of England for nine months; but none of those who cry out against the scandal can express any better in money the difference between the two. Not one of the persons who think that the prize-fighter got for his six or seven minutes' boxing would pay a judge's salary for two years; and we all are all agreed that nothing could be more ridiculous, and that any system of distribution wealth which leads to such absurdities must be wrong. But to suppose that it could be changed by any possible calculation that an ounce of archbishop or three ounces of judge is worth a pound of prize fighter would be sillier still. You can find out how many candles are worth a pound of butter in the market on any particular day; but when you try to estimate the worth of human souls the utmost you can say is that they are all of equal money they should have. You must simply give it up, and admit that distributing money according to merit is beyond mortal measurement and judgement.

41. Which of the following is not a vice attributed to the poor by the rich ?
  - (a) Idleness
  - (b) Drug addiction
  - (c) Gambling
  - (d) Alcoholism
42. According to the passage, which kind of people are not mentioned as likely to get rich quickly ?
  - (a) Selfish people
  - (b) Grasping people
  - (c) Hard people
  - (d) Ambitious people
43. What, according to the author, do the generous and public spirited people need to become rich?
  - (a) A criminal mind
  - (b) To be born with silver spoons
  - (c) Extraordinary talents
  - (d) Strength of character
44. Which of the following about the author's thinking may be inferred from the passage ?
  - (a) The poor should work harder to become rich
  - (b) The present system of distribution of wealth is biased in favour of the rich
  - (c) The honest men should resort to trickery if they want to become rich
  - (d) The present system of government should give way to a more progressive one
45. What, according to the author, is the main problem in distributing wealth according to the goodness or badness of human beings?
  - (a) Because the bad people will as always, cheat the good people of their fair share of the money
  - (b) Because there are too many people in the world and it will take a long time to categories them into good or bad
  - (c) Because there are no standards by which to judge good or bad in relation to money
  - (d) None of the above
46. This passage most probably a part of .
  - (a) A newspaper article
  - (b) An anthropological document
  - (c) A letter to someone
  - (d) An ecclesiastical liturgy

47. The author gives the example of the Archbishop of Canterbury and the prize fighter to
- prove that there cannot be any division of wealth based on moral standards
  - prove that in this day and age might always scores over religion and love
  - prove the existence of a non-discriminating god
  - prove that a pound of butter is worth more than any amount of candles any day
48. The word 'improvidence,' in the context of the passage means.....
- extravagance
  - lasciviousness
  - corruption
  - indelicacy

## PASSAGE - 7

(1997)

When talk turns to how India has done for itself in 50 years of independence, the world has nothing but praise for our success in remaining a democracy. On other fronts, the applause is less loud. In absolute terms, India hasn't done too badly, of course. Life expectancy has increased. So has literacy. Industry, which was barely a fledgling, has grown tremendously. And as far as agriculture is concerned, India has been transformed from a country perpetually on the edge of starvation into a success story held up for others to emulate.

But these are competitive times when change is rapid, and to walk slowly when the rest of the world is running is almost as bad as standing still or walking backwards. Compared with large chunks of what was then the developing world - South Korea, Singapore, Malaysia, Thailand, Indonesia, China and what was till lately a separate Hong Kong - India has fared abysmally.

It began with a far better infrastructure than most of these countries had. It suffered hardly or not at all during the second World War. It had advantages like an English speaking elite, quality scientific manpower (including a Nobel laureate and others who could be ranked among the world's best) and excellent business acumen. Yet, today, when countries are ranked according to their global competitiveness, it is tiny Singapore that figures at the top. Hong Kong is an export powerhouse. So is Taiwan. If a symbol were needed of how far we have fallen back, note that while Korean Cielos are sold in India, no one in South Korea is rushing to buy an Indian car.

The reasons list themselves. Topmost is economic isolationism. The government discouraged imports and encouraged self-sufficiency. Whatever the aim was, the result was the creation of a totally inefficient industry that failed to keep pace with global trends and, therefore, became absolutely uncompetitive. Only when the trade gates were opened a little did this become apparent. The years since then have been spent in merely trying to catch up.

That the government actually sheltered its industrialists from foreign competition is a little strange. For, in all other respects, it operated under the conviction that business men were little more than crooks who were to be prevented from entering the most important areas of the economy, who were to be hamstrung in as many ways as possible, who were to be tolerated in the same way as an inexcusable wart. The high, expropriatory rates of taxation, the licensing laws, the reservation of whole swathes of industry for the public sector, and the granting of monopolies to the public sector firms were the principal manifestations of the attitude. The government forgot that before wealth could be distributed, it had to be created. The government forgot that it itself could not create, only squander wealth.

Some of the manifestations of the old attitude have changed. Tax rates have fallen. Licensing has been all but abolished. And the gates of global trade have been opened wide. But most of these changes were forced by circumstances, partly by the foreign exchange bankruptcy of 1991 and by the recognition that the government could no longer muster the funds to support the public sector, leave alone expand it. Whether the attitude of the government itself, or that of more than handful of ministers, has changed is open to question.

In many other ways, however, the government has not changed one wit. Business still has to negotiate a welter of negotiations. Transparency is still a long way off. And there is no exit policy. In defending the existing policy, politicians betray an inability to see beyond their noses. A no-exit policy for labour is equivalent to a no-entry policy for new business. If one industry is not allowed to retrench labour, other industries will think a hundred times before employing new labour.

In other ways too, the government hurts industries. Public sector monopolies like the department of telecommunications and Videsh Sanchar Nigam make it possible for Indian businesses to operate only at a cost several times that of their counterparts abroad. The infrastructure is in a shambles partly because it is unable to formulate a sufficiently remunerative policy for private business, and partly because it does not have the stomach to change market rates for services.

After a burst of activity in the early nineties, the government is dragging its feet. At the rate it is going, it will be another 50 years before the government realises that a pro-business policy is the best pro-people policy. By then of course, the world would have moved even farther ahead.

49. The writer's attitude towards the government is
- critical
  - ironical
  - sarcastic
  - derisive

50. The writer is surprised at the government's attitude towards its industrialists because ....  
 (a) the government did not need to protect its industrialists  
 (b) the issue of competition was non-existent  
 (c) the government looked upon its industrialists as crooks  
 (d) the attitude was a conundrum
51. The government was compelled to open the economy due to ....  
 (a) pressure from international markets  
 (b) pressure from the domestic market  
 (c) foreign exchange bankruptcy and paucity of funds with the government  
 (d) All of the above
52. The writer ends the passage on a note of ...  
 (a) cautious optimism      (b) pessimism      (c) optimism      (d) pragmatism
53. According to the writer, India should have performed better than the other Asian nations because  
 (a) it had adequate infrastructure  
 (b) it had better infrastructure  
 (c) it had better politicians who could take the required decisions  
 (d) All of the above
54. India was in a better condition than the other Asian nations because  
 (a) it did not face the ravages of the second World War      (b) it had an English speaking populace and good business sense  
 (c) it had enough wealth through its exports      (d) both (a) and (b)
55. The major reason for India's poor performance is ...  
 (a) economic isolationism      (b) economic mismanagement  
 (c) inefficient industry      (d) All of the above
56. One of the features of the government's protectionist policy was ....  
 (a) encouragement of imports      (b) discouragement of exports  
 (c) encouragement of exports      (d) discouragement of imports
57. The example of the Korean Cielo has been presented to highlight  
 (a) India's lack of stature in the international market      (b) India's poor performance in the international market  
 (c) India's lack of credibility in the international market      (d) India's disrepute in the international market
58. According to the writer, ....  
 (a) India's politicians are myopic in their vision of the country's requirements  
 (b) India's politicians are busy lining their pockets  
 (c) India's politicians are not conversant with the needs of the present scenario  
 (d) All of the above

## PASSAGE - 8

(1998)

The narrator of *Midnight's Children* describes it as a kind of collective fantasy. I suppose what he, or I, through him was trying to say, was that there never has been a political entity called India until 1947. The thing that became independent had never previously existed, except that there had been an area, a zone called India. So it struck me that what was coming into being, this idea of a nation-state, was an invention. It was an invention of the nationalist movement. And a very successful invention.

One could argue that nation states are a kind of collective fantasies. Very similar things happened with the unification of Italy, with the unification of Germany. The history of India is a history of independent nation-states. It is a history of Oudh or Bengal or Maratha kingdoms. All those independent histories agreed to collectives themselves into the idea of the nation of India. In the case of Pakistan, it was less successful, Pakistan was under-imagined. It did not survive as a nation-state.

If you ask people in general, they would have absolutely no problem with the idea of India at all. I think, in a way, the strength of the nationalist idea is shown by its ability to survive the extraordinary stresses that it was placed under. I think the stresses of things-communalism, the high degree of public corruption, of regional rivalries, of the tension between the Centre and the state, the external pressures of bad relations with Pakistan-these are colossal pressures which any state could be forgiven for being damaged by. I think the thing to say about the success of the idea is that it remains an idea though people might not find it very easy to give a simple definition of it. But it does exist and that it is something to which people feel they belong, I think is now the case. That it survives these stresses is an indication of the strength of it.

I'm not interested in an idealised, romantic vision of India. I know it is the great pitfall of the exile. So you know for me, always, the issue of writing about India has been not to write as an outsider. On the other hand, evidently something has changed in the last

10 years, which is that as result of various circumstances, I've not been able to return. All I can say is that I have felt it as the most profound loss and I still do. There have been many losses in this last decade but the loss of the easy return to India has been for me an absolute anguish, an inescapable anguish, I feel as if I have lost a limb. I am very anxious to bring that period to an end.

I do think that one of the most interesting phenomena for India as a country is the phenomenon of the Indian Diaspora. I often think Indians- Indian Indians- find that very hard to understand, In England, when people call themselves British Indian, they mean both halves of that. And yet, what it means to be a British Indian is very alien to an Indian. The same is true in the Caribbean, in Africa, in Canada, in the United States, and so on. The thing that has interested me is that there are now many, many ways of being something which you can legitimately call an Indian. Being an Indian in India is just one of those ways.

The forces of disintegration are always there. I think in every society there is the tension between the forces that bring it. Together and the forces that pull it apart. I'm worried, above all, of the communal issue because half a century is no time at all in the eye of history, and half a century ago something of colossally horrible proportion took place. The fact that hasn't happened for 50 years on quite the same scale means nothing. It could still happen tomorrow. One of the things that I remember very vividly, being there 10 years ago at about the time of the killings that took place in Assam, is discussing this with good friends and fellow writers. And I remember somebody said to me, until we understand that we are capable of these things, we can't begin to move beyond them. Because it's a very easy response to atrocities to say ; oh those terrible people did that, and we are not like that. I think the difficult response is to accept we are capable of that, the thing that happened there could also, in certain circumstances, be something that we were able to perpetrate. The civilizing influence is what prevents most of us from giving vent to those terrible urges. Those urges are part of humanity as well as the more civilized urges.

Of course , I fear in India the recurrence of communal or regionalist inter-community violence. I fear the long term damage to a democracy that can be done by mass corruption. I think corruption is in a way a subversion of democracy and the commonplace view in India is that corruption is everywhere. In a sense, you could say, that is not a democratic society. If money, favour and privilege is what makes the place work, then that's not a democracy. At least it runs the danger of being no longer able to call itself a democracy.

What was happening, I thought, was that people were trying to seize control of that rhetoric. That is to say, special interest groups you could say Hindus are a very large special interest group. If any group inside such a complex and many faceted country tries to define the nation exclusively in its own terms, then it begins to create terrible stresses. I do think that the kind of attempt to define India in Hindu terms is worrying for that reason. It creates backlashes, it creates polarisations, and it creates the risk of more upheaval. Partly, I am saying this as a kind of objective observer, but nobody is an objective observer.

I come from an Indian minority, I no doubt have a minority perspective. I can't ignore that and nor would I wish to. Partly also I am speaking temperamentally. That is to say, the kind of religious language in politics is something I find temperamentally unpleasant. I don't like people who do that, whether they be sectarians in Northern Ireland or India. I believe in, if possible, separating one's personal spiritual needs and aspirations from the way in which a country is run. I think in those countries where that separation has not taken place, one can see all kinds of distortions of social and ordinary life which are unpleasant. Iran is an obvious example. The country in which that kind of separation has completely broken down.

Where Naipaul is right, although I don't share his conclusions about it, but I think where he is right, is in saying that this is a great historical moment. One reason why the 50th anniversary is interesting is that it does seem to represent the end of the first age and the beginning of second age. And to that extent that is true now, if someone was born today, they would be born into a very different set of cultural assumptions and hopes than somebody born 50 years ago. We were entirely sold on the Nehru-Gandhi kind of plan. We grew up and that was the portrait of the nation we had hung on our wall, and to the extent that you never entirely lose those formative ideas, that's still the picture of the country I've got hung on my wall. But it's a clear that for somebody being born now, they are being born into a very different country.

I also think of take the Naipaul point on what would happen if the BJP were to form a government. Well, what I would like to think is that in order for the BJP or. Or anybody of that persuasion to form a government, they would have to change. There is even some kind of suggestion that it may even be happening a little bit because they are intelligent people . They understand their weaknesses as well as their strengths. Clearly, for a Hinduist party to become the government of the country is not at all unlikely. So I think one does have to engage with that in the same way as many people in this country who, like myself, were not remotely in tune with the Thatcherite revolution but had to engage with it because it was in fact happening, and kept winning election and the world was not to go back. So, of course, both people inside the Hindu political enterprise and people outside it will have to shift. I am optimistic about India's ability to force those changes that are necessary because I do believe it is not fundamentally an intolerant country and will not fundamentally accept intolerant politics.

On the other hand, there has to be reckoning with the fact that these are ideas which are gaining in popularity. I'll tell you where I would draw the line myself. I think there was a great historical mistake made in Europe about the Nazi Party. People attempted to see whether they could live with it and discovered very rapidly that was a mistake, that appeasement was a great historical mistake. So, it seems to me, the question is : What do we make of this political enterprise ? Is it fundamentally democratic or fundamentally anti democratic ? If democratic, then we must all learn to make the best of it. If anti-democratic, then we must fight it very hard.

What happened in India happened before the book (Satanic Verses) had actually entered. It happened because of an article in India Today which, I must say, I thought was an irresponsibly written article. Because it was written by somebody who, as a friend asked me for an early copy of the book, and then presented that book in the most inflammatory sort of way.

This was one of the things that disappointed me, that after a lifetime of having written from a certain sensibility, and a certain point of view, I would have expected people in India to know about it since it was all entirely about India. It was written from a deep sense of connection and affection for India. I would have expected that I had some money in the bank. That is to say, if Salman Rushdie writes any book, then we know who he is. He is not some idiot who just arrived from nowhere shouting abuse. This is somebody whose work, whose opinions, whose lectures and whose stories we know. I would have hoped that my work would have been judged in the context of what people already knew about me. Instead, it seemed as if everything I had been in my life up to that point, suddenly vanished out of the window and this other Rushdie was invented who was this complete bastard who had done this terrible thing. There did not seem to be any attempt to correct that or to combat that. I was surprised and disappointed it did not. It didn't happen here either. It didn't happen anywhere in the world. It was as if the force of history, the force of a historical event was so huge that it erases all that goes before it.

The negative response to the Satanic Verses let us remember that there was also a positive response was such that it erased my personality and put in its place some other guy who didn't recognize at all. Anybody who knows anything about these countries and I do know something about these countries knows that every cheap politician can put a demonstration in the streets in five minutes. That doesn't represent in any sense the people's will. It represents a certain kind of political structure, political organization. It doesn't represent truth.

But I always believed and I still believe that India would come back. I never believed that the loss of India was forever. Because India is not Iran, it's not even Pakistan, and I thought good sense will prevail in India because that's my life experience of Indian people and of the place.

59. The Idea of India that inspired the writer's generation was the one dominated or formed by
  - (a) the Nehru-Gandhi politics
  - (b) the Nehru-Gandhi ideology
  - (c) the Nehru-Gandhi idea regarding India's formative years
  - (d) the Nehruvian idea of socialism
60. The writer does not share
  - (a) Naipaul's stand that the 50<sup>th</sup> anniversary is a historical moment
  - (b) Naipaul's stand that the 50<sup>th</sup> anniversary is not a historical moment
  - (c) Naipaul's conclusion on the 50<sup>th</sup> anniversary being a historical moment
  - (d) Naipaul's conclusion on the 50<sup>th</sup> anniversary not being a historical moment.
61. The writer shows faith in India's basic
 

(a) stability	(b) resilience	(c) fortitude	(d) democracy
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62. According to the writer
  - (a) politicians incite the general public to demonstrate against writers
  - (b) a politician's demonstration does not reflect the people's will
  - (c) Both (a) and (b)
  - (d) Neither (a) nor (b)
63. The writer's view on India is determined mainly by his
 

(a) his experience	(b) his fondness for the country
(c) his love for the resilience of the Indian people	(d) his love of writing about India
64. According to the writer's friends
  - (a) we should fight communal pressure
  - (b) the fact that communal conflagrations haven't occurred in India for half a century, is something to be proud of
  - (c) we can move beyond things, only after we know we are capable of those things
  - (d) we have to identify with the people who were involved in inciting communal passions.
65. What according to the passage prevents us from giving into violent, terrible urges ?
  - (a) our education
  - (b) our upbringing
  - (c) our cultural influences
  - (d) the civilization influence
66. According to the writer, what disqualifies India from being called a democracy ?
  - (a) its communalism
  - (b) its corruption
  - (c) its anti-minority stance
  - (d) all of these
67. The writer contradicts his assertion of being an 'objective observer' on the basis that
 

(a) no one can be an 'objective observer'	(b) no one is an 'objective observer'
(c) he is a subjective observer	(d) everybody is a subjective observer

68. In the first paragraph of the passage, the writer questions
- the existence of a political entity called India prior to independence
  - the contention that a political entity called India did not exist
  - the stand that India was an invention
  - the stand that India needs to think in terms of its being a nation state
69. According to the writer, the difference between India and Pakistan was that
- India survived as a nation state, Pakistan did not
  - Indians were full of fantastic ideas in 1947
  - Pakistan was born out another nation
  - The creation of Pakistan suffered from under-imaginativeness
70. According to the passage, the secret of India's survival lies in
- its ability to fight back in the face of tremendous stress and strains
  - in the highly fertile imagination of the Indian people
  - in the sense of belonging that people feel for it
  - both (a) and (c)

## PASSAGE - 9

(1998)

If western civilization is in a state of permanent crisis, it is not far fetched to suggest that there may be something wrong with its education. No civilization, I am sure, has devoted more energy and resources to organized education, and if we believe in nothing else, we certainly believe that education is, or should be, the key to everything. In fact, the belief in education is so strong that we treat it as the residual legatee of all our problems. If the nuclear age brings new danger: if the advance of genetic engineering opens the doors to new abuses; if commercialism brings new temptations the answer must be more and better education. The modern way of life is becoming ever more complex: this means that everybody must become more highly educated. 'By 1984,' it was said recently, 'it will be desirable that the most ordinary of men is not embarrassed by the use of a logarithm table, the elementary concepts of the calculus, and by the definitions and uses of such words as electron, coulomb, and volt. He should further have become able not only to handle a pen, pencil, and ruler but also a magnetic tape, valve, and transistor. The improvement of communications between individuals and groups depends on it.' Most of all, it appears, the international situation calls for prodigious educational efforts. The classical statement on this point was delivered by Sir Charles (now Lord) Snow in his 'Red Lecture' some years ago: 'To say that we must educate ourselves or perish, is a little more melodramatic than the facts warrant. To say we have to educate ourselves or watch a steep decline in our lifetime, is about right.' According to Lord Snow, the Russians are apparently doing much better than anyone else and will 'have a clear edge', 'unless and until the Americans and we educate ourselves both sensibly and imaginatively',

Lord Snow, it will be recalled, talked about 'The Two Cultures and the Scientific Revolution' and expressed his concern that 'the intellectual life of the whole of western society is increasingly being split into two polar concern that 'the intellectual life of the whole of western society is increasingly being split into two polar groups--- At one pole we have the literary intellectuals... At the other the scientists. 'He deplores the 'gulf of mutual incomprehension between these two groups and wants it bridged. It is quite clear how he thinks this 'bridging' operation is to be done ; the aims of his educational policy would be, first to get as many 'alpha-plus scientists as the country can throw up second, to train 'a much larger stratum of alpha professionals' to do the supporting research, high class design and development; third, to train 'thousands upon thousands' of other scientists and engineers ; and finally, to train 'politicians, administrators, and entire community, who know, enough science to have a sense of what the scientists are talking about'. If this fourth and last group can at least be educated enough to 'have sense' of what the real people the scientists and engineers, are talking about, so Lord Snow seems to suggest, the gulf of mutual incomprehension between the 'Two Cultures' may be bridged.

These ideas on education which are by no means unrepresentative of our times, leave one within the uncomfortable feeling that ordinary people, including politicians, administrators, and so forth, are really not much use: they have failed to make the grade : but at least, they should be educated enough to have a sense of what is going on, and to know what the scientists mean when they talk to quote Lord Snow's example about the Second Law of Thermodynamics. If is an uncomfortable feeling, because the scientists never tire of telling us that the fruits of their labours are 'neutral': whether they enrich humanity or destroy it depends on how they are used . And who is to decide how they are used ? There is nothing in the training of scientists and engineers to enable them to take such decisions, or else, what becomes of the neutrality of science ?

If so much reliance is today being placed in the power of education to enable ordinary people to cope with the problems thrown up by scientific and technological progress then there must be something more to education than Lord snow suggests . Science and engineering produce 'know-how'; is one more a culture than a piano is music Can education help us to finish the sentence, to turn the potentiality into a reality to the benefit of man ?

To do so, the task of education would be, first and foremost the transmission of idea of value, of what to do with our live. There is no doubt also the need to transmit know-how but this must take second place, for it is obviously somewhat foolhardy to put great powers into the hands of people without making sure that they have a reasonable idea of what to do with the. At present, there can be little doubt that the whole of mankind is in mortal danger, not because we are short of scientific and technological know-how, but because we tend to use it destructively, without wisdom. More education can help us only if it produces more wisdom.

The essence of education, I suggested, is the transmission of values do not help us to pick our way through life unless they have become our own, a part, so to say, of our mental make-up. This means that they are the very instruments through which we like at interpret, and experience the world. When we think, we do not just think: we think with ideas. Our mind is not a blank, a *tabula rasa*. When we begin to think we can do so only because our mind is already filled with all sorts of ideas with which to think. All through our youth and adolescence, before the conscious and critical mind begins to act as a sort of censor and guardian at the threshold, ideas seep into our mind, vast hosts and multitudes of them. These Years are, one might say, our Dark Ages during which we are nothing but inheritors it is only in later that we can gradually learn to sort out our inheritance.

First of all, there is language. Each word is an idea. If the language which seeps into us during our Dark Ages is English, our mind is thereby furnished by a set of ideas which is significantly different from the set represented by Chinese, Russian, German, or even American. Next to world, there are the rules of putting them together: grammar, another bundle of ideas, the study of which has fascinated some modern philosophers to such an extent that they thought they could reduce the whole of philosophy to a study of grammar.

All philosophers and others have always paid a great deal of attention to ideas seen as the result of thought and observation; but in modern times all too little attention has been paid to the study of the ideas which form the very instruments by which thought and observation proceed. On the basis of experience and conscious thought small ideas may easily be dislodged, but when it comes to bigger, more universal, or more subtle ideas it may not be so easy to change them. Indeed, it is often difficult to become aware of them, as they are the instruments and not the results of our thinking just as you can see what is outside you, but cannot easily see that with which you see, the eye itself. And even when one has become aware of them it is often impossible to judge them on the basis of ordinary experience.

We often notice the existence of more or less fixed ideas in other people's minds-ideas with which they think without being aware of doing so. We then call them prejudices, which is logically quite correct because they have merely seeped to the mind and are in no way the result of judgement. But the word prejudice is generally applied to ideas that are patently erroneous and.

Recognizable as such by anyone except the prejudiced man, most of the ideas with which we think are not of that kind at all. To some of them, like those incorporated in words and grammar, the notions of truth or error cannot even be applied, others are quite definitely not prejudices but the result of a judgement; others again are tacit assumptions or presuppositions which may be very difficult to recognise.

I say, therefore, that we think with or through ideas and that what we call thinking is generally the application of pre-existing ideas to a given situation or set of facts. When we think about say the political situation we apply to that situation our political ideas, more or less systematically, and attempt to make that situation 'intelligible' to ourselves by means of these ideas. Similarly everywhere else. Some of the ideas of value, that is to say, we evaluate the situation in the light of our value-ideas.

The way in which we experience and interpret the world obviously depends very much indeed on kind of ideas that fill our minds. If they are mainly small, weak superficial, and incoherent, life will appear insipid, uninteresting, petty and chaotic. It is difficult to bear the resultant feeling of emptiness, and the vacuum of our minds may only too easily be filled by some big, fantastic notion-political or otherwise-which suddenly seem to illumine everything and to give meaning and purpose to our existence. It needs no emphasis that herein lies one of the great danger of our time.

When people ask of education they normally mean something more than mere training, something more than mere knowledge of facts, and something more than a mere diversion. May be they cannot themselves formulate precisely what they are looking for ; but I think what they are really looking for is ideas that could make the world, and their own lives, intelligible to them. When a thing is intelligible you have a sense of participation; when a thing is unintelligible you have a sense of estrangement. 'Well, I don't know', you hear people say, as an impotent protest against the unintelligibility of the world as they meet it. If the mind cannot bring to the world a set -or, shall we say, a tool-box of powerful ideas, the world must appear to it as a chaos, a mass of unrelated phenomena, of meaningless events. Such a man is like a person in a strange land without any signs of civilization, without maps or signposts or indicators of any kind. Nothing has any meaning to him; nothing can hold his vital interest; he has no means of making anything intelligible to himself.

71. The writer's contention in the passage is that the crisis in western civilizations can be explained by
  - (a) the presence of some flaws in its education
  - (b) some inherent lack of co-ordination among its various elements
  - (c) some basic misunderstanding in its society
  - (d) the energy it has devoted to education
72. According to the writer, Lord Snow sees the intellectual life of western society as split between
 

(a) the educated and the uneducated	(b) the government servants and the plebeians
(c) scientists and literary intellectuals	(d) administrators and intellectuals

73. The writer seems to criticise the belief that
- education gives rise to further complexities as the civilization progresses
  - all new problems and complexities can be tackled and solved by more and better education
  - people need to learn more in order to earn more
  - none of the above
74. What according to the author, would be the definition of 'prejudice'?
- ideas that help people to identify with new situations
  - fixed ideas with which people think without being aware of doing so
  - ideas that people cull experience in order to judge a situation
  - fixed ideas that see a person through the trials and tribulations of life
75. According to Lord Snow, which of the following groups needs to be educated enough to at least understand the works of scientists and engineers?
- politicians, administrators, and the entire community
  - politicians and the literary intellectuals
  - politicians And the layman
  - all of the above
76. In the passage, the writer questions
- the neutrality of science
  - scientists' stand on the neutrality of science
  - scientists' stand on the neutrality of their labours
  - Lord Snow's assertion regarding the potential of intellectuals in society
77. The author's assertion in the passage is that education's main responsibility is to
- transmit ideas of value
  - transmit technical knowledge
  - both (a) and (b)
  - transmit values regarding human and societal norms
78. The author believes that
- the gulf between science and literature needs to be bridged
  - should be maintained for a holistic view of society and its problems
  - is created by society
  - none of the above
79. Which of the following sentences is not true according to the author ?
- values must be part of one's psyche
  - values are merely dogmatic assertions
  - one identifies with values
  - values are the means to interpret and experience the world
80. Thinking is
- being
  - knowing
  - application of pre-existing ideas to a situation
  - application of fixed ideas to a situation

## PASSAGE - 10

(1998)

The highest priced words are ghost-written by gagmen who furnish the raw material for comedy over the air and on the screen. They have a word-lore all their own, which they practice for five to fifteen hundred dollars a week or fifteen dollars a gag at piece rates. That's sizable rate for confounding acrimony with matrimony, or extracting attar of roses the other.

Quite apart from dollar sign on it, gagmen's word-lore is worth a close look, if are given to the popular American pastime of playing with words—or if you're part of the 40% who make their living in the word trade.

Gag writers' tricks with words point up the fact that we have two distinct level of language: familiar, ordinary words that everybody knows; and more elaborate words that don't turn up so often, but many of which we need to know if we are to feel at home in listening and reading today.

To be sure gagmen play hob with the big words, making not sense but fun of them. They keep on confusing bigotry with bigamy, illiterate with illegitimate, monotony with monogamy, osculation with oscillation. They trade on the fact that for many of their listeners, these fancy terms linger in a twilight zone of meaning. Its their deliberate intent to make everybody feel cozy at hearing big words jumbled up or smacked down. After all, such words loom up as over-size in ordinary talk, so no wonder they get the bulldozer treatment from the gagmen.

Their wrecking technique incidentally reveals our language as full of tricky words, some with nineteen different meanings, others which sound alike but differ in sense. To ring good punning changes, gag writers have to know their way around in the language. They don't get paid for ignorance, only for simulating it.

Their trade is a hard one, and they regard it as serious business. They never laugh at each other's jokes, rarely at their own. Like comedienne, they are usually melancholy men in private life.

Fertile invention and ingenious fancy are required to clean up "blue" burlesque gags for radio use. These shady gags are theoretically taboo on the air. However, a gag writer who can leave a faint trace of bluing when he launders the joke is all the more admired---and more highly paid.

A gag that keeps the blue tinge a called a "double intender", gag-land jargon for double entendre. The double meaning makes the joke funny at two levels. Children and other innocents hearing the crack for the first time take it literally, laughing at the surface hummer; listeners who remember the original as they heard it in vaudeville or burlesque, laugh at the artfulness with which the blue tinge is disguised.

Another name for a double meaning of this sort is "insuendo". This is a portmanteau word or "combo", as the gagmen would label it, thus abbreviating combination. By telescoping insinuation and innuendo, they get insuendo, on the principle of blend words brought into vogue by Lewis Carroll.

"Shock logic" is another favorite with gag writers. Supposedly, a specialty of women comedienne, it is illogical logic more easily illustrated than defined. A high school girl has to turn down a boy's proposal. She writes :

Dear Jerry,

I'm sorry, but I can't get engaged to you. My mother thinks I am too young to be engaged, and besides, I'm already engaged to another boy.

Yours regrettfully,

Guess who.

Gag writers' lingo is consistently funnier than their gags. It should interest the slang-fancier. And like much vivid jargon developed in specialized trades and sports, a few of the terms are making their way into general use. Gimmick, for instance, in the sense either of a thick devised or the point of a joke, is creeping into the vocabulary of columnists and feature writers.

Even apart from the trade lingo, gagmen's manoeuvres are of real concern to any one who follows words with a fully awakened interest. For the very fact that gag writers often use a long and unusual word as the hinge of a joke, or as a peg for situation comedy, tells us something quite significant: they are well aware of the limitations of the average vocabulary and are quite willing to cash in on its shortcomings.

When Fred Allens' joke-smiths work out a fishing routine, they have Allen referring to the bait in his most arch and solemn tones: "I presume you mean the legless invertebrate." This is the old minstrel trick, using a long fancy term instead of calling a worm a worm.

Chico Marx can stretch a pun over five hundred feet of film, making it funnier all the time, as he did when he worried the word viaduct, which he rendered "why a duck ?"

And even the high-brow radio writers have taken advantage of gagmen's technique. You might never expect to hear on the air such words as lepidopterist and entomologist. Both occur in a very famous radio play by Norman Corvine, "My client Curly," about an unusual caterpillar which would dance at the tune "yes, sir she's my baby" but remained inert to all other music. The dancing caterpillar was given a real New York buildup, which involved calling in the experts on butterflies and insects which travel under the learned names above. Corvine made mild fun of the fancy professional titles, at the same time explaining them unobtrusively.

There are many similar occasion where any one working with words can turn gagmen's trade secrets to account. Just what words do they think outside the familiar range ? How do they pick the words that they "kick around"? It's not hard to find out.

81. According to the writer a large part of the American population
  - (a) indulges in playing out the role of gag writers
  - (b) indulges in the word trade
  - (c) seeks employment in the gag trade for want of something better
  - (d) looks down on gag writers
82. The hallmark of gag writers is that
 

(a) they ruin good, simple language	(b) have fun with words
(c) make better sense of words	(d) play with words to suit the audience's requirements
83. According to the passage, the second level of language is important if
 

(a) one wants to be at home reading and listening today	(b) one wants to be a gag writer
(c) one wants to understand clean entertainment	(d) all of these
84. According to the writer, gag writers thrive on
 

(a) the double-layered aspect of language	(b) audience craze of double entendres
(c) vulgar innuendoes	(d) commonplace jugglery with language

85. In gag writers' trade
- long words abbreviated for effect
  - parts of words are combined to produce a hilarious portmanteau effect
  - long words play a major role
  - both (b) and (c)
86. When the writer says, "They don't get paid for ignorance, only for simulating it", he means to say
- the audience likes to think the gag writers are an ignorant lot
  - gag writers are terrific with insinuations
  - simulating ignorance is the trick that makes gag writers tick
  - none of the above
87. Gag writers have influenced
- (a) television artists      (b) radio writers      (c) circus clowns      (d) all of these

### PASSAGE - 11

(1999)

Have you ever come across a painting, by Picasso, Mondrian, Miro, or any other modern abstract painter of this century, and found yourself engulfed in a brightly coloured canvas which your senses cannot interpret? Many people would tend to denounce abstractionism as senseless trash. These people are disoriented by Miro's bright, fanciful creatures and two-dimensional canvases. They click their tongues and shake their heads at Mondrian's grid works, declaring the poor guy played too many scrabble games. They silently shake their heads in sympathy for Picasso, whose gruesome, distorted figures must be a reflection of his mental health. The standing in front of a work by Charlie Russell, the famous Western artist, they'll declare it a work of God. People feel more comfortable with something they can relate to and understand immediately without too much thought. This is the case with the work of Charlie Russell. Being able to recognise the elements in his paintings - trees, horse and cowboys- gives people a safety line to their world of "reality". There are some that would disagree when I say abstract art requires more creativity and artistic talent to produce a good piece than does representational art, but there are many weaknesses in their argument.

People who look down on abstract art have several major arguments to support their beliefs. They feel that artists turn abstract because they are not capable of the technical drafting skills that appear in a Russell; therefore, such artists create an art form that anyone is capable of and that is less time consuming, and then parade it as artistic progress. Secondly, they feel that the purpose of art is to create something of beauty in an orderly, logical composition. Russell's composition are balanced and rational; everything sits calmly on the canvas, leaving the viewer satisfied that he has seen all there is to see. The modern abstractionists, on the other hand, seems to compose their pieces irrationally. For example, upon seeing Picasso's *Guernica*, a friend of mine asked me, "What's the point?" Finally, many people feel that art should portray the ideal and the real. The exactness of detail in Charlie Russell's work is an example of this. He has been called a great historian because his pieces depict the life style, dress, and events of the times. His subject matter is derived from his own experiences on the trail, and reproduced to the smallest detail.

I agree in part with many of these arguments, and at one time even endorsed them. But now, I believe differently. Firstly I object to the argument that abstract artists are not capable of drafting. Many abstract artists, such as Picasso, are excellent draftsmen. As his work matured, Picasso became more abstract in order to increase the expressive quality of his work. *Guernica* was meant as a protest against the bombing of that city by the Germans. To express the terror and suffering of the victims more vividly, he distorted the figures and presented them in a black and white journalistic manner. If he had used representational images and colour, much of the emotional content would have been lost and the piece would not have caused the demand for justice that it did. Secondly, I do not think that a piece must be logical and aesthetically pleasing to be art. The message it conveys to its viewers is more important. It should reflect the ideals and issues of its time and be true to itself, not just a flowery, glossy surface. For example, through his work, Mondrian was trying to present a system of simplicity, logic, and rational order. As a result, his pieces did end up looking like a scrabble board.

Miro created powerful, surrealistic images from his dreams and subconscious. These artist were trying to evoke a response from society through an expressionistic manner. Finally, abstract artists and representational artist reality is what he sees with his eyes. This is the reality he reproduces on canvas. To the abstract artist, Reality is what he feels about what his eyes see, This is the reality he interprets on canvas. This can be illustrated by Mondrian's Trees series. You can actually see the progression from the early recognizable, though abstracted, Trees, to his final solution, the grid system.

A cycle of abstract and representational art began with the first scratchings of prehistoric man. From the abstractions of the ancient Egypt to representational, classical Rome, returning to abstractionism in early Christian art and so on up to the present day, the cycle has been going on. But this day and age may witness its death through the camera. With film, there is no need to produce finely detailed historical records manually; the camera does this for us more efficiently. May be representational art would cease to exist. With abstractionism as the victor of the first battle may be a different kind of cycle will be touched off. Possibly, some time in the distant future, thousand of years from now, art itself will physically non-existent. Some artists today believe that once they have planned and constructed a piece in their is no sense in finishing it with their hands; it has already been done and can never be duplicated.

88. The author argues that many people look down upon abstract art because they feel that
- Modern abstract art does not portray what is ideal and real
  - Abstract artists are unskilled in matters of technical drafting
  - Abstractionists compose irrationally
  - All of the above
89. The author believes that people feel comfortable with representational art because
- they are not engulfed in brightly colored canvases
  - they do not click their tongues and shake their heads in sympathy
  - they understand the art without putting too much strain on their minds
  - painting like Guernica do not have a point.
90. In the author's opinion, Picasso's *Guernica* created a strong demand for justice since
- It was protest against the German bombing of Guernica
  - Picasso managed to express the emotional content well with his abstract depiction
  - It depicts the terror and suffering of the victims in a distorted manner
  - It was a mature work of Picasso's painted when the artist's drafting skills were excellent.
91. The author acknowledges that Mondrian's pieces may have ended up looking like a scrabble board because
- many people declared the poor guy played too many scrabble games
  - Mondrian believed in the 'grid-works approach to abstractionist painting
  - Mondrian was trying to convey the message of simplicity and rational order
  - Mondrian learned from his *Trees* series to evolve a grid system.
92. The main difference between the abstract artist and the representational artist in matters of the 'ideal' and the 'real', according to the author is
- How each chooses to deal with 'reality' on his or her canvas
  - The superiority of interpretation of reality over reproduction of reality
  - The different values attached by each being a historian
  - The varying levels of drafting skills and logical thinking abilities

## PASSAGE - 12

(1999)

Each one has his reasons: for one art is a flight; for another, a means of conquering. But one can flee into a hermitage, into madness, into death. One can conquer by arms. Why does it have to writing, why does one have to manage his escapes and conquests by writing? Because behind the various aims of authors, there is a deeper and more immediate choice which is common to all of us. We shall try to elucidate this choice, and we shall see whether it is not in the name of this very choice of writing that the engagement of writers must be required.

Each of our perceptions is accompanied by the consciousness that human reality is a 'revealer', that is, it is through human reality that 'there is being, or to put it differently, that is the means by which things are manifested. It is our presence in the world which multiplies relations. It is we who set up relationship between this tree and that bit of sky. Thanks to us, that star which has been dead for millenia, that quarter moon, and that dark river are disclosed in the unity of a landscape. It is the seed of our auto and our airplane which organizes the great masses of the earth. With each of our acts, the world reveals to save us a new face. But, if we know that we are the directors of being, we also know that we are not its producers. If we turn away from this landscape, it will sink back into its dark permanence. At least, it will sink back; there is no one mad enough to think that it is going to be annihilated. It is we who shall be annihilated, and the earth will remain until another consciousness comes along to awaken it. Thus, to our inner certainty of being 'revealers' is added that of being inessential in relation to the thing revealed.

One of the chief motives of artistic creation is certainly the need of feeling that we are essential in relationship to the world. If I fix on canvas or in writing a certain aspect of the fields or the sea or a look on someone's face which I have disclosed, I am conscious of having produced them by condensing relationships, by introducing order where there was none, by imposing the unity of mind on the diversity of things. That is, I think myself essential in relation to my creation. But this time it is the created object which escapes me; I cannot reveal and produce at the same time. The creation becomes inessential in relation to the creative activity. First of all, even if it appears to others as definitive, the created object always seems to us in a state of suspension; we can always change this line, that shade, that word. Thus it never forces itself. A novice painter asked his teacher, 'When should I consider my painting finished?' And the teacher answered, 'When you look at it in amazement and say to yourself "I'm the one who did that!"'

Which amounts of saying 'never. For it is virtually considering one's work with someone else's eyes and revealing what had been created. But its is self-evident that we are proportionally less conscious of the thing produced and more conscious of our productive activity. When it is a matter of poetry or carpentry , we work according to traditional norms, with tools whose usage is codified; it is Heidegger's famous 'they' who are working with our hands. In this case, the result can seem to us sufficiently strange to preserve its objectivity in our eyes. But if we ourselves produce the rules of produce the rules of production, the measures, the criteria, and if our creative drive comes form the very depths of our heart, then we never find anything but ourselves in work. It is we who have invented the laws by which we judge it. It is our history, our love, our gaiety that we recognize in it. Even if we should regard it without touching it any further, we never receive from it that gaiety or love. We put them into it. The results which we have obtained on canvas or paper never seems to us objective. We are too familiar with the processes of which they are the effects. These processes remain a subjective discovery; they are ourselves, our inspiration, our ruse, and when we seek to perceive our work, we create it again, we repeat mentally the operations which produced it; each of its aspects appears as the inessential. The latter seeks essentially in the creation and obtains it, but them it is the object which becomes the inessential.

The dialectic is now where more apparent than in the art of writing, for the literary object is a peculiar top which exists only in movement. To make it come into view a concrete act called reading is necessary, and it lasts only as long as this act can last beyond that, there are only black marks on paper. Now the writer can not read what he writes, whereas the shoemaker can put on the shoes he has just made if they are of the size, and the architect can live in the house he has built. In reading, one foresees; one waits. He foresees the end of the sentence, the following sentence, the next page. He waits for them to confirm or disappoint his foresights. The reading is composed of a host of the sentence they are reading in a merely probable future which partly collapses and partly comes together in proportion as they progress, which withdraws from one page to the next and forms the moving horizon of the literary object. Without waiting a future, without ignorance, there is no objectivity.

93. The author holds that

- (a) There is an objective reality and a subjective reality
- (b) Nature is the sum total of disparate elements
- (c) It is human action that reveals the various facets of nature
- (d) Apparently disconnected elements in nature are unified in a fundamental sense.

94. It is the author's contention that

- (a) Artistic creations are results of human consciousness
- (b) The very act of artistic creations leads to the escape of the created object
- (c) Man can produce and reveal at the same time
- (d) An act of creation forces itself on our consciousness leaving us full of amazement.

95. The passage makes a distinction between perception and creation in terms of

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|---|--|
| <ul style="list-style-type: none"> <li>(a) Objectivity and subjectivity</li> <li>(c) Objective reality and perceived reality</li> </ul> | <ul style="list-style-type: none"> <li>(b) Revelation and action</li> <li>(d) Essentiality and non-essentiality of objects and subjects</li> </ul> |
|---|--|

96. The art of writing manifests the dialectic of perception and creation because

- (a) reading reveals the writing till the act of reading lasts
- (b) writing to be meaningful needs the concrete act of reading
- (c) this art is anticipated and progresses on series of hypotheses
- (d) this literary object has a moving horizon brought about by the very act of creation

97. A writer, as an artist

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>(a) reveals the essentiality of revelation</li> <li>(c) Creates reality</li> </ul> | <ul style="list-style-type: none"> <li>(b) makes us feel essential vis-a-vis nature</li> <li>(d) Reveals nature in its permanence</li> </ul> |
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### PASSAGE - 13

(1999)

The persistent patterns in the way nations fight reflect their cultural and historical traditions and deeply rooted attitudes that collectively make up their strategic culture. These patterns provide insights that go beyond what can be learnt by just comparing armaments and divisions. In Vietnam War, the strategic tradition of the United States called for forcing the enemy to fight a massed battle in an open area, where superior American weapons would prevail. The United States was trying to re-fight World War II in the jungles of Southeast Asia, against an enemy with no intention of doing so.

Some British military historian's describe the Asian way of war as one indirect attacks, avoiding frontal attacks meant overpower an opponent. This traces back to Asian history and geography: the great distances and harsh terrain have often made it difficult to execute the sort of open field clashes allowed by the flat terrain and relatively compact size of Europe. A very different strategic tradition arose in Asia.

The bow and arrow were metaphors for an Eastern way, of war, by its nature, the arrow is an indirect weapon. Fired from a distance of hundred yards, it does not necessitate immediate physical contact with the enemy. Thus, it can be fired from hidden positions. When from behind a ridge, the barrage seems to come out from classical strategic writings of the East. The 2,000 years' worth of Chinese writings on war constitutes the most subtle writings on the subject in any language. Not until Clausewitz, did the West produce a strategic theorist to match the sophistication of Sun-tzu, whose *Art of war* was written 2,300 years earlier.

In Sun-tzu and other Chinese writings, the highest achievement of arms is to defeat an adversary without fighting. He wrote: "To win one hundred victories in one hundred battles is not the acme of skill. To subdue the enemy without fighting is the supreme excellence." Actual combat is just one among many means towards the goal of subduing an adversary. War contains too many surprises to be a first resort. It can lead to ruinous losses, as has been seen time and again. It can have the unwanted effect of inspiring heroic efforts in an enemy, as the United States learned in Vietnam, and as the Japanese found out after Pearl Harbour.

Aware of the uncertainties of a military campaign, Sun-tzu advocated war only after the most thorough preparations. Even then it should be quick and clean. Ideally, the army is just an instrument to deal the final blow to an enemy already weakened by isolation, poor morale, and disunity. Ever since Sun-tzu, the Chinese have been seen as masters of subtlety who take measured actions to manipulate an adversary without his knowledge. The dividing line between war and peace can be obscure. Low level violence often is the backdrop to a large strategic campaign. The unwitting victim, focused on the day to day events, never realizes what's happening to him until it's too late. History holds many examples. The mobile army of the United States was designed to fight on the plains of Europe, where it could quickly move unhindered from one spot to the next. The jungle did more than make quick movement impossible: broken down into smaller units and scattered in isolated bases, US forces were deprived of the feeling of support and protection that ordinarily comes from being part of a big army.

The isolation of US troops in Vietnam was not just a logistical detail, something that could be overcome by, for instance, bringing in reinforcements by helicopter. In a big army reinforcements are readily available. It was Napoleon who realized the extraordinary effects on morale that come from being a part of a larger formation. Just the knowledge of it lowers the soldier's fear and increases his aggressiveness. In the jungle and on isolated bases, this feeling was removed. The thick vegetation slowed down the reinforcements and made it difficult to find stranded units. Soldiers felt they were on their own.

More important, by altering the way the war was fought, the Viet Cong stripped the United States of its belief in the inevitability of victory, as it had done to the French before them. Morale was high when these armies first went to Vietnam. Only after many years of debilitating and demoralizing fighting did Hanoi launch its decisive attacks, at Dien Bien Phu in 1954 and against Saigon in 1975. It should be recalled that in the final push to victory the North Vietnamese abandoned their jungle guerrilla tactics completely, committing their entire army of twenty divisions to pushing the South Vietnamese into collapse. This final battle with the enemy's army all in one place, was the one that the United States had desperately wanted to fight in 1965. When it did come out into the open in 1975, Washington had already withdrawn its forces and there was no possibility of re-intervention.

The Japanese early in World War II used a modern form of the indirect attack one that relied on stealth and surprise for its effect. At Pearl Harbour, in the Philippines, and in Southeast Asia, stealth and surprise were attained by sailing under radio silence so that the navy's movements could not be tracked moving troops aboard ships into southeast Asia made it appear that the Japanese army was also "invisible" attacks against Hawaii and Singapore seemed, to the American and British defenders, to come from nowhere. In Indonesia and the Philippines the Japanese attack was even faster the German blitz against France in the west.

The greatest military surprises in American history have all been in Asia. Surely there is something going on there beyond the purely technical difficulties of detecting enemy movement Pearl Harbour, the Chinese intervention in Korea, and was greatly improved after each surprise, but with no noticeable improvement in the American ability to foresee or prepare what would happen next. There is a cultural divide here, not just a technical one. Even when it was possible to track an army with intelligence satellites, as when Iraq invaded Kuwait or when Syria and Egypt attacked Israel, surprise was achieved, the United States was stunned by Iraq's attack on Kuwait even though it had satellite pictures of Iraqi troops massing at the border.

The exception proves the point that cultural differences obscure the west's understanding of Asian behaviour was the Soviet Union's 1979 invasion of Afghanistan. This was fully anticipated and understood in advance. There was no surprise because the United States understood Moscow's world view and thinking. It could anticipate Soviet action almost as well as the Soviets themselves, because the Soviet Union was really a Western country.

The difference between the Eastern and the Western way of war is striking. The West's great strategic writer, Clausewitz, linked war to politics, as did Sun-tzu. Both were opponents of militarism, of turning war over to the generals. But there all similarity ends. Clausewitz wrote that the way to achieve a large political purpose is through destruction of the enemy's army. After observing Napoleon conquer Europe by smashing enemy armies to bits, Clausewitz made his famous remark in *On War* (1932) that combat is the continuation of politics by violent means. Morale and unity are important, but they should be harnessed for the ultimate battle. If the Eastern way of war is embodied by the stealthy archer, the metaphorical Western counterpart is the swordsman charging forward, seeking a decisive showdown eager to administer the blow that will obliterate the enemy once and for all. In this view, war proceeds along a fixed course and occupies a finite extent of time, like a play in three acts with a beginning, a middle, and an end. The final scene, decides the issue for good.

When things don't work out quite this way, the western military mind feels tremendous frustration. Sun-tzu's great disciples, Mao Zedong and Ho Chi Minh, are respected in Asia for their clever use of indirection and deception to achieve and advantage over stronger adversaries. But in the west their approach is seen as underhanded and devious. To the American strategic mind, the Viet Cong guerrilla did not fight fairly. He should have come out into the open and fought like a man, instead of hiding in the jungle and sneaking around like a cat in the night.

98. According to the author, the main reason for the US losing the Vietnam war was
  - (a) the Vietnamese understood the local terrain better
  - (b) The lack of support for the war from the American people
  - (c) The failure of the US to mobilize its military strength
  - (d) Their inability to fight a war on terms other than those they understood well.
99. Which of following statements does not describe the 'Asian " way of war ?
  - (a) Indirect attacks without frontal attacks
  - (b) The swordsman charging forward to obliterate the enemy once and for all
  - (c) Manipulation of an adversary without his knowledge
  - (d) Subduing an enemy without fighting.
100. Which of the following is not one of Sun-tzu's ideas
  - (a) Actual combat is the principal means of subduing an adversary
  - (b) war should be undertaken only after thorough preparation
  - (c) War is linked to politics
  - (d) war should not be left to the generals alone.
101. The difference in the concepts of war of Clausewitz and Sun-tzu is best characterised by
  - (a) Clausewitz's support for militarism as against Sun-tzu's opposition to it
  - (b) their relative degrees of sophistication
  - (c) their attitude to guerilla warfare
  - (d) their differing conceptions of the structure, time and sequence of a war.
102. To the Americans, the approach of the Viet Cong seemed devious because
  - (a) the Viet Cong did not fight like men out in the open
  - (b) the Viet Cong allied with America's enemies
  - (c) the Viet Cong took strategic advice from Mao Zedong
  - (d) the Viet Cong used bows and arrows rather than conventional weapons
103. According to the author, the greatest military surprises in American history have been in Asia because
  - (a) The Americans failed to implement their military strategies many miles away from their own country
  - (b) The Americans were unable to use their technologies like intelligence satellites effectively to detect enemy movements
  - (c) The Americans failed to understand the Asian culture of war that was based on stealth and surprise
  - (d) Clausewitz is inferior to Sun-tzu

## PASSAGE - 14

(2000)

One of the criteria by which we judge the vitality of a style of painting is its ability to renew itself - its responsiveness to the changing nature and quality of experience, the degree of conceptual and formal innovation that it exhibits. By this criterion, it would appear that the practice of abstractionism has failed to engage creatively with the radical change in human experience in recent decades. It has, seemingly, been unwilling to re-invent itself in relation to the systems of artistic expression and viewer's expectations that have developed under the impact of the mass media.

The judgement that abstractionism has slipped into 'inertia gear' is gaining endorsement, not only among discerning viewers and practitioners of other art forms, but also among abstract painters themselves. Like their companions elsewhere in the world, abstractionists in India are asking themselves an overwhelming question today: Does abstractionism have a future? The major crisis that abstractionists face is that of revitalising their picture surface; few have improvised any solutions beyond the ones that were exhausted by the 1970s. Like all revolutions, whether in politics or in art, abstractionism must now confront its moment of truth: having begun life as a new and radical pictorial approach to experience, it has become an entrenched orthodoxy itself. Indeed, when viewed against an historical situation in which a variety of subversive, interactive and richly hybrid forms are available to the art practitioner, abstractionism assumes the remote and defiant air of an aristocracy that has outlives its age; trammelled by formulaic conventions yet buttressed by a rhetoric of sacred mystery, it seems condemned to being the last citadel of the self-regarding 'fine-art' tradition, the last hurrah of painting for paintings's sake.

The situation is further complicated in India by the circumstances in which an indigenous abstractionism came into prominence here during the 1960s. From the beginning it was propelled by the dialectic between two motives, one revolutionary and the other conservative. It was inaugurated as an act of indulgence at worst, and at best, as an instrument for the celebration of the republic's hopes and aspirations. Having rejected these dogmas, the pioneering abstractionists also went on to reject the various figurative styles associated with the Shantiniketan circle and others. In such a situation, abstractionism was a revolutionary move. It led art towards the exploration of the subconscious mind, the spiritual quest and the possible expansion of consciousness. Indian painting entered into a phase of self-inquiry, a meditative inner space where cosmic symbols and non-representational images ruled. Often, the transition from figurative idioms to abstractionist ones took place within the same artist.

At the same time, Indian abstractionists have rarely committed themselves wholeheartedly to a non-representational idiom. They have been preoccupied with the fundamentally metaphysical project of aspiring to the mystical-holy without altogether renouncing the symbolic. This has been sustained by a hereditary reluctance to give up the *murti*, the inviolable iconic form, which explains why abstractionism is marked by the conservative tendency to operate with images from the sacred repertoire of the past. Abstractionism thus entered India as a double-edged device in a complex cultural transaction. Ideologically, it served as an internationalist legitimisation of the emerging revolutionary local trends. However, on entry, it was conscripted to serve local artistic preoccupations - a survey of indigenous abstractionism will show that its most obvious points of affinity with European and American abstract art were with the more mystically oriented of the major sources of abstractionist philosophy and practice, for instance the Kandinsky-Klee school. There have been no takers for Malevich's Suprematism, which militantly rejected both the artistic forms of the past and the world of appearances, privileging the new-minted geometric symbol as an autonomous sign of the desire for infinity.

Against this backdrop, we can identify three major abstractionist idioms in Indian art. The first develops from a love of the earth, and assumes the form of a celebrations of the self's dissolution in the cosmic panorama; the landscape is no longer a realistic transcription of the scene, but is transformed into a visionary occasion for contemplating the cycles of decay and regeneration. The second idiom phrases its departures from symbolic and archetypal devices as invitations to heightened planes of awareness. Abstractionism begins with the establishment of dissolution of the motif, which can be drawn from the diverse sources, including the hieroglyphic tablet, the Sufi meditation dance or the Tantric diagram. The third idiom is based on the lyric play of form guided by gesture or allied with formal improvisations like the assemblage. Here, sometimes, the line dividing abstract image from patterned design or quasi-random expressive marking may blur. The flux of forms can also be regimented through the poetics of pure arrangements, vector-diagrammatic spaces and gestural design.

In this genealogy, some pure lines of descent follow their logic to the inevitable point of extinction, others engage in cross-fertilisation, and yet other undergo mutation to maintain their energy. However, this genealogical survey demonstrates the wave at its crests, those points where the metaphysical and the painterly have been fused in images of abiding potency, ideas sensuously ordained rather than fabricated programmatically to a concept. It is equally possible to enumerate the troughs where the two principles do not come together, thus arriving at a very different account. Uncharitable as it may sound, the history of Indian abstractionism records a series of attempts to avoid the risks of abstraction by resorting to an overt and near-generic symbolism, which many Indian abstractionists metaphysics and painterliness.

Such symbolism falls into dual trap it succumbs to the pompous vacuity of pure metaphysics when the burden of intention is passed off as justification; or then it is desiccated by the arid formalism of pure painterliness, with delight in the measure of chance or pattern guiding the execution of painting. The ensuing conflict of purpose stalls the progress of abstractionism in an impasse. The remarkable Indian abstractionists are precisely those who have overcome this and addressed themselves to the basic elements of their art with a decisive sense of independence from their prior models. In their recent work, we see the logic of Indian abstractionism pushed almost to the furthest it can be taken. Beyond such artists stands a lost generation of abstractionists whose work invokes a wistful, delicate beauty but stops there.

Abstractionism is not a universal language; it is an art that points up the loss of a shared language of signs in society. And yet it affirms the possibility of its recovery through the effort of awareness. While its rhetoric has always emphasised a call for new forms of attention, abstractionist practice has tended to fall into complacent pride in its own incomprehensibility; a complacency fatal in an ethos where vibrant new idioms compete for the viewers attention. Indian abstractionist ought to really return to basics, to reformulate and replenish their understanding of the nature of the relationship between the painted image and the world around it. But will they abandon their favourite conceptual habits and formal conventions, if this becomes necessary

104. Which one of the following is not stated by the author as a reason for abstractionism losing its vitality ?
- Abstractionism has failed to reorient itself in the context of changing human experience
  - Abstractionism has not considered the developments in artistic expression that have taken place in recent times
  - Abstractionism has not followed the path taken by all revolutions, whether in politics or art
  - The impact of mass media on viewers expectations has not been assessed, and responded to, by abstractionism

105. Which one of the following, according to the author, is the role that abstractionism plays in a society?
- It provides an idiom that can be understood by most members in a society
  - It highlights the absence of a shared language of meaningful symbols which can be recreated through greater awareness
  - It highlights the contradictory artistic trends of revolution and conservation that any society needs to move forward
  - It helps abstractionists invoke the wistful, delicate beauty that may exist in society
106. According to the author, which one of the following characterises the crisis faced by the abstractionism?
- Abstractionists appear to be unable to transcend the solutions tried out earlier
  - Abstractionism has allowed itself to be confirmed by set forms and practices
  - Abstractionists have been unable to use the multiplicity of forms now becoming available to an artist
  - All of the above
107. According to the author, the introduction of abstractionists was revolutionary because it
- celebrated the hopes and aspirations of a newly independent nation
  - provided a new direction to Indian art, towards self-inquiry and non-representational images
  - managed to obtain internationalist support for the abstractionist agenda
  - was an emancipation from the dogmas of the nascent nation state
108. Which one of the following is not part of the authors characterisation of the conservative trend in Indian abstractionism
- An exploration of the subconscious mind
  - A lack of full commitment to non-representational symbols
  - An adherence to the symbolic while aspiring to the mystical
  - Usage of the images of gods or similar symbols.
109. Given the authors delineation of the three abstractionist idioms in Indian art, the idiom can be best distinguished from the other two idioms through is :
- |  |   |
|--|---|
| (a) depiction of nature cyclical renewal | (b) use of non-representational images  |
| (c) emphasis on arrangement of forms     | (d) limited reliance on original models |
110. According to the author, the attraction of the Kandinsky -klee school for Indian abstractionists can be explained by which one of the following?
- The conservative tendency to aspire to the mystical without a complete renunciation of the symbolic.
  - The discomfort of Indian abstractionists with Malevich's Suprematism
  - The easy identification of obvious point of affinity with European and American abstract art, of which the Kandinsky -Klee school is an example
  - The double- edged nature of abstractionism which enabled identification with mystically-oriented schools.
111. Which one of the following, according to the author, is the most important reason for the stalling of abstractionism's progress in an impasse ?
- Some artist have followed their abstractionist logic to the point of extinction
  - Some artists have allowed chance or pattern to dominate the execution of their paintings
  - Many artists avoided the trap of near-generic and an open symbolism
  - Many artists have found it difficult to fuse the twin principles of the metaphysical and the painterly

### PASSAGE - 15

(2000)

The teaching and transmission of North Indian classical music is, and long has been, achieved by largely oral means. The *raga* and its structure, the often breathtaking intricacies of *tala* or rhythm, and the incarnation of *raga* and *tala* as *bandish* or composition, are passed thus, between guru and *shishya* by word of mouth and direct demonstration, with no printed sheet of notated music, as it were, acting as a go-between. Saussure's conception of language as a communication between addresser and addressee is given in this model, a further instance, and a new, exotic complexity and glamour.

These days, especially with the middle class having entered the domain of classical music and playing not a small part in ensuring the continuation of this ancient tradition, the tape recorder serves as a handy technological slave and preserves, from oblivion, the vanishing, the elusive moment of oral transmission. Hoary *gurus*, too have seen the advantage of this device, and increasingly use it as an aid to instructing their pupils; in place of the shawls and other traditional objects that used to pass from *shishya* to guru in the past, as a token of the regard of the former of the latter, it is not unusual today, to see cassettes changing hands.

Part of my education in North Indian classical music was conducted via this rather ugly but beneficial rectangle of plastic, which I carried with me to England when I was an undergraduate. One cassette had stored in it various *talas* played upon the tabla, at various

tempos, by my music teacher's brother-in-law, Hazarilalji, who was a teacher of Kathak dance, as well as a singer and a tabla player. This was a work of great patience and prescience, a one- and a half hour performance without any immediate point or purpose, but intended for some delayed future moment when I'd practise the *talas* solitarily.

This repeated playing out of the rhythmic cycles on the tabla was inflected by the noises—an irate auto driver blowing a horn; the sound of overbearing pigeons that were such a nuisance on the banister; even the cry of a *kulfi* seller in summer-entering from the balcony of the third floor flat we occupied in those days, in a lane in Bombay suburb, before we left the city for good. These sounds, in turn, would invade, hesitantly, the ebb and flow of silence inside the artificially heated room, in a borough of West London, in which I used to live as an undergraduate. There, in the trapped dust silence and heat, the theka of the table, qualified by the imminent but intermittent presence and the itinerant *kulfi* seller, would inhabit a small graduate room in Oxford.

The tape recorder, though remains an extension of the oral transmission of music, rather than a replacement of it. And the oral transmission of North Indian classical music remains, almost uniquely, a testament to the fact that the human brain can absorb, remember and reproduce structures of great complexity and sophistication without the help of the hieroglyph or written mark or a system of notation. I remember my surprise on discovering that Hazarilalji - who had mastered Kathak dance, *tala* and North Indian classical music, and who used to narrate to me, occasionally, compositions meant or dance that were grand and intricate in their verbal prosody, architecture and rhythmic complexity - was near illiterate and barely learnt to write his name in large and clumsy letters.

Of course, attempts have been made, throughout the 20th century, to formally codify and even notate this music and institutions set up and degrees created. Specifically to educate students in this "scientific" and codified manner. Paradoxically, however, this style of teaching has produced no noteworthy student or performer; the most creative musicians still emerge from the *guru-shishya* relationship, their understanding of music developed by oral communication.

The fact that North Indian classical music emanated from, and has evolved through, oral culture, means that this music has a significantly different aesthetic, and that this aesthetic has different politics, from that of Western classical music. A piece of music in the Western tradition, at least in its most characteristic and popular conception, originates in its composer, and the connection between the composer writes down, in notation, his composition, as a poet might write down and publish his poem. However far the printed sheet of noted music might travel this from the composer, it still remains his property; and the notion of property remains at the heart of the Western conception of "genius", which derives from the Latin *gignere* or 'to beget'.

The genius in Western classical music is, then the originator, begetter and owner of his work—the printed, notated sheet testifying to his authority over his product and his power, not only of expression or imagination, but of origination. The conductor is a custodian and guardian of this property. Is it an accident that Mandelstam, in his notebooks, compares the conductor's baton to a policeman's, saying all the music of the orchestra lies mute within it, waiting for its first movement to release it into the auditorium?

The raga transmitted through oral means—is, in a sense, no one's property; it is not easy to pin down its source, or to know exactly where its provenance or origin lies. Unlike the Western classical tradition, where the composer begets his piece, notates it and stamps it with his ownership, the raga—unconfined to a single incarnation, composer or performer—remains necessarily greater than the artist who invokes it.

This leads to a very different politics of interpretation and valuation, to an aesthetic that privileges the evanescent moment of performance and invocation over the controlling authority of genius and the permanent record. It is a tradition, thus, that would appear to value the performer, as medium, more highly than the composer who presumes to originate what, effectively, cannot be originated in a single person—because the *raga* is the inheritance of a culture.

12. The author's contention that the notion of property lies at the heart of the Western conception of genius is best indicated by which one of the following?
  - (a) The creative output of a genius is invariably written down and recorded
  - (b) The link between the creator and his output is unambiguous
  - (c) The word "genius" is derived from a Latin word which means "to beget"
  - (d) The music composer notates his music and thus becomes the "father of a particular piece of music."
13. Saussure's conception of language as communication between addresser and addressee, according to the author, is exemplified by the
  - (a) teaching of North Indian classical music by word of mouth and direct demonstration
  - (b) use of the recorded cassette as a transmission medium between the music teacher and the trainee
  - (c) written down notation sheets as musical compositions
  - (d) conductor's baton and the orchestra
14. The author holds that the "rather ugly but beneficial rectangle of plastic" has proved to be a "handy technological slave" in:
  - (a) storing the talas played upon the tabla, various tempos
  - (b) ensuring the continuance of an ancient tradition
  - (c) transporting North Indian classical music across geographical borders
  - (d) capturing the transient moment of oral transmission

115. The oral transmission of North Indian classical music is an almost unique testament of the :
- efficacy of the *guru-shishya* tradition
  - learning impact of direct demonstration
  - brain's ability to reproduce complex structures without the help of written marks
  - the ability of an illiterate person to narrate grand and intricate musical compositions
116. According to the passage, in the North Indian classical tradition, the raga remains greater than the artist who invokes it. This implies an aesthetic which
- Emphasises performance and invocation over the authority of genius and permanent record
  - makes the music no one's property
  - values the composer more highly than the performer
  - supports oral transmission of traditional music
117. From the author's explanation of the notion that in the Western tradition, music originates in its composer, which one of the following be inferred?
- It is easy to transfer a piece of Western classical music to a distant place
  - The conductor in the Western tradition, as a custodian, can modify the music, since it 'lies mute' in his baton
  - The authority of the western classical music composer over his music product is unambiguous
  - The power of the Western classical music composer extends to the expression of his music.
118. According to the author, the inadequacy of teaching North Indian classical music through a codified, notation based system is best illustrated by
- a loss of the structural beauty of the *ragas*
  - a fusion of two opposing approaches creating mundane music
  - the conversion of free-flowing ragas into stilled set pieces
  - its failure to produce any noteworthy student or performer.
119. Which of the following statements best conveys the overall idea of the passage?
- North Indian and Western classical music are structurally different
  - Western music is the intellectual property of the genius while the North Indian *raga* is the inheritance of the culture
  - Creation as well as performance are important in the North Indian tradition
  - North Indian classical music is orally transmitted while Western classical music depends on written down notations.

## PASSAGE - 16

(2001)

Studies of the factors governing reading development in young children have achieved a remarkable degree of consensus over the past two decades. This consensus concerns the causal role of phonological skills in young children's reading progress. Children who have good phonological skills, or good "phonological awareness" become good readers and good spellers. Children with poor phonological skills progress more poorly. In particular, those who have a specific phonological deficit are likely to be classified as dyslexic by the time that they are 9 or 10 years old.

Phonological skills in young children can be measured at a number of different levels. The term phonological awareness is a global one, and refers to a deficit in recognising smaller units of sound within spoken words. Developmental work has shown that this deficit can be at the level of syllables, of onsets and rimes, or of phonemes. For example, a 4-year old child might have difficulty in recognising that a word like valentine has three syllables, suggesting a lack of syllabic awareness. A 5- years old might have difficulty in recognising that the odd word out in the set of words fan, cat, hat, mat, is fan. This task requires an awareness of the sub-syllabic units of the onset and the rime. The onset corresponds to any initial consonants in a syllable, and the rime corresponds to the vowel and to any following consonants. Rimes correspond to rhyme in single-syllable words and so the rime in fan differs from the rime cat, hat, and mat. In longer words, rime and rhyme may differ. The onsets in valentine are /v/ and /t/, and the rimes correspond to the spelling patterns 'al' 'en' and 'ine'.

A 6-year-old might have difficulty in recognising that plea and pray begin with the same initial sound. This is a phonemic judgement. Although the initial phoneme /p/ is shared between the two words, in plea it is part of the onset 'pl', and in pray it is part of the onset 'pr'. Until children can segment the onset (or the rime), such phonemic judgements are difficult are difficult for them to make. In fact, a recent survey of different developmental studies has shown that the different levels of phonological awareness appear to emerge sequentially. The awareness of syllables, onsets, and rimes appears to emerge at around the ages of 3 and 4, long before most children go to school. The awareness of phonemes, on the other hand, usually emerges at around the age of 5 or 6 when children have been taught to read for about a year. An awareness of onsets and rimes thus appears to be a precursor of reading, whereas an awareness of phonemes at every serial position on a word only appears to develop as reading is taught. The onset-rime and phonemic levels of phonological structure, however, are not distinct. Many onsets in English are single phonemes, and so are some rimes (e.g., sea, go, zoo).

The early availability of onsets and rimes is supported by studies that have compared the development of phonological awareness of onsets, rimes, and phonemes in the same subjects using the same phonological awareness tasks. For example, a study by Treiman and Zudowski used a same/different judgement task based on the beginning or the end sounds of the words. In the beginning sound task, the words began with the same onset, as in plea and plank, or shared only the initial phoneme, as in plea and pray. In the end-sound task, the words either shared the entire rime, as in spit and wit, or shared only the final phoneme, as in rat and wit. Treiman and Zudowski showed that 4- and 5-year old children found the onset/rime version of the same/different task significantly easier than the version based on the phonemes. Only the 6-year-olds, who had been learning to read for about a year, were able to perform both versions of the tasks with an equal level of success.

120. From the following statements, pick out the true statement according to the passage :
- A mono-syllabic word can have only one onset
  - A mono-syllabic word can have only one rhyme but more than one rime
  - A mono-syllabic word can have only one phoneme
  - All of the above
121. Which one of the following is likely to emerge last in the cognitive development of a child ?
- Rhyme
  - Rime
  - Onset
  - Phoneme
122. A phonological deficit in which of the following is likely to be classified as dyslexia?
- Phonemic judgement.
  - Onset judgement
  - Rime judgement
  - Any one or more of the above
123. The Treiman and Zudowski experiments found evidence to support the following
- at age 6, reading instruction helps children perform, both, the same- different judgement task
  - the development of onset-rime awareness precedes the development of an awareness of phonemes
  - at age 4 - 5 children found the onset-rime version of the same/different task significantly easier
  - the development of onset-rime awareness is a necessary and sufficient condition for the development of an awareness of phonemes
124. The single-syllable words Rhyme and Rime are constituted by the exact set of :
- |             |              |              |                |
|-------------|--------------|--------------|----------------|
| (A) rime(s) | (B) onset(s) | (C) rhyme(s) | (D) phoneme(s) |
| (a) A, B    | (b) A, C     | (c) A, B, C  | (d) B, C, D    |

## PASSAGE - 17

(2001)

Billie Holiday died a few weeks ago. I have been unable until now to write about her, but since she will survive many who receive longer obituaries, a short delay in one small appreciation will not harm her or us. When she died we the musicians, critics all who were ever transfixed by the most heart-rending voice of the past generation-grieved bitterly. There was no reason to. Few people pursued self-destruction more whole-heartedly than she, and when the pursuit was at an end, at the age of forty-four, she had turned herself into a physical and artistic wreck. Some of us tried gallantly to pretend otherwise, taking comfort in the occasional moments when she still sounded like a ravaged echo of her greatness. Others had not even the heart to see and listen any more. We preferred to stay home and, if old and lucky enough to own the incomparable records of her heyday from 1937 to 1946, many of which are not even available on British LP, to recreate those coarse textured, sinuous, sensual and unbearable sad noises which gave her a sure corner of immortality. Her physical death called, of anything for relief rather than sorrow. What sort of middle age would she have faced without the voice to earn money for her drinks and fixes, without the looks -and in her day she was hauntingly beautiful- to attract the men she needed, without business sense, without anything but the disinterested worship of ageing men who had heard and seen her in her glory?

And yet, irrational though it is, our grief expressed Billie Holiday's art, that of a woman for whom one must be sorry. The great blues singers, to whom she may be justly compared, played their game from strength. Lionesses, though often wounded or at bay (did not Bessie Smith call herself 'a tiger, ready to jump?'), their tragic equivalents were Cleopatra and Phaedra; Holiday's was embittered Ophelia. She was the Puccini heroine among blues singers, or rather among jazz singers, for thought she sang a cabaret version of the blues incomparably her natural idiom was the pop song. Her unique achievement was to have twisted this into a genuine expression of the major passions by means of a total disregard of its sugary tunes, or indeed of any tune other than her own few delicately crying elongated notes, phrased like Bessie Smith or Louis Armstrong in sackcloth, sung in a thin, gritty, haunting voice whose natural mood was an unresigned and voluptuous welcome for the pains of love. Nobody has sung, or will sing, Bess's songs from *Porgy* as she did. It was this combination of bitterness and physical submission, as of someone lying still while watching his legs being amputated, which gives such a blood curdling quality to her strange fruit the anti-lynching poem which she turned into an unforgettable art song. Suffering was her profession, but she did not accept it.

Little need be said about her horrifying life, which she described with emotional thought hardly with factual, truth in her autobiography *Lady Singer the Blues*. After an adolescence in which self-respect was measured by a girl's insistence on picking up the coins thrown to her by clients with her hands, she was plainly beyond help. She did not lack it, for she had the flair and scrupulous honesty of John Hammond to launch her, the best musicians of the 1930s to accompany her notably Teddy Wilson, Frankie Newton and Lester Young the boundless devotion of all serious connoisseurs and much public success. It was too late to arrest a career of systematic embittered self-immolation. To be born with both beauty and self-respect in the Negro ghetto of Baltimore in 1915 was too much of a handicap, even without rape at the age of ten and drug-addiction in her teens. But, while she destroyed herself, she sang, unmelodious profound and heartbreaking. It is impossible not to weep for her or not to hate the world which made her what she was.

125. Why will Billie Holiday survive who receive linger obituaries ?
  - (a) Because of her blues creations
  - (b) Because she was not as self-destructive as some other blues exponents
  - (c) Because of her smooth and mellow voice
  - (d) Because of the expression of anger in her songs
126. According to the author, if Billie Holiday had not died in her middle age
  - (a) she would have gone on to make a further mark
  - (b) she would have become even richer than what she was when she died
  - (c) she would have led a rather ravaged existence
  - (d) she would have led a rather comfortable existence
127. Which of the following statements is not representative of the author's opinion
  - (a) Billie Holiday had her unique brand of melody
  - (b) Billie Holiday's voice can be compared to other singers in certain ways
  - (c) Billie Holiday's voice had a ring of profound sorrow
  - (d) Billie Holiday welcomed suffering in her profession and in her life
128. According to the passage, Billie Holiday was fortunate in all but one of the following ways
  - (a) she was fortunate to have been picked up young by an honest producer
  - (b) she was fortunate to have the likes of Louis Armstrong and Bessie Smith accompany her
  - (c) she was fortunate to possess the looks
  - (d) she enjoyed success among the public and connoisseurs

### PASSAGE - 18

(2001)

The narrative of *Dersu Uzala* is divided into two major sections, set in 1902 and 1907 that deal with separate expeditions which Arseniev conducts into the Ussuri region. In addition a third time frame forms a prologue to the film. Each of the temporal frames has a different focus, and by shifting them Kurosawa is able to describe the encroachment of settlements upon the wilderness and the consequent erosion of Dersu's way of life. As the film opens, that erosion has already begun. The first image is a long shot of a huge forest, the trees piled upon one another by the effects of the telephoto lens so that the landscape becomes an abstraction and appears like a huge curtain of green. A little informs us that the year is 1910. This is as late into the century as Kurosawa will go. After this prologue, the events of the film will transpire even farther back in time and will be presented as Arseniev's recollections. The character of Dersu Uzala is the heart of the film, his life the example that Kurosawa wishes to affirm. Yet the formal organisation of the film works to contain, to circumscribe that life by erecting a series of obstacles around it. The film itself is circular, opening and closing by Dersu's grave thus sealing off the character from the modern world to which Kurosawa once so desperately wanted to speak. The multiple time frames also work to maintain a separation between Dersu and the contemporary world. We must go back farther even than 1910 to discover who he was. But this narrative structure has yet another implication. It safeguards Dersu's example, inoculates it from contamination with history, and protects it from contact with the industrialised, urban world. Time is organised by the narrative into a series of barriers, which enclose Dersu in kind of vacuum chamber protecting him from the social and historical dialectics that destroyed the other Kurosawa heroes. Within the film, Dersu does die, but the narrative structure attempts to immortalise him and his example, as Dersu passes from history into myth.

We see all this at work in the enormously evocative prologue. The camera tilts down to reveal felled trees littering the landscape and an abundance of construction. Roads and hoses outline the settlement that is being built. Kurosawa cuts to a medium shot of Arseniev standing in the midst of the clearing, looking uncomfortable and disoriented. A man passing in a wagon asks him what he is doing, and the explorer says he is looking for grave. The driver replies that no one has died here, the settlement is too recent. These words enunciate the temporal rupture that the film studies. It is the beginning of things (industrial society) and the end of things (the forest) the commencement of one world so young that no one has had time yet to die and the eclipse of another, in which Dersu has died. It is his grave for which the explorer searches. His passing symbolises the new order, the development that now surrounds

Arseniev. The explorer says he buried his friend three years ago, next to huge cedar and fir trees, but now they are all gone. The man on the wagon replies they were probably chopped down when the settlement was built, and he drives off. Arseniev walks to a barren, treeless spot next to a pile of bricks. As he moves the camera tracks and pans to follow, revealing a line of freshly built houses and a woman hanging her laundry to dry. A distant train whistle is heard, and the sound of construction in the clearing vie with the cries of birds and the rustle of wind in the trees. Arseniev pauses looks around for the grave that once was, and murmurs desolately, "Dersu". The image now cuts farther into the past, to 1902 and the first section of the film commences, which describes Arseniev's meeting with Dersu and their friendship.

Kurosawa defines the world of the film initially upon a void a missing presence. The grave is gone, brushed aside by a world rushing into modernism, and now the hunter exists only in Arseniev's memories. The hallucinatory dreams and visions of Dodeskaden are succeeded by nostalgic, melancholy ruminations. Yet by exploring these ruminations, the film celebrates the timelessness of Dersu's wisdom. The first section of the film has two purposes: to describe the magnificence and inhuman vastness of nature and to delineate the code of ethics by which Dersu lives and which permits him to survive in these conditions. When Dersu first appears, the other soldiers treat him with condescension and laughter, but Arseniev watches him closely and does not share their derisive response. Unlike them, he is capable of immediately grasping Dersu's extraordinary qualities. In camp, Kurosawa frames Arseniev by himself, sitting on the other side of the fire from his soldiers. While they sleep or joke among themselves, he writes in his diary and Kurosawa cuts in several point-of-view shots from his perspective of trees that appear animated and sinister as the fire light dances across their gnarled, leafless outlines. This reflective dimension, this sensitivity to the spirituality of nature, distinguishes him from the others and forms the basis of his receptivity to Dersu and their friendship. It makes him a fir pupil for the hunter.

129. How is Kurosawa able to show the erosion of Dersu's way of life?
- (a) By documenting the ebb and flow of modernisation
  - (b) By going back farther and farther in time
  - (c) By using three different time frames and shifting them
  - (d) Through his death in a distant time.
130. Arseniev's search for Dersu's grave
- (a) is part of the beginning of the film
  - (b) symbolises the end of the industrial society
  - (c) is misguided since the settlement is too new
  - (d) symbolises the rediscovery of modernity.
131. The film celebrates Dersu's wisdom
- (a) by exhibiting the moral vacuum of the pre-modern world
  - (b) by turning him into a mythical figure
  - (c) through hallucinatory dreams and visions
  - (d) through Arseniev's nostalgic, melancholy ruminations
132. According to the author the section of the film following the prologue
- (a) serves to highlight the difficulties that Dersu faces that eventually kill him
  - (b) shows the difference in thinking between Arseniev and Dersu
  - (c) shows the code by which Dersu lives that allows him to survive his surroundings
  - (d) serves to criticize the lack of understanding of nature in the pre-modern era
133. In the film, Kurosawa hints at Arseniev's reflective and sensitive nature
- (a) by showing him as not being derisive towards Dersu, unlike other soldiers
  - (b) by showing him as being aloof from other soldiers
  - (c) through shots of Arseniev writing his diary, framed by trees
  - (d) All of the above
134. According to the author, which of these statements about the film are correct?
- (a) The film makes its arguments circuitously
  - (b) The film highlights the insularity of Arseniev
  - (c) The film begins with the absence of its main protagonist
  - (d) None of the above

## PASSAGE - 19

(2002)

The production of histories of India has become very frequent in recent years and may well call for some explanation. Why so many and why this one in particular? The reason is a twofold one: changes in the Indian scene requiring a re-interpretation of the facts and changes in attitudes of historians about the essential elements of Indian history. These two considerations are in addition to the normal fact of fresh information, whether in the form of archeological discoveries throwing fresh light on an obscure period or culture, or the revelations caused by the opening of archives or the release of private papers. The changes in the Indian scene are too obvious to need emphasis. Only two generations ago British rule seemed to most Indian as well as British observers likely to extend into an indefinite future; now there is a teenage generation which knows nothing of it. Changes in the attitude of historians have occurred everywhere, changes in attitudes to the content of the subject as well as to particular countries, but in India there have been some special features. Prior to the British, Indian historiographers were mostly Muslims, who relied, as in the case of Sayyid Ghulam Hussain,

on their own recollection of events and on information from friends and men of affairs. Only a few like Abul Fazl had access to official papers. These were personal narratives of events, varying in value with the nature of the writer. The early British writers were officials. In the eighteenth century they were concerned with some aspect of Company policy, or, like Robert Orme in his *Military Transactions*, gave a straight narrative in what was essentially a continuation of the Muslim tradition. In the early nineteenth century the writers were still, with two notable exceptions, officials, but they were now engaged in chronicling, in varying moods of zest, pride, and awe, the rise of the British power in India to supremacy. The two exceptions were James Mill, with his critical attitude to the Company and John Marchman, the Baptist missionary. But they, like the officials, were anglo-centric in their attitude, so that the history of modern India in their hands came to be the history of the rise of the British in India.

The official school dominated the writing of Indian history until we get the first professional historian's approach, Ramsay Muir and P. E. Roberts in England and H. H. Dodwell in India. Then Indian historians trained in the English school joined in, of whom the most distinguished was Sir Jadunath Sarkar and the other notable writers: Surendranath Sen, Dr. Radhakumud Mukerji, and Professor Nilakanta Shastri. They, it may be said, restored India to Indian history, but their bias was mainly political. Finally have come the nationalists who range from those who can find nothing good or true in the British to sophisticated historical philosophers like K. M. Panikker.

Along with types of historians with their varying bias have gone changes in the attitude to the content of Indian history. Here Indian historians have been influenced both by their local situation and by changes of thought elsewhere. It is in this field that this work can claim some attention since it seeks to break new ground, or perhaps to deepen a freshly turned furrow in the field of Indian history. The early official historians were content with the glamour and drama of political history from Plassey to the Mutiny, from Dupleix to the Sikhs. But when the *raj* was settled down, glamour departed from politics, and they turned to the less glorious but more solid ground of administration. Not how India was conquered but how it was governed was the theme of this school of historians. It found its archpriest in H. H. Dodwell, its priestess in Dame Lilian Penson, and its chief shrine in the Volume VI of the *Cambridge History of India*. Meanwhile in Britain other currents were moving, which led historical study into the economic and social fields. R. C. Dutt entered the first of these currents with his *Economic History of India* to be followed more recently by the whole group of Indian economic historians. W. E. Moreland extended these studies to the Mughal Period. Social history is now being increasingly studied and there is also of course a school of nationalist historians who see modern Indian history in terms of the rise and the fulfillment of the national movement.

All these approaches have value, but all share in the quality of being compartmental. It is not enough to remove political history from its pedestal of being the only kind of history worth having if it is merely to put other types of history in its place. Too exclusive an attention to economic, social, or administrative history can be as sterile and misleading as too much concentration on politics. A whole subject needs a whole treatment for understanding. A historian must dissect his subject into its elements and then fuse them together again into an integrated whole. The true history of a country must contain all the features just cited but must present them as parts of a single consistent theme.

35. Which of the following may be the closest in meaning to the statement "restored India to Indian history"?
- Indian historians began writing Indian history
  - Trained historians began writing Indian history
  - Writing India-centric Indian history began
  - Indian history began to be written in India
136. Which of the following is the closest implication of the statement "to break new ground, or perhaps to deepen a freshly turned furrow"?
- Dig afresh or dig deeper
  - Start a new stream of thought or help establish a recently emerged perspective
  - Begin or conduct further work on existing archeological sites to unearth new evidence
  - Begin writing a history free of any biases
137. Historians moved from writing political history to writing administrative history because
- attitudes of the historians changed
  - the *raj* was settled down
  - politics did not retain its past glamour
  - administrative history was based on solid ground
138. According to the author, which of the following is **not** among the attitudes of Indian historians of Indian origin?
- Writing history as personal narratives
  - Writing history with political bias
  - Writing non-political history due to lack of glamour
  - Writing history dissecting elements and integrating them again
139. In the table given below, match the historians to the approaches taken by them

A. Administrative      E. Robert Orme

B. Political      F. H. H. Dodwell

C. Narrative      G. Radhakumud Mukherji

D. Economic      H. R. C. Dutt

(a)	(b)	(c)	(d)
A – F	A – G	A – E	A – F
B – G	B – F	B – F	B – H
C – E	C – E	C – G	C – E
D – H	D – H	D – H	D – G

## PASSAGE - 20

(2002)

The conceptions of life and the world which we call 'philosophical' are a product of two factors: one, inherited religious and ethical conceptions; the other, the sort of investigation which may be called 'scientific', using this word in its broadest sense. Individual philosophers have differed widely in regard to the proportions in which these two factors entered into their system, but it is the presence of both, in some degree, that characterizes philosophy.

'Philosophy' is a word which has been used in many ways, some wider, some narrower. I propose to use it in a very wide sense, which I will now try to explain.

Philosophy, as I shall understand the word, is something intermediate between theology and science. Like theology, it consists of speculations on matters as to which definite knowledge has, so far, been unascertainable; but like science, it appeals to human reason rather than to authority, whether that of tradition or that of revelation. All definite knowledge-so I should contend-belts to science; all dogma as to what surpasses definite knowledge belongs to theology. But between theology and science there is a 'No man's Land', exposed to attack from both sides; this 'No Man's Land' is philosophy. Almost all the questions of most interest to speculative minds are such as science cannot answer, and the confident answers of theologians no longer seem so convincing as they did in former centuries. Is the world divided into mind and matter, and if so, what is mind and what is matter? Is mind subject to matter, or is it possessed of independent powers? Has the universe any unity or purpose? Is it evolving towards some goal? Are there really laws of nature, or do we believe in them only because of our innate love of order? Is man what he seems to the astronomer, a tiny lump of carbon and water impotently crawling on a small and unimportant planet? Or is he what he appears to Hamlet? Is he perhaps both at once? Is there a way of living that is noble and another that is base, or are all ways of living merely futile? If there is a way of living that is noble, in what does it consist, and how shall we achieve it? Must the good be eternal in order to deserve to be valued, or is it worth seeking even if the universe is inexorably moving towards death? Is there such a thing as wisdom, or is what seems such merely the ultimate refinement of folly? To such questions no answer can be found in the laboratory. Theologies have professed to give answers, all to definite; but their definiteness causes modern minds to view them with suspicion. The studying of these questions, if not the answering of them, is the business of philosophy.

Why, then, you may ask, waste time on such insoluble problems? To this one may answer as a historian, or as an individual facing the terror of cosmic loneliness.

The answer of the historian, in so far as I am capable of giving it, will appear in the course of this work. Ever since men became capable of free speculation, their actions in numerable important respects, have depended upon their theories as to the world and human life, as to what is good and what is evil. This is as true in the present day as at any former time. To understand an age or a nation, we must understand its philosophy, and to understand its philosophy we must ourselves be in some degree philosophers. There is here a reciprocal causation: the circumstances of men's lives do much to determine their philosophy, but, conversely, their philosophy does much to determine their circumstances.

There is also, however, a more personal answer. Science tells us what we can know, but what we can know is little, and if we forget how much we cannot know we may become insensitive to many things of very great importance. Theology, on the other hand, induces a dogmatic belief that we have knowledge, where in fact we have ignorance, and by doing so generates a kind of impudent insolence towards the universe. Uncertainty, in the presence of vivid hopes and fears, is painful, but must be endured if we wish to live without the support of comforting fairy tales. It is not good either to forget the questions that philosophy asks, or to persuade ourselves that we have found indubitable answers to them. To teach how to live without certainty, and yet without being paralyzed by hesitation, is perhaps the chief thing that philosophy, in our age, can still do for those who study it.

140. The purpose of philosophy is to
- (a) reduce uncertainty and chaos
  - (b) help us to cope with uncertainty and ambiguity
  - (c) help us to find explanations for uncertainty
  - (d) reduce the terror of cosmic loneliness
141. Based on this passage what can be concluded about the relation between philosophy and science?
- (a) The two are antagonistic
  - (b) The two are complimentary
  - (c) There is no relation between the two
  - (d) Philosophy derives from science
142. From reading the passage, what can be concluded about the profession of the author? He is most likely **not** to be a
- (a) historian
  - (b) philosopher
  - (c) scientist
  - (d) theologian
143. According to the author, which of the following statements about the nature of the universe must be definitely true?
- (a) The universe has unity
  - (b) The universe has a purpose
  - (c) The universe is evolving towards a goal
  - (d) None of the above

## PASSAGE - 21

(2003C)

As you set out for Ithaka  
hope the journey is a long one.  
full of adventure, full of discovery.  
Laistrygonians and Cyclops.  
angry Poseidon-don't be afraid of them :  
you'll never find things like that on your way  
as long as you keep your thoughts raised high,  
as long as a rare excitement  
stirs your spirit and your body.  
Laistrygonians and Cyclops,  
wild Poseidon-you won't encounter them  
unless you bring them along inside you soul,  
unless your soul sets them up in front of you.  
Hope the voyage is a long one,  
may there be many a summer morning when,  
with what pleasure, what joy,  
you come into harbours seen for the first time;  
may you stop at Phoenician trading stations  
to buy fine things,  
mother of pearl and coral, amber and ebony,  
sensual perfume of every kind—  
as many sensual perfumes as you can ;  
and may you visit many Egyptian cities  
to gather stores of knowledge from their scholars.  
Keep Ithaka always in your mind  
arriving there is what you are destined for.  
But do not hurry the journey at all.  
Better if it lasts for years,  
so you are old by the time you reach the island  
Wealthy with all you have gained on the way, not expecting Ithaka to make you rich  
Ithaka gave you the marvellous journey,  
without her you would not have set out  
She has nothing left to give you now.  
And if you find her poor, Ithaka won't have fooled you  
Wise as you will have become, so full of experience  
you will have understood by then what these Ithakas mean.

## PASSAGE - 22

(2003)

The endless struggle between the flesh and the spirit found an end in Greek art. The Greek artists were unaware of it. They were spiritual materialists, never denying the importance of the body and ever seeing in the body a spiritual significance. Mysticism on the whole was alien to the Greeks, thinkers as they were. Thought and mysticism never go well together and there is little symbolism in Greek art. Athena was not a symbol of wisdom but an embodiment of it and her statues were beautiful grave women, whose seriousness might mark them as wise, but who were marked in no other way. The Apollo Belvedere is not a symbol of the sun, nor the Versailles Artemis of the moon. There could be nothing less akin to the ways of symbolism than their beautiful, normal humanity. Nor did decoration really interest the Greeks. In all their art they were preoccupied with what they wanted to express, not with ways of expressing it, and lovely expression, merely as lovely expression, did not appeal to them at all.

Greek art is intellectual art, the art of men who were clear and lucid thinkers, and it is therefore plain art. Artists than whom the work has never seen greater, men endowed with the spirit's best gift, found their natural method of expression in the simplicity and clarity which are the endowment of the unclouded reason. "Nothing in excess," the Greek axiom of art, is the dictum of men who would brush aside all obscuring, entangling superfluity, and see clearly, plainly, unadorned, what they wished to express. Structure belongs in an especial degree to the province of the mind in art, and architectonics were pre-eminently a mark of the Greek. The power that made a unified whole of the trilogy of a Greek tragedy, that envisioned the sure, precise, decisive scheme of the Greek statue, found its most conspicuous expression in Greek architecture. The Greek temple is the creation, par excellence, of mind and spirit in equilibrium.

A Hindoo temple is a conglomeration of adornment. The lines of the building are completely hidden by the decorations. Sculptured figures and ornaments crowd its surface, stand out from it in thick masses, break it up into a bewildering series of irregular tiers. It is not a unity but a collection, rich, confused. It looks like something not planned but built this way and that as the ornament required. The conviction underlying it can be perceived: each bit of the exquisitely wrought detail had a mystical meaning and the temple's exterior was important only as a means for the artist to inscribe thereon the symbols of the truth. It is decoration, not architecture.

Again, the gigantic temple of Egypt, those massive immensities of granite which look as if only the power that moves in the earthquake were mighty enough to bring them into existence, are something other than the creation of geometry balanced by beauty. The science and the spirit are there, but what is there most of all is force, unhuman force, calm but tremendous, overwhelming. It reduces to nothingness all that belongs to man. He is annihilated. The Egyptian architects were possessed by the consciousness of the awful, irresistible domination of the ways of nature; they had no thought to give to the insignificant atom that was man.

Greek architecture of the great age is the expression of men who were, first of all, intellectual artists, kept firmly within the visible world by their mind, but, only second to that, lovers of the human world. The Greek temple is the perfect expression of the pure intellect illumined by the spirit. No other great building anywhere approach its simplicity. In the Parthenon straight columns rise to plain capital; a pediment is sculptured in bold relief; there is nothing more. And yet - here is the Greek miracle - this absolute simplicity of structure is alone in majesty of beauty among all the temples and cathedrals and palaces of the world. Majestic but human, truly Greek. No superhuman force as in Egypt; no strange supernatural shapes as in India; the parthenon is the home of humanity at ease, calm, ordered, sure of itself and the world. The Greeks flung a challenge to nature in the fullness of their joyous strength. They set their temple on the summit of a hill overlooking the wide sea, outlined against the circle of the sky. They would build what was more beautiful than hill and sea and sky and greater than all these. It matters not at all if the temple is larger or small; one never thinks of the size. It matters not how much it is in ruins. A few white columns dominate the lofty height at Sunion as securely as the great mass of the Parthenon dominates all the sweep of the sea and land around Athens. To the Greek architect man was the master of the world. His mind could understand its laws; his spirit could discover its beauty.

149. Which of the following is NOT a characteristic of Greek architecture, according to the passage?
- A lack of excess
  - Simplicity of form
  - Expression of intellect
  - Mystic spirituality
150. From the passage, which of the following combination can be inferred to be correct?
- Hindoo temple-power of nature
  - Parthenon-simplicity
  - Egyptian temple-mysticism
  - Greek temple-symbolism.
151. According to the passage, what conception of man can be inferred from Egyptian architecture?
- Man is the centre of creation
  - Egyptian temples save man from unhuman forces
  - Temples celebrate man's victory over nature
  - Man is inconsequential before the tremendous force of nature
152. According to the passage, which of the following best explains why there is little symbolism in Greek art?
- The Greeks focused on thought rather than mysticism
  - The struggle between the flesh and the spirit found an end in Greek art
  - Greek artists were spiritual materialists
  - Greek statues were embodiments rather than symbols of qualities

153. "The Greeks flung a challenge to nature in the fullness of their joyous strength." Which of the following best captures the 'challenge' that is being referred to?

- (a) To build a monument matching the background colours of the sky and the sea
- (b) To build a monument bigger than nature's creations
- (c) To build a monument that were more appealing to the mind and spirit than nature's creations
- (d) To build a small but architecturally perfect monument

### PASSAGE - 23

(2004)

The painter is now free to paint anything he chooses. There are scarcely any forbidden subjects, and today everybody is prepared to admit that a painting of some fruit can be as important as a painting of a hero dying. The impressionists did as much as anybody to win this previously unheard-of freedom for the artist. Yet, by the next generation, painters began to abandon the subject altogether, and began to paint abstract pictures. Today the majority pictures painted are abstract.

Is there a connection between these two developments? Has art gone abstract because the artist is embarrassed by his freedom? Is it that because he is free to paint anything, he doesn't know what to paint? Apologists for abstract art often talk of it as the art of maximum freedom. But could this be the freedom of the desert island? It would take to long to answer these questions properly. I believe there is a connection. Many things have encouraged the development of abstract art. Among them has been the artists' wish to avoid the difficulties of finding subjects when all subjects are equally possible.

I raise the matter now because I want to draw attention to the fact that the painter's choice of a subject is a far more complicated question than it would at first seem. A subject does not start with what is put in front of the easel or with something which the painter happens to remember. A subject starts with the painter deciding he would like to paint such-and-such because for some reason or other he finds it meaningful. A subject begins when the artist selects something for *special mention*. (What makes it special or meaning full may seem to the artist to be purely visual— its colours or its form.) When the subject has been selected, the function of the painting itself is to communicate and justify the significance of that selection.

It is often said today that subject matter is unimportant. But this is only a reaction against the excessively literary and moralistic interpretation of subject matter in the nineteenth century. In truth the subject is literally the beginning and end of a painting. The painting begins with a selection (I will paint this and not everything else in the world); it is finished when that selection is justified (now you can see all that I saw and felt in this and how it is more than merely itself).

Thus, for a painting to succeed it is essential that the painter and his public agree about what is significant. The subject may have a personal meaning for the painter or individual spectator; but there must also be the possibility of their agreement on its general meaning. It is at this point that the culture of the society and period in question proceeds the artist and his art. Renaissance art would have meant nothing to the Aztecs—and vice versa. If, to some extent, a few intellectuals can appreciate them both today it is because their culture is an historical one: its inspirations is history and therefore it can include within itself, in principle if not in every particular, all known developments to date.

When a culture is secure and certain of its values, it presents its artists with subjects. The general agreement about what is significant is so well established that the significance of a particular subject accrues and becomes traditional. This is true, for instance, of reeds and water in China, of the nude body in Renaissance, of the animal in Africa. Furthermore, in such cultures the artist is unlikely to be a free agent: he will be employed *for the sake of particular subjects*, and the problem, as we have just described it, will not occur to him.

When a culture is in a state of disintegration or transition the freedom of the artist increases – but the question of subject matter becomes problematic for him: he, himself, has to choose for society. This was at the basis of all the increasing crises in European art during the nineteenth century. It is too often forgotten how many of the art scandals of that time were provoked by the choice of subject (Gericault, Courbet, Daumier, Degas, Lautrec, Van Gogh, etc.).

By the end of the nineteenth century there were, roughly speaking, two ways in which the painter could meet this challenge of deciding what to paint and so choosing for society. Either he identified himself with the people and so allowed their lives to dictate his subjects to him; or he had to find his subjects within himself as painter. By *people* I mean everybody except the bourgeoisie. Many painters did of course work of the bourgeoisie according to their copy-book of approved subjects, but all of them, filling the Salon and the Royal Academy year after year are now forgotten, buried under the hypocrisy of those they served so sincerely.

154. When a culture is insecure, the painter chooses his subject on the basis of

- (a) The prevalent style in the society of his time.
- (b) Its meaningfulness to the painter.
- (c) Past experience and memory of the painter.
- (d) What is put in front of the easel.

155. In the sentence, ‘I believe there is a connection’ (Second paragraph), what two developments is the author referring to?
- Painters using a dying hero and using a fruit as a subject of painting.
  - Growing success of painter and an increase in abstract forms.
  - Artists gaining freedom to choose subjects and abandoning subjects altogether.
  - Rise of impressionists and an increase in abstract forms.
156. Which of the following is NOT necessarily among the attributes needed for a painter to succeed:
- The painter and his public agree on what is significant.
  - The painting is able to communicate and justify the significance of its subject selection.
  - The subject has a personal meaning for the painter.
  - The painting of subjects is inspired by historical developments.
157. In the context of the passage, which of the following statements would NOT be true?
- Painters decided subjects based on what they remembered from their own lives.
  - Painters of reeds and water in China faced no serious problem of choosing a subject.
  - The choice of subject was a source of scandals in nineteenth century European art.
  - Agreement on the general meaning of a painting is influenced by culture and historical context.
158. Which of following views is taken by the author?
- The more insecure a culture, the greater the freedom of the artist.
  - The more secure a culture, the greater the freedom of the artist.
  - The more secure a culture, more difficult the choice of subject.
  - The more insecure a culture, the less significant the choice of the subject.

**Directions for Questions 159 to 162 :** Each of the two passages given below is followed by a set of four questions. Choose the best answer to each question.

## PASSAGE - 24

(2005)

While complex in the extreme, Derrida’s work has proven to be a particularly influential approach to the analysis of the ways in which language structures our understanding of ourselves and the world we inhabit, an approach he termed *deconstruction*. In its simplest formulation, deconstruction can be taken to refer to a methodological strategy which seeks to uncover layers of hidden meaning in a text that have been denied or suppressed. The term ‘text’, in this respect, does not refer simply to a written form of communication, however. Rather, texts are something we all produce and reproduce constantly in our everyday social relations, be they spoken, written or embedded in the construction of material artifacts. At the heart of Derrida’s deconstructive approach is his critique of what he receives to be the totalitarian impulse of the Enlightenment pursuit to bring all that exists in the world under the domain of a representative language, a pursuit he refers to as logocentrism. Logocentrism is the search for a rational language that is able to know and represent the *world* and all its aspects perfectly and accurately. Its totalitarian dimension, for Derrida at least, lies primarily in its tendency to marginalize or dismiss all that does not neatly comply with its particular linguistic representations, a tendency that, throughout history, has all too frequently been manifested in the form of authoritarian institutions. Thus logocentrism has, in its search for the truth of absolute representation, subsumed difference and oppressed that which it designates as its alien ‘other’. For Derrida, western civilization has been built upon such a systematic assault on alien cultures and ways of life, typically in the name of reason and progress.

In response to logocentrism, deconstruction posits the idea that the mechanism by which this process of marginalization and the ordering of truth occurs is through establishing systems of binary opposition. Oppositional linguistic dualisms, such as rational/irrational, culture/nature and good/bad are not, however, construed as equal partners as they are in, say, the semiological structuralism of Saussure. Rather, they exist, for Derrida, in a series of hierarchical relationships with the first term normally occupying a superior position. Derrida defines the relationship between such oppositional terms using the neologism *difference*. This refers to the realization that in any statement, oppositional terms differ from each other (for instance, the difference between rationality and irrationality is constructed through oppositional usage), and at the same time, a hierarchical relationship is maintained by the deference of one term to the other (in the positing of rationality over irrationality, for instance). It is this latter point which is perhaps the key to understanding Derrida’s approach to deconstruction.

For the fact that at any given time one term must defer to its oppositional ‘other’, means that the two terms are constantly in a state of interdependence. The presence of one is dependent upon the absence or ‘absent-presence’ of the ‘other’, such as in the case of good and evil, whereby to understand the nature of one, we must constantly relate it to the absent term in order to grasp its meaning. That is, to do good, we must understand that our act is not evil for without that comparison the term becomes meaningless. Put simply, deconstruction represents an attempt to demonstrate the absent-presence of this oppositional ‘other’, to show that what we say or write is in itself not expressive simply of what is present, but also of what is absent. Thus, deconstruction seeks to reveal the interdependence of apparently dichotomous terms and their meanings relative to their textual context; that is, within the linguistic power relations which structure dichotomous terms hierarchically. In Derrida’s own words, a deconstructive reading “must always aim at a certain relationship, unperceived by the writer, between what he commands and what he does not command of the patterns of a language that he uses. . . [It] attempts to make the not-seen accessible to sight.”

Meaning, then, is never fixed or stable, whatever the intention of the author of a text. For Derrida, language is a system of relations that are dynamic, in that all meanings we ascribe to the world are dependent not only on what we believe to be present but also on what is absent. Thus, any act of interpretation must refer not only to what the author of a text intends, but also to what is absent from his or her intention. This insight leads, once again, Derrida's further rejection of the idea of the definitive authority of the intentional agent or subject. The subject is decentred; it is conceived as the outcome of relations of difference. As author of its own biography, the subject thus becomes the ideological fiction of modernity and its logocentric philosophy, one that depends upon the formation of hierarchical dualisms, which repress and deny the presence of the absent 'other'. No meaning can, therefore, ever be definitive, but is merely an outcome of a particular interpretation.

159. According to the passage, Derrida believes that the system of binary opposition
  - (a) represents a prioritization or hierarchy.
  - (b) reconciles contradictions and dualities.
  - (c) weakens the process of marginalization and ordering of truth.
  - (d) deconstructs reality.
160. According to the passage, Derrida believes that :
  - (a) Reality can be construed only through the use of rational analysis.
  - (b) Language limits our construction of reality.
  - (c) A universal language will facilitate a common understanding of reality.
  - (d) We need to uncover the hidden meaning in a system of relations expressed by language.
161. Derrida rejects the idea of 'definitive authority of the subject' because
  - (a) interpretation of the text may not make the unseen visible.
  - (b) the meaning of the text is based on binary opposites.
  - (c) the implicit power relationship is often ignored.
  - (d) any act of interpretation must refer to what the author intends.
162. To Derrida, 'logocentrism' does not imply:
  - (a) A totalitarian impulse.
  - (b) A domain of representative language.
  - (c) Interdependence of the meanings of dichotomous terms.
  - (d) A strategy that seeks to suppress hidden meanings in a text.

**Directions for Questions 163 to 167 :** The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

### PASSAGE - 25

(2006)

My aim is to present a conception of justice which generalizes and carries to a higher level of abstraction the familiar theory of the social contract. In order to do this we are not to think of the original contract as one to enter a particular society or to set up a particular form of government. Rather, the idea is that the principles of justice for the basic structure of society are the object of the original agreement. They are the principles that free and rational persons concerned to further their own interests would accept in an initial position of equality. These principles are to regulate all further agreements; they specify the kinds of social cooperation that can be entered into and the forms of government that can be established. This way of regarding the principles of justice, I shall call justice as fairness. Thus, we are to imagine that those who engage in social cooperation choose together, in one joint act, the principles which are to assign basic rights and duties and to determine the division of social benefits. Just as each person must decide by rational reflection what constitutes his good, that is, the system of ends which it is rational for him to pursue, so a group of persons must decide once and for all what is to count among them as just and unjust. The choice which rational men would make in this hypothetical situation of equal liberty determines the principles of justice.

In 'justice as fairness', the original position is not an actual historical state of affairs. It is understood as a purely hypothetical situation characterized so as to lead to a certain conception of justice. Among the essential features of this situation is that no one knows his place in society, his class position or social status, nor does anyone know his fortune in the distribution of natural assets and abilities, his intelligence, strength, and the like. I shall even assume that the parties do not know their conceptions of the good or their special psychological propensities. The principles of justice are chosen behind a veil of ignorance. This ensures that no one is advantaged or disadvantaged in the choice of principles by the outcome of natural chance or the contingency of social circumstances. Since all are similarly situated and no one is able to design principles to favor his particular condition, the principles of justice are the result of a fair agreement or bargain.

Justice as fairness begins with one of the most general of all choices which persons might make together, namely, with the choice of the first principles of a conception of justice which is to regulate all subsequent criticism and reform of institutions. Then, having chosen a conception of justice, we can suppose that they are to choose a constitution and a legislature to enact laws, and so on, all in accordance with the principles of justice initially agreed upon. Our social situation is just if it is such that by this sequence of

hypothetical agreements we would have contracted into the general system of rules which defines it. Moreover, assuming that the original position does determine a set of principles, it will then be true that whenever social institutions satisfy these principles, those engaged in them can say to one another that they are cooperating on terms to which they would agree if they were free and equal persons whose relations with respect to one another were fair. They could all view their arrangements as meeting the stipulations which they would acknowledge in an initial situation that embodies widely accepted and reasonable constraints on the choice of principles. The general recognition of this fact would provide the basis for a public acceptance of the corresponding principles of justice. No society can, of course, be a scheme of cooperation which men enter voluntarily in a literal sense; each person finds himself placed at birth in some particular position in some particular society, and the nature of this position materially affects his life prospects. Yet a society satisfying the principles of justice as fairness comes as close as a society can to being a voluntary scheme, for it meets the principles which free and equal persons would assent to under circumstances that are fair.

163. A just society, as conceptualized in the passage, can be best described as:
- A Utopia in which everyone is equal and no one enjoys any privilege based on their existing positions and powers.
  - A hypothetical society in which people agree upon principles of justice which are fair.
  - A society in which principles of justice are not based on the existing positions and powers of the individuals.
  - A society in which principles of justice are fair to all.
  - A hypothetical society in which principles of justice are not based on the existing positions and powers of the individuals.
164. The original agreement or original position in the passage has been used by the author as:
- A hypothetical situation conceived to derive principles of justice which are not influenced by position, status and condition of individuals in the society.
  - A hypothetical situation in which every individual is equal and no individual enjoys any privilege based on the existing positions and powers.
  - A hypothetical situation to ensure fairness of agreements among individuals in society.
  - An imagined situation in which principles of justice would have to be fair.
  - An imagined situation in which fairness is the objective of the principles of justice to ensure that no individual enjoys any privilege based on the existing positions and powers.
165. Which of the following best illustrates the situation that is equivalent to choosing 'the principles of justice' behind a 'veil of ignorance'?
- The principles of justice are chosen by businessmen, who are marooned on an uninhabited island after a shipwreck, but have some possibility of returning.
  - The principles of justice are chosen by a group of school children whose capabilities are yet to develop.
  - The principles of justice are chosen by businessmen, who are marooned on an uninhabited island after a shipwreck and have no possibility of returning.
  - The principles of justice are chosen assuming that such principles will govern the lives of the rule makers only in their next birth if the rule makers agree that they will be born again.
  - The principles of justice are chosen by potential immigrants who are unaware of the resources necessary to succeed in a foreign country.
166. Why, according to the passage, do principles of justice need to be based on an original agreement?
- Social institutions and laws can be considered fair only if they conform to principles of justice.
  - Social institutions and laws can be fair only if they are consistent with the principles of justice as initially agreed upon.
  - Social institutions and laws need to be fair in order to be just.
  - Social institutions and laws evolve fairly only if they are consistent with the principles of justice as initially agreed upon.
  - Social institutions and laws conform to the principles of justice as initially agreed upon.
167. Which of the following situations best represents the idea of justice as fairness, as argued in the passage?
- All individuals are paid equally for the work they do.
  - Everyone is assigned some work for his or her livelihood.
  - All acts of theft are penalized equally.
  - All children are provided free education in similar schools.
  - All individuals are provided a fixed sum of money to take care of their health.

**Directions for Questions 168 to 170 :** The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

## PASSAGE - 26

(2007)

Every civilized society lives and thrives on a silent but profound agreement as to what is to be accepted as the valid mould of experience. Civilization is a complex system of dams, dykes, and canals warding off, directing, and articulating the influx of the surrounding fluid element; a fertile fenland, elaborately drained and protected from the high tides of chaotic, unexercised, and inarticulate experience. In such a culture, stable and sure of itself within the frontiers of 'naturalized' experience, the arts wield their creative power not so much in width as in depth. They do not create new experience, but deepen and purify the old. Their works do not differ from one another like a new horizon from a new horizon, but like a madonna from a madonna.

The periods of art which are most vigorous in creative passion seem to occur when the established pattern of experience loosens its rigidity without as yet losing its force. Such a period was the Renaissance, and Shakespeare its poetic consummation. Then it was as though the discipline of the old order gave depth to the excitement of the breaking away, the depth of joy and tragedy, of incomparable conquests and irredeemable losses. Adventurers of experience set out as though in lifeboats to rescue and bring back to the shore treasures of knowing and feeling which the old order had left floating on the high seas. The works of the early Renaissance and the poetry of Shakespeare vibrate with the compassion for live experience in danger of dying from exposure and neglect. In this compassion was the creative genius of the age. Yet, it was a genius of courage, not of desperate audacity. For, however elusively, it still knew of harbours and anchors, of homes to which to return, and of barns in which to store the harvest. The exploring spirit of art was in the depths of its consciousness still aware of a scheme of things into which to fit its exploits and creations.

But the more this scheme of things loses its stability, the more boundless and uncharted appears the ocean of potential exploration. In the blank confusion of infinite potentialities flotsam of significance gets attached to jetsam of experience; for everything is sea, everything is at sea —

*...The sea is all about us;  
The sea is the land's edge also, the granite  
Into which it reaches, the beaches where it tosses  
Its hints of earlier and other creation ...*

- and Rilke tells a story in which, as in T.S. Eliot's poem, it is again the sea and the distance of 'other creation' that becomes the image of the poet's reality. A rowing boat sets out on a difficult passage. The oarsmen labour in exact rhythm. There is no sign yet of the destination. Suddenly a man, seemingly idle, breaks out into song. And if the labour of the oarsmen meaninglessly defeats the real resistance of the real waves, it is the idle single who magically conquers the despair of apparent aimlessness. While the people next to him try to come to grips with the element that is next to them, his voice seems to bind the boat to the farthest distance so that the farthest distance draws it towards itself. 'I don't know why and how,' is Rilke's conclusion, but suddenly I understood the situation of the poet, his place and function in this age. It does not matter if one denies him every place — except this one. There one must tolerate him.'

168. In the passage, the expression "like a madonna from a madonna" alludes to
- The difference arising as a consequence of artistic license.
  - The difference between two artistic interpretations.
  - The difference between 'life' and 'interpretation of life'.
  - The difference between 'width' and 'depth' of creative power.
  - The difference between the legendary character and the modern day singer.
169. The sea and 'other creation' leads Rilke to
- Define the place of the poet in his culture.
  - Reflect on the role of the oarsman and the singer.
  - Muse on artistic labour and its aimlessness.
  - Understand the elements that one has to deal with.
  - Delve into natural experience and real waves.
170. According to the passage, the term "adventurers of experience" refers to
- Poets and artists who are driven by courage.
  - Poets and artists who create their own genre.
  - Poets and artists of the Renaissance.
  - Poets and artists who revitalize and enrich the past for us.
  - Poets and artists who delve in flotsam and jetsam in sea.

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**Directions for Questions 171 to 175 :** The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

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## PASSAGE - 27

(2008)

A remarkable aspect of art of the present century is the range of concepts and ideologies which it embodies. It is almost tempting to see a pattern emerging within the art field - or alternatively imposed upon it *a posteriori* - similar to that which exists under the umbrella of science where the general term covers a whole range of separate, though interconnecting, activities. Any parallelism is however - in this instance at least - misleading. A scientific discipline develops systematically once its bare tenets have been established, named and categorized as conventions. Many of the concepts of modern art, by contrast, have resulted from the almost accidental meetings of groups of talented individuals at certain times and certain places. The ideas generated by these chance meetings had

twofold consequences. Firstly, a corpus of work would be produced which, in great part, remains as a concrete record of the events. Secondly, the ideas would themselves be disseminated through many different channels of communication - seeds that often bore fruit in contexts far removed from their generation. Not all movements were exclusively concerned with innovation. Surrealism, for instance, claimed to embody a kind of insight which can be present in the art of any period. This claim has been generally accepted so that a sixteenth century painting by Spranger or a mysterious photograph by Atget can legitimately be discussed in surrealist terms. Briefly, then, the concepts of modern art are of many different (often fundamentally different) kinds and resulted from the exposures of painters, sculptors and thinkers to the more complex phenomena of the twentieth century, including our ever increasing knowledge of the thought and products of earlier centuries. Different groups of artists would collaborate in trying to make sense of a rapidly changing world of visual and spiritual experience. We should hardly be surprised if no one group succeeded completely, but achievements, though relative, have been considerable. Landmarks have been established - concrete statements of position which give a pattern to a situation which could easily have degenerated into total chaos. Beyond this, new language tools have been created for those who follow - semantic systems which can provide a springboard for further explorations.

The codifying of art is often criticized. Certainly one can understand that artists are wary of being pigeon-holed since they are apt to think of themselves as individuals - sometimes with good reason. The notion of self - expression, however, no longer carries quite the weight it once did; objectivity has its defenders. There is good reason to accept the ideas codified by artists and critics, over the past sixty years or so, as having attained the status of independent existence - an independence which is not without its own value. The time factor is important here. As an art movement slips into temporal perspective, it ceases to be a living organism - becoming, rather, a fossil. This is not to say that it becomes useless or uninteresting. Just as a scientist can reconstruct the life of a prehistoric environment from the messages codified into the structure of a fossil, so can an artist decipher whole webs of intellectual and creative possibility from the recorded structure of a 'dead' art movement. The artist can match the creative patterns crystallized into this structure against the potentials and possibilities of his own time. As T.S. Eliot observed, no one starts anything from scratch; however consciously you may try to live in the present, you are still involved with a nexus of behaviour patterns bequeathed from the past. The original and creative person is not someone who ignores these patterns, but someone who is able to translate and develop them so that they conform more exactly to his - and our - present needs.

171. Many of the concepts of modern art have been the product of
  - (a) ideas generated from planned deliberations between artists, painters and thinkers.
  - (b) the dissemination of ideas through the state and its organizations.
  - (c) accidental interactions among people blessed with creative muse.
  - (d) patronage by the rich and powerful that supported art.
  - (e) systematic investigation, codification and conventions.
172. In the passage, the word 'fossil' can be interpreted as
  - (a) an art movement that has ceased to remain interesting or useful.
  - (b) an analogy from the physical world to indicate a historic art movement.
  - (c) an analogy from the physical world to indicate the barrenness of artistic creations in the past.
  - (d) an embedded codification of pre-historic life.
  - (e) an analogy from the physical world to indicate the passing of an era associated with an art movement.
173. In the passage, which of the following similarities between science and art may lead to erroneous conclusions?
  - (a) Both, in general, include a gamut of distinct but interconnecting activities.
  - (b) Both have movements not necessarily concerned with innovation.
  - (c) Both depend on collaborations between talented individuals.
  - (d) Both involve abstract thought and dissemination of ideas.
  - (e) Both reflect complex priorities of the modern world.
174. The range of concepts and ideologies embodied in the art of the twentieth century is explained by
  - (a) the existence of movements such as surrealism.
  - (b) landmarks which give a pattern to the art history of the twentieth century.
  - (c) new language tools which can be used for further explorations into new areas.
  - (d) the fast changing world of perceptual and transcendental understanding.
  - (e) the quick exchange of ideas and concepts enabled by efficient technology.
175. The passage uses an observation by T.S. Eliot to imply that
  - (a) creative processes are not 'original' because they always borrow from the past.
  - (b) we always carry forward the legacy of the past.
  - (c) past behaviours and thought processes recreate themselves in the present and get labelled as 'original' or 'creative'.
  - (d) 'originality' can only thrive in a 'greenhouse' insulated from the past biases.
  - (e) 'innovations' and 'original thinking' interpret and develop on past thoughts to suit contemporary needs.

*Directions for Questions 176 to 180 : The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.*

## PASSAGE - 28

(2008)

When I was little, children were bought two kinds of ice cream, sold from those white wagons with canopies made of silvery metal: either the two-cent cone or the four-cent ice-cream pie. The two-cent cone was very small, in fact it could fit comfortably into a child's hand, and it was made by taking the ice cream from its container with a special scoop and piling it on the cone. Granny always suggested I eat only a part of the cone, then throw away the pointed end, because it had been touched by the vendor's hand (though that was the best part, nice and crunchy, and it was regularly eaten in secret, after a pretence of discarding it).

The four-cent pie was made by a special little machine, also silvery, which pressed two disks of sweet biscuit against a cylindrical section of ice cream. First you had to thrust your tongue into the gap between the biscuits until it touched the central nucleus of ice cream; then, gradually, you ate the whole thing, the biscuit surfaces softening as they became soaked in creamy nectar. Granny had no advice to give here: in theory the pies had been touched only by the machine; in practice, the vendor had held them in his hand while giving them to us, but it was impossible to isolate the contaminated area.

I was fascinated, however, by some of my peers, whose parents bought them not a four-cent pie but two two-cent cones. These privileged children advanced proudly with one cone in their right hand and one in their left; and expertly moving their head from side to side, they licked first one, then the other. This liturgy seemed to me so sumptuously enviable, that many times I asked to be allowed to celebrate it. In vain. My elders were inflexible: a four-cent ice, yes; but two two-cent ones, absolutely no.

As anyone can see, neither mathematics nor economy nor dietetics justified this refusal. Nor did hygiene, assuming that in due course the tips of both cones were discarded. The pathetic, and obviously mendacious, justification was that a boy concerned with turning his eyes from one cone to the other was more inclined to stumble over stones, steps, or cracks in the pavement. I dimly sensed that there was another secret justification, cruelly pedagogical, but I was unable to grasp it.

Today, citizen and victim of a consumer society, a civilization of excess and waste (which the society of the thirties was not), I realize that those dear and now departed elders were right. Two two-cent cones instead of one at four cents did not signify squandering, economically speaking, but symbolically they surely did. It was for this precise reason, that I yearned for them: because two ice creams suggested excess. And this was precisely why they were denied to me: because they looked indecent, an insult to poverty, a display of fictitious privilege, a boast of wealth. Only spoiled children ate two cones at once, those children who in fairy tales were rightly punished, as Pinocchio was when he rejected the skin and the stalk. And parents who encouraged this weakness, appropriate to little parvenus, were bringing up their children in the foolish theatre of "I'd like to but I can't." They were preparing them to turn up at tourist-class check-in with a fake Gucci bag bought from a street peddler on the beach at Rimini.

Nowadays the moralist risks seeming at odds with morality, in a world where the consumer civilization now wants even adults to be spoiled, and promises them always something more, from the wristwatch in the box of detergent to the bonus bangle sheathed, with the magazine it accompanies, in a plastic envelope. Like the parents of those ambidextrous gluttons I so envied, the consumer civilization pretends to give more, but actually gives, for four cents, what is worth four cents. You will throwaway the old transistor radio to purchase the new one, that boasts an alarm clock as well, but some inexplicable defect in the mechanism will guarantee that the radio lasts only a year. The new cheap car will have leather seats, double side mirrors adjustable from inside, and a panelled dashboard, but it will not last nearly so long as the glorious old Fiat 500, which, even when it broke down, could be started again with a kick.

The morality of the old days made Spartans of us all, while today's morality wants all of us to be Sybarites.

176. Which of the following cannot be inferred from the passage?
- Today's society is more extravagant than the society of the 1930s.
  - The act of eating two ice cream cones is akin to a ceremonial process.
  - Elders rightly suggested that a boy turning eyes from one cone to the other was more likely to fall.
  - Despite seeming to promise more, the consumer civilization gives away exactly what the thing is worth.
  - The consumer civilization attempts to spoil children and adults alike.
177. In the passage, the phrase "little parvenus" refers to
- naughty midgets.
  - old hags.
  - arrogant people.
  - young upstarts.
  - foolish kids.
178. The author pined for two two-cent cones instead of one four-cent pie because
- it made dietetic sense.
  - it suggested intemperance.
  - it was more fun.
  - it had a visual appeal.
  - he was a glutton.
179. What does the author mean by "nowadays the moralist risks seeming at odds with morality"?
- The moralists of yesterday have become immoral today.
  - The concept of morality has changed over the years.
  - Consumerism is amoral.
  - The risks associated with immorality have gone up.
  - The purist's view of morality is fast becoming popular.
180. According to the author, the justification for refusal to let him eat two cones was plausibly
- didactic.
  - dietetic.
  - dialectic.
  - diatonic.
  - diastolic.

## ANSWERS WITH SOLUTIONS

### PASSAGE - 1

1. (a) As can be inferred from the concern of the author from the passage the tone of the passage seems to be of economical concern.
2. (c) (c) is the correct option, as it can be inferred from the sixth para.
3. (a) (a) is the correct option, as can be inferred from the second para, third line.
4. (b) (b) is the correct option, as clear from the second para.
5. (c) (c) is the only option not mentioned in the passage anywhere.
6. (a) (b), (c) and (d) can be clearly inferred from the passage. (c) is the only option not mentioned in the passage anywhere.
7. (d) The passage clearly says that libraries are being affected as mentioned in Para 3. Further Para 8 says that it would be a great loss to our society or General Public. The last para brings out the effect to the Publishing Industry.
8. (c) Para 2, line 4 clearly tells about lignin, which causes paper to discolour.

### PASSAGE - 2

9. (c) (c) is the correct option, as can be inferred from the author's defence of philosophy.
10. (d) (a), (b) and (c) can be clearly inferred from the passage. (d) is the only option not mentioned in the passage anywhere.
11. (c) Ninth line of the passage says that Philosophy is both respected and despised.
12. (b) The word 'chairs', as mentioned in line 8 and 17, means departments.
13. (d) (d) is the only option not mentioned in the passage anywhere.
14. (b) (b) is the correct option, as can be inferred from the passage.
15. (a) The answer is mentioned in the 15th and 16th line of the passage, which says, "For many politicians ..... exist at all".

### PASSAGE - 3

16. (c) It can be inferred from the passage that it is a film review.
17. (d) The writer's opinion of the film Jurassic Park is not very favourable as can be explained by the 24th line of the passage, "Jurassic Park ..... real cinema".
18. (b) (b) is the correct option as can be inferred from the 12th line of the passage which says, "We're looking at nothing ..... convincing villain in John Hammond".
19. (a) The book is written by Crichton as explained by the 5th (courtesy of Michael Crichton) and 12th line ("Crichton's book was enthusiastically misguided").
20. (c) (c) is the correct option, as can be inferred from the sixth and seventh lines.

21. (a) (b), (c) and (d) are clearly mentioned as Steven Spielberg's movies in the passage.
22. (b) The phrase 'muck about', as used in the 15th line, "And Crichton's warning ..... becomes weaker in the film" clearly means interfere with.
23. (d) The 14th and the 15th line of the passage clearly explains that Jurassic Park is neither very amusing nor very frightening.
24. (a) (a) is the correct option, as can be inferred from the first three lines of the passage, "Even if we're a bit snooty ..... the world continue to finance film".

### PASSAGE - 4

25. (b) (b) is the correct title of the passage.
26. (d) (d) is the correct option, as is clear from the second and third para. The other options are not explained by the passage.
27. (b) (b) is the correct option, as explained from the second and third para of the passage.
28. (a) (a) is the correct option, as explained from the second and third para of the passage.
29. (b) (b) is the correct option, as explained from the last sentence of the fourth para.
30. (c) Adam Smith is the correct option, as it can be inferred from the third para of the passage.
31. (d) None of the lines are related to what the author has been talking in the last para.
32. (c) As the author is making fun of the fact, i.e. he is being satirical.
33. (b) (b) is the correct option, as it can be inferred from the third para of the passage.

### PASSAGE - 5

34. (a) It can be inferred from the fact that the passage refers to the British Empire. So (a) is the correct option.
35. (c) (c) is the correct option, as it can be inferred from the third para of the passage.
36. (c) (d) is the correct option, as it can be inferred from the second para of the passage.
37. (b) (b) is the correct option, as it can be inferred from the second para of the passage.
38. (a) (a) is the correct option, as it can be inferred from the third para, first two lines, "But trade requires ..... law to restrain them".
39. (d) (d) is the correct option, as it can be inferred from the fourth para of the passage.
40. (a) (a) is the correct option, as it can be inferred from the third para of the passage.

### PASSAGE - 6

41. (b) Drug addiction has not been mentioned in the passage.
42. (d) As given in para 1, ambitious people have not been mentioned. Refer, 'people who are hard.....reach themselves.'

43. (c) (c) is the correct option, as it can be inferred from the first para, ninth line, "On the other hand, .....have extraordinary talents".
44. (b) (b) is the correct option, as it can be inferred from the last sentence of first para of the passage.
45. (c) (c) is the correct option, as it can be inferred from the fourth line of the second para of the passage.
46. (c) (c) is the correct option, as it can be inferred from the second para, first line which opens with "On this, Intelligent Lady,".
47. (a) (a) is the correct option, as it can be inferred from the last 4 sentences of the fourth para of the passage.
48. (a) The word, 'improvidence', as discussed in the third line of first para would mean extravagance.

#### PASSAGE - 7

49. (a) Para 2 clearly tells that the writer's attitude towards the government is critical.
50. (c) (c) is the correct option, as it can be inferred from the first three lines of fifth para of the passage.
51. (c) (c) is the correct option, as it can be inferred from the 2nd and 3rd lines of para 6 of the passage.
52. (b) Author is pessimist because according to him it will take another 50 years to bring about a pro-business policy.
53. (b) (b) is the correct option, as it can be inferred from para 3 of the passage. It clearly says that India had a better infrastructure than most of the other developing nations.
54. (d) (d) is the correct option, as it can be inferred from the 1st and 2nd lines of para 3 of the passage.
55. (a) (a) is the correct option, as it can be inferred from the 1st line of para 4 of the passage.
56. (d) (d) is the correct option, as it can be inferred from the 1st line of para 4 of the passage.
57. (b) (b) is the correct option, as it can be inferred from the last line of para 3 of the passage.
58. (a) (a) is the correct option, as it can be inferred from para 7 of the passage, which says that politicians can not see beyond their nose.

#### PASSAGE - 8

59. (b) Para 10 clearly illustrates that the Nehru-Gandhi ideology dominated India that inspired the writer's generation.
60. (c) (c) is the correct option, as it can be inferred from the first three lines of para 10 of the passage.
61. (b) (b) is the correct option, as it can be inferred from para 16 that India will come back.
62. (c) (c) is the correct option, as it can be inferred from the 3rd and 4th lines of para 15 of the passage.
63. (a) (a) is the correct option, as it can be inferred from the last line of para 16 of the passage.
64. (c) (c) is the correct option, as it can be inferred from the 5th and 6th lines of para 6 of the passage.
65. (d) (d) is the correct option, as it can be inferred from the last 2 sentences of para 6 of the passage.

66. (b) (b) is the correct option, as it can be inferred from the 2nd line of para 7 of the passage.
67. (b) (b) is the correct option, as it can be inferred from the last line of para 8 of the passage.
68. (a) The first two lines, "The narrator of Midnight's ..... entity called India until 1947", gives (a) as the correct choice.
69. (d) (d) is the correct option, as it can be inferred from the last line of para 2, "In the case of Pakistan ..... as a nation-state".
70. (d) Para 3 talks about the secret of India's survival. Clearly both (a) and (c) are correct.

#### PASSAGE - 9

71. (a) (a) is the correct option, as it can be inferred from the first line of para 1.
72. (c) (c) is the correct option, as it can be inferred from the 3rd and the 4th line of para 2.
73. (b) As can be inferred from the passage (b) seems to be the correct choice.
74. (b) The meaning of the word 'prejudice', can be explained from the first two lines of the 10th passage.
75. (a) (a) is the correct option, as it can be inferred from the 8th line of para 2.
76. (c) (c) is the correct option, as it can be inferred from the para 3.
77. (a) (a) is the correct option, as it can be inferred from the first line of para 6.
78. (d) The author does not believe in any of the given options as can be inferred from the passage.
79. (b) (b) is the correct option, as it can be inferred from the third line of para 6.
80. (c) Thinking is clearly explained from the second line of para 10.

#### PASSAGE - 10

81. (b) (b) is the correct option, as it can be inferred from para 2.
82. (b) (b) is the correct option, as it can be inferred from the first line of para 4.
83. (a) (a) is the correct option, as it can be inferred from the last line of para 3.
84. (a) (a) is the correct option, as it can be inferred from para 8.
85. (d) As can be inferred from para 9, option (a) is not a valid one, so (d) is the correct option.
86. (c) (c) is the correct option, as it can be inferred from para 5.
87. (b) (b) is the correct option, as it can be inferred from the opening lines of para 16, "And even ..... Norman Vorvine".

#### PASSAGE - 11

88. (d) The para 2 of the passage clearly talks about what has been asked in the question. Clearly the first three options are correct.
89. (c) (c) is the correct option, as it can be inferred from the 6th, 7th and 8th lines of para 3.

90. (b) (b) is the correct option, as it can be inferred from the line 3 & 4 of para 3.  
 91. (c) (c) is the correct option, as it can be inferred from the last second line of para 3.  
 92. (a) As both tend to depict reality (a) is the correct option.

**PASSAGE - 12**

93. (c) (c) is the correct option, as it can be inferred from the passage.  
 94. (b) (b) is the correct option, as it can be inferred from the first half of the para 3.  
 95. (d) (d) is the correct option, as it can be inferred from the last sentence of para 4.  
 96. (a) (a) is the correct option, as it can be inferred from line 2 and 3 of para 5.  
 97. (b) (b) is the correct option, as it can be inferred from para 2.

**PASSAGE - 13**

98. (d) (d) is the correct option, as it can be inferred from the last sentence of para 1.  
 99. (b) Option (b) is not mentioned anywhere in the passage. (a), (c) and (d) can be inferred from passage 2, 4 and 5.  
 100. (a) Para 4 and 5 explain the theory of Sun-tzu, where (a) does not have a mention.  
 101. (d) (d) is the correct option, as it can be inferred from para 11.  
 102. (a) (a) is the correct option, as it can be inferred from line 3 and 4 of para 12.  
 103. (c) (c) is the correct option, as can be inferred from para 9 & 10.

**PASSAGE - 14**

104. (c) (c) is the correct option, as it can be inferred from lines 2, 3, 4 of para 8.  
 105. (b) (b) is the correct option, as it can be inferred from lines 1 and 2 of the last para.  
 106. (d) All of the first three options are correct as they find a mention in the second para, lines 3 to 8.  
 107. (b) (b) is the correct option, as it can be inferred from lines 5 to 8 of para 3.  
 108. (a) (a) is the correct option, as it is not mentioned in the passage as a conservatism trend.  
 109. (c) (c) is the correct option, as it can be inferred from the last line of the para 5.  
 110. (a) (a) is the correct option, as it can be inferred from the lines 7 to 10 of para 4, "However, on entry, .....Kandinsky-Klee school".  
 111. (d) (d) is the correct option, as it can be inferred from lines 1 to 4 of para 7.

**PASSAGE - 15**

112. (c) (c) is the correct option, as it can be inferred from the closing lines of para 7.  
 113. (a) (a) is the correct option, as it can be inferred from para 1.  
 114. (d) (d) is the correct option, as it can be inferred from opening lines of para 2 and 3.  
 115. (c) (c) is the correct option, as it can be inferred from lines 1 to 4 of para 5.

116. (a) (a) is the correct option, as it can be inferred from the closing lines of para 9 and the opening lines of para 10.  
 117. (b) (b) is the correct option, as it can be inferred from para 8.  
 118. (d) (d) is the correct option, as it can be inferred from para 6.  
 119. (b) The idea given in option (b) comes out very strongly in the passage.

**PASSAGE - 16**

120. (a) (a) is the correct option, as it has only one syllable.  
 121. (d) (d) is the correct option, as Phoneme develops in a child, when he is taught reading, at an age of 5 or 6.  
 122. (d) (d) is the correct option, as it can be inferred from the last sentence of para 1.  
 123. (b) (b) is the correct option, as it can be inferred from para 4.  
 124. (b) (b) is the correct option, as it can be inferred from para 2.

**PASSAGE - 17**

125. (a) (a) is the correct option, as it can be inferred from para 2. She was a great blues singer.  
 126. (c) (c) is the correct option, as it can be inferred from para 1.  
 127. (d) (d) is the correct option, as it can be inferred from the last line of para 2.  
 128. (b) (b) is the correct option, as it can be inferred from para 3, which says that she had the best musicians of the 1930's to accompany her.

**PASSAGE - 18**

129. (c) (c) is the correct option, as it can be inferred from lines 2 to 4 of para 1.  
 130. (a) (a) is the correct option, as it can be inferred from lines 9 & 10 of para 1 and line 1 of para 2.  
 131. (d) (d) is the correct option, as it can be inferred from para 3.  
 132. (c) (c) is the correct option, as it can be inferred from para 3.  
 133. (d) All of the first three options are mentioned in para 3.  
 134. (c) (c) is the correct option, as it can be inferred from the opening lines of the para 3.

**PASSAGE - 19**

135. (b) (b) is the correct option, as it can be inferred from para 2, first four lines. It says that professionals started writing Indian history which was earlier done by the official school.  
 136. (b) (b) is the correct option, as it can be inferred from para 3, first three lines.  
 137. (b) (b) is the correct option, as it can be inferred from para 3, line 5, "But when the *raj* ..... ground of administration".  
 138. (d) (d) is the correct option, as it can be inferred from para 4, last three lines, which says, "A historian must dissect ..... consistent theme".  
 139. (a) (a) is the correct option, as it can be inferred from para 1, 2, and 3.

**PASSAGE - 20**

140. (b) (b) is the correct option, as it can be inferred from the last 4 lines of para 6, which says, "Uncertainty, in the presence ..... do for those who study it".  
 141. (b) (b) is the correct option, as it can be inferred from para 3, which clearly says that the two are complimentary.

142. (d) (d) is the correct option, as it can be inferred from the passage.  
 143. (d) The first three options do not find any mention in the passage.

**PASSAGE - 21**

144. (d) The tone of the poem is 'prescribing'.  
 145. (b) These are obstacles as are given in para 1.  
 146. (a) (a) is the correct option, as it can be inferred from line 1 of para 1.  
 147. (a) The poet refers to the sensual and stores of knowledge.  
 148. (b) (b) is the correct option, as it can be inferred from the tone and wordings of the poem.

**PASSAGE - 22**

149. (d) Option (d) is the clear answer as can be explained from the first paragraph, second line, "Mysticism on the whole ..... thinkers as they were. Further the first three options are explained from para 1.  
 150. (b) (b) is the correct option, as it can be inferred from the last passage, fourth line, "there is nothing more" and sixth line, "the parthenon ..... and the world".  
 151. (d) (d) is the correct option, as it can be inferred from first three lines of para 4, "Again, the gigantic temple of Egypt, ..... tremendous, overwhelming".  
 152. (a) (a) is the correct option, as it can be inferred from para 2 and line 1 of para 5.  
 153. (c) (c) is the correct option, as can be inferred from para 2 and 5.

**PASSAGE - 23**

154. (b) The answer can be inferred from the 1st paragraph. The 1st line says – "the painter is now free to paint anything he chooses and then the 3rd line says – "yet, by the next generation ..... and began to paint abstract pictures."  
 155. (c) The answer can be inferred from the 7th paragraph, first two lines – "when a culture is .....he, himself, has to choose for society."  
 156. (d) Option (a), (b) and (c) are attributes needed for a painter to succeed as is clear in the passage. Option (a) is mentioned in the 5th paragraph 1st line, option (b) can be inferred from the 3rd paragraph, last line and option (c) is mentioned in the 3rd paragraph 3rd line.  
 157. (a) All except option (a) is true. Option (b) can be inferred from 6th paragraph – "when a culture is secure and certain....reeds and water in China", option (c) is mentioned in the 7th paragraph 3rd line – "it is too often forgotten....choice of subject," and option (d) can be inferred from 5th paragraph.  
 158. (a) The answer can be inferred from the 7th paragraph again, 1st line – "when a culture is in a state of disintegration or transition the freedom of artist increases."

**PASSAGE - 24**

159. (a) The paragraph (2) talks about the system of binary opposition . Read the line, Rather, they ..... superior position. Here they refers to binary opposition.

160. (d) The first para talks about Derrida's deconstructive approach.  
 161. (a) The last paragraph, "Thus any act .....agent or subject", clearly gives the answer as option (a)  
 162. (c) The first paragraph speaks about in the 11<sup>th</sup> line. It clearly talks about (a), (b) and (d).

**PASSAGE - 25**

163. (e) The central theme of the passage is to define and explain what a just society, based on original position, will be like According to the passage, the just society will be fair, wherein, justice will not be influenced by class, position, social status of a person. This is best described in the option (e). Although even the first four options appear correct only (e) includes all the points and correct language.  
 164. (a) The original position as mentioned in the second paragraph is a 'hypothetical situation' where everybody is unaware of their privileges, positions, status etc. But this is in order to ensure that justice is received without any influence from these categories. So, while option (b) also appears correct the most appropriate answer is (a) as it states both the situation and the consequence.  
 165. (d) Choosing 'principle of justice' behind a 'veil of ignorance' means while choosing the principles one must not be aware of one's class, status, intelligence, strength, assets, abilities etc. Businessmen, school children, even potential immigrants will be aware of at least one of these things and, thus, a hierarchy will be build, thus, the only correct possibility is that of the new birth where one is completely ignorant of what is to come. So, the right answer is (d).  
 166. (b) According to the passage, social institutions and laws can be fair only if they are consistent with the principles of justice as initially agreed upon. This could be inferred from the last paragraph of the passage. Thus, the correct answer is (b).  
 167. (d) In the first paragraph of the passage the author states that by justice as fairness, he means that 'principles of justice of the basic structures\ society are the objects of original agreement" and these principles are to, further, regulate all agreements of the given options in this questions, the basic structure is that of education which must be provided in all fairness. So, the correct answer is (d).

**PASSAGE - 26**

168. (b) The expression "like a Madonna from a Madonna" in the first paragraph alludes to that, difference lies between the interpretations of the two artists. That means the new artists do not create something new rather old ones are represented in different ways. This is best expressed in option (b).

169. (a) The answer lies in the last paragraph of the passage where Rilke tells a story from T.S. Elliot's poem in which poet has used the terms 'sea' and 'other creations' with some examples explaining it. This story is a metaphor defining the place of poet in the society. So correct answer is option (a).

170. (c) Answer lies in the second line of second paragraph where one finds that 'adventures of experience' refers to poets and artists of Renaissance. Hence, correct answer is option (c).

#### PASSAGE - 27

171. (c) On referring to the 4th sentence of para 1 of the passage, it is clear that (c) is the right choice.

172. (e) Fossil means one, such as a rigid theory, that is outdated or antiquated. Refer para 2, "As an art movement ..... rather, a fossil." Hence (e) is the right choice in the context of the passage.

173. (a) On referring to the 1st and 2nd sentence of para 1 of the passage, "A remarkable aspect of art ..... separate, though interconnecting, activities, it is clear that (1) is the right choice.

174. (d) On referring to line 20 of para 1, "Different groups of artists ..... of visual and spiritual experience". "Visual and spiritual" is synonymous to 'perceptual and transcendental'.

175. (e) On referring to the last 2 sentences of para 2 of the passage, it is clear that (e) is the right choice. As the last sentence says, "The original and ..... present needs." Hence it clearly says that a original and creative person interprets and develop on past thoughts to suit contemporary needs.

#### PASSAGE - 28

176. (c) The opening line of the 4th para, 'Today, citizen ..... elders were right', clearly infers (a). The last line of the 3rd para, 'This liturgy ..... celebrate it', clearly infers (a). The second line of the last para, 'Like the parents of ..... worth four cents', clearly infers (d). The opening line of the last para, 'in a world where ..... adults to be spoiled', clearly infers (e). (c) can not be inferred from the passage as it was the opinion of the author and not the Elders. As referred in the 5th para, "Two two-cent cones ..... a boast of wealth."

177. (d) Parvenu means a person who has suddenly risen to a higher social and economic class and has not yet gained social acceptance by others in that class or an upstart. Hence the phrase 'little parvenus' refers to young upstarts.

178. (b) On referring to the 2nd sentence of para 5 of the passage, "Two-cent cones instead of one ..... that I yearned for them", it is clear that (b) is the right choice.

179. (b) The concept of morality has changed over a period of time. Refer last para, 'Nowadays the moralist .....," the author compares the morality of today's consumerist with the morality of his childhood where children were to be protected from excess and greed, even of a symbolic nature. Hence, the moralist of yesteryears would be at odds with the morality of today.

180. (a) Refer para 4, clearly (b) is ruled out. Further 'secret justification, cruelly pedagogically,' indicates that the justification for refusal was didactic (pertaining to teaching).

# PAST YEARS SOLVED PAPER

## (2009-2016)

### Ch-1. Number System

1. How many numbers are there between 0 and 1000 which on division by 2, 4, 6, 8 leave remainders 1, 3, 5, 7 respectively? (2009)
- (a) 21 (b) 40  
(c) 41 (d) 39
2.  $N!$  is completely divisible by  $13^{52}$ . What is sum of the digits of the smallest such number  $N$ ? (2009)
- (a) 11 (b) 15  
(c) 16 (d) 19
3. If 'x' is a real number then what is the number of solutions for the equation  $\sqrt{(x^4 + 16)} = x^2 - 4$ ? (2009)
- (a) 0 (b) 1  
(c) 2 (d) 3
4. If  $S = 1^2 - 2^2 + 3^2 - 4^2 + \dots - 2000^2 + 2001^2$ , then what is the value of  $S$ ? (2009)
- (a) 2001300 (b) 2003001  
(c) 2010301 (d) 2000031
5. If  $7^{103}$  is divided by 25, then the remainder is (2009)
- (a) 20 (b) 16  
(c) 18 (d) 15
6. In a certain zoo, there are 42 animals in one sector, 34 in the second sector and 20 in the third sector. Out of this, 24 graze in sector one and also in sector two. 10 graze in sector two and sector three, 12 graze in sector one and sector three. These figures also include four animals grazing in all the three sectors are now transported to another zoo, find the total number of animals. (2009)
- (a) 38 (b) 56  
(c) 54 (d) None of the above
7. A person closes his account in an investment scheme by withdrawing Rs. 10,000. One year ago he had withdrawn Rs. 6000. Two years ago he had withdrawn Rs. 5000. Three years ago he had not withdrawn any money. How much money had he deposited approximately at the time of opening the account 4 years ago, if the annual simple interest is 10%? (2009)
- (a) Rs. 15600 (b) Rs. 16500  
(c) Rs. 17280 (d) None of these
8.  $P, Q$  and  $R$  are three consecutive odd numbers in ascending order. If the value of three times  $P$  is three less than two times  $R$ , find the value of  $R$ . (2009)
- (a) 5 (b) 7  
(c) 9 (d) 11
9. If 'n' is a natural number then the greatest integer less than or equal to  $(5 + \sqrt{19})^n$  is (2010)
- (a) even.  
(b) odd.  
(c) even when 'n' is even and odd when 'n' is odd.  
(d) even when 'n' is odd and odd when 'n' is even.
10. If  $x$  and  $y$  are positive integers, then the last digit of which of the following is same as the last digit of the sum of  $x$  and  $y$ ? (2010)
- (a)  $x^7 + y^7$  (b)  $x^{13} + y^{13}$   
(c)  $x^{20} + y^{20}$  (d) None of these
11. If 'a' is one of the roots of  $x^5 - 1 = 0$  and  $a \neq 1$ , then what is the value of  $a^{15} + a^{16} + a^{17} + \dots + a^{50}$ ? (2010)
- (a) 1 (b) 5a  
(c) 35 (d) None of these
12. What is the number of non-negative integer solutions for the equation  $x^2 - xy + y^2 = x + y$ ? (2010)
- (a) 3 (b) 4  
(c) 1 (d) None of these
13. The last digit of  $3^{3^{4n}} + 1$ , is (2010)
- (a) 0 (b) 4  
(c) 8 (d) 2
14. Mr. Mehra is planning for higher education expenses of his two sons aged 15 and 12. He plans to divide ₹ 15 lakhs in two equal parts and invest in two different plans such that his sons may have access to ₹ 21 lakhs each when they reach the age of 21. He is looking for plan that will give him a simple interest per annum. The rates of interest of the plans for his younger son and elder son should be (2010)
- (a) 5% and 7.5% respectively  
(b) 8% and 12% respectively  
(c) 10% and 15% respectively  
(d) 20% and 30% respectively
15. Let  $S$  denote the infinite sum  $2 + 5x + 9x^2 + 14x^3 + 20x^4 + \dots$ , where  $|x| < 1$  and the coefficient of  $x^{n-1}$  is  $\frac{1}{2}n(n+3)$ , ( $n = 1, 2, \dots$ ). Then  $S$  equals (2010)
- (a)  $\frac{2-x}{(1-x)^3}$  (b)  $\frac{2-x}{(1+x)^3}$   
(c)  $\frac{2+x}{(1-x)^3}$  (d)  $\frac{2+x}{(1+x)^3}$
16.  $\frac{(X+3)}{3}, \frac{(X+8)}{4}, \frac{(X+15)}{5}, \frac{(X+24)}{6}, \dots, \frac{(X+80)}{10}$  is a sequence where  $X \neq 1$  (2011)
- What is the least value of  $X$  for which HCF (Numerator, Denominator) = 1 for each term of the given sequence?
- (a) 17 (b) 13  
(c) 11 (d) None of these
17. A positive integer is equal to the square of the number of factors it has. How many such integers are there? (2011)
- (a) 1 (b) 2  
(c) 3 (d) Infinite
18.  $(x-1)(x-2)(x-3) = 6^y$  (2011)
- How many integer solutions exist for the given equation?
- (a) 0 (b) 1  
(c) 2 (d) More than 2
19. All the two-digit natural numbers whose unit digit is greater than their ten's digit are selected. If all these numbers are

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## Past Years Solved Paper (2009-2016)

- written one after the other in a series, how many digits are there in the resulting number? (2012)
- (a) 90 (b) 72  
(c) 36 (d) 54
20. There are five consecutive integers a, b, c, d and e such that  $a < b < c < d < e$  and  $a^2 + b^2 + c^2 = d^2 + e^2$ . What is/are the possible value(s) of b? (2012)
- (a) 0 (b) 11  
(c) 0 and -11 (d) -1 and 11.
21. A sequence of terms is defined such that  $2a_n = a_{n+1} + a_{n-1}$ ;  $a_0 = 1$ ;  $a_1 = 3$ . What is the value of  $a_0 + a_1 + a_2 + \dots + a_{50}$ ? (2012)
- (a) 2551 (b) 2753  
(c) 2601 (d) 2451
22.  $500! + 505! + 510! + 515!$  is completely divisible by  $5^n$ , where n is a natural number. How many distinct values of n are possible? (2012)
- (a) 120 (b) 121  
(c) 124 (d) 125
23. The number 44 is written as a product of 5 distinct integers. If 'n' is the sum of these five integers then what is the sum of all the possible values of n? (2012)
- (a) 11 (b) 23  
(c) 26 (d) 32
24. Arrange the numbers  $2^{\frac{7}{6}}$ ,  $3^{\frac{3}{4}}$  and  $5^{\frac{2}{3}}$  in ascending order. (2013)
- (a)  $2^{\frac{7}{6}} > 3^{\frac{3}{4}} > 5^{\frac{2}{3}}$  (b)  $3^{\frac{3}{4}} > 2^{\frac{7}{6}} > 5^{\frac{2}{3}}$   
(c)  $5^{\frac{2}{3}} > 3^{\frac{3}{4}} > 2^{\frac{7}{6}}$  (d) None of these
25. If  $E = 3 + 8 + 15 + 24 + \dots + 195$ , then what is the sum of the prime factors of E? (2013)
- (a) 29 (b) 31  
(c) 33 (d) 23
26. 'ab' is a two-digit prime number such that one of its digits is 3. If the absolute difference between the digits of the number is not a factor of 2, then how many values can 'ab' assume? (2013)
- (a) 5 (b) 3  
(c) 6 (d) 8
27. The number of factors of the square of a natural number is 105. The number of factors of the cube of the same number is 'F'. Find the maximum possible value of 'F'. (2013)
- (a) 208 (b) 217  
(c) 157 (d) 280
28. How many natural numbers divide exactly one out of 1080 and 1800, but not both? (2013)
- (a) 20 (b) 42  
(c) 24 (d) 36
29. If  $f(n) = 1^4 + 2^4 + 3^4 + \dots + n^4$ , then how can  $1^4 + 3^4 + 5^4 + \dots + (2n-1)^4$  be expressed? (2014)
- (a)  $f(2n-1) - 16 \times f(n)$  (b)  $f(2n-1) - 8 \times f(n)$   
(c)  $f(2n) - 16 \times f(n)$  (d)  $f(2n) - 8 \times f(n)$
30. The number of APs with 5 distinct terms that can be formed from the first 50 natural numbers is (2014)
- (a) 325 (b) 300  
(c) 375 (d) 288
31. The ratio of two numbers whose LCM is 600 is 7 : 8. What is the LCM of the given two numbers? (2014)
- (a) 1120 (b) 560  
(c) 2240 (d) 1152
32. The sequence  $P_1, P_2, P_3, \dots$  is defined by  $P_1 = 211$ ,  $P_2 = 375$ ,  $P_3 = 420$ ,  $P_4 = 523$ , and  $P_n = P_{n-1} - P_{n-2} + P_{n-3} - P_{n-4}$  for all  $n \geq 5$ . What will be the value of  $P_{531} + P_{753} + P_{975}$ ? (2014)
- (a) 898 (b) 631  
(c) 364 (d) 544
33. Find the number of ways in which a batsman can score 100 runs by scoring runs in 2's, 4's and 6's, such that he hits at least one double, one boundary and one six. (2014)
- (a) 184 (b) 185  
(c) 192 (d) 208
34. A set 'P' is formed from the set of first 'N' natural numbers by deleting all the perfect squares and all the perfect cubes. If the numbers are arranged in an ascending order then, what is the 476th number of the set 'P'? (2014)
- (a) 500 (b) 501  
(c) 502 (d) 503
35. If  $7^a = 26$  and  $343^b = 676$  then what is the relation between a and b? (2014)
- (a)  $a = b$  (b)  $a = 2b$   
(c)  $2a = 3b$  (d)  $3a = 2b$
36. 'P' is the product of ten consecutive two-digit natural numbers. If  $2^a$  is one of the factors of P, then the maximum value that 'a' can assume is (2014)
- (a) 11 (b) 12  
(c) 13 (d) 14
37. From a vessel completely filled up with pure wine, 140 litres of content is removed and replaced with equal quantity of water. The process is repeated one more time. In a 98 litres sample of the resulting solution 80 litres is water. Find the capacity (in litres) of the vessel. (2015)
38. x is the smallest positive integer such that when it is divided by 7, 8 and 9 leaves remainder as 4, 5 and 6 respectively. Find the remainder when  $x^3 + 2x^2 - x - 3$  is divided by 132. (2015)
- (a) 49 (b) 76  
(c) 94 (d) 15
39. An amount borrowed at simple interest gets tripled in 24 years. How many years does it take to get doubled, if the interest rate is same. (2015)
40. P is the product of the first 100 multiples of 15 and Q is the product of the first 50 multiples of  $25^{20}$ . Find the number of consecutive zeroes at the end of  $\frac{P^2}{Q} \times 10^{1767}$  (2015)
- (a) 1968 (b) 1914  
(c) 3 (d) 2024
41. A four-digit number is divisible by the sum of its digits. Also, the sum of these four digits equals the product of the digits. What could be the product of the digits of such a number? (2015)
- (a) 6 (b) 8  
(c) 10 (d) 12
42. Let P be the set of all odd positive integers such that every element in P satisfies the following conditions.
- I.  $100 \leq n < 1000$
- II. The digit at the hundred's place is never greater than the digit at tens place and also never less than the digit at units place.

- How many elements are there in  $P^2$ ? (2015)  
 (a) 93 (b) 94  
 (c) 95 (d) 96
43. Which of the following will completely divide  $(106^{90} - 49^{90})$ ? (2015)  
 (a) 589 (b) 186  
 (c) 124 (d) None of these
44. How many ordered triplets  $(a, b, c)$  exist such that  $\text{LCM}(a, b) = 1000$ ,  $\text{LCM}(b, c) = 2000$ ,  $\text{LCM}(c, a) = 2000$  and  $\text{HCF}(a, b) = k \times 125$ ? (2015)  
 (a) 32 (b) 28  
 (c) 24 (d) 20
45. Out of 4 numbers  $a, b, c$ , and  $d$ , each pair of numbers has the same highest common factor. Find the highest common factor of all the four numbers if the least common multiple of  $a$  and  $b$  is 310 and that of  $c$  and  $d$  is 651. (2015)
46. What is the remainder when  $7^{700}$  is divided by 100? (2016)  
 (a) 1 (b) 61  
 (c) 41 (d) 21
47. A sequence of 4 digits, when considered as a number in base 10 is four times the number it represents in base 6. What is the sum of the digits of the sequence? (2016)  
 (a) 7 (b) 6  
 (c) 9 (d) 8
48. If  $N = 888\dots$  up to 100 digits, what is the remainder when  $N$  is divided by 625? (2016)  
 (a) 128 (b) 138  
 (c) 338 (d) 388
49. A natural number  $n$  is such that  $120n \leq 240$ . If  $\text{HCF}(n, 240) = 1$ , how many values of  $n$  are possible? (2016)  
 (a) 24 (b) 32  
 (c) 36 (d) 40

## Ch- 2. Set Theory

1.  $S_1 = \{2, 4, 6, 8, \dots, 800\}$  (2009)  
 $S_2 = \{3, 6, 9, 12, \dots, 900\}$   
 If  $S_3 = S_1 \cup S_2$ , then what will be the 105th element of  $S_3$  if all its elements are arranged in increasing order?  
 (a) 120 (b) 630  
 (c) 158 (d) 198
2. In a factory making radioactive substances, it was considered that the three cubes of uranium together are hazardous. So the company authorities decided to have the stack of uranium interspersed with lead cubes. But there is a new worker in a company who does not know the rule. So he arranges the uranium stack the way he wanted. What is the number of hazardous combinations of uranium in a stack of 5? (2010)  
 (a) 3 (b) 7  
 (c) 8 (d) 10
3. For constructing the working class consumer price index number of a particular town, the following weights corresponding to different group of items were assigned : Food-55, Fuel-15, Clothing -10, Rent -8 and Miscellaneous-12.  
 It is known that the rise in food prices is double that of fuel and the rise in miscellaneous group prices is double that of rent. In October 2006, the increased D.A. by a factory of that town by 182% fully compensated for the rise in prices of food and rent but did not compensate for anything else. Another factory of the same locality increased D.A. by

- 46.5%, which compensated for the rise in fuel and miscellaneous groups.  
 Which is the correct combination of the rise in prices of food, fuel, rent and miscellaneous groups? (2011)  
 (a) 320. 14, 159.57, 95.64, 166.82  
 (b) 317.14, 158.57, 94.64, 189.28  
 (c) 311.14, 159.57, 90.64, 198.28  
 (d) 321.14, 162.57, 84.46, 175.38

## DIRECTIONS (Qs. 4-5) : Each of the questions is followed by two statements I and II. Give answer

- (a) if the question can be answered by using one of the statements alone, but cannot be answered using the other statement alone.  
 (b) if the question can be answered by either statement alone.  
 (c) if the question can be answered by using both statements together, but cannot be answered using either statement alone.  
 (d) if the question cannot be answered even by using both the statements together. (2011)
4. A line graph on a graph sheet shows the revenue for each year from 1990 through 1998 by points and joins the successive points by straight line segments. The point for revenue of 1990 is labeled A, that for 1991 as B, and that for 1992 as C. What is the ratio of growth in revenue between 1991-92 and 1990-91?  
**Statement I:** The angle between AB and X-axis when measured with a protractor is 40 degrees, and the angle between CB and x-axis is 80 degrees.  
**Statement II:** The scale of y-axis is 1 cm = ₹ 1000.
5. Geetanjali Express, which is 250 metre long when moving from Howrah to Tatanagar crosses Subarnarekha bridge in 30 seconds. What is the speed of Geetanjali Express?  
**Statement I:** Bombay Mail, which runs at 60 km/hour crosses the Subarnarekha bridge in 30 seconds.  
**Statement II:** Bombay Mail when running at 90 km/hour crosses a lamp post in 10 seconds.

## DIRECTIONS for Questions 6 to 8: Answer the questions on the basis of the information given below.

The following table provides partial details about the comparison of the increase in the number of applicants among four streams in education viz. Engineering, Medical Science, Commerce and Arts in the year 2008 as compared to the year 2007. The increase in the number of applicants in the Commerce stream in 2008 as compared to 2007 is 70000 and the average number of applicants in the four streams in 2008 is 400000. Assume that these are the only four streams in the education system. In the given table, the number 20000 under the title 'Commerce' means that the increase in the number of applicants in the Commerce stream in 2008 as compared to the year 2007 is 20000 less than the corresponding increase in the Engineering stream. All the other data in the table should be interpreted similarly.

	Engineering	Medical Sciences	Commerce
Engineering		69000	20000
Medical	A		B
Commerce	D	C	
Arts	E	59000	F

(2012)

6. Which of the following is not true?  
 (a)  $E + F = 0$  (b)  $C = 49000$   
 (c)  $E + 10000 = 0$  (d) None of these

S-4



**DIRECTIONS for questions 11 and 12 : Answer the questions on the basis of the information given below.**

A robot is designed to move in a peculiar way and it can be set in motion by a microprocessor program. The program can be initiated by assigning a positive rational value to its variable  $n$ . The program directs the robot to move in the following way. As soon as the program is started, the robot starts from the point  $O$ , moves  $2n$  metres northward and changes its direction by  $n^\circ$  to the right. It then moves  $2n$  metres forward and again changes its direction by  $n^\circ$  to the right and continues in this manner till it reaches the starting point  $O$ , or till it covers a total distance of 100 m, whichever happens first, and then it stop. **(2016)**



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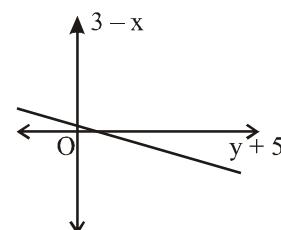
**DIRECTIONS for questions 13 to 16:** Answer the questions on the basis of the information given below.

Mr. Suzuki, a car dealer, sold cars of only two brands, A and B, in the previous year. This year, he introduced a new brand, C. The number of cars of brands A and B sold in the previous year were in the ratio  $3 : 2$ , and the ratio of the number of cars sold in the previous year to that sold in this year is  $2 : 3$  for brand A and  $2 : 5$  for brand B. Further, the number of cars of brand C sold this year forms 81 % of the total number of cars sold this year. (2016)

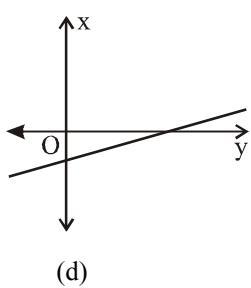
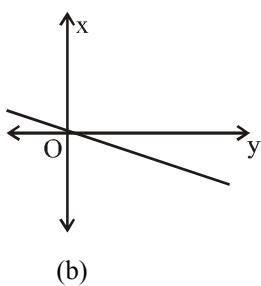
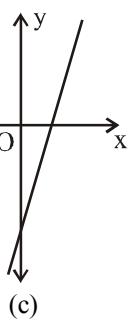
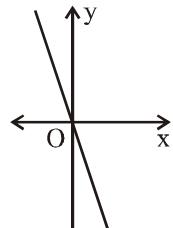
## **Past Years Solved Paper (2009-2016)**



## Ch-3. Functions



Which of the following shows the graph of  $y$  against  $x$ ?



6. Consider the expression  $(a^2 + a + 1)(b^2 + b + 1)(c^2 + c + 1)(d^2 + d + 1)(e^2 + e + 1)$

abcde

Where  $a, b, c, d$  and  $e$  are positive numbers. The minimum value of the expression is

- (a) 3 (b) 1 (c) 10 (d) 243

7. If  $mx^m - nx^n = 0$ , then what is the value of  $\frac{1}{x^m + x^n} + \frac{1}{x^m - x^n}$  in terms of  $x^n$ ?

- (a)  $\frac{2mn}{x^n(n^2 - m^2)}$  (b)  $\frac{2mn}{x^n(n^2 + m^2)}$   
 (c)  $\frac{2mn}{x^n(m^2 - n^2)}$  (d)  $\frac{2mn}{x^n(m^2 + n^2)}$

8. If  $f\left(x + \frac{y}{8}, x - \frac{y}{8}\right) = xy$ , then  $f(m, n) + f(n, m) = 0$

- (a) only when  $m = n$  (b) only when  $m \neq n$   
 (c) only when  $m = -n$  (d) for all  $m$  and  $n$

9. There are three coplanar parallel lines. If any  $p$  points are taken on each of the lines, then find the maximum number of triangles with the vertices of these points.

- (a)  $p^2(4p - 3)$  (b)  $p^3(4p - 3)$   
 (c)  $p(4p - 3)$  (d)  $p^3$

10. If three positive real numbers  $a, b$  and  $c$  ( $c > a$ ) are in Harmonic Progression, then  $\log(a + c) + \log(a - 2b + c)$  is equal to:

- (a)  $2 \log(c - b)$  (b)  $2 \log(a - c)$   
 (c)  $2 \log(c - a)$  (d)  $\log a + \log b + \log c$

11. When '2' is added to each of the three roots of  $x^3 - Ax^2 + Bx - C = 0$ , we get the roots of  $x^3 + Px^2 + Qx - 18 = 0$ . A, B, C, P and Q are all non-zero real numbers. What is the value

of  $(4A + 2B + C)$ ?

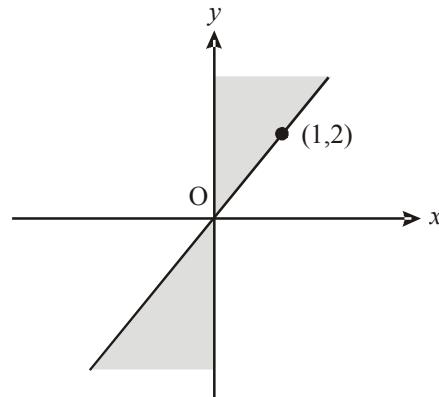
(2011)

- (a) 10 (b) -10

- (c) 11 (d) Cannot be determined

12. The shaded portion of figure shows the graph of which of the following?

(2011)



- (a)  $x(y - 2x) \geq 0$

- (b)  $x(y - 2x) \leq 0$

- (c)  $x\left(y + \frac{1}{2}x\right) \geq 0$

- (d)  $x\left(y - \frac{1}{2}x\right) \leq 0$

13. Let  $f$  be an injective map with domain  $\{x, y, z\}$  and range  $\{1, 2, 3\}$  such that exactly one of the following statements is correct and the remaining are false.  $f(x) = 1, f(y) \neq 1, f(z) \neq 2$ . The value of  $f^{-1}(1)$  is

(2011)

- (a)  $x$

- (b)  $y$

- (c)  $z$

- (d) None of the above

14. A function  $f(x)$  is defined for real values of  $x$  as:

(2012)

$$f(x) = \frac{1}{\log_{5-|x|} \sqrt{x^3 - 7x^2 + 14x - 8}} \text{ What is the domain of } f(x)?$$

- (a)  $x \in (0, \infty)$

- (b)  $x \in (-5, -4) \cup (-4, 4) \cup (4, 5)$

- (c)  $x \in (1, 2) \cup (4, 5)$

- (d)  $x \in (1, 2) \cup (4, \infty)$

15. A function  $F(n)$  is defined as  $F(n-1) = \frac{1}{(2 - F(n))}$  for all natural numbers 'n'. If  $F(1) = 2$ , then what is the value of  $[F(1)] + [F(2)] + \dots + [F(50)]$ ?

(2012)

- (Here,  $[x]$  is equal to the greatest integer less than or equal to 'x')

- (a) 51

- (b) 55

- (c) 54

- (d) None of these

16. At how many points do the graphs of  $y = \frac{1}{x}$  and  $y = x^2 - 4$  intersect each other?

(2013)

- (a) 0

- (b) 1

- (c) 2

- (d) 3

17. If  $f(x) = (\sec x + \operatorname{cosec} x)(\tan x - \cot x)$  and  $\frac{\pi}{4} < x < \frac{\pi}{2}$ , then  $f(x)$  lies in the range of

(2013)

- (a)  $[\infty, 0)$

- (b)  $(0, \infty)$

- (c)  $(-\infty, 0]$

- (d) None of these

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18. Let  $f(x) = ax^2 + bx + c$ , where  $a, b$  and  $c$  are real numbers and  $a \neq 0$ . If  $f(x)$  attains its maximum value at  $x = 2$ , then what is the sum of the roots of  $f(x) = 0$ ? (2013)  
 (a) 4 (b) -2 (c) 8 (d) -4
19. 'f' is a real function such that  $f(x + y) = f(xy)$  for all real values of  $x$  and  $y$ . If  $f(-7) = 7$ , then the value of  $f(-49) + f(49)$  is (2014)  
 (a) 7 (b) 14 (c) 0 (d) 49
20. The coordinates of two diagonally opposite vertices of a rectangle are  $(4, 3)$  and  $(-4, -3)$ . Find the number of such rectangle(s), if the other two vertices also have integral coordinates. (2015)  
 (a) 1 (b) 4 (c) 5 (d) 10
21. If  $\log 2x = 2 \log(x + 1)$ , find the number of real values of  $x$ . (2015)
22. If  $[\log_{10} 1] + [\log_{10} 2] + [\log_{10} 4] + \dots + [\log_{10} n] = n$  where  $[x]$  denotes the greatest integer less than or equal to  $x$ , then (2016)  
 (a)  $96 \leq n < 104$  (b)  $104 < -n < 107$   
 (c)  $107 \leq n < 111$  (d)  $111 \leq n < 116$
23. Consider two figures A and D that are defined in the coordinate plane. Each figure represents the graph of a certain function, as defined below:  
 A :  $|x| - |y| = a$   
 D :  $|y| = d$   
 If the area enclosed by A and D is O. Which of the following is a possible value of  $(a, d)$  : (2016)  
 (a)  $(2, 1)$  (b)  $(-2, 1)$   
 (c)  $(-2, 3)$  (d)  $(2, 3)$

#### Ch-4. Average, Ratio & Proportion

1. On 1st January, 2000 the average age of a family of 6 people was 'A' years. After 5 years a child was born in the family and one year after that the average age was again found to be 'A' years. What is the value of 'A'? (Assume that there are no other deaths and births.) (2009)  
 (a) 25 (b) 35  
 (c) 37 (d) 39
2. Three truck drivers, Amar, Akbar and Anthony stop at a road side eating joint. Amar orders 10 rotis, 4 plates of tadka, and a cup of tea. Akbar orders 7 rotis, 3 plates of tadka, and a cup of tea. Amar pays ₹ 80 for the meal and Akbar pays ₹ 60. Meanwhile, Anthony orders 5 rotis, 5 plates of tadka and 5 cups of tea. How much (in ₹) will Anthony pay? (2009)  
 (a) 75 (b) 80  
 (c) 95 (d) 100
3. Two different solutions of honey, milk and water are mixed with each other three times in varying proportions. The concentration of honey and milk in the three resulting solutions are found to be  $(10\%, 16\%)$ ,  $(12\%, 12\%)$  and  $(16\%, x\%)$  respectively. What is the value of  $x$ ? (2010)

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- (a) 4 (b) 7  
 (c) 8 (d) 10
4. The average age of a couple is 25 years. The average age of the family just after the birth of the first child was 18 years. The average age of the family just after the second child was born was 15 years. The average age of the family after the third and the fourth children (who are twins) were born was 12 years. If the present average age of the family of six persons is 16 years, how old is the eldest child? (2010)  
 (a) 6 years (b) 7 years  
 (c) 8 years (d) 9 years
5. The letters of the English alphabet, in the order A to Z, are made to represent 26 numbers which are in Arithmetic Progression. The sum of the numbers representing A, C and E is 36 while that of A, C, E and G is 60. What is the sum of the numbers representing B, D, F and H? (2011)  
 (a) 96 (b) 66  
 (c) 72 (d) 84
6. Three men are gambling in Casino Royal. They start with sums of money in the ratio  $7 : 6 : 5$  and finish with sums of money in the ratio  $6 : 5 : 4$ , in the same order as before. One of them won \$ 12. How many dollars did he start with? [The three men gambled amongst each other only] (2012)  
 (a) \$1080 (b) \$420  
 (c) \$210 (d) None of these
7. The ratio of alcohol to water in an alcohol-water solution is  $9 : 1$ . The rate of evaporation per hour of alcohol and water on boiling is 20% and 5% respectively. The minimum number of hours for which the solution needs to be boiled so as it contains at least 18% of water? (2013)  
 (a) 3 (b) 4  
 (c) 3.5 (d) 4.5
8. There are 40 students in a class. A student is allowed to shake hand only once with a student who is taller than him or equal in height to him. He can't shake hand with anyone who is shorter than him. Average height of the class is 5 feet. What is the difference between the maximum and minimum number of handshakes that can take place in the class? (2015)  
 (a)  $\left( \frac{^{40}C_2}{2} - 20 \right)$  (b) 361  
 (c)  $^{40}C_2 - 40$  (d)  $^{40}C_2$
9. A certain sum of money is made up of Re. 1, 50 paise and 25 paise coins. The ratio of the number of these coins is  $5 : 6 : 8$ . Then,  $\frac{3}{5}$ th of the Re. 1 coins are changed to 50 paise and 25 paise coins, such that the ratio of the total number of these coins in the same order became  $1 : 2$ . Now, half of the 50 paise coins are changed to Re. 1 coins and all the 25 paise coins are changed to Re. 1 and 50 paise coins in the ratio  $7 : 4$ . What is the ratio of the Re. 1 and 50 paise coins at the end of the conversions? (Note:- If you change a Re. 1 coin into 50 paise coins, then you will get two coins of 50 paise for a Re. 1 coin.) (2015)  
 (a) 11 : 23 (b) 16 : 13  
 (c) 54 : 71 (d) None of these

## Ch-5. Algebra 1

1.  $p, q$  and  $r$  are three non-negative integers such that  $p + q + r = 10$ . The maximum value of  $pq + qr + pr + pqr$  is (2009)  
 (a)  $\geq 40$  and  $< 50$       (b)  $\geq 50$  and  $< 60$   
 (c)  $\geq 60$  and  $< 70$       (d)  $\geq 70$  and  $< 80$

2.  $a + \frac{1}{b + \frac{1}{c + \frac{1}{d + \dots}}} = 2^{1/3}$

If  $a, b, c, d$  etc are positive integers, then what is the value of 'b'? (2011)

- (a) 2      (b) 4  
 (c) 3      (d) 5
3. The ratio of the roots of  $\ell x^2 + nx + n = 0$  is  $p : q$ , then (2011)

(a)  $\sqrt{\frac{q}{p}} + \sqrt{\frac{p}{q}} + \sqrt{\frac{\ell}{n}} = 0$       (b)  $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} + \sqrt{\frac{n}{\ell}} = 0$

(c)  $\sqrt{\frac{q}{p}} + \sqrt{\frac{p}{q}} + \sqrt{\frac{\ell}{n}} = 0$       (d)  $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} + \sqrt{\frac{n}{\ell}} = 0$

4. If  $x = 1 + 2a + 3a^2 + 4a^3 + \dots$  ( $-1 < a < 1$ ) and  $y = 1 + 3b + 6b^2 + 10b^3 + \dots$  ( $-1 < b < 1$ ), then find  $1 + ab + (ab)^2 + (ab)^3 + \dots$  in terms of  $x$  and  $y$ . (2011)

(a)  $\frac{x^{1/2}y^{1/3}}{x^{1/2} + y^{1/3} - 1}$       (b)  $\frac{xy}{x + y - 1}$

(c)  $\frac{x^{1/3}y^{2/3}}{x^{1/3} + y^{1/2} - 1}$       (d) None of these

5. If  $r, s$ , and  $t$  are consecutive odd integers with  $r < s < t$ , which of the following must be true? (2011)  
 (a)  $rs = t$       (b)  $r + t = 2t - s$   
 (c)  $r + s = t - 2$       (d)  $r + t = 2s$

6. For which value of  $k$  does the following pair of equations yield a unique solution for  $x$  such that the solution is positive? (2011)

$$\begin{aligned} x^2 - y^2 &= 0 \\ (x - k)^2 + y^2 &= 1 \end{aligned}$$

(a) 2      (b) 0  
 (c)  $\sqrt{2}$       (d)  $-\sqrt{2}$

7. If  $\frac{bx - ay}{bc} = \frac{ay - cz}{ac} = \frac{cz - bx}{ab}$ , then, given that  $(bx \neq ay \neq cz)$  (2012)  
 (a)  $ab + bc + ca = 0$       (b)  $ab - bc + ca = 0$   
 (c)  $ab + bc - ca = 0$       (d)  $ab - bc - ca = 0$

8.  $ax^2 + bx + c = 0$  is a quadratic equation with rational coefficients such that  $a + b + c = 0$ , then which of the following is necessarily true? (2012)  
 (a) Both the roots of this equation are less than 1.  
 (b) One of the roots of the equation is  $c$ .

- (c) One of the roots of the equation is  $\frac{c}{a}$   
 (d) Exactly one of the roots is 1.

9. Muniram made an investment of 10 lakh in Axim Dynamic Bond. The variation in fund value of the bond with respect to time follows a polynomial with degree 2. Due to precarious market condition, the fund value of the investment becomes 50% of the investment at the end of 2<sup>nd</sup> year. If the fund value becomes 150% of the investment at the end of 4<sup>th</sup> year, then what is the absolute difference (in lakh) between the investment and the fund value of the bond at the end of 8<sup>th</sup> year? (2013)

- (a) 80      (b) 70  
 (c) 75      (d) 60

10. Let  $R(x) = mx^3 - 100x^2 + 3n$ , where  $m$  and  $n$  are positive integers. For how many ordered pairs  $(m, n)$  will  $(x - 2)$  be a factor of  $R(x)$ ? (2013)

- (a) 16      (b) 17  
 (c) 18      (d) 15

11. The coefficient of  $a^{12}b^8$  in the expansion of  $(a^2 + b)^{13}$  is (2013)

- (a)  $\frac{13!}{12!6!}$       (b)  $-\frac{13!}{6!8!}$   
 (c)  $\frac{13!}{6!8!}$       (d) None of these

12. An equation with all positive roots is written as  $x^n + a_n x^{n-1} + a_{n-1} x^{n-2} + \dots + a_1 = 0$ . Which of the following is necessarily true? (2014)

- (a)  $a_n^n \geq n^n \times a_1$       (b)  $n^n \geq a_n^n \times a_1$   
 (c)  $a_1^n \geq n^n \times a_n$       (d) None of these

13. The sum of the coefficients of the polynomial  $(x - 1)^9 (x - 2)^4 (x - 4)$  is (2014)

- (a) 0      (b) 16  
 (c) -20      (d) None of these

14. What is the sum of the roots of all the quadratic equations that can be formed such that both the roots of the quadratic equation are common with the roots of equation  $(x - a)(x - b)(x - c) = 0$ ? (2014)

- (a)  $3(a + b + c)$       (b)  $2(a + b + c)$   
 (c)  $(a + b + c)$       (d)  $4(a + b + c)$

15.  $P = \frac{1}{1!+2!} + \frac{1}{2!+3!} + \frac{1}{3!+4!} + \dots + \frac{1}{9!+10!}$ . Find the value of  $P$ . (2014)

- (a)  $\frac{1}{2!} - \frac{1}{11!}$       (b)  $\frac{1}{2!} - \frac{1}{10!}$   
 (c)  $\frac{1}{1!} - \frac{1}{10!}$       (d)  $\frac{1}{1!} - \frac{1}{11!}$

16. If  $x(x - 3) = -1$ , then the value of  $x^3(x^3 - 18)$  is (2014)

- (a) 1      (b) 0  
 (c) -1      (d) 2

17. Both the roots of the quadratic equation  $x^2 + rx + s = 0$  are real and greater than 1. If  $R = \left( \frac{r+s+1}{s-r} \right)$ , then which of the following is definitely true? (2015)

- (a)  $R = 0$       (b)  $R < 0$   
 (c)  $R > 0$       (d) Cannot be determined

18. Let  $x, y, z$  and  $t$  be the positive numbers which satisfy the following conditions:

- I. If  $x > y$ , then  $z > t$  and  
 II. If  $x > z$ , then  $y < t$

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- Which of the following is necessarily true? (2015)
- (a) If  $x < y$ , then  $z < t$   
 (b) If  $x > z$  then  $x - y < z + t$   
 (c) If  $x > y + z$ , then  $z > y$   
 (d) None of these
19. If  $3x + y + 4 = 2xy$ , where  $x$  and  $y$  are natural numbers, then find the ratio of the sum of all possible values of  $x$  to the sum of all possible values of  $y$ . (2015)
- (a)  $\frac{2}{3}$  (b)  $\frac{15}{19}$   
 (c)  $\frac{17}{21}$  (d)  $\frac{7}{9}$
20. Find the solution set for  $[x] + [2x] + [3x] = 8$ , where  $x$  is a real number and  $[x]$  is the greatest integer less than or equal to  $x$ . (2015)
- (a)  $1 \leq x < \frac{4}{3}$  (b)  $x < \frac{5}{3}$   
 (c)  $\frac{3}{2} \leq x < \frac{5}{3}$  (d) None of these
21. If  $x^2 + (x+1)(x+2)(x+3)(x+6) = 0$ , where  $x$  is a real number, then one value of  $x$  that satisfies this equation is (2015)
- (a)  $3 - \sqrt{3}$  (b)  $3 + \sqrt{3}$   
 (c)  $(-3 + \sqrt{3})$  (d) 0
22. If the roots of the equation  $(x+1)(x+9)+8=0$  are  $a$  and  $b$ , then the roots of the equation  $(x+a)(x+b)-8=0$  are (2016)
- (a) 1 and 9 (b) -4 and -6  
 (c) 4 and 6 (d) Cannot be determined
23. If  $S = \frac{2}{10} + \frac{6}{10^2} + \frac{12}{10^3} + \frac{20}{10^4} + \frac{30}{10^5} + \frac{42}{10^6} + \dots$ , find the value of  $S$ ? (2016)
- (a) 24/90 (b) 242/900  
 (c) 245/900 (d) 200/729
24. If the sum to infinity of the series  $2 + (2-d) \frac{2}{3} + (2+d) \frac{4}{9} + (2+3d) \frac{8}{27} + \dots$  is  $5/2$ , what is the value of  $d$ ? (2016)
- (a)  $\frac{7}{12}$  (b)  $-\frac{7}{12}$   
 (c)  $-\frac{5}{12}$  (d)  $\frac{5}{12}$
3. If  $a$ ,  $b$  and  $c$  are three real numbers, then which of the following is not true? (2009)
- (a)  $|a+b| \leq |a| + |b|$   
 (b)  $|a-b| \leq |a| + |b|$   
 (c)  $|a-b| \leq |a| - |b|$   
 (d)  $|a-c| \leq |a-b| + |b-c|$
4. If  $a = b^2 = c^3 = d^4$  then the value of  $\log_a(abcd)$  would be : (2010)
- (a)  $\log_a 1 + \log_a 2 + \log_a 3 + \log_a 4$  (b)  $\log_a 24$   
 (c)  $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4}$   
 (d)  $1 + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!}$
5. If  $\log_{16} 5 = m$  and  $\log_5 3 = n$ , then what is the value of  $\log_3 6$  in terms of 'm' and 'n'? (2011)
- (a)  $\frac{1+4mn}{4mn}$  (b)  $\frac{4mn}{1+4mn}$   
 (c)  $\frac{1}{1+4mn}$  (d) Cannot be determined
6. If  $x + y = 1$ , then what is the value of  $(x^3 + y^3 + 3xy)$ ? (2012)
- (a) 1 (b) 3  
 (c) 9 (d) -1
7. If  $X = \sum_{i=1}^{i=n} \log_{10}(i) - \sum_{j=1}^{j=p} \log_{10}(j) - \sum_{k=1}^{k=(n-p)} \log_{10}(k)$ , where  $p \leq n$ , then the maximum value of  $X$  for  $n = 8$  is : (2014)
- (a)  $1 + \log_{10} 24$  (b)  $\log_{10} 56$   
 (c)  $1 + \log_{10} 7$  (d)  $1 + \log_{10} 48$
8. A ray of light along the line  $\sqrt{3}x + y = \sqrt{3}$  gets reflected on the x-axis to become a ray along the line (2014)
- (a)  $y = x + \sqrt{3}$  (b)  $\sqrt{3}y = x - 1$   
 (c)  $y = \sqrt{3}x - \sqrt{3}$  (d)  $\sqrt{3}y = x - \sqrt{3}$
9. If  $\log_3 2$ ,  $\log_3(2^x - 5)$  and  $\log_3 \left(2^x - \frac{7}{2}\right)$  are in Arithmetic Progression, then  $x$  is equal to (2014)
- (a) 2 (b) 3  
 (c) 2 or 4 (d) 2 or 3
10.  $P_1, P_2, P_3, \dots, P_{11}$  are 11 friends. The number of balls with  $P_1$  through  $P_{11}$  in that order is in an Arithmetic Progression. If the sum of the number of balls with  $P_1, P_3, P_5, P_7, P_9$  and  $P_{11}$  is 72, what is the number of balls with  $P_1, P_6$  and  $P_{11}$  put together? (2014)
- (a) 24 (b) 48  
 (c) 36 (d) Cannot be determined
11. If  $x^4 - y^4 = 15$ , where  $x$  and  $y$  are natural numbers, then find the value of the expression  $x^4 + y^4$ . (2015)
12. Two positive real numbers,  $a$  and  $b$ , are expressed as the sum of  $m$  positive real numbers and  $n$  positive real numbers respectively as follows:  
 $a = s_1 + s_2 + \dots + s_m$  and

## Ch-6. Algebra 2

1.  $x$  and  $y$  are real numbers such that  $y = |x-2| - |2x-12| + |x-8|$ . What is the least possible value of  $y$ ? (2009)
- (a) 6 (b) 2  
 (c) -2 (d) None of these
2. If  $\log(0.57) = \bar{1.756}$ , then the value of  $\log 57 + \log(0.57)^3 + \log \sqrt{0.57}$  is : (2009)
- (a) 0.902 (b)  $\bar{2.146}$   
 (c) 1.902 (d)  $\bar{1.146}$

$$b = t_1 + t_2 + \dots + t_n$$

If  $[a] = [s_1] + [s_2] + \dots + [s_m] + 4$  and  $[b] = [t_1] + [t_2] + \dots + [t_n] + 3$ ,

Where  $[x]$  denotes the greatest integer less than or equal to  $x$ , what is the minimum possible value of  $m + n$ ? (2016)

- (a) 6 (b) 10  
(c) 8 (d) 9

## Ch-7. Percentage, Profit & Loss

- There are three water-alcohol solutions A, B and C whose alcohol concentrations are 50%, 60% and 70% respectively.  $x$  ml of A,  $(x + 2)$  ml of B and  $(x + 3)$  ml of C are mixed. If the alcohol concentration of the resultant mixture is 65%, then  $x$  lies in the range (2009)  
(a) 0.1 to 0.5 (b) 0.5 to 0.9  
(c) 0.9 to 1.4 (d) 1.4 to 1.9
- In an examination, the average marks obtained by students who passed was  $x\%$ , while the average of those who failed was  $y\%$ . The average marks of all students taking the exam was  $z\%$ . Find in terms of  $x$ ,  $y$  and  $z$ , the percentage of students taking the exam who failed. (2009)  
(a)  $(z-x)/(y-x)$  (b)  $(x-z)/(y-z)$   
(c)  $(y-x)/(z-y)$  (d)  $(y-z)/(x-z)$
- Ramit sold a table at a profit of 15%. Had he bought it at 10% less and sold it for ₹ 21 less, he would have gained 25%. At what price (in ₹) had he bought the table? (2010)  
(a) 800 (b) 840  
(c) 420 (d) 640
- 10% of the voters did not cast their vote in an election between two candidates. 10% of the votes polled were found invalid. The successful candidate got 54% of the valid votes and won by a majority of 1620 votes. The number of voters enrolled on the voters list was : (2011)  
(a) 25000 (b) 33000  
(c) 35000 (d) 40000
- A contractor did not have space in his garage for 8 of his trucks. He, therefore, increased the size of his garage by 50% which gave him space for 8 more trucks than he owned altogether. How many trucks did he own? (2012)  
(a) 32 (b) 48  
(c) 40 (d) 45
- The list price of an article was increased by 10%. It was then decreased by 10%. If the final price became Rs. 20, then find the initial list price (in Rs.) (2012)  
(a)  $\frac{10 \times 100^2}{100^2 - 20^2}$  (b)  $\frac{20^2 \times 10^2}{100^2 - 10^2}$   
(c)  $\frac{20 \times 100^2}{100^2 - 10^2}$  (d)  $20 \times \left( \frac{100^2 - 10^2}{100^2} \right)$
- A shopkeeper sells four qualities of rice A, B, C and D having cost price ₹ 40/kg, ₹ 55/kg, ₹ 50/kg and ₹ 65/kg respectively. Ankit purchased 'a' kg of A and 'b' kg of B to make 'a + b' kg of a new quality 'E' of rice worth ₹ 50/kg. Then he purchased 'c' kg of C and 'd' kg of D to make 'c + d' kg of a new quality 'F' of rice worth ₹ 60/kg. Finally he took 'x' kg of rice and 'y' kg of rice from 'E' quality of rice and 'F' quality of rice respectively to make 'x + y' kg of rice worth ₹ 53/kg. Ensuring that a, b, c, d, x

and y are all integers then what is the minimum value of  $a + b + c + d + x + y$  in kg? (2014)

- (a) 28 (b) 22  
(c) 16 (d) 26

8. A trader used to make 5% profit on an item by selling it at the usual marked price. One day, he tripled the marked price of the item and finally offered a discount of 30%. Find the percentage profit he made on the item that day. (2014)

- (a) 120.5% (b) 100%  
(c) 94.5% (d) None of these

9. An empty metal container (without its handle) weighs 15% of what it weighs when completely filled with a particular liquid. After adding the handle, the weight of the fully filled container increases by 5%. If the weight of a partly filled container is  $\frac{1}{3}$  of the completely filled container with the handle attached, then what fraction of container is utilized? (2014)

- (a)  $\frac{4}{17}$  (b)  $\frac{3}{17}$   
(c)  $\frac{6}{19}$  (d)  $\frac{3}{19}$

10. The percentage volumes of milk in three solutions A, B and C from a geometric progression in the order. If we mix the first, second and third solutions in the ratio 2 : 3 : 4 by volume, we obtain a solution containing 32% milk. If we mix them in the ratio 3 : 2 : 1, by volume, we obtain a solution containing 22% milk. What is the percentage of milk in A? (2014)

- (a) 6% (b) 12%  
(c) 18% (d) 24%

11. There are two factories – A and B – in Kaarobaarnagar. In factory A, the number of male employees is 50% more than that of female employees. In factory B, the number of female employees is 40% less than that of male employees. The number of female employees in factory B is 60 more than that of male employees in factory A. Which of the following cannot be the total number of male employees in the two factories put together? (2014)

- (a) 204 (b) 180  
(c) 320 (d) 300

12. Find the domain of the function

$$f(x) = \frac{3}{9-x^2} + \log_{10}(x^3 - x). \quad (2014)$$

- (a)  $(-1, 0) \cup (1, 3)$  (b)  $(-1, 0) \cup (1, 3) \cup (3, \infty)$   
(c)  $(-3, 0) \cup (3, \infty)$  (d)  $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$

13. A shopkeeper sold 10 items, all of which are of the same cost price, such that profit percentage on no two item is the same. The profits made on the given items were in an arithmetic progression. If the profit percentage of the item the selling price of which is 4th highest and the item the selling price of which is 7th highest were 13% and 10% respectively, find the profit percentage on the whole. (2015)

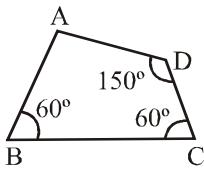
- (a) 11.5% (b) 12%  
(c) 12.5% (d) Data insufficient

s-10

14. The total cost of 2 pencils, 5 erasers, and 7 sharpeners is ₹ 30, while 3 pencils and 5 sharpeners cost ₹ 15 more than 6 erasers. By what amount (in ₹) does the cost of 39 erasers and 1 sharpener exceed the cost of 6 pencils? (2016)
- (a) 20 (b) 30  
(c) It does not exceed (d) Cannot be determined
15. Balram, the local shoe shop owner, sells four types of footwear – Slippers (S), Canvas Shoes (C), Leather Shoes (L) and Joggers (J). The following information is known regarding the cost prices and selling prices of these four types of footwear: (2016)
- (i) L sells for ₹ 500 less than J, which costs ₹ 300 more than S, which, in turn, sells for ₹ 200 more than L.  
(ii) L costs ₹ 300 less than C, which sells for ₹ 100 more than S, which, in turn, costs ₹ less than C.
- If it is known that Balram never sells any item at a loss, then which of the following is true regarding the profit percentages earned by Balram on the items L, S, C and J represented by l, s, c and j
- (a)  $l \geq c \geq s \geq j$  (b)  $c \geq s > l > -j$   
(c)  $l \geq s \geq c > j$  (d)  $s \geq l > -j > -c$
16. Some friends planned to contribute equally to jointly buy a CD player. However, two of them decided to withdraw at the last minute. As a result, each of the others had to shell out one rupee more than what they had planned for. If the price (in ₹) of the CD player is an integer between 1000 and 1100, find the number of friends who actually contributed? (2016)
- (a) 21 (b) 23  
(c) 44 (d) 46

## Ch-8. Geometry

1. In the given figure ABCD is a quadrilateral with  $BC = 4$  cm and  $AD = 2$  cm. (2009)



What is the length of AB (in cm)?

- (a)  $4 - \frac{1}{\sqrt{3}}$  (b)  $\frac{4\sqrt{3} - 2}{\sqrt{3}}$   
(c)  $\frac{2\sqrt{3} + 1}{2}$  (d)  $\frac{2\sqrt{3} - 1}{2}$
2. ABCD is a parallelogram. E is a point on AB such that  $AE : BE = 2 : 3$ . A line EF is drawn parallel to AD and it meets CD at F. G is a point on BC such that  $GB : GC = 1 : 4$ . What is the ratio of the area of  $\triangle DEC$  to the area of  $\triangle EFG$ ? (2009)
- (a) 3 : 5 (b) 10 : 3  
(c) 25 : 12 (d) None of these
3.  $A_1, A_2, A_3, A_4, A_5, A_6$  are 6 points in clockwise order on the circumference of a circle of radius 4 cm. The length of the arc  $A_i A_{i+1}$  is one-third the length of  $A_{i+1} A_{i+2}$ , for all

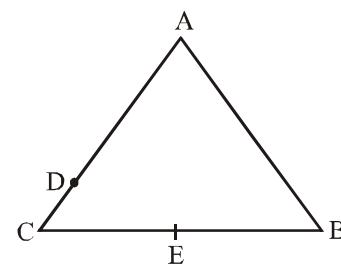
## Past Years Solved Paper (2009-2016)

i = 1 to 4. If the sum of the lengths of the 5 arcs is one-eighth the circumference of the circle, what is the angle (in radians) subtended by  $A_2 A_3$  at the center of the circle? (2009)

- (a)  $\frac{\pi}{484}$  (b)  $\frac{3\pi}{484}$   
(c)  $\frac{\pi}{243}$  (d)  $\frac{3\pi}{243}$

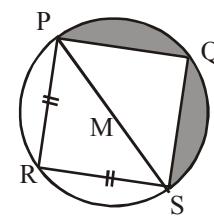
4. In triangle ABC, the internal angle bisector of  $\angle A$  meets BC at point D. If  $AB = 8$  cm,  $AD = 6$  cm and  $\angle BAC = 120^\circ$ , then what is the length of AC? (2009)
- (a) 24 cm (b) 12 cm  
(c)  $6\sqrt{3}$  cm (d) none of these

5. ABC is an equilateral triangle. Point D is on AC and point E is on BC, such that  $AD = 2CD$  and  $CE = EB$ . If we draw perpendiculars from D and E to other two sides and find the sum of the length of two perpendiculars for each set, that is, for D and E individually and denote them as per (D) and per (E) respectively, then which of the following option will be correct. (2009)



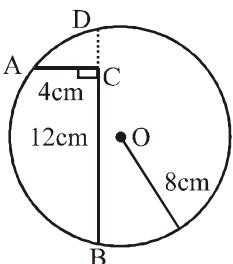
- (a) per (D) > per (E) (b) per (D) < per (E)  
(c) per (D) = per (E) (d) None of these

6. M is the centre of the circle.  $\ell(QS) = 10\sqrt{2}$ .  $\ell(PR) = \ell(RS)$  and  $PR \parallel QS$ . Find the area of the shaded region. (use  $\pi = 3$ ) (2009)



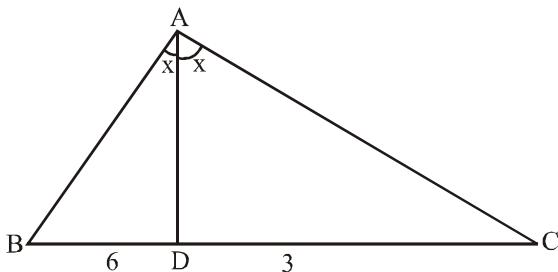
- (a) 100 sq. units (b) 114 sq. units  
(c) 50 sq. units (d) 200 sq. units
7. Two circles, touching each other, are drawn inside a square of side 10 cm. Each circle also touches exactly two sides of the square. What is the maximum possible value (in cm) of the sum of their radii? (2010)

- (a)  $10(2 - \sqrt{2})$  (b)  $10(2 + \sqrt{2})$   
(c)  $10\sqrt{2}$  (d) 10
8. The figure given below shows a circle with center O and radius 8 cm. BD is a chord of the circle and A is a point on the minor arc BD. C is a point on BD such that AC is perpendicular to BD. The length of AC is 4 cm and BC is 12 cm. What is the length (in cm) of CD? (2010)



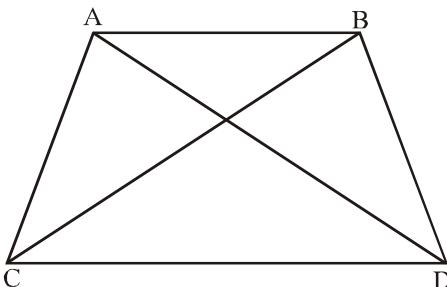


9. In a  $\triangle ABC$ ,  $AD$  is the bisector of  $\angle BAC$ ,  $AB = 8$  cm,  $BD = 6$  cm and  $DC = 3$  cm. Find  $AC$ . (2010)



- (a) 4 cm (b) 6 cm  
(c) 3 cm (d) 5 cm

10. In the figure given below,  $AD = BC$  and  $BD = AC$ . Which of the following is not true? (2011)



- (a)  $\angle ADB = \angle ACB$       (b)  $\angle ABD = \angle ACD$   
 (c)  $\angle ACD = \angle BAC$       (d)  $\angle ADB = \angle CAD$

11. Two vertical lamp-posts of equal height stand on either side of a road 50m wide. At a point P on the road between them, the elevation of the tops of the lamp-posts are  $60^\circ$  and  $30^\circ$ . Find the distance of P from the lamp post which makes angle of  $60^\circ$ . (2011)

- (a) 25 m (b) 12.5 m  
(c) 16.5 m (d) 20.5 m

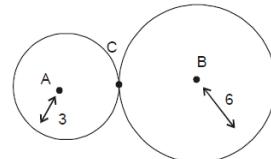
12. The sum of the areas of two circles which touch each other externally is  $153\pi$ . If the sum of their radii is 15, find the ratio of the larger to the smaller radius **(2011)**

- (a) 4 (b) 2  
 (c) 3 (d) None of these

13. ABCD is a rectangle. The points  $p$  and  $Q$  lie on  $AD$  and  $AB$  respectively. If the triangles  $PAQ$ ,  $QBC$  and  $PCD$  all have the same areas and  $BQ = 2$ , then  $AQ =$  **(2011)**

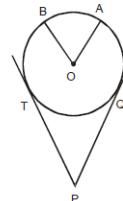
- (a)  $1 + \sqrt{5}$       (b)  $1 - \sqrt{5}$   
 (c)  $\sqrt{7}$       (d)  $2\sqrt{7}$

14. Two circles with centers A and B touch each other at C. The radii of the two circles are 3 m and 6 m respectively. Ramu and Shamu start simultaneously from C with speeds  $6\pi$  m/s and  $3\pi$  m/s and travel along the circles with centers A and B respectively. If Ramu gives Shamu a start of 2 seconds, what time (in seconds) after Ramu's start would they be separated by a distance of 18 m? **(2012)**



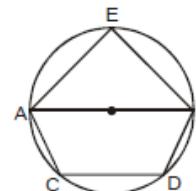


15. From a point P, the tangents PQ and PT are drawn to a circle with centre O and radius 2 units. From the centre O, OA and OB are drawn parallel to PQ and PT respectively. The length of the chord TQ is 2 units. Find the measure of the  $\angle AOB$ . (2012)



- (a)  $30^\circ$  (b)  $90^\circ$   
 (c)  $120^\circ$  (d)  $45^\circ$

16. In the figure given below, AB is a diameter of the circle. If  $AB \parallel CD$ ,  $AC \parallel BE$  and  $\angle BAE = 35^\circ$ , then the absolute difference between  $\angle CDB$  and  $\angle ABD$  is **(2013)**



- (a)  $90^\circ$       (b)  $70^\circ$   
 (c)  $55^\circ$       (d)  $125^\circ$

17. E is a point on the side AB of a rectangle ABCD, the adjacent sides of which are in the ratio 2 : 1. If  $\angle AED = \angle DEC$ , then what is the measure of  $\angle AED$ ? (2013)



18. AC is a chord of a circle whose centre is at O. If B is any point on the arc AC and  $\angle OCA = 20^\circ$ , then the magnitude of  $\angle ABC$  is **(2014)**  
(a)  $110^\circ$       (b)  $70^\circ$

- (a) 110° (b) 70°  
 (c) 140° (d) Either (a) or (b)

19. ABCD is a rectangle with points E and F lying on sides AB and CD respectively. If the area of quadrilateral AEFD equals the area of quadrilateral CBEF, then which of the following statements is necessarily false with respect to the rectangle ABCD? **(2014)**

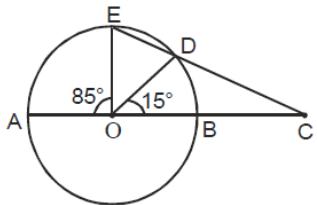
- (a) Length of AE is always equal to the length of CF.
  - (b) If the length of BC is 4 units, then the smallest integral length of EF is 5 units.
  - (c) Length of AE is equal to the length of DF.
  - (d)  $\angle AEF = \angle EFC$

s-12

20. Let S be an arbitrary point on the side PQ of an acute-angled  $\triangle PQR$ . Let T be the point of intersection of QR and the straight line PT drawn parallel to SR through P. Let U be the point of intersection of PR and the straight line QU drawn parallel to SR through Q. If  $PT = a$  units and  $QU = b$  units, then the length of SR is (2014)

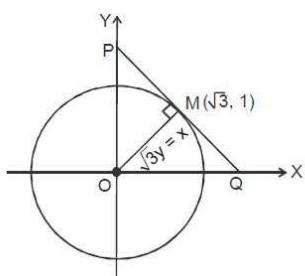
- (a)  $\frac{a+b}{ab}$  units      (b)  $\frac{a-b}{ab}$  units  
 (c)  $\frac{ab}{a+b}$  units      (d)  $\frac{ab}{a-b}$  units

21. The bisector of  $\angle BAC$  of  $\triangle ABC$  cuts BC at D and the circumcircle of the triangle at E. If  $DE = 3$  cm,  $AC = 4$  cm and  $AD = 5$  cm, then the length of AB is (2014)  
 (a) 7 cm      (b) 8 cm  
 (c) 9 cm      (d) 10 cm
22. In the given figure, AB is the diameter of the circle with centre O. If  $\angle BOD = 15^\circ$ ,  $\angle EOA = 85^\circ$ , then find the measure of  $\angle ECA$ . (2015)



- (a)  $20^\circ$       (b)  $25^\circ$   
 (c)  $35^\circ$       (d) Cannot be determined

23. The line  $\sqrt{3}y = x$  is the radius of the circle, it meets the circle centred at origin O at point M( $\sqrt{3}, 1$ ). If PQ is the tangent to the circle at M as shown, find the length of the PQ. (2015)



- (a)  $\frac{5}{2}\sqrt{3}$  units      (b)  $3\sqrt{3}$  units  
 (c)  $2\sqrt{3}$  units      (d)  $\frac{8}{\sqrt{3}}$  units

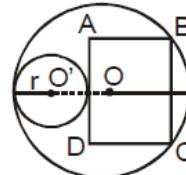
24. An isosceles right angled triangle with length of its equal sides being 30 cm, is rotated  $180^\circ$  about its centroid to form a new triangle. Find the area of the region common to the original and the new triangles. (2015)  
 (a) 275 sq. cm      (b) 300 sq. cm  
 (c) 375 sq. cm      (d) 350 sq. cm
25.  $\triangle ABC$  is a right angled triangle, with  $\angle B = 90^\circ$ ,  $AB = 20$  cm and  $BC = 21$  cm. A circle with centre O is inscribed in

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triangle ABC. OD, OE and OF are perpendiculars drawn on the sides AB, BC and CA respectively. Find the ratio of the area of the quadrilateral FOEC to the area of the quadrilateral ADOF. (2015)

- (a) 15 : 14      (b) 14 : 15  
 (c) 12 : 11      (d) 7 : 5

26.

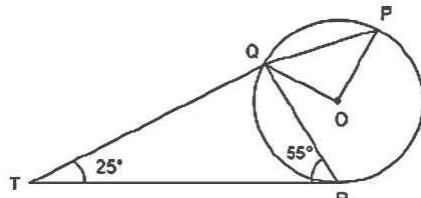


In the figure, O and O' are the centres of the bigger and smaller circles respectively and small circle touches the square ABCD at the mid point of side AD. The radius of the bigger circle is equal to 15 cm and the side of the square ABCD is 18 cm. Find the radius of the smaller circle. (2015)

- (a) 4.25 cm      (b) 4.5 cm  
 (c) 4.75 cm      (d) 5 cm

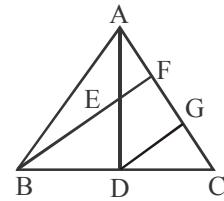
27.

In the figure below, P, Q and R are points on a circle with centre O. The tangent to the circle at R intersects secant PQ at T. If  $\angle QRT = 55^\circ$  and  $\angle QTR = 25^\circ$ , find  $\angle POQ$ . (2016)



- (a)  $110^\circ$       (b)  $100^\circ$   
 (c)  $90^\circ$       (d)  $50^\circ$

28. In the figure below,  $BD = 8$  cm and  $DC = 6$  cm.  $AE : ED = 3 : 4$ . If  $AF = 12$  cm, find AC (in cm). (2016)



- (a) 28      (b) 38  
 (c) 44      (d) 40

### Ch-9. Mensuration

1. Find the ratio of the diameter of the circles inscribed in and circumscribing an equilateral triangle to its height. (2009)  
 (a) 1 : 2 : 1      (b) 1 : 2 : 3  
 (c) 1 : 3 : 4      (d) 3 : 2 : 1
2. The resistance of a wire is proportional to its length and inversely proportional to the square of its radius. Two wires of the same material have the same resistance and their radii are in the ratio 9 : 8. If the length of the first wire is 162 cms., find the length of the other. (2009)  
 (a) 64 cm.      (b) 120 cm.  
 (c) 128 cm.      (d) 132 cm.

3. The area of a regular polygon of side 'x' units is '10x' sq units and the length of its inradius is an integer. How many such polygons would be there? (2010)
- (a) 6 (b) 4  
(c) 3 (d) 2

4. The area of the circle circumscribing three circles of unit radius touching each other is (2010)

(a)  $(\pi/3)(2+\sqrt{3})^2$  (b)  $6\pi(2+\sqrt{3})^2$   
(c)  $3\pi(2+\sqrt{3})^2$  (d)  $\left(\frac{\pi}{6}\right)(2+\sqrt{3})^2$

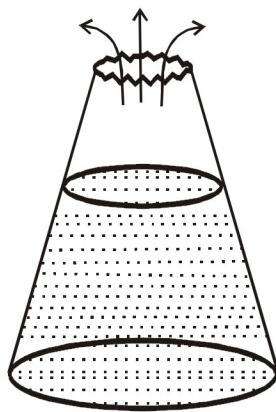
5. A 20 litre vessel is filled with alcohol. Some of the alcohol is poured out into another vessel of an equal capacity, which is then completely filled by adding water. The mixture thus obtained is then poured into the first vessel to capacity. Then

$6\frac{2}{3}$  litres is poured from the first vessel into the second.

Both vessels now contain an equal amount of alcohol. How much alcohol was originally poured from the first vessel into the second? (2010)

(a) 9 litres (b) 10 litres  
(c) 12 litres (d) 12.5 litres

6. A conical vessel, with a circular base, is filled with water to two-thirds of its volume. The pointed end of the cone is snipped off and replaced with a lid. The lid is kept open for 10 hours every day during which some water evaporates. The volume of the water that evaporates on a day is directly proportional to the area of the water surface at the beginning of the day. The volume of the water left in the container after evaporation on the 1st day is half the volume of the original cone. If  $V$  is the volume of the original cone, then what is the volume of the water that evaporates on the 2nd day? (2011)



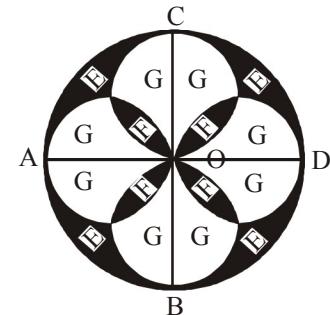
(a)  $\frac{V}{6}\left(\frac{3}{2}\right)^{\frac{3}{2}}$  (b)  $\frac{V}{4}$   
(c)  $\frac{V}{6}\left(\frac{3}{2}\right)^{\frac{2}{3}}$  (d)  $\frac{V}{4}\left(\frac{3}{2}\right)^{\frac{3}{4}}$

7. A cube of edge 12 cm is cut into 64 equal cubes. All the cubes are now arranged on a table such that one face of each cube touches the table. The resulting figure is a solid cuboid whose length and breadth are in the ratio 4 : 1

respectively. What is the total surface area of the table occupied by the cuboid? (2011)

(a) 144 cm<sup>2</sup> (b) 288 cm<sup>2</sup>  
(c) 576 cm<sup>2</sup> (d) None of these

8. ABDC is a circle and circles are drawn with AO, CO, DO and OB as diameters. Areas E and F are shaded. E/F is equal to



(2011)

(a) 1 (b) 2/3  
(c) 1/2 (d)  $\pi/4$

9. An unsharpened cylindrical pencil consists of a layer of wood surrounding a solid cylinder of graphite. The radius of a pencil is 7 mm, the radius of the graphite cylinder is 1 mm and the length of the pencil is 10 cm. Find the cost of the material used in a pencil, if the cost of wood is ₹ 0.70/cm<sup>3</sup> and that of graphite is ₹ 2.10/cm<sup>3</sup>. (2011)

(a) ₹ 9.84 (b) ₹ 10.80  
(c) ₹ 11.22 (d) ₹ 12.44

10. Suresh, who runs a bakery, uses a conical shaped equipment to write decorative labels (e.g., Happy Birthday etc.) using cream. The height of this equipment is 7 cm and the diameter of the base is 5 mm. A full charge of the equipment will write 330 words on an average. How many words can be written using three fifth of a litre of cream? (2011)

(a) 45090 (b) 45100  
(c) 46000 (d) None of these

11. A pole has to be erected on the boundary of a circular park of diameter 13 metres in such a way that the difference of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 metres. The distance of the pole from one of the gates is: (2011)

(a) 8 metres (b) 8.25 metres  
(c) 5 metres (d) None of these

12. From a square piece of card-board measuring  $2a$  on each side of a box with no top is to be formed by cutting out from each corner a square with sides  $b$  and bending up the flaps. The value of  $b$  for which the box has the greatest volume is (2011)

(a)  $b = \frac{a}{5}$  (b)  $b = \frac{a}{4}$   
(c)  $b = \frac{2a}{3}$  (d)  $b = \frac{a}{2}$

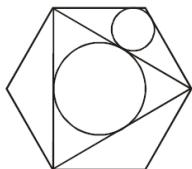
13. A circle of radius 6.5 cm is circumscribed around a right-angled triangle with the sides  $a$ ,  $b$  and  $c$  cm where  $a$ ,  $b$  and  $c$  are natural numbers. What is the perimeter of the triangle? (2012)

(a) 30 cm (b) 26 cm  
(c) 28 cm (d) 32 cm

s-14

14. In the regular hexagon shown below, what is the ratio of the area of the smaller circle to that of the bigger circle?

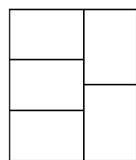
(2012)



- (a)  $3:7+2\sqrt{3}$  (b)  $3:7+\sqrt{3}$   
 (c)  $3:16+4\sqrt{3}$  (d)  $3:7+4\sqrt{3}$

15. A rectangle with perimeter 88 m is partitioned into 5 congruent rectangles, as shown in the diagram given below. The perimeter of each of the congruent rectangles is

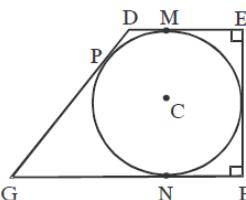
(2012)



- (a) 20 m (b) 32 m  
 (c) 48 m (d) 40 m

16. A trapezium DEFG is circumscribed about a circle that has centre at C. If DM = 1 cm, GN = 4 cm and the measure of  $\angle DEF = \angle EFG = 90^\circ$ , then find the radius of the circle.

(2012)



- (a) 2 cm (b) 2.5 cm  
 (c) 2.25 cm (d) 4 cm

17. How many triangles can be drawn by joining any three vertices of a pentagon?

(2013)

- (a) 8 (b) 9  
 (c) 11 (d) 10

18. A spherical ball of the maximum possible volume is placed inside a right-circular cone of height 'h' units. If the radius of the base of the cone is equal to  $h/\sqrt{3}$  units, then the ratio of the volume of the sphere to that of the cone is

(2013)

- (a)  $4:9$  (b)  $5:9$   
 (c)  $1:\sqrt{3}$  (d)  $2:3\sqrt{3}$

19. How many rectangles with integral sides are possible where the area of the rectangle equals the perimeter of the rectangle?

(2014)

- (a) One (b) Three  
 (c) Two (d) Infinitely many

20. The length of the hypotenuse of a right-angled triangle is 240 units. The perimeter of the given triangle is a perfect square. If the perimeter of the given triangle is greater than 550 units, then which of the following can be the length of a side of the given right-angled triangle?

(2014)

### Past Years Solved Paper (2009-2016)

- (a) 192 units (b) 168 units  
 (c) 144 units (d) Both (a) and (c)

21. The top and bottom radii of a frustum of a solid cone are 3 cm and 6 cm respectively. Its height is 8 cm. There is a conical cavity of height 3 cm and radius 6 cm at the bottom. The amount of material in the solid is

(2014)

- (a)  $132\pi\text{ cm}^3$  (b)  $168\pi\text{ cm}^3$   
 (c)  $159\pi\text{ cm}^3$  (d) Data Insufficient

22. The smallest possible circle touching two opposite sides of a rectangle is cut-out from a rectangle of area 60 sq. units.

If the area of this circle is  $\frac{3}{2}$  times the area left out in the rectangle, find the length of the smaller side of the rectangle.

(2015)

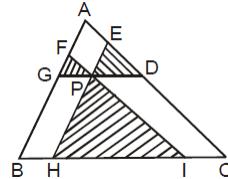
- (a)  $\frac{6}{\sqrt{\pi}}\text{ units}$  (b)  $\frac{9}{\sqrt{\pi}}\text{ units}$   
 (c)  $\frac{12}{\sqrt{\pi}}\text{ units}$  (d)  $\frac{15}{\sqrt{\pi}}\text{ units}$

23. ABCD is an isosceles trapezium with BC = AD = 10 units, AB = 2 units and CD = 14 units. The mid-points of the sides of the trapezium are joined to form a quadrilateral PQRS. Find the ratio of the area of the circle inscribed in the quadrilateral PQRS to the area of trapezium ABCD.

(2015)

- (a)  $\frac{3\pi}{8}$  (b)  $\frac{3\pi}{16}$   
 (c)  $\frac{\pi}{4}$  (d)  $\frac{\pi}{8}$

24.



Through point P, lines are drawn parallel to the sides of triangle ABC. The areas of the  $\Delta PED$ ,  $\Delta PFG$  and  $\Delta PHI$  are 9, 16 and 49 sq. cm respectively. Find the area (in sq. cm) of triangle ABC.

(2015)

25. All reputed B-schools place their students. One-sixth of those B-schools that place their students are reputed and one-fourth of all B-schools that are recognised, place their students. There are exactly 6 reputed B-schools that are recognised too and there are 39 B-schools that are recognised but do not place their students. If there is a total of 78 B-schools that place their students, then how many of these B-schools are neither recognised nor reputed but place their students?

(2015)

A field is in the form of a rectangle of dimension 24 m  $\times$  56 m. There is 2700 m of fencing that is available. The field has to be divided into many identical smaller square plots, having integral sides (in metres), each of which is to be fenced. Find the side of each of the square plots such that the fencing material that is left out is minimum.

(2015)

- (a) 1 m (b) 2 m  
 (c) 4 m (d) 8 m

**Ch- 10 Time, Distance & Work**

s-16

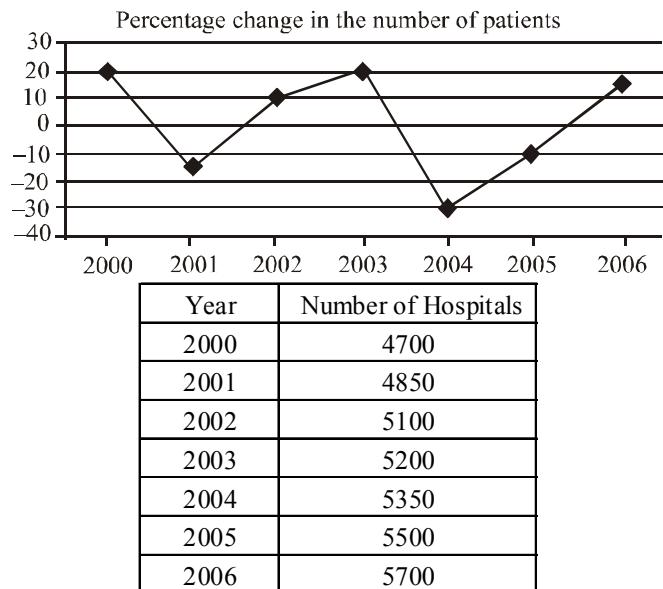
Past Years Solved Paper (2009-2016)

## Ch- 11 Permutation, Combination &amp; Probability

- that even after taking a nap of 't' min, he would beat the tortoise by 13 min, he stooped under a tree and went to sleep. Meanwhile the tortoise kept walking. When the rabbit woke up, he realized that he had slept for  $(14 + t)$  min, and immediately started running towards the target at a speed  $\frac{3}{2}$  times his original speed. The race eventually ended in a dead heat. If the ratio of the original speed of the rabbit to that of the tortoise was 6 : 1 and the rabbit overstretched his nap by  $1\frac{1}{6}$  t min, then how long did the tortoise take to complete the race? **(2013)**
- (a) 24 min (b) 30 min  
(c) 28 min (d) 36 min
14. P, Q and R start walking from the same point. P and Q start at 1 PM and R starts at 3 PM. R takes over P at 5 PM and then doubles his speed and takes over Q after another hour. What is the ratio of speed of A and speed of B? **(2014)**
- (a) 8 : 5 (b) 3 : 4  
(c) 4 : 3 (d) 5 : 8
15. There is a string of length 100 m running from east to west. 1000 ants are dropped onto the string. Assume that each ant lands on the string facing either the east or the west direction. As soon as they land, each ant starts moving in the direction which is being faced by it at 50 m/min till it falls off the string. But if an ant collides with another ant coming from the opposite direction, both of them reverse their directions and proceed to move now in the opposite directions. Ants fall only at either of the ends of the string. What is the minimum time by which the string is definitely free of ants? **(2015)**
- (a) 1 min (b) 2 min  
(c) 200 min (d) Infinite time
16. In a rowing competition, first boat rows over the course at an average speed of 4 yards/second. Second boat rows over the first half of the course at the rate of  $3\frac{1}{2}$  yards / second and over the remaining half at  $4\frac{1}{2}$  yards/second, thereby reaching the winning post 15 seconds after the first boat. Find the time taken (in minutes) by the second boat to cover the entire course. **(2015)**
17. There are three cities A, B and C, not on the same straight road. Two buses P and Q start simultaneously from A and B respectively towards C. By the time Q reaches C, P is exactly halfway to C. Immediately after Q reaches C, it starts travelling towards A and it crosses P at a point 165 km from A. The ratio of the speeds of P and Q is 3 : 5. Assume that the roads joining A to C, B to C and B to A are all straight roads. If B is twice as far from A as it is from C and P would take to cover the distance from A to B, how much time would Q take to cover the distance from C to A? **(2016)**
- (a)  $2\frac{2}{5}$  hours (b) 3 hours  
(c)  $3\frac{3}{5}$  hours (d) 4 hours
1. A man, while driving to his office, finds three traffic signals on his way. The probability that the traffic light is red when he reaches the first, second and third traffic signal is  $\frac{5}{8}$ ,  $\frac{5}{6}$  and  $\frac{3}{5}$  respectively. **(2009)**  
What is the probability that he finds at least one traffic light on his way which is not red?
- (a)  $\frac{3}{8}$  (b)  $\frac{11}{16}$   
(c)  $\frac{5}{16}$  (d)  $\frac{5}{8}$
2. A and B throw with one dice for a stake of Rs. 11 which is to be won by the player who first throws 6. If A has the first throw, what are their respective expectations **(2009)**
- (a) Rs 7, Rs 4 (b) Rs 6, Rs 5  
(c) Rs 4, Rs 7 (d) Rs 5, Rs 6
3. In how many ways can 6 letters A, B, C, D, E and F be arranged in a row such that D is always somewhere between A and B? **(2010)**
- (a) 324 (b) 240  
(c) 60 (d) 48
4. A cube is painted with red colour and then cut into 64 small identical cubes. If two cubes are picked randomly from the heap of 64 cubes, what is the probability that both of them have exactly two faces painted red? **(2010)**
- (a)  $\frac{23}{168}$  (b)  $\frac{47}{84}$   
(c)  $\frac{1}{4}$  (d)  $\frac{31}{63}$
5. A box contains five yellow and five green balls. A ball is picked from the box and is replaced by a ball of the other colour. For instance, if a green ball is picked then it is replaced by a yellow ball and vice-versa. The process is repeated ten times and then a ball is picked from the box. What is the probability that this ball is yellow? **(2011)**
- (a)  $1 - \left\{ \frac{1}{2} + \left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^3 + \dots + \left(\frac{1}{2}\right)^{10} \right\}$   
(b)  $1 - \left\{ \frac{1}{2} - \left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^3 - \left(\frac{1}{2}\right)^4 + \dots - \left(\frac{1}{2}\right)^{10} \right\}$   
(c)  $\frac{1}{2} - \left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^3 - \left(\frac{1}{2}\right)^4 + \dots - \left(\frac{1}{2}\right)^{10}$   
(d) None of these
6. What is the probability that the product of two integers chosen at random has the same unit digit as the two integers? **(2012)**
- (a)  $\frac{3}{10}$  (b)  $\frac{1}{25}$   
(c)  $\frac{4}{15}$  (d)  $\frac{7}{15}$

7. In how many ways can 18 identical candies be distributed among 8 children such that the number of candies received by each child is a prime number? (2013)
- (a) 4 (b) 8  
(c) 28 (d) 12
8. There are exactly sixty chairs around a circular table. There are some people sitting on these chairs in such a way that the next person to be seated around the table will have to sit next to someone. What is the least possible number of people sitting around the table currently? (2014)
- (a) 10 (b) 20  
(c) 30 (d) 40
9. If  $p$  is the probability of head turning up in the toss of a coin (not necessarily fair) and  $q$  is the probability of a tail turning up. Find the minimum possible value of  $X = pq + \left(\frac{1}{p}\right)\left(\frac{1}{q}\right)$ . (2014)
- (a) 4.25 (b)  $2\sqrt{5}$   
(c) 2 (d) None of these
10. Amar, Akbar and Antony are three students in a class of 9 students. A class photo is taken. The number of ways in which it can be taken such that no two of Amar, Akbar and Antony are sitting together is: (2014)
- (a) 151200 (b) 120960  
(c) 181440 (d) 241920
11. Three persons - A, B and C - are playing the game of death. 3 bullets are placed randomly in a revolver having 6 chambers. Each one has to shoot himself by pulling the trigger once after which the revolver passes to the next person. This process continues till two of them are dead and the survivor of the game becomes the winner. What is the probability that B is the winner if A starts the game and A, B and C take turns in that order. (2015)
- (a) 0.33 (b) 0.3  
(c) 0.25 (d) None of these
12. If we arrange the letters of the word 'KAKA' in all possible ways, what is the probability that vowels will not be together in an arrangement? (2015)
- (a)  $\frac{2}{3}$  (b)  $\frac{1}{3}$   
(c)  $\frac{1}{2}$  (d)  $\frac{5}{6}$
13. The first  $n$  natural numbers, 1 to  $n$ , have to be arranged in a row from left to right. The  $n$  numbers are arranged such that there are an odd number of numbers between any two even numbers as well as between any two odd numbers. If the number of ways in which this can be done is 72, then find the value of  $n$ . (2016)
- (a) 6 (b) 7  
(c) 8 (d) More than 8

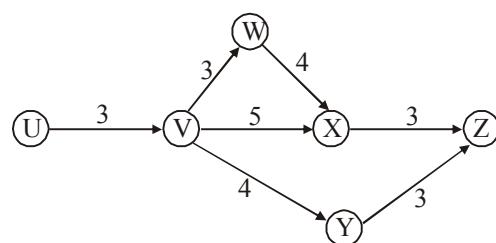
shows the number of hospitals available in XYZ. The number of patients in 1999 were 2,00,000.



The Unhealthiness Index of XYZ for a year is defined as the number of patients per hospital in the country. (2009)

- Find the year for which the Unhealthiness Index of XYZ was the maximum.
- (a) 2000 (b) 2003  
(c) 2004 (d) 2006
- In 2006, WHO launched a massive health improvement program in XYZ. As a result there was 30% reduction in the number of patients per year for the next two years and the number of hospitals in the country was also increased by 10% per year during the same period. Find the Unhealthiness Index of XYZ for the year 2008.
- (a) 15.4 (b) 19.8  
(c) 13.9 (d) 21.3
- The Government of XYZ targets an Unhealthiness Index of 15 for the year 2007. By approximately what percent should the number of hospitals be increased in 2007 over the previous year if the number of patients in 2007 is expected to decrease by 40% over the previous year?
- (a) 27% (b) 34%  
(c) 47% (d) 37%

**DIRECTIONS (Qs. 4 & 5) :** The following network gives details about the various activities carried out in a bottling firm for their latest project and the time required for each activity. The average cost incurred in each activity is 5 times the square of the duration of the activity. If the organisation wants to reduce the duration of any particular activity, in addition to the average cost, it will have to incur an amount equal to 15 times the cube of the new duration of the activity.



## Ch-12. Line & Bar Chart

**DIRECTIONS (Qs. 1-2) :** Answer the questions on the basis of the information given below.

In a country called XYZ, the number of patients changes every year. The graph given below shows the percentage change in the number of patients w.r.t. the previous year. The table given below

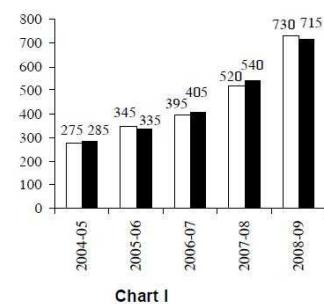
## s-18

4. The completion of one cycle of the network results in one bottle ready to be sold in the market. The project involves a total of 800 bottles. What is the average cost of the entire project?  
 (a) Rs. 74400 (b) Rs. 372000  
 (c) Rs. 15000 (d) Rs. 18500
5. If profit is defined as the difference between the selling price and the average cost, and each bottle is sold for Rs. 510, what is the approximate percent profit earned by the firm?  
 (a) 5% (b) 10%  
 (c) 15% (d) 17.5%

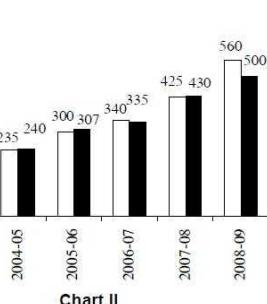
**DIRECTIONS for Questions 6 to 8: Answer the questions on the basis of the information given below.**

The bar charts given below shows the details of the “Budgeted I-Tax” collections and the “Actual I-Tax” collections of India in each of the years from 2004-05 to 2008-09. Bar Chart-I shows the details of the **Total I-Tax** collections and bar chart-II shows the details of the **Corporate I-Tax** collections. There are only two categories of taxpayers in India “Individual Taxpayers” and “Corporate Taxpayers”. All the figures are in Rs. crores. (2012)

**Total I-Tax collections**



**Corporate I-Tax collections**



□ Budgeted ■ Actual

$$\text{Efficacy Ratio} = \frac{\text{Budgeted I-Tax Collections}}{\text{Actual I-Tax Collections}}$$

6. For how many of the given years the Efficacy Ratio of at least two out of “Total I-Tax” collections, “Corporate I-Tax” collections and “Individual I-Tax” collections is greater than 1?  
 (a) 0 (b) 1  
 (c) 2 (d) Data Insufficient

7. In which of the following years, for either of the Corporate I-Tax collections or the Total I-Tax collections, the percentage growth of I-Tax over the previous year for both the Budgeted and the Actual is approximately the same?  
 (a) 2005-06  
 (b) 2006-07  
 (c) 2007-08  
 (d) Both 2006-07 and 2007-08

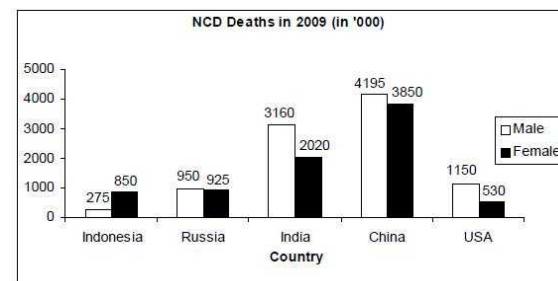
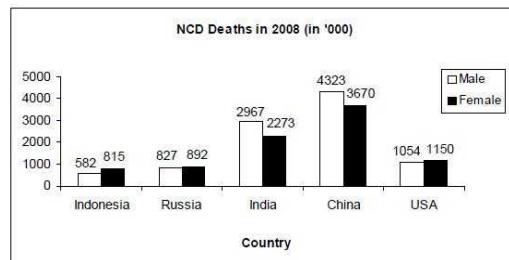
8. Which of the following statements (is/are) true?  
 I. Percentage contribution of the corporate I-Tax (Actual) collections to the total I-Tax (Actual) collections has decreased in the year 2008-09 in comparison to the year 2005-06.  
 II. Simple Annual growth rate of Actual I-Tax paid by the individual taxpayers for the period 2004-05 to 2008-09 is more than 90 percent  
 III. Efficacy ratio for the “Corporate I-Tax” collections is the highest in the year 2008-09.

**Past Years Solved Paper (2009-2016)**

- (a) I (b) II  
 (c) III (d) I, II and III

**DIRECTIONS (Qs. 9 - 11): Answer the questions on the basis of the information given below.**

The bar graphs given below show the gender-wise deaths (in '000) due to NCDs (Non Communicable Diseases) in five countries for the years 2008 and 2009. (2013)



9. In how many countries was the number of deaths due to NCDs in 2009 less than that in 2008?

- (a) 1 (b) 2  
 (c) 3 (d) 4

10. By what percent was the total number of female deaths due to NCDs in the five countries put together in 2009 more/less than that in 2008?

- (a) 7.10 (b) 6.40  
 (c) 8.60 (d) 7.90

11. What was the absolute difference between the total number of male deaths due to NCDs in the five countries put together in 2008 and 2009?

- (a) 22500 (b) 23000  
 (c) 24000 (d) None of these

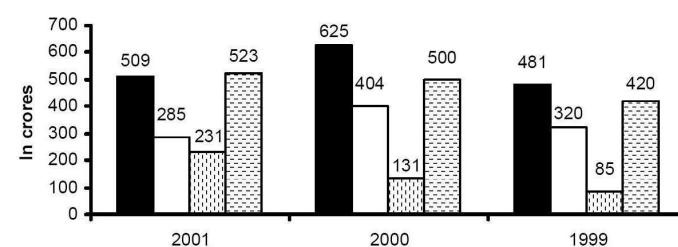
**DIRECTION for questions 12 to 15: Answer the questions on the basis of the information given below.**

The graphs given below show the revenues and profits of four IT education companies. (2014)

$$\text{Profitability} = (\text{Profit}/\text{Revenue})$$

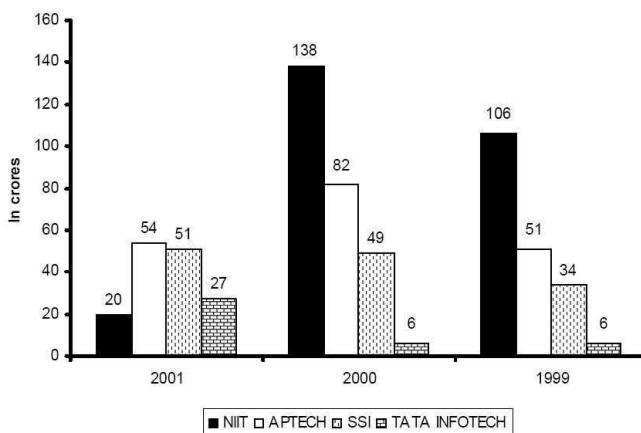
$$\text{Total cost} = \text{Revenue} - \text{Profit}$$

**Revenues**



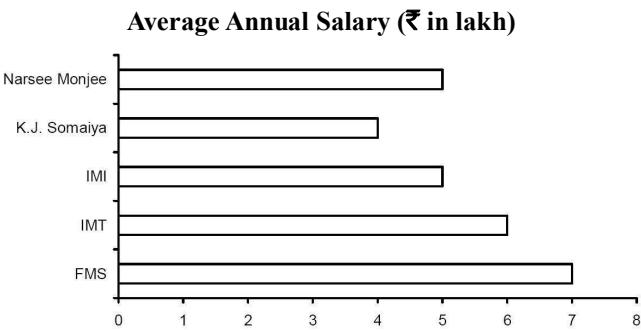
■ NIIT □ APTECH ▨ SSI ▨ TATA INFOTECH

**Profits**

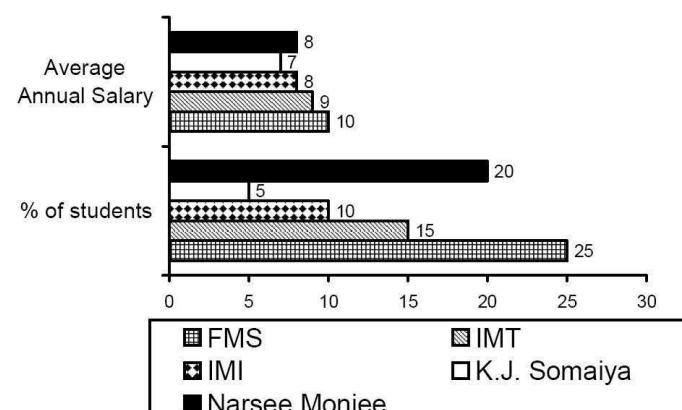


12. In 1999, how many companies have a profitability less than the average of the profitabilities of the four companies?
- 1
  - 2
  - 3
  - 0
13. In 2002, if the cost in each company increased by 10% over 2001 and the revenue for each company decreased by 10% over 2001, what is the approximate profitability of all the companies taken together in 2002?
- 10.25%
  - 10.25%
  - 9.25%
  - 8.75%
14. Arrange the companies in increasing order of their profitability in 2001.
- NIIT, Tata Infotech, Aptech, SSI
  - NIIT, Tata Infotech, SSI, Aptech
  - NIIT, Aptech, Tata Infotech, SSI
  - SSI, Aptech, Tata Infotech, NIIT
15. Which company has the highest profitability in 2000?
- NIIT
  - Aptech
  - SSI
  - Tata Infotech

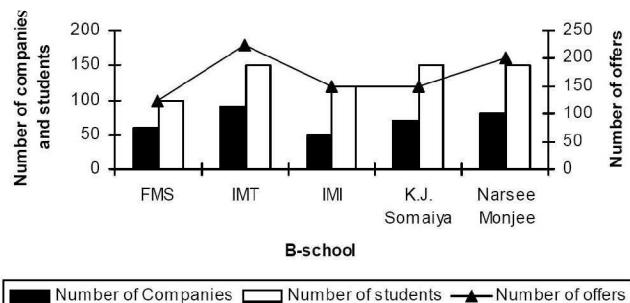
**DIRECTIONS for questions 16 to 18:** Answer the questions on the basis of the information given below. The average annual salary figures of five leading B-schools have been shown below.



The percentage of students getting PPOs (Pre-Placement offers) and their average annual salary in lakhs is shown below:

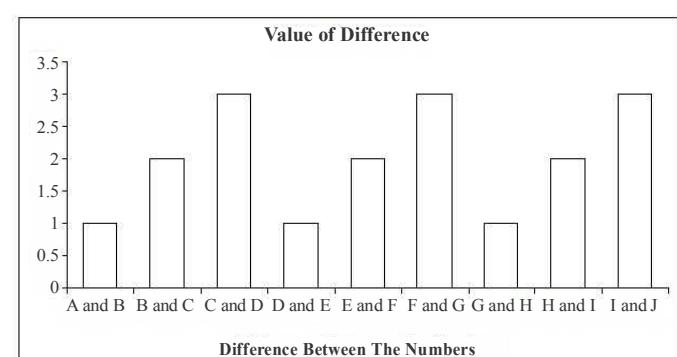


The number of students, the number of companies visiting the campus and total offers made (including PPO's) have been shown below for these five leading B-schools. (2014)



16. Which school has the highest total number of offers per student?
- IMT
  - Narsee Monjee
  - IMI
  - FMS
17. The ratio of number of offers to the number of companies visiting the campus is highest for:
- IMT
  - K.J. Somaiya
  - IMI
  - FMS
18. At FMS, what is the average salary of students, who did not get a PPO?
- ₹ 6.5 lakh
  - ₹ 4.5 lakh
  - ₹ 8 lakh
  - ₹ 6 lakh

**DIRECTIONS for questions 19 to 21:** Answer the questions on the basis of the information given below. There are ten real numbers A, B, C, D, E, F, G, H, I. Differences between any two of them are given in the diagram below. (2014)

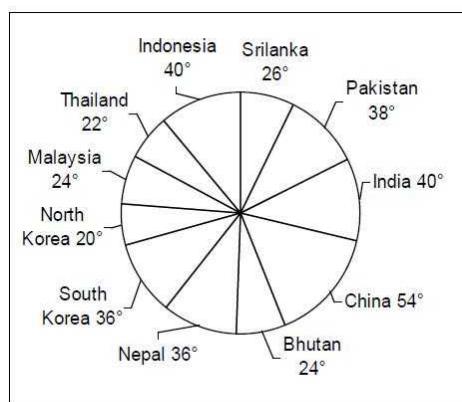


s-20

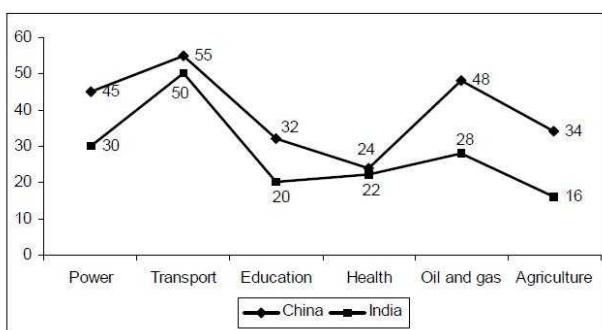
19. If the value of A is known then how many distinct values are possible for J?  
 (a) 512 (b) 256  
 (c) 128 (d) None of these
20. If all the 10 numbers from A to J are positive integers then at least how many of them are even?  
 (a) 3 (b) 4  
 (c) 5 (d) 6
21. If all the 10 numbers from A to J are positive integers and A is equal to 1 then at a time at most how many of them can be perfect squares?  
 (a) 7 (b) 9  
 (c) 8 (d) 6

**DIRECTIONS (Qs. 22-25) : Answer the questions on the basis of the information given below.**

The following pie chart gives the distribution of the total loans disbursed by ADB in 2012 among eleven Asian countries. Total amount of loans disbursed = Rs. 7200 cr



The following line graph gives the percentage contribution of loan from ADB in the total investment made in different sectors in the same year by India and China.



For both China and India, the loan received from ADB was utilized in the given sectors only. (2015)

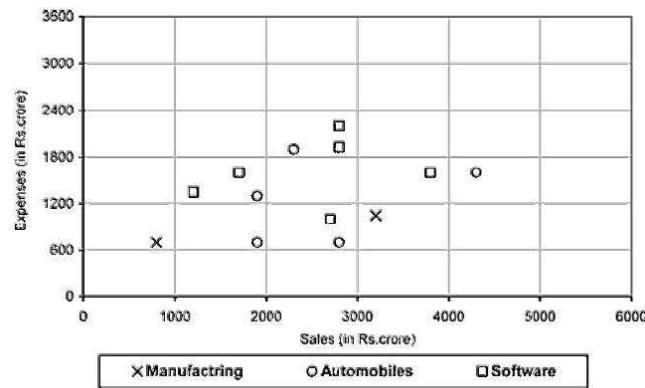
22. If the total investment in Education sector in China was 60% higher than that in India, then what is the ratio of A and B, where  
 A : The percentage of loan from ADB invested in Education sector by China  
 B : The percentage of loan from ADB invested in Education sector by India  
 (a) 256 : 135 (b) 256 : 189  
 (c) 256 : 225 (d) Cannot be determined

**Past Years Solved Paper (2009-2016)**

23. The amount of loan invested in Transport sector by China was equal to 60% of the total loan given by ADB to Malaysia. The amount of loan invested in Transport sector by India was equal to 60% of the total loan given by ADB to North Korea. The total investment made in Transport sector by India was approximately what percent of that made by China?  
 (a) 75.76 (b) 91.67  
 (c) 80.80 (d) 81.81
24. If the total investments made in Education, Health and Agriculture sectors in India in 2012 was Rs. 150 cr., Rs. 120 cr and Rs. 400 cr. respectively, then the amount of ADB loan invested by India in these three sectors constitute what percentage of the total loan granted to India by ADB?  
 (a) 15.05% (b) 18.85%  
 (c) 12.33% (d) 16.66%
25. The total loan invested in Power, Transport and Education sectors by India was 500 cr. What was the maximum possible investment (in Rs. crore) in these three sectors made by India?  
 [The loan amount invested in all of these three sectors is a multiple of 30 cr]  
 (a) 2000 (b) 2100  
 (c) 2360 (d) 2400

**DIRECTIONS for questions 26 and 27: Answer the questions on the basis of the information given below.**

Each point in the graph below shows the sales and expenses of a company. Each company belongs to one of the three sectors among manufacturing, automobiles, and software.

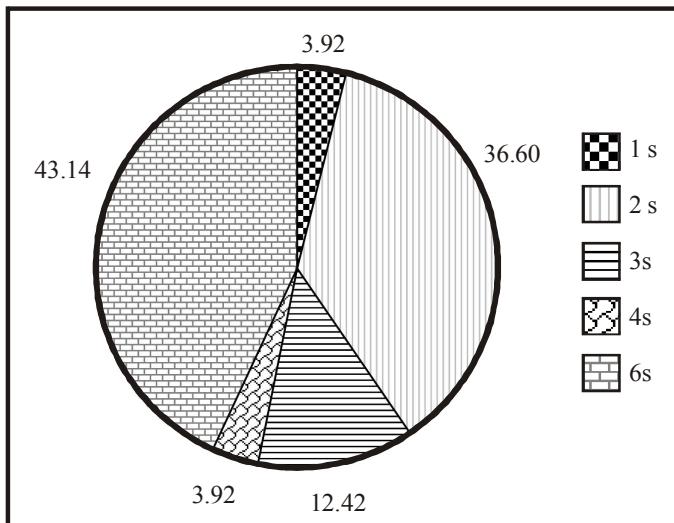


**(2016)**

26. For how many of the companies, is the profit more than 40% of the sales (Profit = Sales - Expenses)?  
 (a) 4 (b) 5  
 (c) 6 (d) 7
27. For how many software companies are the sales more than Rs. 2500 crore but the expenses less than Rs. 2100 crore?  
 (a) 2 (b) 3  
 (c) 4 (d) 6

## Ch-13. Pie Chart

**DIRECTION (Qs. 1 & 2) :** Based on the following information. The following pie chart shows the percentage distribution of runs scored by a batsman in a test innings.



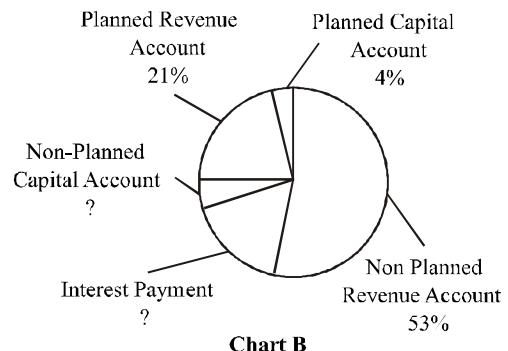
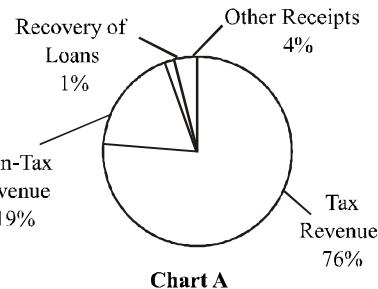
(2009)

- If the batsman has scored a total of 306 runs, how many 4s and 6s did he hit?  
 (a) 31 and 3 respectively (b) 32 and 2 respectively  
 (c) 32 and 3 respectively (d) 33 and 2 respectively
- If 5 of the dot balls had been hit for 4s, and if two of the shots for which the batsman scored 3 runs each had fetched him one run instead, what would have been the central angle of the sector corresponding to the percentage of runs scored in 4s?  
 (a) 160 (b) 163  
 (c) 165 (d) 170

**DIRECTIONS (Qs. 3 to 5) :** Answer the questions on the basis of the information given below.

The break-up of the financial budget of a country called Chaupatland for FY 2010-11 is represented by the pie charts given below. Pie chart A represents Budgeted Revenue and pie chart B represents Budgeted Expenditure.

(2010)



- The difference between Budgeted Expenditure and Budgeted Revenue was what percentage of Budgeted Revenue?  
 (a) 120% (b) 125%  
 (c) 25% (d) 20%
- By how much did the sum of Planned Revenue Account and Planned Capital Account exceed Non-Tax Revenue?  
 (a) Rs. 281.25 thousand crores  
 (b) Rs. 236.25 thousand crores  
 (c) Rs. 186.25 thousand crores  
 (d) Rs. 88.25 thousand crores
- In FY 2011-12, if Budgeted Revenue is increased by 52% over that of the previous year, then what will be the new percentage share of Tax Revenue in Budgeted Revenue?  
 (a) 50% (b) 76%  
 (c) 56% (d) Cannot be determined

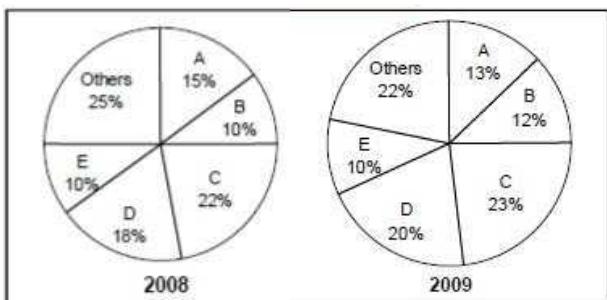
**DIRECTIONS for Questions 6 to 8:** Answer the following questions on the basis of the information given below.

The following table gives the sales turnover (in crore Rs.) of the five major detergent brands A, B, C, D, E and others in the 4 regions East, West, North and South of India. The data is for the years 2008 and 2009. The pie chart gives the breakup of the sales of the same brands in terms of the number of units sold. The total number of units sold for 2008 and 2009 was the same. (2012)

Region → Brand ↓	East		West		North		South		Total	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
A	165	172	180	192	167	190	213	180	725	734
B	75	90	62	75	53	72	17	77	207	314
C	212	182	207	222	153	162	137	120	709	686
D	101	115	121	134	113	121	178	190	513	560
E	90	105	87	95	73	92	67	92	317	384
Others	250	310	152	175	143	162	57	83	602	730
Total	893	974	809	893	702	799	669	742		

(2012)

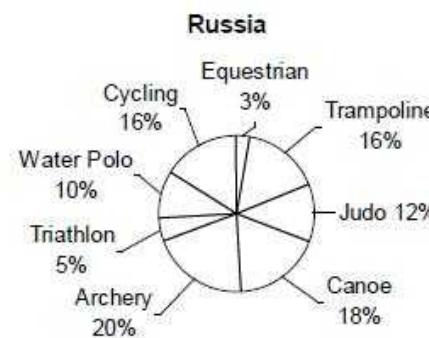
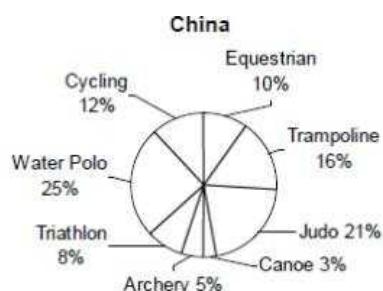
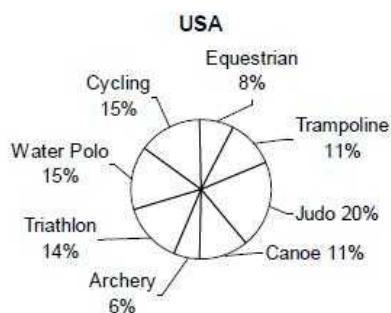
## **Volumewise Breakup of Brands All India**






**DIRECTIONS (Qs. 9-11) : Answer the questions on the basis of the information given below.**

The pie charts given below show the distribution of the number of athletes sent by three countries to take part in eight different games in the recently held Olympics. The numbers of athletes sent by USA, China and Russia were in the ratio 8 : 11 : 5. It is also known that the total number of athletes sent by the three countries put together was 2400. (2013)



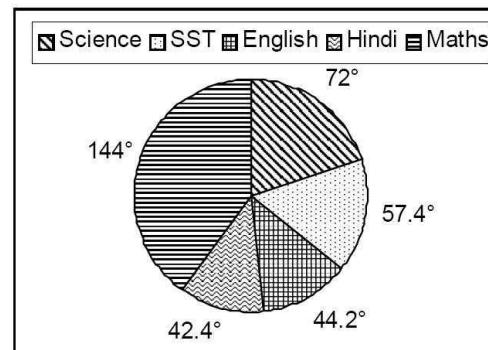



**DIRECTIONS for questions 12 to 15:** Answer the questions on the basis of the information given below.

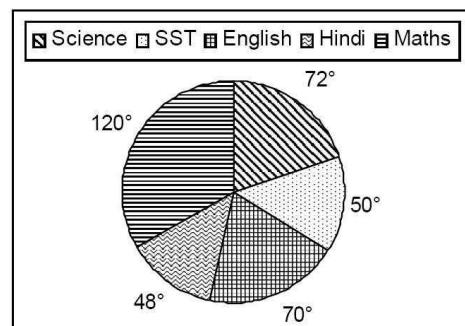
The subject wise breakup of the marks obtained by 4 students in 5 subjects during their board examination is given below. Assume that all subjects carry equal maximum marks unless specified.

(2014)

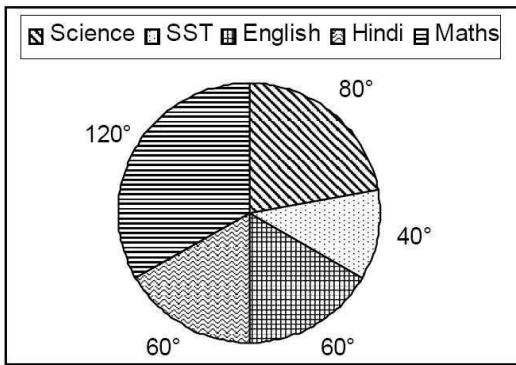
Geoffrey



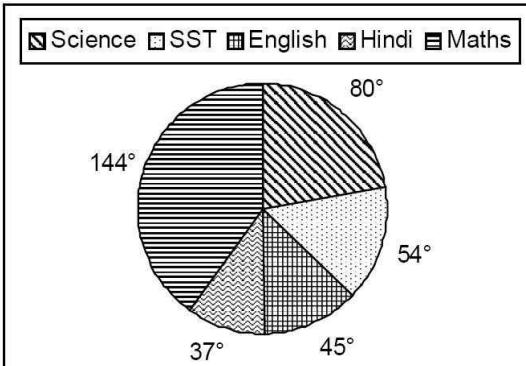
## Tommen



Arya



Sansa



12. If the minimum percentage required to pass in any subject is 33.33 and it is also known that Arya passed in all the subjects, then what can be the minimum percentage that she can score in English?
- (a) 30% (b) 40%  
(c) 50% (d) 60%
13. If the pattern of the examination is changed in such a way that the maximum marks for Maths is double of the maximum marks for any other subject (the breakup of marks remaining unchanged), then what is the ratio of maximum marks, in all the subjects put together, which Geoffrey can score to the maximum marks, in all the subjects put together, which Tommen can score?
- (a) 4 : 3 (b) 1 : 1  
(c) 3 : 4 (d) 1 : 2
14. If the pattern of the examination is changed in such a way that the maximum marks for Maths is double of the maximum marks for any other subject (the breakup of marks remaining unchanged), then what is the ratio of maximum marks, in all the subjects put together, which Sansa can score after the change in pattern and before the change in pattern?
- (a) 35 : 54 (b) 3 : 2  
(c) 2 : 3 (d) 9 : 5
15. If the marks scored by Geoffrey in Maths is maximum possible then what is the average of percentage marks scored by him in all the subjects?
- (a) 50% (b) 25%  
(c) 10% (d) 12.5%

**DIRECTIONS for questions 16 to 18: Answer the questions on the basis of the information given below.**

Mr. Alfonso has six cars such that each car is of a different brand. The cars with Mr. Alfonso are of the six brands Chevrolet, Ferrari, Honda, Mercedes, BMW and Hyundai. In the months of January

and February in the year 2008, Mr. Alfonso drove exactly one car each day. The following table gives details about the days in January and February 2008 on which he did not drive a car of each of the given six brands. Given that January 1, 2008 was a Tuesday.

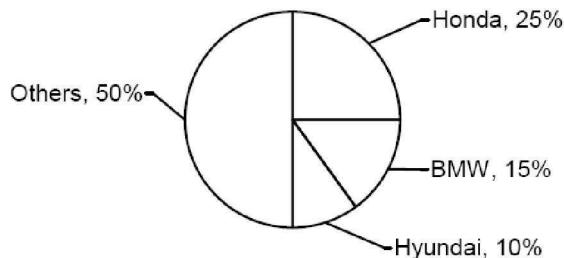
Brand	Sunday	Monday	Wednesday	Friday
Chevrolet	Sunday			
Ferrari	Tuesday	Thursday	Saturday	Monday
Honda	Sunday	Wednesday	Thursday	Friday
Mercedes	Tuesday	Monday	Wednesday	Thursday
BMW	Friday	Monday	Saturday	Tuesday
Hyundai	Sunday	Tuesday	Wednesday	Saturday

The number of days in January and February 2008 on which he drove a car of brand Chevrolet, Ferrari, Honda, Mercedes, BMW and Hyundai is denoted by CH, FE, HO, ME, BM and HY respectively.

It is also known that HO > ME > CH > BM > HY > FE.

The following pie – chart gives details about the number of days in January and February 2008 on which he drove a car of brand Honda, BMW and Hyundai. (2014)

Percentage\_Break up



16. Given that the number of days in January 2008 on which Mr. Alfonso drove the car of brand Honda is the maximum. What is the number of days in February 2008 on which he drove the car of brand Honda?
- (a) Zero (b) One  
(c) Three (d) Two
17. If Mr. Alfonso drove the car of brand Chevrolet on all possible Saturdays in January 2008 and all possible Thursdays in January 2008 and February 2008, then what is the number of days on which he drove Ferrari in the given two months?
- (a) Four (b) Two  
(c) Three (d) Five
18. What is the difference between the maximum and minimum possible number of days on which Mr. Alfonso drove the car of brand Mercedes in the given two months?
- (a) Four (b) Three  
(c) Two (d) One

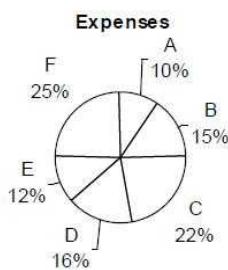
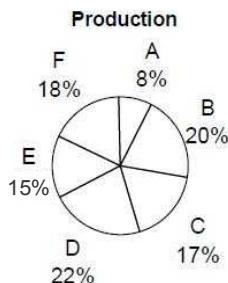
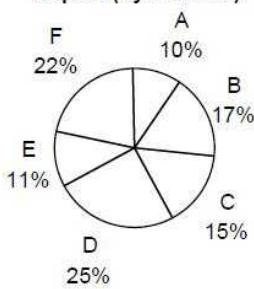
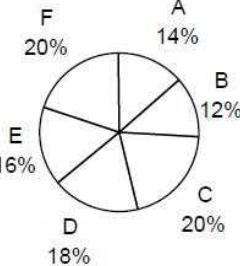
**DIRECTIONS (Qs. 19-22) :** Answer the questions on the basis of the information given below.

The following pie chart gives details of the production, expenses and export of the six products manufactured by company KL Enterprises, which manufactures only the given six products, in the year 2014. In the given year, the company followed a very strict internal audit policy and any item that did not meet the

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Past Years Solved Paper (2009-2016)

specifications were rejected and disposed off. All the products exported were those manufactured in the same year itself. (2015)

**Export (by volume)****Export (by value)**

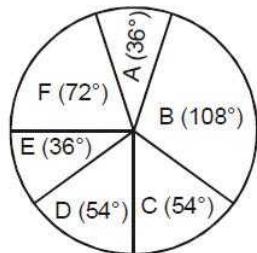
Profit = Sales – Expenses

$$\text{Profitability}(\%) = \frac{\text{Profit}}{\text{Expenses}} \times 100$$

19. In 2014, the products exported as a percentage of the products manufactured by the company could not be more than  
 (a) 73.3% (b) 81.81%  
 (c) 80% (d) 88%
20. In 2014, if product D was a profit making product for the company, what was the maximum number of products that were loss making products for the company?  
 (a) 2 (b) 3  
 (c) 4 (d) Zero
21. The export price per unit of which product was the highest?  
 (a) A (b) C  
 (c) D (d) E
22. For which product the rejection rate was maximum?  
 (a) C (b) F  
 (c) E (d) B

**DIRECTIONS (Qs. 23-26) :** Answer the questions on the basis of the information given below.

The pie chart given below shows the break-up of production cost of six products – A through F – of Zen Private Ltd. in year 2011. The total production cost was ₹ 250 Cr.



Each of the six products is produced in two varieties- Type P and Type Q. The ratio of the units produced for each product and the profit percentage on selling them is given in the table below.

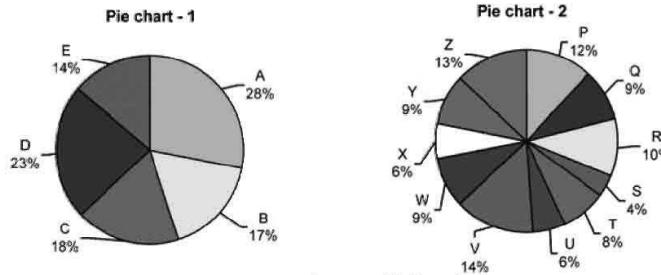
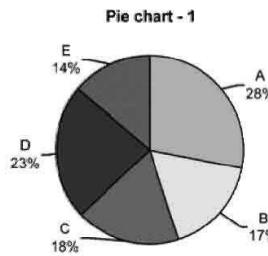
Product	Ratio of production		Profit Percentage	
	Type P	Type Q	Type P	Type Q
A	3	2	15	30
B	4	3	25	20
C	5	6	15	20
D	1	1	15	10
E	5	3	25	20
F	5	4	20	15

Also for each product, the cost of production per item of Type P and Type Q varieties are in the ratio 4 : 5. (2015)

23. For how many of the six products, is the profit made on items of type Q not more than the profit made on items of type P?
24. For which product is the ratio of total profit to total production cost, the lowest?  
 (a) B (b) C  
 (c) D (d) F
25. For how many products, overall profit percentage is more than 20%?
26. The nearest integer to the total cost (In Rs. Cr.) incurred in producing type A of products A, D & F is

**DIRECTIONS for questions 27 to 40: Answer the questions on the basis of the information given below.**

Pie chart – 1 gives the percentage shares of all the five cement companies – A, B, C, D and E – in the total quantity of cement sold in country XYZ. Pie Chart 2 gives the percentage shares of all the eleven states – P through Z – in the total quantity of cement sold in the country.



The market share of any company in a state is the total quantity of cement sold by the company in that state as a percentage of the total quantity of cement sold in that state.

27. In any state, if no company had more than 50% market share, then in at least how many states did company A sell cement?  
 (a) 4 (b) 5  
 (c) 6 (d) 3
28. If in all the states in which company E was present, it had a market share of at least 25%, in at most how many states did company E sell cement?  
 (a) 9 (b) 8  
 (c) 7 (d) 6
29. The number of companies which had sales in more than two states, is at least  
 (a) 1 (b) 2  
 (c) 3 (d) 4

## Ch-14. Data Tabulation

### DIRECTIONS (Qs. 1 & 2) : Answer the questions on the basis of the information given below.

In a society, the newspapers of only three languages – Marathi, Gujarati and Hindi – are distributed. Each family residing in the society reads newspapers of at least one of the three languages. The total number of families reading newspapers of exactly one language can be divided into three types – only Marathi, only Gujarati and only Hindi. These three numbers are in A.P., in no particular order. Similarly, the three types of families reading newspapers of exactly two languages are also in A.P. The number of families reading newspapers of all the three languages is one-

tenth of the number of families reading only Gujarati newspapers, which in turn is two-third of the number of families reading only Hindi newspapers. The number of families reading both Marathi and Gujarati newspapers is 15, whereas the number of families reading both Gujarati and Hindi newspapers is 19. The number of families reading Hindi newspapers is 70, which is more than the number of families reading Marathi newspapers. (2009)

1. What is the total number of families in the society?
  - 111
  - 113
  - 128
  - Cannot be determined
2. What is the number of families reading both Marathi and Hindi newspapers?
  - 11
  - 21
  - 23
  - Cannot be determined

### DIRECTIONS (Qs. 3-5) : Read the table carefully and answer the questions that follow:-

Given below are data points on the India economy from 2005 - 2010:

(2010)

Indicator	Unit	2005	2006	2007	2008	2009	2010
GDP, current price	Rs. Billions	35662.2	41159.73	47675.86	54470.27	60712.76	73555.34
GDP per capita, current prices	Rs.	32128.1	36553.93	41747.69	47038.23	51714.45	61784
Gross national savings Percent of GDP	%	32.88	34.28	36.65	32.17	35.08	32.14
Inflation, average consumer prices index	Index	115.67	122.92	130.75	141.67	157.08	175.92
Volume of imports of goods and services	%change	17.99	9.438	16.3	10.84	8.321	16.49
Volume of exports of goods and services	%change	18.88	13.83	17.13	10.63	0.813	21.86
Unemployment Rate	%	9.2	8.9	7.8	7.2	6.8	7.32
Current account balance percent of GDP	%	-1.272	-1.024	-0.701	-2.475	-2.066	-3.268

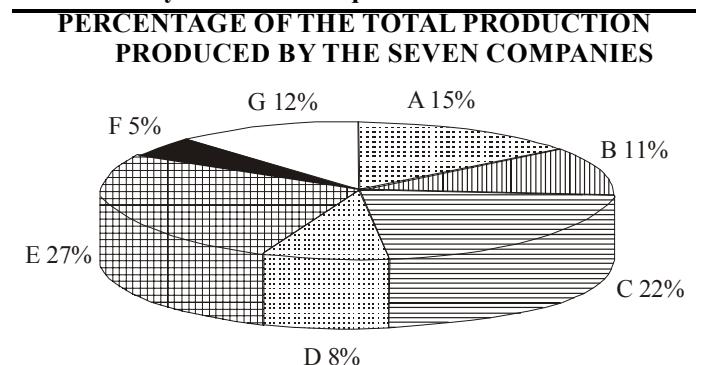
\*Per capita GDP is arrived by dividing GDP by population.

3. What is the ratio of the current account balance in 2010 to current account balance 2005?
  - 0.35
  - 4.56
  - 5.01
  - 5.30
4. Read the statements given below:
  1. Exports were more than imports in 2006
  2. Imports were more than exports in 2009
  3. Export increased at faster rate than imports during period 2005 to 2010

Which of the statements is necessarily true?

  - 1 and 2
  - 1, 2 and 3
  - 3 only
  - 2 only
5. What was the approximate number of unemployed persons in 2006
  - 100 million
  - 102 million
  - 98 million
  - 105 million

### DIRECTIONS (Qs. 6 to 10) : Seven companies A, B, C, D, E, F and G are engaged in production of two items I and II. The comparative data about production of these items by the seven companies is given in the following Graph and Table. Study them carefully to answer the questions that follow.



**Cost of the total production (both items together) by seven companies = ₹ 25 crores**

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**RATIO OF PRODUCTION BETWEEN ITEMS I AND II AND THE PERCENT PROFIT EARNED FOR THE TWO ITEMS**

Company	Ratio of Production		Percent Profit Earned	
	Item I	Item II	Item I	Item II
A	2	3	25	20
B	3	2	32	35
C	4	1	20	22
D	3	5	15	25
E	5	3	28	30
F	1	4	35	25
G	1	2	30	24

(2011)

6. Cost of production of item I by company F is what percent of the cost of production of item II by company D?  
 (a) 16% (b) 33.33%  
 (c) 66.67% (d) None of these
7. What is the total profit earned by company G for items I and II together?  
 (a) ₹ 78 lakh (b) ₹ 1.62 crore  
 (c) ₹ 7.8 crore (d) ₹ 16.2 lakh
8. What is the ratio of the cost of production of item I by company A to the cost of production of item I by company D?  
 (a) 3 : 5 (b) 1 : 2 (c) 2 : 1 (d) 2 : 3
9. The cost of production of both items together by company E is equal to the total cost of production of both items together by which of the two companies?  
 (a) C and D (b) B and G  
 (c) A and D (d) C and F
10. What is the total of the cost of production of item I by company A and the cost of production of item II by company B?  
 (a) ₹ 2.6 crore (b) ₹ 26 lakh  
 (c) ₹ 3.35 crore (d) ₹ 33.65 lakh

**DIRECTIONS (Qs. 11 - 13) :** Answer the questions on the basis of the information given below.

The table given below shows the data related to a few key financial indicators for fourteen European countries in the FY 2011-12.

Country	Inflation (%)	Long-term interest rate (% p.a.)	Debt to GDP ratio (in %)	Fiscal-deficit (as a % of GDP)
Austria	2.2	3.4	70.2	4.8
Belgium	3.4	3.9	100.8	4.8
Cyprus	2.2	4.6	61.1	5.7
Denmark	2.2	3	46.6	4.6
Estonia	2.4	5.7	7.7	1.7
Finland	1.1	3.1	45.4	3.4
France	1.5	3.3	83.5	8
Germany	1.9	2.9	74.8	4.5
Italy	1.4	4.6	118	5.1
Latvia	1.2	7.5	48	8.6
Malta	1.7	4.4	72	3.8
Netherlands	1.1	3.1	64.6	5.6
Poland	2.4	5.9	53.9	7.3
Portugal	1.1	6.5	83.2	7.3

(2013)

**Past Years Solved Paper (2009-2016)**

11. If the Fiscal-deficit of France was x Euros, which was 50% more than that of Belgium, then what was the Debt (in Euros) of Belgium in FY 2011-12?  
 (a) 13x (b) 7x  
 (c) 14x (d) 6.5x
12. The countries with the Long-term interest rate less than 4% per annum, Debt to GDP ratio less than 60% and Fiscal-deficit not more than 4.6% were given a AAA rating. The number of countries rated AAA among the fourteen in FY 2011-12 was  
 (a) 0 (b) 1  
 (c) 2 (d) None of these
13. If the GDP (in Euros) of Finland was 50% more than that of Italy, then by what percent was the Fiscaldeficit (in Euros) of Italy more/less than that of Finland in FY 2011-12?  
 (a) 0 (b) 1.5  
 (c) 0.5 (d) Cannot be determined

**DIRECTIONS (Qs. 14-17) :** Answer the questions on the basis of the information given below.

The total electricity production of five thermal power plants in India in year 2009-10 is given in the table below. Capacity utilization for any power plant is the percentage of maximum capacity, of that power plant, which is used for power production. Maximum capacity (100%) = Capacity utilization (In %) + Unutilized production (In %)

Power Plant	Capacity Utilization	Unutilized production (In MW units)	Number of units sold as a percentage of maximum capacity
A	93%	595	89%
B	88%	750	87%
C	92.50%	750	90%
D	86%	1190	85%
E	81%	1805	80%

	Production Cost (In Rs. / KW units)	Selling Price (In Rs. / KW units)
A	2.1	3.4
B	2.25	3.2
C	2.0	2.9
D	2.35	3.0
E	2.2	2.8

Total cost of production = Units Produced (in KW) × Production Cost (in Rs. / KW units)

Total Revenue = Units Sold (in KW) × Selling price (in Rs. / KW units)

$$\text{Profitability} = \left( \frac{\text{Revenue} - \text{Cost}}{\text{Cost}} \right) \times 100\% \quad (2015)$$

14. In the given year, if capacity of power plant B had 12.5% of the total power capacity of India, and thermal power capacity of India is 95% of its total power capacity. The total capacity of these 5 thermal power plants was what percentage of the total thermal power capacity of India?  
 (a) 91.92% (b) 85.5%  
 (c) 77.73% (d) 90%

15. Which of the following represents the decreasing order of units sold by the given 5 power plants?  
 (a) E > C > D > A > B      (b) C > E > A > D > B  
 (c) E > C > A > D > B      (d) C > A > E > B > D
16. Which power plant had the third highest profitability?  
 (a) A      (b) C  
 (c) D      (d) B
17. Which of the following statements is true?  
 (a) The power plant with the lowest percentage capacity utilization sold minimum number of units.  
 (b) The power plant with the second highest per unit selling price sold minimum number of units.  
 (c) The power plant B had the second lowest capacity.  
 (d) The total capacity of E was more than 10,000 MW units.

## Ch-15. Data Sufficiency

**DIRECTIONS for questions 1 to 4: The question given below is followed by two statements, I and II. Study the information given in the two statements and assess whether the statements are sufficient to answer the question and choose the appropriate option from among the choices given below:**

(2016)

1. Two of the three cricketers Pavan, Rajan and Tarun are selected to the national team. Each of these three persons scored a different number of centuries and a different number of runs. Further, among these three, Tarun scored the highest number of centuries. Who among Pavan, Rajan and Tarun is not selected to the national team?  
 I. the person with the higher number of runs between Tarun and Pavan, is the person who scored the lesser number of centuries between the two persons selected.  
 II. The person with the least number of runs between Rajan and Tarun, is the person who scored the higher number of centuries between the two persons selected.  
 (a) The question can be answered by using one of the statements alone, but cannot be answered using the other statement alone.  
 (b) The question can be answered by using either statement alone  
 (c) The question can be answered by using both statements together, but cannot be answered using either statement alone  
 (d) the question cannot be answered even by using both statements together.
2. Triangle ABC is right angled at B. What is the value of AB + BC?  
 I. Diameter of the circle inscribed in the triangle ABC is 10 cm.  
 II. Diameter of the circle circumscribing the triangle ABC is 27 cm.  
 (a) The question can be answered by using one of the statements alone, but cannot be answered using the other statement alone.

- (b) The question can be answered by using either statement alone.  
 (c) the question can be answered by using both statements together, but cannot be answered using either statement alone.  
 (d) The question cannot be answered even by using both statements together.

3. What percentage of the questions were attempted by Ramya in the exam?

- I. 30% of the questions are attempted by both Ramya and Swathi.  
 II. The number of questions attempted by Ramya but not by Swathi is  $(5/8)$ th of the total number of questions attempted by Ramya.  
 (a) The Question can be answered by using one of the statements alone but not by the other.  
 (b) The question can be answered by using either statement alone  
 (c) The question can be answered by using both the statement together, but cannot be answered by using either statement alone.  
 (d) The question cannot be answered even by using both the statements together

4. Each of Ankit and Bhanu belong to one of the tribes between truth tellers i.e., those who always speak the truth, and liars i.e., those who always lie. Do both of them belong to the same tribe?

- I. Ankit: I am a liar, only if Bhanu is truth teller.  
 II. Bhanu: I am a truth teller, only if Ankit is a liar.  
 (a) The question can be answered by using one of the statements alone but not by the other.  
 (b) The question can be answered by using either statement alone.  
 (c) The question can be answered by using both the statement together but cannot be answered by using either statement alone.  
 (d) The question cannot be answered even by using both the statements together.

## Ch-16. Logical Reasoning

**DIRECTIONS (Qs. 1 to 3) : Study the information below and answer questions based on it.**

Everyday Miss Yadav, Miss Sharma, Miss Toppo, and Miss Hussain go to a park for morning walk. One day, they reach the gate of the park at the same time and immediately start walking on the only circular track adjacent to the gate. Miss Yadav, Miss Toppo and Miss Hussain go on a clockwise direction while Miss Sharma goes anti-clockwise. Miss Hussain who is asthmatic is the slowest among the four and soon others move away from her. Like every day she could walk only one round taking almost the same time as others to complete their morning walk. After her walk Miss Hussain reads the following instruction written at the gate while others join her one after another. "Walkers are requested to use only the 500 m walking track. Plucking of flowers and leaves are strictly prohibited. The park will remain closed from 6 pm to 5 am." While walking Miss Yadav overtakes Miss Hussain twice; once near the fountain and the other time at the signature rock. Miss Toppo and Miss Sharma cross her three times. (2009)

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## Past Years Solved Paper (2009-2016)

- What is the total distance covered by Miss Sharma and Miss Toppo together?  
(a) 3500 m (b) 4000 m  
(c) 2500 m (d) 3000 m
- How many times Miss Yadav and Miss Sharma crossed each other on the track?  
(a) Twice (b) Three times  
(c) Four times (d) Five times
- How many times Miss Toppo would overtake Miss Yadav?  
(a) Never (b) Once  
(c) Twice (d) Three times

**DIRECTIONS (Qs. 4 to 6) : Answer the questions on the basis of the information given below.**

H1, H2, H3 and H4 are four horses that participated in each of the four different races – Race-I, Race-II, Race-III and Race-IV – during an annual horse-racing event in Goa. Each horse is owned by a different owner among Rahul, Dharma, Dablu and Ritesh, in no particular order. None of the four horses finished at the same position in more than two of the four races. In each race the four horses were given ranks 1, 2, 3 and 4 according to the positions at which they finished in the race. It is also known that: (2009)

- In Race-I, H2 finished third and Ritesh's horse finished first. Interestingly, in Race-II, H2 finished first and Ritesh's horse finished third.
  - In Race-IV, H2 finished third and H3 finished fourth.
  - Dablu's horse finished at the same position in Race-I and Race-II, and also in Race-III and Race-IV.
  - In Race-IV, H1 and H3 interchanged the positions at which they had finished in Race-II.
  - In Race-III, H3 finished fourth and H4 finished second.
  - Rahul's horse did not finish first in any of the four races.
- Who are the owners of H3 and H4 respectively?  
(a) Ritesh and Rahul (b) Dablu and Ritesh  
(c) Rahul and Dablu (d) Cannot be determined
  - Whose horse finished third in Race-III?  
(a) Rahul (b) Ritesh  
(c) Dharma (d) Either Rahul or Dablu
  - If the horse with the lowest sum of ranks in the four races won a Jackpot of ₹1 crore, which horse won the Jackpot?  
(a) H1 (b) H2  
(c) H3 (d) H4

**DIRECTIONS (Qs. 7 & 8) : Go through the situation and the accompanying table, and pick up the best alternative to answer.**

There are five sets of digits; Set A, Set B, Set C, Set D and Set E; as shown in given diagram. Set A contains one digit, Set B contains two digits, Set C contains three digits. Set D contains two digits, and Set E contains one digit. Rearrange the digits, across the sets, such that the number formed out of digits of Set C is multiple of the numbers formed from digits in sets on either side. For example; in the given diagram, Set C is a multiple of digits in Set A and Set B but not of Set D and Set E. (2010)

Set A	Set B	Set C	Set D	Set E
7	28	196	34	5

- What is the minimum number of rearrangements required to arrive at the solution? A rearrangement is defined as an exchange of positions between digits across two sets. For example, when 1 from Set C is exchanged with 5 of Set E,

it is counted as one rearrangement?

- (a) 5 (b) 2  
(c) 8 (d) 3  
(e) 7

- Which of the following pairs of digits would occupy Set A and E?  
(a) 2 and 6 (b) 3 and 6  
(c) 3 and 9 (d) 4 and 8  
(e) 2 and 4

**DIRECTIONS (Qs. 9 & 10) : Answer the questions on the basis of the information given below.**

During a political rally, seven leaders of a party – Ajeet, Ambika, Azad, Kamal, Kapil, Mukul and Pranab – are sitting on seven chairs arranged in a row, not necessarily in the same order. It is also known that:

- Ambika is sitting beside Kapil.
  - Pranab is the party president and so he is sitting in the middle of the row.
  - Either Ajeet or Kamal, but not both, is sitting at one of the ends of the row.
  - Azad and Mukul are sitting as far as possible from each other, without violating other conditions. (2011)
- If 'n' represents the number of leaders sitting between Ajeet and Azad, which of the following is not a possible value of 'n'?  
(a) 0 (b) 2  
(c) 3 (d) 5
  - Which two leaders, among the given pairs, cannot sit adjacent to each other?  
(a) Mukul and Kamal (b) Azad and Ambika  
(c) Kamal and Kapil (d) Ajeet and Mukul

**Ch-17. Analytical Reasoning****DIRECTIONS (Qs. 1 to 4) : Read the following information and answer the questions that follow:**

The cars at a dealership come with a choice of the following options : air-conditioning, a cassette deck, leather seats, power windows, a sunroof and tinted glass. None of the cars has any other optional equipment. The following conditions apply :

If a car has leather seats, it also has a cassette deck. If a car has a cassette deck, it also has power windows; If a car has power windows, it also has a cassette deck.

Cars with tinted glass have a sunroof, but no air-conditioning. Cars that have air-conditioning have, at most, two other options.

(2010)

- If a car has both tinted glass and leather seats, what is the greatest number of additional options that the car could have?  
(a) 1 (b) 2  
(c) 3 (d) 4
- Which one of the following could be a complete and accurate list of options on a car?  
(a) air-conditioning, cassette deck, leather seats, power windows  
(b) air-conditioning, cassette deck, leather seats, sunroof  
(c) cassette deck, leather seats, sunroof, tinted glass  
(d) cassette deck, power windows, sunroof, tinted glass

3. If a car has power windows and a sunroof, how many different sets of options, at most, can the car have?  
 (a) 2 (b) 3  
 (c) 4 (d) 5
4. If a car has exactly two options, which one of the following could they be?  
 (a) air-conditioning and cassette deck  
 (b) tinted glass and sunroof  
 (c) cassette deck and leather seats  
 (d) power windows and sunroof

**DIRECTIONS (Qs. 5 to 7) : These questions are based on the following information**

IT School of Management is a management institute involved in teaching, training and research. Currently it has 37 faculty members. They are involved in three jobs: teaching, training and research. Each faculty member working with IT School of Management has to be involved in at least one of the three jobs mentioned above:

- A maximum number of faculty members are involved in training. Among them, a number of faculty members are having additional involvement in the research.
  - The number of faculty members in research alone is double the number of faculty members involved in all the three jobs.
  - 17 faculty members are involved in teaching. The number of faculty members involved in teaching alone is less than the number of faculty members involved in research alone.
  - The faculty members involved in the teaching are also involved in at least one more job. **(2011)**
5. After sometime, the faculty members who were involved in all the three tasks were asked to withdraw from one task. As a result, one of the faculty members each opted out of teaching and research, while remaining ones involved in all the three tasks opted out of training. Which one of the following statements, then necessarily follows:
- (a) The least number of faculty members is now involved in teaching.
  - (b) More faculty members are now associated with training as compared to research.
  - (c) More faculty members are now involved in teaching as compared to research.
  - (d) None of the above
6. Based on the information given above, the minimum number of faculty members involved in both training and teaching, but not in research is:  
 (a) 1 (b) 3  
 (c) 4 (d) 5
7. Among Anil, Bibek, Charu, Debu and Eswar, Eswar is taller than Debu but not as fat as Debu. Charu is taller than Anil but shorter than Bibek. Anil is fatter than Debu but not as fat as Bibek. Eswar is thinner than Charu, who is thinner than Debu. Eswar is shorter than Anil. Who is the thinnest person?  
 (a) Bibek (b) Charu  
 (c) Debu (d) Eswar

**DIRECTIONS for questions 8 to 10: Answer the questions on the basis of the information given below.**

Eight teams participate in the Indian Soccer League (ISL) in which they play one another exactly once. The winner gets three points while the loser gets no points from a match. Both the teams get one point each if the match results in a draw. It is known that not more than 3 matches resulted in a draw in the tournament. The teams are ranked in the following manner before the tournament starts:

Rank	Team
1	Deccan Kings
2	Sydney Chargers
3	Hobart Rockets
4	Delhi Challengers
5	Peshawar Pehalwans
6	Rajasthan Badshahs
7	Chennai Royals
8	Kolkata Invincibles

The new ranks of the eight teams would be decided based on their performance in the ISL, with the team scoring the maximum points ranked 1 and so on. If two or more teams score equal points at the end of the tournament, their final ranks would be decided based on the total number of goals scored in the tournament, with more goals giving a team better rank.

An “upset” is said to have happened when a lower ranked team defeats a higher ranked team in a match. **(2012)**

8. If Rajasthan Badshahs came in the top four teams after ISL, then what is the minimum number of upsets that must have happened?  
 (a) 1 (b) 2  
 (c) 3 (d) None of these
9. If Hobart Rockets retained Rank 3, then what is the maximum number of upsets that could have happened?  
 (a) 18 (b) 25  
 (c) 26 (d) 24
10. If 27 matches in ISL resulted in upsets, then what is the maximum number of teams who could have retained their initial ranks?  
 (a) 1 (b) 2  
 (c) 3 (d) 4

**DIRECTIONS for Questions 11 to 13: Answer the questions on the basis of the information given below.**

Each of the six persons namely A, B, C, D, E and F took one ball from a box containing 300 balls of six different colours Blue, Black, Red, White, Green and Yellow. Also, the number of balls of each colour is the same. Following is the detail of three statements made by each of the persons. Exactly one of the statements made by each person is true and only one of the statements made about B is correct. Also, balls of two particular colours were not taken by any of the persons. **(2012)**

	Statement I	Statement II	Statement III
A	B took a green ball	C did not take a red ball	E took a blue ball
B	A took a green ball	D did not take a yellow ball	C took a black ball
C	F took a white ball	F did not take a white ball	A did not take a blue ball
D	E took a yellow ball	F took a yellow ball	One green ball was taken by me
E	F took a red ball	B took the same coloured ball as A	B took a blue ball
F	A took a white ball	C took a black ball	D did not take a red ball

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11. What is the colour of the ball taken by A?  
 (a) Green (b) Yellow  
 (c) Blue (d) Red
12. What is the colour of the ball taken by C?  
 (a) Green (b) White  
 (c) Blue (d) Red
13. For how many of the mentioned persons, the exact colour of the balls taken by them can be determined?  
 (a) 6 (b) 4  
 (c) 3 (d) 5

**DIRECTIONS for Questions 14 to 16: Answer the questions on the basis of the information given below.**

Five friends, viz. Ashok, Amit, Ajay, Akansh and Abhishek are living in five different cities named Kunnamangalam, Joka, Vastrapur, Banerghatta and Prabandhnagar, not necessarily in that order. Their salaries are 700000, 800000, 900000, 1100000, 1300000 (INR per annum), in no particular order. Further, the following information is given about them: (2012)

- I. Akansh, who does not live in Banerghatta, earns a salary that is a prime number multiple of 100000.
- II. Amit made a call to one of his four mentioned friends who lives in Prabandhnagar and earning a perfect square multiple of 100000 INR in salary.
- III. Ajay's salary is 100000 INR more than the average salary of Akansh and Ashok
- IV. Amit lives in the city, which has the shortest name amongst the above cities.
14. If Akansh lives in Vastrapur, then what is the average salary of the persons living in Banerghatta and Kunnamangalam?  
 (a) ₹ 9 lakh (b) ₹ 10 lakh  
 (c) ₹12 lakh (d) Data Insufficient
15. Who stays in Prabandhnagar?  
 (a) Ashok (b) Amit  
 (c) Abhishek (d) Akansh
16. If Amit and Ajay live in cities with names starting with consecutive alphabets, then who lives in Vastrapur?  
 (a) Ashok (b) Amit  
 (c) Abhishek (d) Akansh

**DIRECTIONS (Qs. 17-19) : Answer the questions on the basis of the information given below.**

Four teams—T1, T2, T3 and T4—participated in a tournament of 'Bat and trap', an English bat-and-ball pub game. In the tournament, each team played exactly one match with each of the other teams. The matches were played on six consecutive days of a week from Monday to Saturday. Two points were awarded to the winner of a match and no points to the loser. No match in the tournament resulted in a tie/draw. It is also known that: (2013)

- I. T1 won only one match in the tournament and it was played on Monday.
- II. The match played on Thursday was won by T4.
- III. T3 won against T2 on Tuesday.
- IV. T2, T3 and T4 definitely did not play on Wednesday, Monday and Saturday respectively.

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- V. T2 and T3 ended up with the same number of points at the end of the tournament.
17. How many points did T4 score in the tournament?  
 (a) 2 (b) 4  
 (c) 6 (d) Cannot be determined
18. T3 lost its match against  
 (a) T1 (b) T2  
 (c) T4 (d) Both T1 and T2
19. The match played on Friday was between  
 (a) T1 and T2 (b) T2 and T3  
 (c) T1 and T4 (d) T2 and T4

**DIRECTIONS (Qs. 20-48) : Answer the questions on the basis of the information given below.**

Eight persons are sitting at a rectangular table such that four persons are sitting along each of the longer sides of the table. Each person works in a different bank among PNB, SBI, HDFC, ICICI, CBI, BOB, BOI and Citi, and holds a different designation among IT Officer, Marketing Officer, Law Officer, Agricultural Officer, Rajbhasha Adhikari, Technical Officer, Finance Officer and HR Manager, not necessarily in the same order. It is also known that:

- I. The Finance Officer, who works in BOI, is sitting to the immediate left of the HR Manager.
- II. The Marketing Officer, who works in SBI, is sitting opposite the Technical Officer.
- III. The Agricultural Officer, who works in ICICI, is sitting diagonally opposite the Rajbhasha Adhikari, who is sitting to the immediate left of the Technical Officer.
- IV. The Law Officer, who works in HDFC, is sitting to the immediate left of the Marketing officer.
- V. The persons who work in PNB and HDFC are sitting along the same side of the table.
- VI. The Rajbhasha Adhikari, who works in CBI, is sitting at one of the extreme ends in his row. (2013)
20. Who is sitting to the immediate right of the Finance Officer?  
 (a) Agricultural Officer (b) Technical Officer  
 (c) Marketing Officer (d) None of these
21. For how many persons can we definitely determine the banks in which they work?  
 (a) 8 (b) 6  
 (c) 4 (d) None of these
22. The person who is sitting opposite the Law Officer works in  
 (a) BOI (b) ICICI  
 (c) BOB (d) Cannot be determined

**DIRECTIONS (Qs. 23-25) : Answer the questions on the basis of the information given below.**

A Cricket team of 11 players is to be formed from a group of 15 players—A, B, C, D, E, F, G, H, I, J, K, L, M, N and O. Among the players A, D, K, L, M, N and O are batsmen; B, C, E, F, G and H are bowlers; I and J are wicketkeepers. It is also known that:

- I. The team must have at least 5 batsmen and exactly 1 wicketkeeper.
- II. H can be selected only if B is selected.
- III. F can be selected only if both G and N are selected.
- IV. If I is selected, then F is also selected.

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**DIRECTIONS for questions 26 to 29 : Answer the questions on the basis of information given below.**

A farmer has 60 hens in his poultry farm. Each of these 60 hens lays one egg per day. On each day out of the eggs laid, some of the eggs are found to be rotten and some of the eggs get broken. Only the eggs that are neither rotten nor broken are taken to the market for sale but due to some unavoidable reasons some eggs are not sold. The eggs that are not sold are brought back to the poultry farm.

(2014)

### **Additional Information Given:**






**DIRECTIONS for questions 30 to 33: Answer the questions on the basis of the information given below.**

There are 6 friends — Gurvinder, Surinder, Mahinder, Bhupinder, Harinder and Joginder. Their wives are — Sita, Rama, Dolly, Monica, Trisna and Kaveri (not in the same order as their husbands). Each of these 6 friends belong to exactly one out of Ambala, Jaipur, Guntur, Kapurthala, Noida and Jammu (not necessarily in order). Each of them plays exactly one of the games — cricket, football, volleyball, snooker, TT and badminton (again not necessarily in that order). Each of the friends is married to one lady only.



**DIRECTIONS** for questions 34 to 37: Answer the questions on the basis of information given below. **Volleyball** is a sport played by two teams on a playing court divided by a net.

The object of the game is to send the ball over the net in order to ground it on the opponent's court, and to prevent the same effort by the opponent.

The team has three hits for returning the ball. The rally continues until the ball is grounded on the playing court, goes “out” or a team fails to return it properly. In Volleyball, the team winning a rally scores a point (Rally Point System).

There are six players on court in a volleyball team.

Matches are played in five sets. The first four sets are played to 25 points, with the final set being played to 15 points. A team must win a set by at least two points.

There is no ceiling, so a set continues until one of the teams gains a two-point advantage. **(2014)**

A match was played between Brazil and Russia in which-

- (i) Only three sets finished with the minimum threshold points.
  - (ii) The final score of Russia was same in two of the sets in which it won one of the sets.

**DIRECTIONS (Qs. 38-41) : Answer the questions on the basis of the information given below.**

Sixteen teams – A through P – participated in the Hockey World Cup, 2013. The tournament was conducted in two stages. In the first stage, the teams were divided into two groups – teams A to H in group 1 and teams I to P in group 2. In the first stage, each team in a group played exactly one match against every other team in that group. At the end of the first stage, the top four teams from each group advanced to the second stage while the rest got eliminated. The second stage comprised three rounds – Quarterfinals, Semi-finals and Finals. A round involves one match for each team. The winner of a match in a round advanced to the next round, while the loser got eliminated. The team that remains undefeated in the second stage was declared the winner of the tournament.

At the end of the first stage, top four teams in each group were determined on the basis of total number of matches won by individual teams; in case, two or more teams in a group were ended up with the same number of wins, ties were resolved by a series of complex tie-breaking rules to determine the top four positions. The teams qualifying for the second stage from group 1 were A, B, C and D and those from group 2 were I, J, K and L. No match in the tournament ended in a draw/tie. **(2015)**

38. In the tournament, if E and L won the same number of matches and L was the winner of the tournament, then what was the sum of the number of matches won by E and that by L?

39. The number of matches won in the first stage by a team that advanced to the second stage could not be less than.

40. How many of the following statements is/are true?

(i) Maximum number of teams which could have one win in the first stage was 6.

- (ii) Maximum number of teams which could have three wins in the first stage was 12.

(iii) Number of teams which had exactly 2 wins in the second stage was 2.

41. The value of the total of number of matches won, in the first stage, by teams A, B, C and D together could not be more than.

**DIRECTIONS (Qs. 42-45) :** Answer the questions on the basis of the information given below.

A group has to be selected from seven persons containing two women (Rehana and Kavya) and five men (Rohit, Rahul, Kamal, Nusarat and John). Rohit would not like to be in the group if Rahul is selected. Rahul and John want to be selected together in the group. Kavya would like to be in the group only if Kamal is also there. Kamal, if selected, would not like Nusarat in the group. Rohit would like to be in the group only if Nusarat is also there. Kamal insists that Rehana must be selected in case he is there in the group. **(2015)**



**DIRECTIONS (Qs. 46-49) :** Answer the questions on the basis of the information given below.

In a given season of F1 racing, 9 races are to be held. There are 8 teams with two drivers in each team and the points are awarded to the drivers in each race as per to the following table.

Rank	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup> to 16 <sup>th</sup>
Points	10	8	6	5	4	3	2	1	0

Two championships viz. 'Driver's Championship' and 'Constructor's Championship' take place simultaneously.

'Driver's Championship' is given to the player who has the maximum number of points at the end of the season.

‘Constructor’s Championship’ is given to the team for which the sum of the points of two its drivers is the maximum. A driver is said to get the podium finish only when he is among the top 3 rankers in a race. After the first 6 races, the point standings of the 16 drivers is as follows: (2015)

Driver	Team	Points
Alonso	Renault	54
Schumacher	Ferrari	39
Kimi	McLaren	29
Fisichella	Renault	27
Montoya	McLaren	22
Massa	Ferrari	22
Button	Honda	21
Barichello	Honda	10
Villeneuve	Red Bull	4
Webber	Williams	3
Roseberg	Williams	2
Coulthard	BMW Sauber	1
Heidfeld	Red Bull	0
Klien	BMW Sauber	0
Liuzzi	Toro Rosso	0
Scott Speed	Toro Rosso	0

46. If Alonso got the podium finish in each of the first 6 races, then what was the maximum number of races in which he had 2nd rank?
- (a) 4 (b) 3  
(c) 2 (d) 1
47. Apart from the first six races, Alonso got the podium finish in the 7th race as well. However, he was not allowed to participate in the subsequent races due to mechanical failure. At the end of the season, if Schumacher won the 'Driver's Championship', then which of the following could have been his lowest rank in any of the last three races?
- (a) 5th (b) 6th  
(c) 7th (d) 4th
48. Which of the following statements CANNOT be true?
- (a) Renault and Ferrari had a tie for the 'Constructor's Championship'.  
(b) Alonso got the podium finish in each of the first 6 races out of which he did not have rank 1st in the 6th race.  
(c) Fisichella got the podium finish in the 9th race and Honda won the 'Constructor's Championship'.  
(d) Barichello got the podium finish in the 3rd race but he did not score any point in the 1st race.
49. If Schumacher ranked 9th in one of the first six races, then which of the following CANNOT be the points scored by him in any one of the first six races?
- (a) 3 (b) 2  
(c) 1 (d) 0

**DIRECTIONS (Qs. 50-53) : Answer the questions on the basis of the information given below.**

From ISBT, buses ply on 6 different routes viz. 414, 413, 427, 966, 893 and 181 at an interval of 10 min, 10 min, 12 min, 15 min, 20 min and 30 min, not necessarily in that order, to four different destinations viz. Mehrauli, Badarpur, Uttam Nagar and Azadpur. There is at least one bus for each destination. Further information is also known:

- i. Two buses to the same destination cannot start at the same time.

- ii. If the timings of two buses plying different routes but heading towards the same destination clash, then the bus of the route number having the shorter time interval will skip this journey.
- iii. Buses on two different routes ply between ISBT and Mehrauli.
- iv. The difference between the time intervals of a route to Mehrauli and Uttam Nagar is equal to the difference between the time intervals of the two routes to Uttam Nagar.
- v. Buses on a route to Mehrauli leaves after every 10 min.
- vi. 414 leaves for Badarpur after every 30 min.
- vii. Time intervals between two different routes heading towards the same destination cannot be equal.
- viii. Buses on one of the routes to Uttam Nagar leave after every 15 min.
- ix. Buses to any destination can leave from ISBT with an interval of at least one minute or an integral multiple of one minute. **(2015)**

50. If 427 leaves to Mehrauli after every 10 min, then in a given hour a minimum of how many buses can ply on route 427?
- (a) 3 (b) 4  
(c) 6 (d) 2
51. On a festival day, if frequency of all buses was increased by decreasing the time interval of all the routes by 5 min, then what can be the minimum time difference between any two buses plying to Mehrauli?
- (a) 2 min (b) 5 min  
(c) 1 min (d) None of these
52. Which of the following statements is necessarily TRUE?
- (a) A maximum of 3 buses can depart at a given time.  
(b) Maximum of 11 buses can depart for Mehrauli in 1 hour.  
(c) Maximum difference between the intervals of the buses plying to Uttam Nagar and Badarpur is 10 min.  
(d) The difference between the time intervals of buses plying to Uttam Nagar is an integral multiple of 5 min.
53. If condition (iii) is not there, then what can be the minimum difference between the time intervals between the buses plying to Uttam Nagar?
- (a) 2 min (b) 3 min  
(c) 4 min (d) 5 min.

**DIRECTIONS (Qs. 54-56): Answer the questions on the basis of the information given below.**

After facing yet another World Cup debacle, the Board of Cricket Control in India (BCCI) is in search of a new coach for the team. It shortlisted five persons – Anshuman, Buchanen, John, Whatmore and Chappel. Each of them is from a different country among Australia, India, Japan, Pakistan and Canada, not necessarily in that order. At present, each of them is coaching the team of a different country among Australia, Bangladesh, China, Wales and Bermuda, not necessarily in that order. The following details were also observed about their particulars:

- (i) For any person, each of his three particulars – his name, the name of the country from which he is and the name of the country that he is coaching at present, starts with a different letter.
- (ii) Whatmore is coaching Australia and John is from neither Australia nor Pakistan.

- (iii) Buchanan is not coaching China and the person who is coaching Bermuda is from Canada.  
 (iv) Anshuman is neither from Canada nor from Pakistan and also the person from Pakistan is coaching Bangladesh. **(2016)**
54. Whatmore is from which country?  
 (a) India (b) Japan  
 (c) Canada (d) Cannot be determined
55. Who is the person from Australia?  
 (a) Buchanan (b) John  
 (c) Whatmore (d) Cannot be determined
56. The person from Japan is definitely not coaching  
 (a) China  
 (b) Wales  
 (c) Australia  
 (d) More than one of the above

**DIRECTIONS for questions 57 to 60: answer the questions on the basis of the information given below.**

A team must be selected from ten probable – A, B, C, D, E, F, G, H, I and J. Of these, A, C, E and are forwards, B, G and H are point guards and D, F and I are defenders.

Further, the following conditions need to be observed:

- The team must have at least one forward, one point guard and one defender.
  - If the team includes J, it must also include F.
  - The team must include E or B, but not both.
  - If the team includes G, it must also include F.
  - The team must include exactly one among C, G and I.
  - C and F cannot be members of the same team
  - D and H cannot be members of the same team
  - The team must include both A and D or neither of them.
- There is no restriction on the number of members in the team. **(2016)**

57. What could be the size of the team that includes G?  
 (a) 4 (b) 5  
 (c) 6 (d) More than one of the above
58. What would be the size of the largest possible team?  
 (a) 4 (b) 5  
 (c) 6 (d) 7
59. Who cannot be included in a team of size 6?  
 (a) A (b) H  
 (c) J (d) E
60. What can be the size of the team that includes C?  
 (a) 3 (b) 4  
 (c) 5 (d) More than one of the above

## Ch-18. Verbal Ability

**Directions (Qs. 1 to 6) : The word given below has been used in sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is incorrect or inappropriate.**

1. **HAND**  
 (a) The board rejected the manager's plan out of hand.  
 (b) When you have small children at home it is advisable to have a first aid kit at hand.  
 (c) He's an old hand at managing advertising campaigns.  
 (d) He is hand over glove with the new president of the company.
2. **PENCIL**  
 (a) I wanted to write a letter but couldn't put pencil to paper.  
 (b) The agent managed to pencil in a meeting at 4 pm.  
 (c) An active person would hate to become a pencil pusher.  
 (d) If you write well they will not blue-pencil the article.
3. **SHOW**  
 (a) The latest computers will be on show at the exhibition.  
 (b) She had shown herself unable to deal with money.  
 (c) It just goes to show what you can do when you really try.  
 (d) He showed me away by snoring during the concert.
4. **JOB**  
 (a) There was a job of work waiting for him that he was not looking forward to.  
 (b) That cup of tea was just the job.  
 (c) Sorting these papers out is going to be a tall job.  
 (d) He got six months for that last job he did.
5. **SORT**  
 (a) Let's sort these boys into four groups  
 (b) They serve tea of a sort on these trains.  
 (c) Farmers of all sort attended the rally.  
 (d) What sort of cheese do you use in pizza?
6. **HOST**  
 (a) A virus has infected the host computer  
 (b) Ranchi will play the host to the next national film festival  
 (c) Kerala's forests are host to a range of snakes  
 (d) If you host the party, who will foot the bill
7. The word given below has been used in sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is **incorrect or inappropriate.** **(2012)**
- NOTE**  
 (a) The author included a note on the usage of the term.  
 (b) The chess player of note was invited to inaugurate the Sports Complex.  
 (c) Her photograph rings a note but I still can't remember who she is.  
 (d) There was a note of sorrow in her manner.
8. The word given below is used in sentences in four different ways. Choose the option in which the usage of the word is **incorrect or inappropriate.** **(2012)**
- HIT**  
 (a) In his new book he hits off the American temperament with amazing insight.  
 (b) What will happen when the story hits the front page?  
 (c) This course will hit the high spots of ancient history.  
 (d) Critics hit off at the administration's new energy policy.
9. There are two blanks in the following sentence. From the pair of words given, choose the one that fills the blanks most appropriately. The first word in the pair should fill the first blank.

- Even those who do not \_\_\_\_\_ Mahatma Gandhi's ideas \_\_\_\_\_ him as a champion who has daringly refused give up his convictions. (2012)
- (a) shrink from..... condemn  
 (b) concur with..... recognize  
 (c) disagree with..... envision  
 (d) dissent from..... remember
10. There are two gaps in the sentence/paragraph given below. From the pairs of words given, choose the one that fills the gaps most appropriately. It's the vulnerability of the political father-figure, played strategically to bring out something deeper from the \_\_\_\_\_ than civil obedience, something more like love. (2013)
- (a) populace, unquestioning  
 (b) society, irrevocable  
 (c) generality, unrequited  
 (d) opposition, inevitable
11. There are two gaps in the sentence/paragraph given below. From the pairs of words given, choose the one that fills the gaps most appropriately. For Septimius Severus stood as a \_\_\_\_\_ reminder of what Libya had once been: a Mediterranean region of immense cultural and economic wealth, anything but \_\_\_\_\_ from the world beyond the sea. (2013)
- (a) constant, analogous  
 (b) wistful, isolated  
 (c) steady, different  
 (d) nostalgic, indistinguishable
12. There are two gaps in the sentence/paragraph given below. From the pairs of words given, choose the one that fills the gaps most appropriately. However, the adults in the audience may find even these \_\_\_\_\_ effects a relief, given the overwhelming \_\_\_\_\_ of most of the film. (2014)
- (a) Gaffe, Tempo (b) Gauche, Blandness  
 (c) Gauche, Traction (d) Gaffe, Speed
13. There are two gaps in the sentence/paragraph given below. From the pairs of words given, choose the one that fills the gaps most appropriately. Despite the \_\_\_\_\_ that has characterized much of Vietnamese history, a nationalist \_\_\_\_\_ has remained in the form of anti-colonization and anti imperialism. (2014)
- (a) Divisiveness, Continuity  
 (b) Divisions, Colony  
 (c) Schisms, Bridge  
 (d) Tumult, Consistency
14. The word given below has been used in the given sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is **incorrect or inappropriate**. (2014)
- NECK**
- (a) The company that he founded in 1983 is now an albatross around his neck, making losses of several hundreds of thousands a year.  
 (b) Your little brother who cannot sit still for five seconds is a pain in the neck.  
 (c) He stuck his neck out for the deal because he thought he could make some big money.  
 (d) The two companies are neck to neck in the competition to win over customers.
15. The word given below has been used in the given sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is **incorrect or inappropriate**. (2014)
- EYES**
- (a) She cried her eyes after her husband died in a gruesome car accident.  
 (b) We had a bird's eye view of the old town from the top of the city walls.  
 (c) Martha married an abusive younger man with a roving eye and a habit of spending his days at the country inn.  
 (d) She was a girl with stars in her eyes and dreams of becoming famous.
- DIRECTIONS for questions 16 and 17: In each of the following questions, the word at the top is used in four different ways. Choose the option in which the usage of the word is INCORRECT or INAPPROPRIATE.** (2016)
16. **PULL**
- (a) Pill aside the curtains and let in some fresh air.  
 (b) I decided to pull away from the venture due to differences of opinion with my partners.  
 (c) Being a charismatic leader that he is, he can certainly pull the crowds.  
 (d) The municipal corporation has decided to pull down all illegal
17. **SHADE**
- (a) Nina's bedroom was painted in a soft shade of pink.  
 (b) Abdul is a dubious character who is suspected of being involved in several shady deals.  
 (c) The weary traveler rested for a while in the shade of a tree.  
 (d) The people in the strife torn region have been living in the shade of fear for several years.
- DIRECTIONS (Qs. 18 to 24) : Five sentences are given below, labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate one.**
18. A. It is demanding that any party it backs should establish a working group on violence against women and children in the assembly.  
 B. In the run-up to the January 28 polls, for instance, members of Women Action for Development (WAD) are organising camps in all constituencies.  
 C. Ironically, Manipur has many activist groups led by women.  
 D. True empowerment will only happen when women enter the assembly in good numbers.  
 E. Conflict Widows' Forum is a group made up of women who have lost their husbands to civil violence in the state. (2009)
- (a) DBCEA (b) CBADE  
 (c) BDCEA (d) CBEAD
19. A. Fortunately, global wealth and technology allow us to better prepare for and respond to natural disasters.  
 B. It does not necessarily mean that volcanoes and quakes are getting worse — but rather that there are more of us living in areas where we might be affected by a disaster, and we have more to lose.  
 C. As global populations have grown and people have crowded into risk zones — like earthquake areas and flood plains — the toll of natural disasters has grown as well.

- D. According to the Center for Research on Epidemiology of Disasters, the number of catastrophic events has more than doubled since the 1980s.
- E. The Red Cross estimates that the economic damage from disasters rose fivefold, to \$629 billion, from 1985 to 2005. **(2009)**
- (a) CDBEA (b) BCDEA  
(c) CDEBA (d) CADEB
20. A. That may be beyond us, but as long as there are tears and suffering, so long our work will not be over.
- B. The service of India means the service of the millions who suffer.
- C. That future is not one of ease or resting but of incessant striving so that we may fulfil the pledges we have so often taken and the one we shall take today.
- D. It means the ending of poverty and ignorance and disease and inequality of opportunity.
- E. The ambition of the greatest man of our generation has been to wipe every tear from every eye. **(2009)**
- (a) BDCEA (b) CBDEA  
(c) CDEBA (d) CEABD
21. A. So that his place shall never be with those cold and timid souls who neither know victory nor defeat.
- B. Who strives valiantly; who errs, who comes short again and again, because there is no effort without error and shortcoming; but who does actually strive to do the deeds.
- C. It is not the critic who counts; not the man who points out how the strong man stumbles, or where the doer of deeds could have done them better.
- D. Who knows great enthusiasms, the great devotions; who spends himself in a worthy cause; who at the best knows in the end the triumph of high achievement, and who at the worst, if he fails, at least fails while daring greatly.
- E. The credit belongs to the man who is actually in the arena, whose face is marred by dust and sweat and blood. **(2010)**
- (a) EBDAC (b) CEDBA  
(c) DBAEC (d) CEBDA
22. A. The recent communal violence in Hyderabad and in Bareilly a month ago has remained on the sidelines of national attention.
- B. In both cities, the present round of violence was preceded by mobilisations and speeches, primarily by Hindu fundamentalist groups.
- C. Fortunately, there was no death in the violence in Bareilly, while in Hyderabad only three people were killed.
- D. Yet, the scale, planning and causes behind the riots indicate a certain change in the morphology of the typical riot, a change which needs to be identified and understood if we want to keep religious sectarianism and violence in check.
- E. Communal violence has become so endemic to the polity of India that it has ceased to attract much attention outside its immediate area of impact, or unless it crosses very high levels of fatality and barbarity. **(2010)**
- (a) EACDB (b) ABEDC  
(c) EABCD (d) ABCDE
23. A. That too was historic.
- B. The word that immediately rolled off of every tongue after the presidential election was “historic”, and rightly so.
- C. It would have been unimaginable forty years ago.
- D. The fact that the country has become civilized enough to accept this outcome is a considerable tribute to the activism of the 1960s and its aftermath.
- E. The two candidates in the Democratic primary were a woman and an African-American. **(2011)**
- (a) BCDAE (b) BCDEA  
(c) BEDAC (d) BEACD
24. A. The revolution began as an attack on despotism.
- B. Already by 1762 Rousseau was implying in his “Social Contract” that there was no meaningful difference between the authority of a despot and that of a monarch.
- C. As usual, regular usage soon diluted the original rigor of the expression’s meaning.
- D. Montesquieu has defined its spirit as “The rule of one, according to no law”.
- E. Obeying no law, authority was arbitrary and its animating spirit was fear. **(2011)**
- (a) ABDCE (b) AEDCB  
(c) ADECB (d) ADEBC
- DIRECTIONS (Q. 25 to 31) : Select the most appropriate word(s) from the given choice to fill in the blank(s).**
25. Justice Minister Bola Ige, confronted with the general incivility of local police, placed a \_\_\_\_\_ on the cads. Said the Hon. Bola Ige, “I pray that God will make big holes in their pockets.” **(2009)**
- (a) malediction (b) sanction  
(c) proscription (d) plea
26. During the heated discussion, the leader of the group \_\_\_\_\_ refuted all the claims brought by his opponents. Later everybody acknowledged that he survived by most \_\_\_\_\_ luck. **(2009)**
- (a) ingeniously, incredible (b) ingeniously, incredulous  
(c) ingenuously, incredible (d) ingenuously, incredulous
27. The \_\_\_\_\_ of the country should take a greater interest in promoting the indigenous works that are rooted in the deep traditions of scholarship across the world.
- (a) LITERATI (b) LITERATE  
(c) LITERATURE (d) LITERAL
28. We can stand in awe of the pyramids while understanding the slave labour and misery that comprised their construction. Similarly, amid the politics and pain that engulf and sometimes threaten to \_\_\_\_\_ professional sport, there is also a/an \_\_\_\_\_ that can take your breath away. **(2010)**
- (a) overwhelm, emollient (b) smother, art  
(c) promulgate, beauty (d) destroy, asperity
29. The day dies slowly,\_\_\_\_\_. It’s reluctant to go and drags out the farewell, like an elemental orchestra returning with just one more\_\_\_\_\_, one final flourish, and then another, and then just one more. **(2010)**
- (a) turbulently, encore (b) arduously, presage  
(c) quietly, abyss (d) languorously, refrain

30. At the moment, security agencies are getting \_\_\_\_\_ printouts of chat messages within four to five hours of their requirements with RIM, a home ministry source said, adding that once it gets \_\_\_\_\_ access, it could track chat messages on a real-time basis. **(2011)**
- (a) secure, exhaustive (b) complete, inclusive  
(c) computer, secure (d) manual, automated
31. He later said that his organization was in \_\_\_\_\_ discussion with the Indian government and he remains optimistic that a positive outcome can be achieved but \_\_\_\_\_ it will not alter the security architecture of its corporate offering. **(2011)**
- (a) serious, announced (b) constructive, reassured  
(d) advanced, stated (d) preliminary, justified
32. Given below are five sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/ are correct in terms of grammar and usage (including spelling, punctuation and logical consistency). Then, choose the most appropriate option.
- A. A tarot is one of the most wonderful of human inventions.  
B. Despite all the outcry of philosophers, this pack of pictures,  
C. in whom destiny is reflected as in a mirror with multiple facets,  
D. remains so vital and exercises so irresistible an attraction on  
E. imaginative minds that it is hardly possible that it could ever be abolished. **(2012)**
- (a) A only (b) A and B  
(c) D and E (d) D only
33. The sentences given below, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a letter. Choose the most logical order of sentences from among the given choices.
- A. On the whole, we have not arrived at any general consensus over the nature and causes of fascism in our time.  
B. Historians, sociologists, social psychologists, and political theorists have been debating this question since Mussolini's seizure of power in 1922.  
C. However, with limited success.  
D. What is the 'true' nature of fascism?  
E. Is it something radically new to political experience, a unique creation of the 20th century; or is it merely old tyranny possessed of new, more efficient techniques for gaining and holding power? **(2012)**
- (a) ABCDE (b) DEABC  
(c) DEBCA (d) ADEBC
34. Given below are five sentences or parts of sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/are correct in terms of grammar and usage. Then, choose the most appropriate option.
1. In every democratic and more-or-less secular countries,
  2. similar questions arise about precise extent to which religious sub-cultures
  3. should be allowed to live on their own rules and laws.
  4. One set of questions emerge when believers demand, and often get,
  5. an opt-out from the law of the land. **(2012)**
35. (a) 3 & 5 (b) 3 only  
(c) 5 only (d) 2, 3 & 5
- The sentences given below, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a letter. Choose the most logical order of sentences from among the given choices.
- A. Those who don't recognize wisdom latent in the foolishness?  
B. There is always a knowing wink in these tales, but who is being laughed at?  
C. In an imaginary East European scene, these paragons of scholarship and righteousness are shown to be fools.  
D. The wise men of Chelm may be among the most familiar folk characters in the Jewish tradition.  
E. The fools who don't realize they are fools? **(2012)**
- (a) DCEAB (b) AEDCB  
(c) BDCEA (d) DCBEA
36. The sentences given below, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a letter. Choose the most logical order of sentences from among the given choices. **(2012)**
- A. In addition to being one of Mr. De Palma's signature set pieces — a deft and dazzling aria of surveillance, suspense and partial nudity — this sequence seems especially designed to beguile critics who have covered the annual carnival of cinematic indulgence and bureaucratic intransigence that is Cannes.  
B. The loot in question is a serpentine diamondstudded gold brassiere that adorns the otherwise naked torso of a willowy model named Veronica (Rie Rasmussen), who strolls up the famed red carpet at the Palais des Festivals on the arm of the French filmmaker Regis Wargnier.  
C. *Femme Fatale*, the breathtakingly convoluted new thriller from Brian De Palma, opens with a daring jewel heist carried out in the middle of the Cannes International Film Festival.  
D. If this conjures up an image of diamonds tastefully stashed in a velvet drawstring bag, think again.  
E. Veronica is abruptly summoned to the ladies room — whose sparkling cleanliness is a notably unrealistic touch — for some heavy-breathing sex with Laure Ash (Rebecca Romijn-Stamos), a thief posing as a member of the paparazzi.
- (a) CBDAE (b) CBDEA  
(c) CDBEA (d) CDAEB
37. Five sentences are given below labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate one. **(2013)**
- A. At the critical moment, a canopy conceals the act of anointment, by a priest not a civil official.  
B. The conferring of state headship is an exclusive Anglican ritual, steeped in the Henrician Reformation.  
C. The Queen is serene and vulnerable, flanked by fussing bishops and ranks of hereditary peers, symbolising the legitimacy of inherited office.  
D. Succession is sanctioned and blessed by God, with a staged cry of assent from the congregation.

38. E. The Queen's 1953 coronation, to be reprised many times on television this weekend, now seems medieval in its costumes and ritual.  
 (a) BDACE (b) EBCAD  
 (c) BECAD (d) ECBAD  
 Five sentences are given below, labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate one. **(2013)**

A. Logic suggests that Japanese food should not do well in North Indian fish-hating markets.  
 B. But sushi is all the rage because teenagers love it.  
 C. Over the last decade, new restaurants have opened and turned the conventional wisdom on its head.  
 D. Similarly, the fast food chains which survive on wheat (pizzas, pasta, hamburger buns, etc.) should all flop in the rice-loving South.  
 E. My guess is that the differences will be ironed out as the new generation comes of age.  
 (a) ECABD (b) ABDEC  
 (c) CABED (d) EABDC

39. Four sentences are given below labeled (a), (b), (c) and (d). Of these, three sentences need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the one that does not fit the sequence. **(2013)**

(a) Nostalgia and wonder are the two emotions that dominate visitors' minds when they view the quaint collection of artwork harking back to an idyllic Bangalore, in Fernandes' small gallery, aPaulogy.  
 (b) Thus nostalgia works at several levels, and as humans think that the condition of their lives is improving as they head into the future, a part of their mind also harks back to a supposedly simpler time when life was more peaceful.  
 (c) Nostalgia can exist only when there is a linear conception of time and modernity, with its notion of progress, is deeply intertwined with the concept of nostalgia.  
 (d) And Fernandes' work satiates that hunger for nostalgia an old Bangalorean would have.

40. The word given below has been used in the given sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is *incorrect* or *inappropriate*. **(2013)**  
**Buy**  
 (a) The negotiators kept the gunman talking to buy time for the hostages.  
 (b) She had never bought into the idea that to be attractive you have to be thin.  
 (c) Joe finally bought it in a plane crash in Tunisia.  
 (d) Supermarkets have been buying out champagne for Christmas.

41. Given below are five sentences or parts of sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/are incorrect in terms of grammar and usage. Then, choose the most appropriate option. **(2013)**

A. Since the breakdown of political formality, pictures have stood for a different message, for which the umbrella term is "down to earth".  
 B. This down-to-earthness has myriad elements, most of it contradictory or impossible.  
 C. For instance, to be down-to-earth you have to like sport; to like sport you have to choose a team; but if you go and see your team, you are no longer down-to-earth because you can afford a ticket.  
 D. If you pretend that you can't afford a ticket, you're disingenuous; if you shrug and say, "I can get a free ticket to anything, I'm prime minister", you're reasonable but you have squandered the advantage you gained in liking sport in the first place.  
 E. Realistically, all one can do is pretend you're too busy to watch sport, which works OK for the harassed, sleep-deprived, Thatcher-model premier, but couldn't possibly wash for David "Fruit Ninja" Cameron.  
 (a) A, C and E (b) B, D and E  
 (c) B, C and D (d) A, B and E

42. Given below are five sentences or parts of sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/are incorrect in terms of grammar and usage. Then, choose the most appropriate option. **(2013)**

A. The central question to answering in judging the proportionality of this sentence is whether the desire to punish a whistleblower driven by moral outrage stems from the alleged harm he did US military and diplomatic interests, or whether it derives more from sheer embarrassment.  
 B. The judge presiding, Col Denise Lind, had already thrown out the gravest of charge, that of "aiding the enemy".  
 C. Col Lind had also limited the admissibility of evidence regarding the "chilling effects" that Mr Manning's actions had on US diplomacy by releasing 250,000 state department cables.  
 D. A military witness conceded there was no evidence that anyone had been killed after being named in the releases.  
 E. Mr Manning's recent apology for his actions does not, and should not, detract from the initial defence he gave for it, when he spoke of his shock at the "delightful bloodlust" displayed by that helicopter crew, or his belief that stimulating a debate about the wars was the right thing to do.  
 (a) A, B and E (b) B, C and D  
 (c) A, C and D (d) A, C and E

43. Five sentences are given below, labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate sequence. **(2014)**

A. Two and a half years ago, her father received the grim news that he was suffering from the early symptoms of Alzheimer's.  
 B. She is focusing on her other career as a successful children's book author.  
 C. Her latest, *What's Happening to Grandpa?* is a touching, compassionate story about a young girl who learns that her grandfather is suffering from Alzheimer's disease.

## Cast

Dictionary Definition	Usage
A. Throw forcefully	E. The fisherman decided to cast his net into the sea only thrice a day.
B. Direct or cause to fall	F. The director cast new actors in his latest venture.
C. Register a vote	G. She cast a glance at him which made him crazy.
D. Actors in a play	H. Every responsible citizen must cast his or her vote.
(a) A–E, B–H, C–G, D–F (b) A–F, B–H, C–G, D–E	(c) A–H, B–G, C–F, D–E (d) A–E, B–G, C–H, D–F
Five sentences are given below, labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate sequence. (2014)	
A. The knowledge worker is gaining importance since the opening up of global competition.	
B. So the bait is no longer fatter bonus, but much beyond that.	
C. Indian companies see the need to attract and retain good workers.	
D. From training sessions to spruce up their skills to fun parties — anything to keep them happy.	
E. Moreover, the employers recognize the importance of peaceful personal relationships in keeping employees happy.	
(a) ACEBD (b) CEABC	
(c) ABCDE (d) ADEBC	



**DIRECTIONS (Qs. 47-49):** Given below are five sentences. Each sentence has a pair of words that are italicized. From the italicized words, select the most appropriate words (A or B) to form correct sentences. The sentences are followed by options that indicate the words, which may be selected to correctly complete the set of sentences. From the options given, choose the most appropriate option.

47. It would not be wrong to say that the politicians today are *leeches* (A) / *leaches* (B) feeding off the hard-working majority.

II. He had been *gulled* (A) / *culled* (B) into believing that the documents were authentic

III. The sole of the shoe should be designed in a manner such that it can take constant *abrasion* (A) / *aberration* (B).

IV. He *attenuated* (A) / *accentuated* (B) the eccentricity of the already freakish costume by adopting theatrical attitudes and an air of satisfied negligence.

V. She is the object of his unabashed *amorphous* (A) / *amorous* (B) intentions.

(a) BAAAB (b) BBBAB  
(c) AAABB (d) ABAAA

48. I. The animal approached us *bellowing* (A) / *billowing* (B) and pawing the ground with the strength of many earthly bulls.

II. I have seen this whole body of soldiers, upon a word of command, draw their swords at once, and *brandish* (A) / *blandish* (B) them in the air.

III. I am surprised that plaintiffs' hyperbolic allegations and inflated damage claims are given any *credence* (A) / *cadence* (B).

IV. A number of the species are edible, while others have been recorded as *deleterious* (A) / *delirious* (B).

V. From the top of the hill I *decried* (A) / *described* (B) a solitary rider.

(a) BABAB (b) BBBAB  
(c) ABAAB (d) AAAAB

49. I. A survey of the history of Christianity tells a disturbing tale, one wherein *diffident* (A) / *dissident* (B) cries for reform resulted in dangerous accusation of heresy and witchcraft.

II. Certainly the Arabs have no interest in seeing another war *conflagrate* (A) / *conflate* (B) in the Gulf region.

III. The government operates according to its own rules, bringing enormous benefits to the chosen few, and suffering and *immiseration* (A) / *commiseration* (B) to millions.

IV. If the minority in such case *cedes* (A) / *secedes* (B) rather than acquiesces, it will make a precedent which in turn will divide and ruin them.

V. The full moon beams like a *beckon* (A) / *beacon* (B) in the clear sky.

(a) BBAAB (b) BAABB  
(c) ABBBA (d) AAABB

50. Four sentences are given below, labeled (a), (b), (c) and (d). Of these, three sentences need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the one that does not fit the sequence.

s-40

- (a) With footage including wallowing hippos, galloping herds of antelope and lunching hyenas, it really shows the potential of drones in wildlife filmmaking.
- (b) So whether it's an aerial shot of surfers riding giant waves off the coast of Oahu, Hawaii or an eerie journey through ice caves in Alaska, we've rounded up six of the best videos filmed by drones around the world.
- (c) By using a drone, he gives you a rare look at the shape of the waves coming in, the flow of the surfers around the bay and the motion of the barrels as they break.
- (d) A state-of-the-art video being the one created by photographer Will Burrard-Lucas using his "BeetleCopter" - this stunning film takes a drone on a safari in the Serengeti.
51. Four sentences are given below, labeled (a), (b), (c) and (d). Of these, three sentences need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the one that does not fit the sequence. **(2014)**
- (a) If that's what it is, there's little wonder Britain is no longer capable of marching into somebody else's country and forcing the indigenous population to wear ill-fitting suits and make us all a fried breakfast.
- (b) I should think that when the English Spirit of Cricket waddles self-deprecatingly into view looking down at the ground, the Australian Spirit of Cricket spits, readjusts its box and growls, "Strewh, what happened to you mate? Did you blow all the housekeeping money at the pie stall?"
- (c) Andrew Strauss went to Radley and all I can say is that is the sort of sharp practice they are teaching in English public schools these days.
- (d) And that to me is what was truly galling about England's final-session shenanigans on Sunday – the complete schoolboy amateurishness of it.
52. Four sentences are given below, labeled (a), (b), (c) and (d). Of these, three sentences need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the one that does not fit the sequence. **(2014)**
- (a) According to Amnesty International: "In August [2012], despite the failure of Mexican authorities to meet human rights conditions set by the US Congress as part of the Merida initiative, the US State Department recommended that Congress release the 15% of funds subject to the conditions."
- (b) The Americas must follow the progressive lead of countries such as Uruguay and Bolivia in exploring alternatives to a military response to the war on drugs, which has been an unmitigated failure of violence, corruption and oppression.
- (c) It is undeniable that the US dishes out extravagant amounts of military aid to Mexico with a scandalous lack of oversight as to how it is used.
- (d) This aid may have since been spent on equipment and training of the same security services that prosecutors are now accusing of the extrajudicial execution of students, many of whom are teenagers.
53. Given below is a sentence, part of which is missing. Beneath the sentence you will find four ways of phrasing the missing part. Select the correct answer in terms of grammar and usage. The bamboo sharks are just as easy to breed, \_\_\_\_\_ not much market for them. **(2014)**

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- (a) but they grow much larger, and are so common that there are
- (b) but they grow much larger, and thus are so common that there are
- (c) but they grow much larger, and thus are so common that their is
- (d) but they grow much larger, and are so common that there is
54. Given below are four sentences or parts of sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/are incorrect in terms of grammar and usage. Then, choose the most appropriate option. **(2014)**
1. William Butler Yeats wrote two poems, which are together known as the Byzantium series.
  2. The first is "Sailing to Byzantium," and their sequel is simply named "Byzantium."
  3. The former is considered easier of the two to understand.
  4. It contains multiple meanings and emotions, and the poet uses various literary devices to communicate them.
- (a) 1 & 4 (b) 2 & 3  
(c) 2 & 4 (d) 1 & 3
55. Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in. **(2015)**
- (a) The poets in question have, like other poets, various faults.
  - (b) But they were, at best, engaged in the task of trying to find the verbal equivalent for states of mind and feeling.
  - (c) And this means both that they are more mature, and that they wear better, than later poets of certainly not less literary ability.
  - (d) Poetry comes from the heart and not from random philosophical concepts.
  - (e) It is not a permanent necessity that poets should be interested in philosophy, or in any other subject.
56. Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in. **(2015)**
- (a) The opening words of James Joyce's Ulysses seem initially to come from the realist world.
  - (b) However, the appearances are going to be deceptive, and they become more so as we go through the novel.
  - (c) Joyce, after all, was a grand master.
  - (d) Its stylistic deviations become more obvious, even though they are at base founded in remarkably accurate history.
  - (e) The primary modernist technique here lies in Joyce's making of allusions, which lead us to feel the presence of underlying conceptual or formal structures.
57. Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. **(2015)**
- Choose its number as your answer and key it in.
- (a) The planet is tidally locked to its star, much as the moon is to Earth, and has one face in permanent daylight, the other in darkness.
  - (b) Given the world's size and mass, researchers suspect it is rocky, like the inner planets of our solar system.
  - (c) It orbits 1.4m miles from its star, far closer than Mercury, which is never less than 36m miles from the sun.

- (d) Red dwarfs are by far the most common type of star in the Milky Way but because of their low luminosity, individual red dwarfs cannot easily be observed.
  - (e) Because the red dwarf is so small, and the planet is on such a close orbit, astronomers should find it fairly easy to detect and study any atmosphere the world has.

**DIRECTIONS for question 58:** The following question has a set of five sequentially ordered statements. Each statement can be classified as one of the following.

**Facts**, which deal with pieces of information that one has heard, seen or read, and which are open to discovery or verification (the answer option indicates such a statement with an 'F').

**Inferences**, which are conclusions drawn about the unknown, on the basis of the known (the answer option indicates such a statement with an 'I').

**Judgments**, which are opinions that imply approval or disapproval of persons, objects, situations and occurrences in the past, the present or the future (the answer option indicates such a statement with a 'J').

Select the answer option that best describes the set of statements. **(2016)**

58. (A) The renewed corporate interest in power is welcome, given the huge investment backlog in the vexed sector and the routine revenue leakages.

(B) Reportedly, industrial houses like Reliance Industries and the Aditya Birla Group are keen to foray into power equipment manufacture.

(C) In tandem, we need proactive policy to wipe out continuing losses of state power utilities, and regular disclosure of SEB finances.

(D) Of late, the tendency has been to clamp up on the huge annual losses of power utilizers – the latest Economic Survey like the previous one is mum on losses, subsidies and plain theft of power; instead we have some pious intentions to gather ‘baseline data’ and use information technology application for accounting and auditing power distribution.

(E) We do need to step up IT for meter reading, billing and collections, of course, but in parallel, what is essential indeed vital, is improved governance in power delivery and follow through.

(a) JFIFJ (b) IJFJJ  
(c) FJJIF (d) JFJIJ

**DIRECTIONS** for questions 59 and 60: In each question, four different ways of presenting an idea are given. Choose the one that conforms most closely to Standard English usage (2016)

59. (i) The inflexibility of the laws, which prevent them from being adapted for emergencies, may in certain cases render them Pernicious and thereby cause the ruin of the state in a time of crisis.

(ii) The inflexibility of the laws, which prevents them from being adapted for emergencies may in certain cases render them Pernicious, thereby cause the ruin of the state in a time of crisis.

(iii) The inflexibility of the laws, which prevents them from being adapted for emergencies may in certain cases render them Pernicious, and thereby cause the ruin of the state in a time of crisis.

- (iv) The inflexibility of the laws, which prevents them from being adapted for emergencies may in certain cases render them Pernicious and thereby causing the ruin of the state in a time of crisis.

(a) (i) (b) (ii)  
(c) (iii) (d) (iv)

60. (A) Human talents vary considerably, within a fixed framework that is characteristic of the species, and that permits ample scope for creative work, including the creative work of appreciating the achievements of others.

(B) Human talents vary considerably, within a fixed framework that is characteristic of the species, and which permits ample scope for creative work, including the creative work of appreciating the achievements of others.

(C) Human talents vary considerably, within a fixed framework that is characteristic of the species, and that permits ample scope for creative work, including the creative work of appreciating achievements of others.

(D) Human talents vary considerably, within a fixed framework that is characteristic of the species, and which permits ample scope for creative work, including the creative work of appreciating achievements of others.

(a) A (b) B  
(c) C (d) D

**DIRECTIONS** for questions 61 and 62: In each question, there are five sentences. Each sentence has pairs of words/phrases that are italicized and highlighted. From the italicized and highlighted word(s)/phrase(s), select the most appropriate word(s)/phrase (s) to from correct sentences.

Then, from the options given, choose the best one. (2016)

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63. Five sentences are given below, labeled (a), (b), (c), (d) and (e). They need to be arranged in a logical order to form a coherent paragraph. Write the correct answer in the space given below. **(2015)**

- (a) It is less than a year since Bellerín was “abandoned” by Per Mertesacker to endure a gruelling ordeal in a bruising Arsenal defeat by Stoke at the Britannia Stadium.
- (b) And he contributes plenty in attack, too, thanks to blinding speed and smart choices.
- (c) At 20 he offers ample scope to get even better, and it is an encouraging sign that in matches where it had initially looked as if his rapid opponent might get the better of him, he has quickly risen to the challenge and come out emphatically on top.
- (d) Bellerín has gone on not only to prove he can cut it in the Premier League but that he is a cut above most other defenders.
- (e) Héctor Bellerín (Arsenal) is another young Spaniard about whom there were once questions over Premier League suitability.

64. Five sentences are given below, labeled (a), (b), (c), (d) and (e). They need to be arranged in a logical order to form a coherent paragraph. Write the correct answer in the space given below. **(2015)**

- (a) Another features a hostage-taking in a hospital.
- (b) Elsewhere, an old lover surprises a lounge pianist, sending her reeling back into painful memories.
- (c) An overbearing mother remembers visiting her wary son and his boisterous, pregnant wife.
- (d) Most stories turn on some kind of betrayal.
- (e) One story takes place at the funeral reception of a man whose wife has just learned of his infidelity.

65. Five sentences are given below, labeled (a), (b), (c), (d) and (e). They need to be arranged in a logical order to form a coherent paragraph. Write the correct answer in the space given below. **(2015)**

- (a) There is, however, a gap of at least a billion years between the formation of the earth and these first signs of living organisms.
- (b) Cyanobacteria are still abundant on earth today.
- (c) The principal kinds of bacteria were cyanobacteria: the name refers to the blue-green colour, not the production of cyanide.
- (d) A small amount of evidence, mostly still controversial, records the presence of bacteria and perhaps other microbial life in Archaean rocks from Australia and South Africa dated at 3.5 b yr ago.
- (e) At some point in that interval, life arose on earth in the form of relatively simple self replicating molecules.

66. Five sentences are given below, labeled (a), (b), (c), (d) and (e). They need to be arranged in a logical order to form a coherent paragraph. Write the correct answer in the space given below. **(2015)**

- (a) Olive bursts into tears when she meets an anorexic young woman.
- (b) “I don’t know who you are,” she confesses, “but young lady, you’re breaking my heart.”
- (c) “You’re not starving,” the girl replies, looking at this large woman, with her thick wrists and hands, her “big lap.”

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- (d) “Sure I am,” Olive says. “We all are.”
- (e) “I’m starving, too,” Olive tells her, “Why do you think I eat every doughnut in sight?”

**DIRECTIONS for questions 67: In the following question, there are five sentences/paragraphs. The sentence/paragraph labelled A is in its correct place. The four that follow are labelled B, C, D and E, and need to be arranged in the logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate option. **(2016)****

67. (A) The driving force of the ‘nuclear renaissance’ is a claim that nuclear power, once up and running, is a carbon free energy source. The assertion is that a functioning nuclear reactor creates no greenhouse gases and thus contributes nothing to global warming or chaotic weather.
- (B) The frequently repeated notion that nuclear power is a carbon free energy source is simply untrue.
  - (C) At every stage of the cycle greenhouse gases are released into the atmosphere from burning diesel, manufacturing steel and cement and, in the circumpolar regions of the planet, by disturbance of the tundra, which releases large amounts of methane, a particularly potent greenhouse gas.
  - (D) That part is almost true, but the claim ignores the total environmental impact of nuclear energy, which includes a long and complicated chain of events known in the industry as the ‘nuclear cycle’ which begins with finding, mining, milling and enriching uranium, then spans through plant construction and power generation to the reprocessing and eventual storage of nuclear waste, all of which creates tons of CO<sub>2</sub>.
  - (E) Even the claim that a functioning nuclear power facility is CO<sub>2</sub> – free challenged by the face that operating plant requires an external power source to run, and that electricity is almost certain to come from a fossil-fuelled plant.
- |          |          |
|----------|----------|
| (a) DCEB | (b) EBCD |
| (c) DEBC | (d) EDCB |

**DIRECTIONS for questions 68 and 69: Each of the following questions has a paragraph from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way. **(2016)****

68. Jawaharlal Nehru seemed an unlikely candidate to lead India towards its vision. Under the cotton Khadi he wore in deference to the dictates of Congress, he remained the quintessential English gentleman. In a land of mysteries, he was a cool rationalist. The mind that had exulted in the discovery of science at Cambridge never ceased to be appalled by his fellow Indians who refused to stir from their homes on days proclaimed inauspicious by their favourite astrologers. He was a publicly declared agnostic in the most intensely spiritual area in the world, and he never ceased to proclaim the horror the word ‘religion’ inspired in him. Nehru despised India’s priests, her sadhus, her chanting monks and pious ‘skerks’.
- (a) And yet, the India of those sadhus and the superstition haunted masses had accepted Nehru.

- (b) They had only served, he felt, to impede her progress.  
 (c) The Mahatma had made it clear that it was on his shoulders that he wished his mantle to fall.  
 (d) Nehru's heart told him to follow the Mahatma and his heart, he would later admit, had been right.
69. Birth rates have fallen dramatically – and voluntarily. Coercive birth control, including paying people not to have babies, was discredited and abandoned decades ago. Nearly two – thirds of the couples in poor countries now use birth control, and not because some patriarchal westerner told them to. In the 1970s, the government of Bangladesh offered people in the Matlab region low-cost contraceptive supplies and advice. Birth rates promptly fell well below those of neighbouring regions. So Bangladesh extended the service nationally and its birth rate plummeted from six children per woman to three.
- (a) The 'population bomb' has already gone off.  
 (b) Given the choice, people want fewer children  
 (c) Governments want fewer children since their own life expectancy falls with rising numbers.  
 (d) Even when birth rates fall, there is a lag which means population keeps growing for decades until birth and death rates even out.
70. Given below is a sentence, part or all of which, is underlined. Beneath the sentence are four ways of phrasing the underlined part. The first of these repeats the original; the other three are different.
- Choose the option that produces the most effective sentence; this answer should be clear and exact, without awkwardness, ambiguity, redundancy, or grammatical error. The question tests correctness and effectiveness of expression.
- I have no doubt that Sri Lankan Tamils — including many with no connections whatever to the Tigers — continue to suffer repression by Sri Lankan officials, despite of the deadly civil war between the two sides having ended last year. (2009)
- (a) continue to suffer repression by Sri Lankan officials, despite of the deadly civil war between the two sides having ended last year.  
 (b) continue to suffer repression by Sri Lankan officials, even though the deadly civil war between the two sides ended last year.  
 (c) continue to suffer repression through Sri Lankan officials, although the deadly civil war between the two sides ended last year.  
 (d) continue to suffer repression by Sri Lankan officials, inspite of the deadly civil war between the two sides ended last year.
- ice will set in train a rise in sea levels that will continue for decades to come, the US team warns. "Even if we have some really cool years ahead, we think the glacier is now unstable," said Jeremie Mouginot at the University of California, Irvine. "Now this has started, it will continue until it retreats to a ridge about 30km back which could stabilise it and perhaps slow that retreat down." (2009)
- (a) Huge Zachariae Isstrom glacier has begun to break up, starting a rapid retreat that could continue to raise sea levels for decades to come.  
 (b) Global Warming and other related factors are breaking up glaciers that are raising the level of North Atlantic ocean.  
 (c) The huge Zachariae Isstrom glacier is now breaking up into large icebergs where the glacier meets the sea.  
 (d) Huge Zachariae Isstrom glacier will continue to melt until it retreats to a ridge about 30km back which could stabilise it.
2. The benefits of psychotherapy result not only from the advice the therapist gives but also from the supportive relationship offered to the patient by the therapist. Even though this relationship may cost large amounts of money over many years, most patients interpret the therapist's concern for them as genuine and identify this caring relationship as the primary factor in improving their mental health. However, recent studies have found that only eight percent of therapist/patient relationships continue after the patient terminates formal paid visits. (2009)
- Which of the following is in accordance with the ideas contained in the passage? Choose the best option.
- (a) Therapists are equally concerned with money making and their patients well-being.  
 (b) Reading published articles of reputed psychotherapists will hardly be beneficial.  
 (c) Therapists can always treat mental illness without the use of prescription drugs.  
 (d) Therapists who terminate relationship are likely to improve mental health of their patients.
- Silver is especially and repetitively savage about what he sees as the extravagant claims made for particle physics, arguing that once the proton, neutron and electron were found and their properties experimentally confirmed, the very expensive searches for ever more exotic particles, such as the Higgs Boson, were increasingly harder to justify other than by their importance to particle physicists. Most of the particles resemble ecstatic happiness: They are very short-lived and have nothing to do with everyday life. His repeated assault goes to the level of sarcasm: "Finding the Higgs Boson will be a magnificent technical and theoretical triumph. Like a great Bobby Fisher game". Of course, this is a tad unfair, even if some of the claims of its practitioners invite such assaults on their field.
- Which of the following, if true, will weaken the argument described in the passage? (2009)
- (a) All streams of new science need to undergo through a period of uncertainty and we should not criticize research in particle physics alone.  
 (b) Necessity is the mother of every invention.  
 (c) Knowledge has preceded application in all spheres of science.  
 (d) Funding agency supporting research on Higgs Boson do not mind wasting their money.

## Ch-19. Critical Reasoning

1. The passage given below is followed by four alternative summaries. Choose the option that best captures the essence of the passage. Key in the number of the option you choose as your answer.
- A major glacier in Greenland that holds enough water to raise global sea levels by half a metre has begun to crumble into the North Atlantic Ocean, scientists say. The huge Zachariae Isstrom glacier in northeast Greenland started to melt rapidly in 2012 and is now breaking up into large icebergs where the glacier meets the sea, monitoring has revealed. The calving of the glacier into chunks of floating

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4. The Yoga system is divided into two principal parts — Hatha and Raja Yoga. Hatha Yoga deals principally with the physiological part of man with a view to establish his health and train his will. The processes prescribed to arrive at this end are so difficult that only a few resolute souls go through all the stages of its practice. Many have failed and some have died in the attempt. It is therefore strongly denounced by all the philosophers. The most illustrious Shankaracharya has remarked in his treatise called Aparokshanubhuti that "the system of Hatha Yoga was intended for those whose wordly desires are not pacified or uprooted." Which one of the following, if true, most substantially strengthens the idea given in the passage? (2010)
- The percentage of people in a given ashram practising Raja Yoga is more than the percentage of people practising Hatha Yoga.
  - The number of people in a given ashram practising Raja Yoga is more than the number of people practising Hatha Yoga.
  - The number of Yoga schools teaching Raja Yoga is more than the number of Yoga schools teaching Hatha Yoga.
  - The percentage of students who have successfully learnt Raja Yoga is more than the percentage of students who have successfully learnt Hatha Yoga.
5. Hindi ought to be the official language of India. There is no reason for the government to spend money printing documents in different languages, just to cater to people who cannot read/write Hindi. The government has better ways to spend tax payers' money. People across India should read/write Hindi or learn it at the earliest. Which of the following, if true, would weaken the speaker's argument the most? (2010)
- The government currently translates official documents into more than eighteen languages.
  - Hindi is the most difficult language in the world to speak.
  - Most people who travel across India learn Hindi within five years.
  - People who are multilingual usually pay maximum taxes.
6. The Bistupur Sakchi corner needs a speed breaker. Loyola school children cross this intersection, on their way to the school, and many a times do not check out for traffic. I get to read regular reports of cars and other vehicles hitting children. I know that speed-breakers are irritating for drivers, and I know that children cannot be protected from every danger, but this is one of the worst intersections in town. There needs to be a speed-breaker so that vehicles have to slow down and the children be made safer. Which of the following arguments is used in the above passage? (2010)
- Emotive – referring to the safety of children to get people interested
  - Analogy – comparing the intersection to something dangerous
  - Statistical analysis – noting the number of children hit by vehicles
  - Personalization – telling the story of one child's near accident at the intersection
  - Attack – pointing out people who are against speed-breakers as being uncaring about children.
7. According to recent reports, CEOs of large organisations are paid more than CEOs of small organisations. It does not

seem fair that just because a CEO is heading a big organisation she/he should be paid more. CEOs' salary should be related to performance, especially growth in terms of sales and profits.

Of course, big organisations are more complex than 'the small, but all CEOs require significant amount of energy and time in managing organisations. There is no proof that CEOs of big organisations are more stressed than CEOs of small organisations. All CEOs should be paid according to their performance.

Which of the following, if true, would strengthen the speaker's argument? (2011)

- CEOs of small organisations come from good educational background.
- CEOs of big organisations are very difficult to hire.
- A few big family businesses have CEOs from within the family.
- CEOs in big organisation take much longer to reach top, as compared to their counterparts in small organisations.

8. History, if viewed as a repository not merely of anecdotes or chronology, could produce a decisive transformation in the image of science by which we are now possessed. The image has previously been drawn, even by scientists themselves, mainly from the study of finished scientific achievements as these are recorded in the classics and more recently, in the textbooks from which each new scientific generation learns to practice its trade.

Which of the following best summarises the above paragraph? (2011)

- Scientific achievements are recorded in classics and textbooks.
- Different ways of looking at history can produce altogether different knowledge.
- History of science can be inferred from finished scientific achievement.
- Textbooks may be biased.
- All of the above.

9. People repeatedly complain that they see advertisements everywhere, but advertisers should not be blamed for this. No one is forced to advertize his property - for many companies it is an important part of their income. Football teams would have much less money if they were not sponsored. And no one is forced to look at advertising - you can turn the TV off between shows, or just flick past adverts in newspapers. If you don't want to see the adverts, then just ignore them.

Which of the following statements would weaken the above argument? (2011)

- Advertisers use many devious methods to get their message across.
- Some adverts today are even being hidden in what seem like pieces of art or public information so people don't realize they are being marketed to.
- By targeting people's unconscious thoughts adverts are a form of brainwashing that take away people's freedoms to make choices.
- Ignoring something that surrounds you all the time is not easy.

10. Given below is a paragraph from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way. It might not sound like a recipe for success – but this is the

most important piece of theatre happening anywhere in the country. Some 40 years ago, director Augusto Boal began experimenting with invisible theatre – rehearsing and performing semi-improvised pieces in public spaces to the unsuspecting public. Meanwhile in the bohemian lofts of New York City, a new generation of visionaries were embedding their art ever further into the everyday. Lurking in the corner of a diner, Vito Acconci sat quietly rubbing his arm to produce a sore, while Allan Kaprow created instructions for almost unseen activities to be carried out on the streets of the city. \_\_\_\_\_

(2012)

- (a) Such theatre is not as successful as that which happens in an auditorium.
- (b) Even audiences were transformed, no longer limited to those who knew they were an audience.
- (c) In this way, theatre broke free of the auditorium, art tore itself from the gallery and the museum.
- (d) Theatre veterans are least bothered about praise or criticism.

11. Given below is a paragraph from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way. There is much to commend in this novel, a witty parable of India's changing society, yet there is much to ponder. The scales have fallen from the eyes of some Indian writers, many either living abroad, or educated there like Adiga. The home country is invariably presented as a place of brutal injustice and sordid corruption, one in which the poor are always dispossessed and victimised by their ageold enemies, the rich. Characters at the colourful extremities of society are Dickensian grotesques, Phiz sketches, adrift in a country that is lurching rapidly towards bland middle-class normality. \_\_\_\_\_ (2012)

- (a) My hunch is this is fundamentally an outsider's view and a superficial one.
- (b) There are so many alternative Indias, uncontacted and unheard which Adiga can never hope to explore.
- (c) Adiga is a genius of this age who has written a pathbreaking book.
- (d) Presenting the home country as a povertystricken place has become a means of getting cheap popularity.

12. Given below is a paragraph from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way. Warschawski describes the atrocities of the occupation—from the sack of Ramallah to the massacre in Jenin, the razing of houses and refugee camps, shooting at ambulances and hospitals, the use of Palestinian civilians as human shields— showing how each of these pushes back the boundaries of what was previously thinkable. Warschawski has the keen eye of an Israeli insider. \_\_\_\_\_ (2012)

- (a) He keenly observes the destructive movements of Palestinians and develops a powerful critique of their terrorist activities with a persuasive power drawn from his Jewish origins.
- (b) He develops a powerful critique of Israeli policies with a persuasive power drawn from his own Jewish origins.

- (c) Palestinian occupation of Israel is the subject that worries him the most, and he writes a powerful critique with a comprehensive account of massacre and plunder.
- (d) He blindly supports the Palestinian cause and even expects the U.S. to stand by an independent state for them.

13.

A paragraph is given below from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way. Twenty some years ago I took my family (wife, toddler, and infant) to the National Gallery of Art, in Washington, D.C. At one point I found myself alone, and I suddenly questioned my assumption that the toddler, my son, was with my wife, who also had the infant. As I stood in a gallery looking around for them, I saw a security guard framed in the door of an adjacent room. He was at first (as guards often are) as staid and unmoving as the statuary he was protecting. \_\_\_\_\_ (2013)

- (a) Suspecting the worst, I ran into the room and saw my son, who wasn't with my wife, swinging on the frame of a huge painting.
- (b) My eyes then moved on to the painting that I had almost become the proud owner of, Peter Paul Rubens' Daniel in the Lions' Den.
- (c) As I glanced at him again, there came a crowd streaming inside the hall which made me curious for the reason of the commotion.
- (d) Suddenly he flinched, gasped, and pointed agitatedly, horror smearing across his face.

14.

A paragraph is given below from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way. Historians have established that parts of Bangalore were inhabited since the time of the Western Ganga dynasty (AD 350 to AD 550) and played a role in the fortunes of the Chola, Hoysala and Vijaynagar empires, as the place was situated in a strategic location at the center of the South Indian peninsula. In spite of this hoary history, the founding date of the city is usually given as AD 1537 when Kempe Gowda I built a mud fort which was later fortified by Haider Ali in the 18th century. This fort was the nucleus of what is now commonly known as the "pete" area, a Bangalore that preceded the arrival of the British. With the defeat of Tipu Sultan in Srirangapatnam, the British army garrisoned itself in the vicinity of the old city area of Bangalore, thus laying the foundation of Bangalore Cantonment in the early 19th century. \_\_\_\_\_ (2013)

- (a) For a significant part of its history, Bangalore was a divided city.
- (b) Through the 19th century the Cantonment gradually expanded and acquired a distinct cultural and political salience as it was governed directly by the British.
- (c) This was the beginning of a very different Bangalore from the one that existed around the old fort.
- (d) The overwhelming influence of the British also bequeathed a particularly libertarian cultural character to the Cantonment that the conservative residents of the city both loathed and longed for at the same time.

15.

A paragraph is given below from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way. When India revised its policy with respect to foreign investment, the country's balance of payments difficulties had not been resolved. However, the presumption was that

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- foreign firms would use India as a base for world market production, earning the country vast amounts of foreign exchange. However, that expectation has been belied. (2013)
- (a) This makes the foreign exchange cost of liberalization high and its implications for India's balance of payments adverse.  
 (b) Unable to limit foreign presence as a result, the government in those years opted for regulation to reduce the cost of foreign presence.  
 (c) That experience suggested that policy favouring foreign capital partly explained India's retarded development.  
 (d) Foreign firms do not engage in export, but their principal target remains the domestic market.
16. Four sentences are given below labeled (a), (b), (c) and (d). Of these, three sentences need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the one that does not fit the sequence. (2013)
- (a) In case of a loss of coolant accident, where there is no supply of light water coolant to circulate around the core, and fuel meltdown, the highly radioactive molten fuel core will drop down into the core catcher.  
 (b) It is a huge vessel, weighing 101 tonnes and made of stainless steel.  
 (c) Extensive research was done at the Kurchatov institute in Moscow before the catcher's design and the bricks' composition were finalized.  
 (d) Another safety feature special to the reactors is the core catcher situated on the floor of the reactor building.
17. Given below are four sentences or parts of sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/are incorrect in terms of grammar and usage. Then, choose the most appropriate option. (2014)
1. Herbivores birds do not have teeth to grind up the vegetation they eat.
  2. Teeth would make their skulls too heavy and make flight difficult.
  3. Instead, a part of their digestive system, called the crop, contains stones, which grind up the plant material they eat.
  4. Some herbivores are called ruminants.
- (a) 1 & 2 (b) 1  
 (c) 2 (d) 3 & 2
18. Read the following arguments and answer the questions that follow.
- A study of the effect of language on memory was performed by Loftus and Loftus, in 1975. They showed subjects a film of a traffic accident to two groups, and then asked them questions about what they had seen. After a week, the subjects were asked about the film again. One group of subjects was asked, immediately after seeing the film, "How fast were the cars going when they hit each other?" The other group of subjects was asked, "How fast were the cars going when they smashed into each other?" When they were tested later, the subjects were asked if they had seen any broken glass in the film. (There hadn't been any.) Those subjects who had heard the word "smashed" remembered seeing broken glass scattered around after the accident. (2014)

- The findings of the study have significant relevance for
- (a) A move subscribing severe penalties for rash drivers who cause accidents amounting to culpable homicide.  
 (b) A memory-improvement course for students who score below the national average in IQ tests.  
 (c) People who are concerned about 'leading questions' in court, or in the police questioning of witnesses.  
 (d) None of the above
19. Read the following arguments and answer the questions that follow.

A letter from a Japanese ex-student to his American Professor:

Do you believe if I say that language can make a person different? What I mean is this. Now I can speak Japanese and English. When I was mainly speaking Japanese, I did not express myself much to other people. It can be because of the circumstances I had or the culture I have. Then I started speaking English and learnt how to express myself, and came to know who I was, what I was aiming for in the future ... Now I'm back in Japan and my mind has started thinking in Japanese. Again, I seem to stop expressing myself. If I tell you which part of mine I like better, I prefer me speaking in English even though my Japanese is far better than my English. (2014)

A possible explanation for the predicament could be:

- (a) the strong distinction of levels in Japanese society, which makes free communication very difficult.  
 (b) we all lack appropriate words to express ourselves.  
 (c) the Japanese ex-student did not grasp anything that he was taught within the precincts of the American classroom.  
 (d) All of the above

**DIRECTIONS for questions 20 to 23: The passage given below is followed by a set of four questions. Choose the most appropriate answer to each question.**

For as long as it has existed, fashion, being a language, has always been used as a means of communication. This very peculiar kind of communication takes place on two levels: an open one, and a hidden one. There is in fact an underlying fact, a creative value left to each individual that allows the transmission of ambiguous and equivocal messages; think of the eroticism of neglected lace, the hardness of riding boots or the provocativeness of some metal details.

If we agree that fashion is a language we should emphasize that it is a very sophisticated one and, in a way, a complementary one — a tool for articulating and supporting words rather than substituting them. And if we agree that fashion is distinct from style, we must admit that its acknowledged codes are variable. This variation can occur at different levels mainly, but not only, visually, often revamping outdated meanings. The system of constantly shifting meanings, codes and values is in fact fundamental to fashion, as we understand it in our culture. Designers know this well and they are the first to perceive signs of instability. The instabilities, ambiguities and ambivalences, described by Fred Davis in his excellent book on the subject, drive creativity to and fro between opposites such as young/old, male/ female, work/play, simplicity/complexity, revelation/ concealment, freedom/constraint, conformism/rebellion, eroticism/chastity, discretion/overstatement and so on. The field where the game of change is played is framed within couples of

constantly recurring antithetic meanings. Fashion delights us by playing on the tensions between these couples — we derive a frisson from the contradictions they suggest. We may tire of a look but whenever one of these themes returns, its freshness is restored; our fascination with them seems endless. James Carse, a professor of philosophy at New York University, and a friend of mine, in one of his books, divides the world of human relations into ‘finite and infinite games’. What is the difference? In the former case, the goal of the game is to select a winner; in the latter, it is to play the game forever. Incidentally, the latter is typical of the game of children, which were in fact the author’s chief source of inspiration. Without doubt, fashion is an infinite game, since nobody is interested in starting the ultimate trend, the final one.

Though changes in fashion correspond to macro-changes in cultures or societies, they nevertheless require human action, the work of creative people, of industry and the complicity of consumers. Fashion, after all, does not happen by accident.

The fashion industry purposefully identifies garments and accessories as indicators of social status. Historians have suggested that this has been so since the fourteenth century. Nowadays, this identification has become a carefully planned and greatly accelerated activity. In the eternal ping-pong game between antithetical meanings, the motivating force for creativity within fashion is nearly always, or often, cultural. When Chanel urged her wealthy clients to dress like their maids, she was playing on the dialectics between the rich and the poor, the high and the low status; but the reason for her attraction to these particular themes, and the reason for the fashion’s success, was her ability to intuit the predominant social tensions of the moment (in this case ideas about the uncertainties of wealth and power initiated by the economic unrest of the 1930s). **(2014)**

20. According to the passage, which of the following statements correctly describes one of the levels of communication through fashion?

- (a) The open level leads to creative value which is easily understood by everyone but is shrouded by the transmission of ambiguous and equivocal messages.
- (b) The close level leads to creative value left for the individual which needs to be properly aligned with the open level communication.
- (c) The hidden level communicates creative value which can lead to transmission of ambiguous and equivocal messages.
- (d) All of the above

21. According to the passage, what is the relevance of the distinction between fashion and style?

- (a) There can be significant variation in the fashion codes used by designers.
- (b) There is significant variation in the style codes used by designers.
- (c) Understanding the variability of fashion codes may make fashion more universal (which was achieved by Chanel).
- (d) All of the above

22. According to the passage, what is the role of contradictions, as mentioned by Fred Davis?

- (a) Designers often avoid these contradictions in order to avoid being controversial.
- (b) Designers may use these well-known contradictions in order to be more creative.

- (c) Designers may utilize these contradictions in order to specialize in a particular genre and achieve fame and recognition.
- (d) Designers often collude with fashion magazines in order to resolve these contradictions.

23. What does the author wish to convey when he states that fashion is an infinite game?

- (a) Fashion trends are numerous and cyclical.
- (b) No one in fashion talks about the ultimate trend.
- (c) Though designers believe in the ultimate trend, fashion magazines are skeptical.
- (d) The author calls fashion an infinite game based on its mass appeal.

24. The passage given below is followed by four alternative summaries. Choose the option that best captures the essence of the passage. Key in the number of the option you choose as your answer

The study of Buddhism over the past century or so has resembled the encounter of the blind men and the elephant in many ways. Students of Buddhism have tended to fasten onto a small part of the tradition and assume their conclusions held true about the whole. Often the parts they have seized on have been a little like the elephant’s tusks — a striking, but unrepresentative, part of the whole animal. As a result, many erroneous and sweeping generalizations about Buddhism have been made, such as that it is ‘negative’, ‘world-denying’, ‘pessimistic’, and so forth. Although this tendency to over generalize is now less common, it is still found in some of the older literature where authors tended to exaggerate certain features of the tradition or assume that what was true of Buddhism in one culture or historical period held good everywhere.

**(2015)**

- (a) The story of three blind men and the elephant can tell us much about Buddhism.
- (b) Buddhism has been generalized and many of its facets over-exaggerated by its perpetrators over the years.
- (c) The way the three blind men make conclusions about the elephant is analogous to how the world views Buddhism.
- (d) Authors in general are unable to grasp the nuances of Buddhism.

25. The passage given below is followed by four alternative summaries. Choose the option that best captures the essence of the passage. Key in the number of the option you choose as your answer .

Volkswagen, trying to get to the bottom of its emissions-cheating scandal, pressured employees to tell what they know, announcing an amnesty program for informants that will expire soon. The company has yet to explain publicly who was responsible for installing software in 11 million diesel vehicles that was designed to disguise the output of nitrogen oxide, a pollutant harmful to the lungs. Volkswagen also admitted that it underreported the levels of carbon dioxide produced by about 800,000 of its diesel and gasoline vehicles in Europe and that had it exaggerated their fuel economy.

**(2015)**

- (a) Volkswagen exaggerated their fuel economy and is now trying to pressurize the employees to take the blame.
- (b) Volkswagen, is pressurizing its employees to spill the beans by stating that the amnesty program will soon end.

- (c) Volkswagen has been underreporting the levels of carbon dioxide produced by its diesel and gasoline vehicles in Europe.
- (d) Volkswagen, trying to get to the bottom of its emissions cheating scandal, pressured employees to tell what they know.

## Ch-20. Reading Comprehension (Based On Social Sciences)

**DIRECTIONS (Qs. 1-15): Read the following information carefully and answer the questions that follow:**

### Passage-I

Thomas Harris' latest novel is being hailed as the long awaited sequel to *The Silence of the Lambs*, but I have never thought that novel actually needed one. It stood on its own, finished and complete. After I put that book down I did not think to ask what Hannibal was going to do next. In my opinion he had done enough. I've always preferred a novel that concludes with a few loose ends because, in life, not all problems get tied up nice and neat. There was something so frightening, so giddily uncomfortable about knowing that Hannibal "The Cannibal" was loose on an unsuspecting world. Author Harris did readers a favor by letting us all keep a little of that fear in our hearts and minds for the past 11 years.

But we became so intrigued by Hannibal, didn't we? And we wanted to see more of him. When we first met him in Harris's second novel *Red Dragon*, he was a small but important player, giving reluctant but brilliant insights into the mind of a serial killer to FBI agent Will Graham. In *The Silence of the Lambs* it was FBI cadet Clarice Starling looking for a multiple murderer and Lecter became a major and integral part of the story. And when we saw Hannibal brought to life by Anthony Hopkins in the 1991 film, we became hooked. Rarely before had we been drawn to such an evil character — one who charmed and hypnotized us with his combination of verbal gymnastics, Old World manners and awesome intellectual abilities.

But now there is Hannibal, Harris's latest novel, and this time Dr. Hannibal Lecter is the player. And like *The Silence of the Lambs*, Hannibal is finished and complete and stands on its own. Quite well in fact. In *Hannibal*, Harris plumbs the shadowy depths of Lecter's mind and throws us into the stinkingoubliette of his psyche, taking us through past — and possibly significant — remembrances. When we re-ascend, it is with a startling array of knowledge about the man. We find him fascinating, sympathetic and — despite his dietary habits and penchant for killing (and consuming) only the "rude" — a likable character. I like the well rounded character that Harris has created, even if he's somewhat outlandish, flamboyant and deeply disturbed. Hannibal loves the finer things in life: classical music, ancient literature, fine art, a tidy evisceration.

The novel's title works, not only because it is about Hannibal; it is Hannibal. And though the narration is in the third person, it speaks with his voice. It's a voice of culture and intelligence; of terror and menace. In hushed conspiratorial tones, it politely invites us to witness acts of inhuman horror and suffering. Almost —almost — making them palatable. And if not palatable, then so fascinating we find it hard to turn away. Harris does not write of these atrocities from the moral standpoint of someone who thinks the things. Hannibal does are wrong; we all know what he does is wrong. Even Hannibal knows very well what he does is wrong. He also believes he has the intellectual and moral superiority to

justify his actions, and this is Harris's triumph in the narration. We are shown things in the way Hannibal would see them through his intellectually superior and amoral eyes, and it is up to us to decide the right or wrongness of things. We also see things with an almost clinically unprejudiced and sometimes uncomfortably uncensored eye; unwavering, unblinking. Harris's prose is elegant and economic. (2010)

1. Why does the writer think that the title of the novel Hannibal works?
  - (a) The title aptly captures the most important aspect of the book.
  - (b) The author's writing style embodies characteristics of Hannibal's personality.
  - (c) The author's narrative is through the eyes of the protagonist himself and leaves moralistic judgement to the reader.
  - (d) The novel is as if it were though a narration by Hannibal himself which enables the reader to understand that Hannibal only attacks the rude.
2. Which of the following is admitted by the author in the passage?
  - (a) Hannibal's actions are morally wrong.
  - (b) Anthony Hopkins' portrayal of Hannibal increased the popularity of the series and compelled the author to write another book.
  - (c) A character with intellectual superiority and old world manners can be fascinating even if evil.
  - (d) Peeping into the mind of Hannibal makes the novel 'Hannibal' a much more interesting read than 'Silence of the lambs'.
3. Which of the following can be inferred from the passage?
  - (a) The fact that readers find a dangerous character like Hannibal fascinating reveals that morality is no longer popular with people.
  - (b) Harris had revealed enough fascinating details about Hannibal's past in the earlier novels prior to warrant a third book on the same character.
  - (c) Hannibal's love for the finer things in life makes him a fascinating character.
  - (d) Hannibal evokes sympathy from the readers due to his turbulent past, which has made him engage in horrific deeds.

### Passage-II

Founded at the dawn of the modern industrial era, the nearly forgotten Women's Trade Union League (WTUL) played an instrumental Line role in advancing the cause of working women throughout the early part of the twentieth century. In the face of considerable adversity, the WTUL made a contribution far greater than did most historical footnotes.

The organization's successes did not come easily; conflict beset the WTUL in many forms.

During those early days of American unions, organized labour was aggressively opposed by both industry and government. The WTUL, which represented a largely unskilled labour force, had little leverage against these powerful opponents. Also, because of the skill level of its workers as well as inherent societal gender bias, the WTUL had great difficulty finding allies among other unions. Even the large and powerful American Federation of Labour (AFL), which nominally took the WTUL under its wing, kept it at a distance. Because the AFL'S power stemmed from its highly skilled labour force, the organization saw little economic benefit in working with the WTUL. The affiliation provided the

AFL with political cover, allowing it to claim support for women workers; in return, the WTUL gained a potent but largely absent ally.

The WTUL also had to overcome internal discord. While the majority of the group's members were working women, a sizeable and powerful minority consisted of middle- and upperclass social reformers whose goals extended beyond labour reform. While workers argued that the WTUL should focus its efforts on collective bargaining and working conditions, the reformers looked beyond the workplace, seeking state and national legislation aimed at education reform and urban poverty relief as well as workplace issues.

Despite these obstacles, the WTUL accomplished a great deal. The organization was instrumental in the passage of state laws mandating an eight-hour workday, a minimum wage for women, and a ban on child labour. It provided seed money to women who organized workers in specific plants and industries, and also established strike funds and soup kitchens to support striking unionists. After the tragic Triangle Shirtwaist Company fire of 1911, the WTUL launched a four-year investigation whose conclusions formed the basis of much subsequent workplace safety legislation. The organization also offered a political base for all reform-minded women, and thus helped develop the next generation of American leaders. Eleanor Roosevelt was one of many prominent figures to emerge from the WTUL.

The organization began a slow death in the late 1920s, when the Great Depression choked off its funding. The organization limped through the 1940s; the death knell eventually rang in 1950, at the onset of the McCarthy era. A turn-of-the-century labour organization dedicated to social reform, one that during its heyday was regarded by many as "radical," stood little chance of weathering that storm. This humble ending, however, does nothing to diminish the accomplishments of an organization that is yet to receive its historical due.

(2010)

4. The primary purpose of this passage is to
  - (a) describe the barriers confronting women in the contemporary workplace
  - (b) call readers' attention to an overlooked contributor to American history
  - (c) critique the methods employed by an important labour union
  - (d) rebuke historians for failing to cover the women's labor movement adequately
5. Which of the following best characterizes the American Federation of Labour's view of the Women's Trade Union League, as it is presented in the passage?
  - (a) The WTUL was an important component of the AFL's multifront assault on industry and its treatment of workers.
  - (b) Because of Eleanor Roosevelt's affiliation with the organization, the WTUL was a vehicle through which the AFL could gain access to the White House.
  - (c) The WTUL was to be avoided because the radical element within it attracted unwanted government scrutiny.
  - (d) The WTUL offered the AFL some political capital but little that would assist it in labour negotiations.
6. Each of the following is cited in the passage as an accomplishment of the Women's Trade Union League EXCEPT
  - (a) It organized a highly skilled workforce to increase its bargaining power.
  - (b) It contributed to the development of a group of leaders in America.

- (c) It provided essential support to striking women.
- (d) It helped fund start-up unions for women.

### Passage-III

The function of strategic planning is to position a company for long-term growth and expansion in a variety of markets by analyzing its strengths and weaknesses and examining current and potential opportunities. Based on this information, the company develops strategy for itself. That strategy then becomes the basis for supporting strategies for its various departments.

This is where all too many strategic plans go astray—at implementation. Recent business management surveys show that most CEOs who have a strategic plan are concerned with the potential breakdown in the implementation of the plan. Unlike 1980s corporations that blindly followed their 5-year plans, even when they were misguided, today's corporations tend to second-guess.

Outsiders can help facilitate the process, but in the final analysis, if the company doesn't make the plan, the company won't follow the plan. This was one of the problems with strategic planning in the 1980s. In that era, it was an abstract, top-down process involving only a few top corporate officers and hired guns. Number crunching experts came into a company and generated tome-like volumes filled with a mixture of abstruse facts and grand theories which had little to do with the day-to-day realities of the company. Key middle managers were left out of planning sessions, resulting in lost opportunities and ruffled feelings.

However, more hands-on strategic planning can produce startling results. A recent survey queried more than a thousand small-to-medium sized businesses to compare companies with a strategic plan to companies without one. The survey found that companies with strategic plans had annual revenue growth of 6.2 percent as opposed to 3.8 percent for the other companies.

Perhaps most important, a strategic plan helps companies anticipate-and survive-change. New technology and the mobility of capital mean that markets can shift faster than ever before. Some financial analysts wonder why they should bother planning two years ahead when market dynamics might be transformed by next quarter. The fact is that it's the very pace of change that makes planning so crucial. Now, more than ever, companies have to stay alert to the marketplace. In an environment of continual and rapid change, long range planning expands options and organizational flexibility.

(2011)

7. The primary purpose of the passage is to
  - (a) refute the idea that change is bad for a corporation's long-term health
  - (b) describe how long-term planning, despite some potential pitfalls, can help a corporation to grow
  - (c) compare and contrast two styles of corporate planning
  - (d) evaluate the strategic planning goals of corporate America today
8. It can be inferred from the passage that, in general, strategic planning during the 1980s had all of the following shortcomings EXCEPT
  - (a) a reliance on outside consultants who did not necessarily understand the nuts and bolts of the business
  - (b) a dependence on theoretical models that did not always perfectly describe the workings of the company
  - (c) an inherent weakness in the company's own ability to implement the strategic plan
  - (d) an excess of information and data that made it difficult to get to key concepts
9. The author most likely mentions the results of the survey of 1,000 companies in order to

- (a) put forth an opposing view on strategic plans so that she can then refute it  
 (b) illustrate that when strategic planning is "hands-on," it produces uninspiring results  
 (c) give a concrete example of why strategic planning did not work during the 1980s  
 (d) support her contention that strategic planning when done correctly can be very successful
10. Over the last 20 years the rate of increase in total production in Workland has been second to none in the world. However, the growth is more modest when calculated per capita of total population. Over the last ten years progress has been much slower.  
 If the information above is accurate, which of the following must be true?  
 (a) Workland has a very large population.  
 (b) Productivity per capita has not grown as fast during the past ten years.  
 (c) Total production has increased faster than population growth.  
 (d) The birth rate has declined.
11. Between 1979 and 1983, the number of unincorporated business self-employed women increased five times faster than the number of self-employed men and more than three times faster than women wage-and-salary workers. Part-time self-employment among women increased more than full-time self-employment.  
 Each of the following, if true, could help to account for this trend except :  
 (a) Owning a business affords flexibility to combine work and family responsibilities.  
 (b) The proportion of women studying business administration courses has grown considerable.  
 (c) There are more self-employed women than men.  
 (d) Uninorporated service industries have grown by 300 percent over the period; the ratio of women to men in this industry is three to one.
12. There is no clear line between health and illness; it is easy to forget what it feels like to be really well and to get gradually used to often having a headache, feeling irritable, or tired. There is an unrecognized proportion of the population that has been tipped over the brink into ill health by ubiquitous contaminants.  
 Which of the following statements best describes the purpose of the above?  
 (a) The public must be encouraged to have regular medical examinations.  
 (b) The public must be warned to be aware of various physical and chemical hazards.  
 (c) The public must be warned to treat seriously such symptoms as headaches, irritability, and tiredness.  
 (d) The medical professional is not always capable of diagnosing illness.

#### Passage-IV

Deborah Mayo is a philosopher of science who has attempted to capture the implications of the new experimentalism in a philosophically rigorous way. Mayo focuses on the detailed way in which claims are validated by experiment, and is concerned with identifying just what claims are borne out and how. A key idea underlying her treatment is that a claim can only be said to be supported by experiment if the various ways in which the claim could be as fault have been investigated and eliminated. A claim can only be said to be borne out by experiment, and a severe test

of a claim, as usefully construed by Mayo, must be such that the claim would be unlikely to pass it if it were false. Her idea can be explained by some simple examples. Suppose Snell's law of refraction of light is tested by some very rough experiments in which very large margins of error are attributed to the measurements of angles of incidence and refraction, and suppose that the results are shown to be compatible with the law within those margins of error. Has the law been supported by experiments that have severely tested it? From Mayo's perspective the answer is "no", because, owing to the roughness of the measurements, the law of refraction would be quite likely to pass this test even if it were false and some other law differing not too much from Snell's law true. An exercise I carried out in my school-teaching days serves to drive this point home. My students had conducted some not very careful experiments to test Snell's law. I there presented them with some alternative laws of refraction that had been suggested in antiquity and mediaeval times, prior to the discovery of Snell's law, and invited the students to test them with the measurements they had used, to test Snell's law; because of the wide margins of error they had attributed to their measurements, all of these alternative laws pass the test. This clearly brings out the point that the experiments in question did not constitute a severe test of Snell's law. The law would have passed the test even if it were false and one of the historical alternatives true. (2011)

13. Which of the following conclusion can be drawn from the passage?  
 (a) Precise measurement is a sufficient condition to ensure validity of conclusions resulting from an experiment.  
 (b) Experimental data might support multiple theoretical explanations same time, hence validity of theories needs to be tested further.  
 (c) Precise measurement is both a necessary and sufficient condition to ensure validity of conclusions resulting from an experiment.  
 (d) Precise measurement along with experimenter's knowledge of the theory underpinning the experiment is sufficient to ensure the validity of conclusions drawn from experiments.
14. As per Mayo's perspective, which of the following best defines the phrase "scientific explanation"?  
 (a) One which is most detailed in its explanation of natural phenomena.  
 (b) One which survives examinations better than other explanations.  
 (c) One which has been thoroughly tested by scientific experts.  
 (d) One which refutes other explanations convincingly.
15. The author's use of Snell's law of refraction to illustrate Mayo's perspective can best be said to be  
 (a) Contrived (b) Premeditated  
 (c) Superfluous (d) Illustrative

**DIRECTIONS for Questions 16 to 18: The passage given below is followed by a set of questions. Choose the most appropriate answer to each question.**

Ask anyone on the street: "what is Romanticism?" and you will certainly receive some kind of reply. Everyone claims to know the meaning of the word romantic. The word conveys notions of sentiment and sentimentality, a visionary or idealistic lack of reality. It connotes fantasy and fiction. It has been associated with different times and with distant places: the island of Bali, the world of the Arabian Nights, the age of the troubadours and even

Manhattan. Advertising links it with the effects of lipstick, perfume and soap. If we could ask the advertising genius who, fifty years ago came up with the brilliant cigarette campaign, "blow some my way," he may have responded with "it's romantic."

These meanings cause few problems in every day life — indeed, few of us wonder about the meaning of Romanticism at all. Yet we use the expression freely and casually ("a romantic, candle-lit dinner"). But literary historians and critics as well as European historians have been quarreling over the meaning of the word Romanticism for decades. One of the problems is that the Romantics were liberals and conservatives, revolutionaries and reactionaries. Some were preoccupied with God; others were atheistic to the core. Some began their lives as devout Catholics, lived as ardent revolutionaries and died as staunch conservatives. The expression Romantic gained currency during its own time, roughly 1780-1850. However, even within its own period of existence, few Romantics would have agreed on a general meaning. Perhaps this tells us something. To speak of a Romantic era is to identify a period in which certain ideas and attitudes arose, gained currency and in most areas of intellectual endeavor, became dominant. That is, they became the dominant mode of expression. Which tells us something else about the Romantics: expression was perhaps everything to them — expression in art, music, poetry, drama, literature and philosophy. Just the same, older ideas did not simply wither away. Romantic ideas arose both as implicit and explicit criticisms of 18th century Enlightenment thought. For the most part, these ideas were generated by a sense of inadequacy with the dominant ideals of the Enlightenment and of the society that produced them.

Romanticism appeared in conflict with the Enlightenment. You could go as far as to say that Romanticism reflected a crisis in Enlightenment thought itself, a crisis which shook the comfortable 18th century *philosophe* out of his intellectual single-mindedness. The Romantics were conscious of their unique destiny. In fact, it was selfconsciousness which appears as one of the keys elements of Romanticism itself.

The *philosophes* were too objective — they chose to see human nature as something uniform. The *philosophes* had also attacked the Church because it blocked human reason. The Romantics attacked the Enlightenment because it blocked the free play of the emotions and creativity. The *philosophe* had turned man into a soulless, thinking machine — a robot. In a comment typical of the Romantic thrust, William Hazlitt (1778-1830) asked, "For the better part of my life all I did was think." And William Godwin (1756-1836), a contemporary of Hazlitt's asked, "what shall I do when I have read all the books?"

Christianity had formed a matrix into which medieval man situated himself. The Enlightenment replaced the Christian matrix with the mechanical matrix of Newtonian natural philosophy. For the Romantic, the result was nothing less than the demotion of the individual. Imagination, sensitivity, feelings, spontaneity and freedom were stifled — choked to death. Man must liberate himself from these intellectual chains. **(2012)**

16. How does the author use the arguments of the *philosophes* and the Romantics attacking the church for different reasons to make a point regarding the Romantics' problem with the *philosophes*?
- By mentioning how both opposed the same thing — the Church's treatment of human beings as being uniform.
  - By talking about how both opposed the Church on different grounds, which in the end were quite similar.
- (c) By quoting the views of the leaders of the Romantics and the *philosophes* and showing how they actually meant the same thing.
- (d) By showing how one fought for logic and the other for sentiments thereby proving the Romantics' support of the spirit opposing dependence on rationality.
17. What specific instance of the Romantics' selfconsciousness is mentioned by the author in the passage?
- The author talks of their acceptance of emotions and sentimentality, all of which is possible only in a faith that is about self-consciousness.
  - The author mentions the Romantics' insistence on ideas and concepts, which is the best expression of self-consciousness.
  - The author talks about the Romantics' consciousness of their ordinance nonpareil.
  - The author points out the anomalies between the Romantics and their *philosophes* where selfconsciousness is mentioned.
18. What makes the author deduce "for the Romantics, expression was everything"?
- Passion was important to the Romantics.
  - The Romantics opposed Enlightenment and objectivity.
  - The existence of atheism in the Romantics.
  - The romantics could not be submissive.

**DIRECTIONS for Questions 19 to 22: The passage given below is followed by a set of questions. Choose the most appropriate answer to each question.**

In the 1950 movie *All About Eve*, the theatre critic is a dapper, cynical charmer with the Old World moniker Addison DeWitt. He's no hero, but his wry assessments can make or break a production. Characters repeat his phrases throughout the film, in both scornful and reverent tones.

Almost a half-century later, the television show *The Critic* presented an animated schlemiel, paunchy and balding, voiced by the nerdy comic endomorph Jon Lovitz. This character's influence on the world in which he lives is nonexistent: His impact comes down to serving as the butt of jokes.

Does this series tell us something about the way the world view those who make cultural judgments for a living? In the decade since that show's run, many critics report, they've gotten even less respect. Or ceased to matter entirely.

"You get arts journalists together these days," says Doug McLennan, editor of Arts Journal.com and a longtime Seattle music writer, "and it's what they talk about: their declining influence. They say Frank Rich was the last critic who could close a show." Most remember when *Time* and *Newsweek* had full rosters of arts critics.

What happened? Besides the Internet and its rash of blogs, suspected culprits include the culture of celebrity, anti-intellectual populism, stingy newspaper owners and what some critics say is a loss of vitality or visibility in their art forms. While many lament the situation, some think the decentralization of authority means the arts — and the conversation around them — will flourish without these stern, doctrinaire figures.

The nonprofit arts, with their limited marketing budgets, have typically depended more on criticism than the promotion-driven world of entertainment, which is sometimes called "critic-proof." But as late as the 1970s, the feisty Pauline Kael was spurring American outlaw filmmakers toward their most daring work.

But it's less common, critics say, for one of their kind to draw an audience's attention to an overlooked work. Some arts critics, such as Peter Schjeldahl of the *New Yorker*, Charles Rosen of the *New York Review of Books* and former *Time* critic Robert Hughes, continue to do this.

Part of the problem seems to be the general tarnishing of the press in recent years. "Two decades ago," concludes "Trends 2005," a Pew Research Center study, "just 16 per cent of readers said they could believe little or nothing of what they read in their daily paper; in the most recent survey, that number nearly tripled, to 45 per cent."

Dave Hickey, an art critic best known for the book *Air Guitar: Essays on Art & Democracy*, doesn't think the Internet is the problem. "But I do think that we're over," he says. "Being an art critic was one of those jobs like night-time disk jockey or sewing machine repairman: It was a one- or two-generation job."

For Hickey, art criticism lost its lustre and excitement the same time art did. "There was a sense that things had a forward tilt," he says of American art after World War II, when it seemed to be moving toward a consummation. "Jackson Pollock changed the way the world looked, Andy Warhol changed the way the world looked."

But the high couldn't last forever, and the power went to the curators.

"I'm like Wolfman Jack," Hickey groans. "The times have passed me by." **(2012)**

19. It can be inferred from the passage that the world of entertainment is less dependent now on the critics because
  - (a) the audience does not pay heed to critics.
  - (b) their big marketing budgets get people interested irrespective of the reviews.
  - (c) they draw people courtesy the star power which is unaffected by criticism.
  - (d) one failure does not end an entertainment empire.
20. By citing the example of Charles Rosen, what aspect of a critic's personality is being highlighted by the author?
  - (a) Controversial and opinionated
  - (b) Capricious
  - (c) One who draws attention towards a work which is not so well-known
  - (d) Wine connoisseurs who want to seek the advice of a critic
21. What is the author trying to prove by mentioning: "*Characters repeat his phrases throughout the film, in both scornful and reverent tones*" while talking about the critic?
  - (a) Even films acknowledged the important role of a critic.
  - (b) People loved him or hated him, but they could not ignore him.
  - (c) Films in earlier times tried to get favourable reviews by creating characters who were critics.
  - (d) The critic was seen as a multidimensional individual in the earlier times.
22. What is Hickey trying to say by calling art criticism "a one – or two – generation job"?
  - (a) It can be done by only one generation in a family unlike law
  - (b) The industry he was involved in was vibrant for only a few decades
  - (c) Such jobs only capture the fancy of one or two generations
  - (d) Every generation has a different approach towards it

**DIRECTIONS (Qs. 23-25) : The passage given below is followed by a set of questions. Choose the most appropriate answer to each question.**

It's argued that retribution is used in a unique way in the case of the death penalty. Crimes other than murder do not receive a punishment that mimics the crime - for example rapists are not punished by sexual assault and people guilty of assault are not ceremonially beaten up. Camus and Dostoevsky argued that the retribution in the case of the death penalty was not fair, because the anticipatory suffering of the criminal before execution would probably outweigh the anticipatory suffering of the victim of their crime. Others argue that the retribution argument is flawed because the death penalty delivers a 'double punishment'; that of the execution and the preceding wait, and this is a mismatch to the crime.

Many offenders are kept 'waiting' on death row for a very long time; in the USA the average wait is 10 years. In Japan, the accused are only informed of their execution moments before it is scheduled. The result of this is that each day of their life is lived as if it was their last.

Some lawyers argue that capital punishment is not really used as retribution for murder, or even consistently for a particular kind of murder. They argue that, in the USA at least, only a small minority of murderers is actually executed, and that imposition of capital punishment on a "capriciously selected random handful" of offenders does not amount to a consistent programme of retribution. Since capital punishment is not operated retributively, it is inappropriate to use retribution to justify capital punishment. This argument would have no value in a society that applied the death penalty consistently for particular types of murder.

Some people who believe in the notion of retribution are against capital punishment because they feel the death penalty provides insufficient retribution. They argue that life imprisonment without possibility of parole causes much more suffering to the offender than a painless death after a short period of imprisonment.

The death penalty doesn't seem to deter people from committing serious violent crimes. The thing that deters is the likelihood of being caught and punished. The general consensus among social scientists is that the deterrent effect of the death penalty is at best unproven. **(2013)**

23. Which of the following options presents the main idea of the given passage?
  - (a) The death penalty itself does not serve its purpose of retribution for heinous crimes and neither does it act as a means of deterrence.
  - (b) The use of the death penalty as a means of retribution needs to be reconsidered as it fails to serve its purpose.
  - (c) The argument of retribution in the favour of death penalty is flawed as it amounts to a punishment not matching the crime, owing to the anticipatory suffering of the guilty.
  - (d) Capital punishment as a just means of retribution and as a deterrent is debatable.
24. Which of the following has not been mentioned as an argument against capital punishment?
  - A. It may not be retribution enough.
  - B. It can be misused to punish the innocent.
  - C. As a punishment, it may not match the crime committed.
  - D. No other crime, apart from murder, receives a punishment that mimics the crime.
  - (a) A and B
  - (b) Only B
  - (c) Only C
  - (d) C and D

25. Why does the author state that retribution in the case of the death penalty is unique?
- Barring cases of murder, the death penalty does not deliver punishment that is similar to the crime.
  - The punishment mirrors the crime, unlike in crimes other than murder.
  - It brings with it an anticipatory suffering that was in all probability absent in the case of the victim of the crime.
  - The death penalty leaves no opportunity for remorse in the case of the criminal.

**DIRECTIONS for questions 26 to 29: The passage given below is followed by a set of four questions. Choose the most appropriate answer to each question.**

You see, society feels that it must control or discipline the citizen, shape his mind according to certain religious, social, moral and economic patterns. One of our most difficult problems is what we call discipline, and it is really very complex. Now, is discipline necessary at all? Most of us feel, especially while we are young, that there should be no discipline, that we should be allowed to do whatever we like, and we think that is freedom. But merely to say that we should or should not have discipline, that we should be free, and so on, has very little meaning without understanding the whole problem of discipline. The keen athlete is disciplining himself all the time, is he not? His joy in playing games and the very necessity to keep fit makes him go to bed early, refrain from smoking, eat the right food and generally observe the rules of good health. His discipline is not an imposition or a conflict, but a natural outcome of his enjoyment of athletics.

Now, does discipline increase or decrease human energy? Human beings throughout the world, in every religion, in every school of thought, impose discipline on the mind, which implies control, resistance, adjustment, suppression; and is all this necessary? If discipline brings about a greater output of human energy, then it is worth while, then it has meaning; but if it merely suppresses human energy, it is very harmful and destructive. All of us have energy, and the question is whether through discipline that energy can be made vital, rich and abundant, or whether discipline destroys whatever energy we have. I think this is the central issue. Many human beings do not have a great deal of energy, and what little energy they have is soon smothered and destroyed by the controls, threats and taboos of their particular society with its so-called education; so they become imitative, lifeless citizens of that society. And does discipline give increased energy to the individual who has a little more to begin with? Does it make his life rich and full of vitality?

When you are very young, as you all are, you are full of energy, are you not? You want to play, to rush about, to talk — you can't sit still, you are full of life. Then what happens? As you grow up, your teachers begin to curtail that energy by shaping it, directing it into various moulds; and when at last you become men and women, the little energy you have left is soon smothered by society, which says that you must be proper citizens, you must behave in a certain way. Through so-called education and the compulsion of society, this abounding energy you have when you are young is gradually destroyed.

Now, can the energy you have at present be made more vital through discipline? If you have only a little energy, can discipline increase it? If it can, then discipline has meaning; but if discipline really destroys one's energy, then discipline must obviously be put aside.

What is this energy which we all have? This energy is thinking, feeling; it is interest, enthusiasm, greed, passion, lust, ambition, and hate. Painting pictures, inventing machines, building bridges, making roads, cultivating the fields, playing games, writing poems, singing, dancing, going to the temple, worshipping — these are all expressions of energy; and energy also creates illusion, mischief and misery. The very finest and the most destructive qualities are equally the expressions of human energy. But, you see, the process of controlling or disciplining this energy and letting it out in one direction and restricting it in another becomes merely a social convenience; the mind is shaped according to the pattern of a particular culture, and thereby its energy is gradually dissipated.

So, our problem is, can this energy, which in one degree or another we all possess, be increased, given greater vitality — and if so, to do what?

What is energy for? Is it the purpose of energy to make war? Is it to invent jet planes and innumerable other machines, to pursue some guru, to pass examinations, to have children, to worry endlessly over this problem and that? Or can energy be used in a different way so that all our activities have significance in relation to something which transcends them all? Surely, if the human mind, which is capable of such astonishing energy, is not seeking reality or God, then every expression of its energy becomes a means of destruction and misery. To seek reality requires immense energy; and if man is not doing that, he dissipates his energy in ways which create mischief, and therefore society has to control him. Now, is it possible to liberate energy in seeking God or truth and, in the process of discovering what is true, to be a citizen who understands the fundamental issues of life and whom society cannot destroy? Are you following this, or is it a little bit too complex? You see, man is energy, and if man does not seek truth, this energy becomes destructive; therefore society controls and shapes the individual, which smothers this energy. That is what has happened to the majority of grown-up people all over the world. And perhaps you have noticed another interesting and very simple fact: that the moment you really want to do something, you have the energy to do it. What happens when you are keen to play a game? You immediately have energy, do you not? And that very energy becomes the means of controlling itself, so you don't need outside discipline. In the search for reality, energy creates its own discipline. The man who is seeking reality spontaneously becomes the right kind of citizen, which is not according to the pattern of any particular society or government.

(2014)

- The athlete's example proves that
  - When discipline is in-born, we enjoy it.
  - Games generate discipline naturally.
  - When one really enjoys doing something, discipline will follow as a natural outcome.
  - Athletes do not need the imposition of discipline, they are naturally disciplined.
- As per the passage, the general effect of education is
  - An organized society
  - Destruction of energy
  - Resistance and suppression
  - one of the above
- The author believes that controlling discipline is
  - Merely a social gimmick
  - Merely a social convenience at the cost of human potential
  - A necessary evil
  - Completely undesirable

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29. According to the author, energy is  
 (a) Greed (b) Lust  
 (c) Enthusiasm (d) All of the above

**DIRECTIONS (Qs. 30-32) :** The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

Hundreds of protesters gathered outside Downing Street Thursday to protest David Cameron's invitation to Egyptian President Abdel Fattah el-Sisi. Seven people were arrested during Thursday's demonstration, including two people for assault. Five others were arrested after holding a "die-in" to block the Egyptian president from entering No. 10, Metropolitan police told BuzzFeed News. All seven are still being held by police officers, BuzzFeed News has been told.

Sisi arrived in London on Wednesday night and met Thursday with Cameron and senior members of the cabinet. He is also expected to meet defence secretary Michael Fallon later today to discuss issues surrounding regional security and counterterrorism.

At a press conference held in Downing Street on Thursday afternoon, both Sisi and Cameron stated that security services were doing all they could to ensure the security of tourists in the Egyptian resort of Sharm el Sheikh. Cameron also said that the UK and Egypt would work together in ensuring the safety of British tourists. "We are working intensively together in the spirit of close cooperation and I'm immensely grateful for all the efforts the Egyptian authorities have made so far," Cameron said. Sisi claimed that the British government had been satisfied with Egyptian airport security when it requested information 10 months ago, but asserted that Egypt was "completely ready to co-operate with all of our friends" to strengthen security.

Sisi's Downing Street invitation has been highly criticised by activists who accuse the British government of ignoring human rights concerns regarding the Egyptian regime, in particular the death of over 800 people at the hands of Egyptian military forces in Ra'baa in 2013.

On Wednesday night, a number of Egyptian activists addressed a crowd of protesters. Among those who spoke were the sisters of Ibrahim Halawa, a 19-year-old Irish man who has been held in an Egyptian prison since 2013 for participating in the Ra'baa protests against the regime. Human rights groups such as Amnesty International and Human Rights Watch have urged the British government to confront Sisi on human rights issues.

"David Cameron needs to show that he's got what it takes to stand up to repressive leaders not just give them a handshake and a grand tour of No. 10," Amnesty International's Egypt researcher, Nicholas Piachaud, told the *IB Times*. "That means raising serious human rights concerns including the repressive laws which are putting peaceful protesters behind bars."

David Mepham, UK director at Human Rights Watch, said the British government should show its "support for an international inquiry into grave crimes committed by the Egyptian security forces" and call for the release of prisoners arrested "solely for peaceful protest or their political or religious sympathies". **(2015)**

30. Which of the following statements states the main idea of this passage appropriately?  
 (a) Press, media and people did not very well take to the idea of David Cameron inviting the Egyptian President as an act of socio-political friendliness.  
 (b) The visit of the Egyptian President Sisi was as controversial as it was necessary and opened multiple

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- discussions on whether it was the best course of action by Cameron.  
 (c) Whenever there is some terroristic activity involved, the nations concerned are always under pressure to rectify the political tension by extending friendly invitations as is the case for the UK and Egypt.  
 (d) The proposed and realized visit of the Egyptian President Sisi to the UK was an event marked with concern and hope on behalf of both the host country and the home country of the invitee because of recent unrest.

31. In the given context, what is the role that para 4 plays in shedding some light on the relationship between the UK and Egypt?

- (a) Para 4 acts as a stamp of good intent and positive outlook on parts of both Cameron and Sisi as they state their motivations in trying to reconcile the differences created between the two nations.  
 (b) Para 4 is a connecting link between the invitation extended by Cameron and the positive response from Sisi, which in turn reflects well on both parties as they shake hands.  
 (c) Para 4 is an attempt to prove that both Cameron and Sisi have only the best intentions for their respective countries' benefit as they come together to forget past disasters.  
 (d) Just like Germany has done for Greece and the US has for Iraq, the UK is now doing the same for Egypt by extending a friendly hand when the latter needs one the most.

32. Based on the information furnished in the passage above, all of the following statements are correct EXCEPT

- (a) David Cameron and President Sisi have met at least once to discuss the political-military unrest caused by events in 2013.  
 (b) There were protestations and exhibition of disagreement and dislike amongst people at the venue of Sisi's proposed visit and there were security measures required.  
 (c) The demonstrations by Halawa's family were supported by Human Rights Watch and Amnesty International as a sign of their allegiance to the Ra'baa victims.  
 (d) There has been insistence following the Ra'baa events to question the Egyptian forces on their past acts of unjustified violence against peaceful protestors.

**DIRECTIONS (Qs. 33-35) :** The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

People in monogamous relationships catch sexually transmitted diseases just as often as those in open relationships, a new survey suggests, largely due to infidelity spreading infections.

Reported in the current *Journal of Sexual Medicine*, the survey of 554 people found that monogamous couples are less likely to use condoms and get tested for STDs — even when they're not being faithful to their partner.

"It turns out that when monogamous people cheat, they don't seem to be very good about using condoms," Justin Lehmiller, a psychologist at Ball State University and author of the study, told Fox News by email. "People in open relationships seem to take a lot of precautions to reduce their sexual health risks."

The finding matters because people who think they are in monogamous relationships may face higher odds of an infection than they suspect, Lehmiller and other researchers told Fox News. And a stigma around open relationships that views such couples as irresponsible — even among researchers who conduct studies — may be skewing the evidence.

One in four of the 351 monogamous-relationship participants in Lehmiller's survey said they had cheated on their partners, similar to rates of sexual infidelity reported in other surveys. About 1 in 5, whether monogamous or not, reported they had been diagnosed with an STD. Participants averaged between 26 to 27 years old, and most (70%) were women.

For people in supposedly exclusive relationships, Lehmiller said, "this risk is compounded by the fact that cheaters are less likely to get tested for (STDs), so when they pick something up, they are probably less likely to find out about it before passing it along."

Psychologist Terri Conley of the University of Michigan told Fox News that the survey results echoed her team's findings in a 2012 *Journal of Sexual Medicine* study that found people in open relationships were more likely to use condoms correctly in sexual encounters than people in exclusive relationships.

To bolster confidence in the results, Conley said, more funding is needed to test research subjects for STDs directly, rather than relying on their own notoriously unreliable self-reporting of infections.

She compared just assuming that monogamous relationships are safer to assuming abstinence education will really stop teenagers from having sex: "Sure, abstinence would be great, but we know that isn't reality."

To put it another way, Lehmiller said, "There's a potential danger in monogamy in that if your partner puts you at risk by cheating, you're unlikely to find out until it's too late."

In a commentary on Lehmiller's study in *Journal of Sexual Medicine*, Conley argued that sex researchers are "committed to the belief that monogamy is best" and are "reluctant to consider contradictory evidence."

"I'm not saying monogamy is bad," Conley said. "What I found is that the level of hostility among reviewers to suggesting people in consensual non-monogamous relationships are more responsible is really over the top."

Conley said she initially struggled to publish her 2012 study. When she changed the framing of its conclusion to find that "cheaters" in monogamous relationships were more irresponsible, the study was suddenly published.

"Even in a scientific review process, challenging researchers' preconceived notions is perilous," she wrote in her commentary.

Other relationship researchers disagree, however, saying that sociologists have cast shade on monogamy — finding declines in happiness, sexual satisfaction, and frequency of intercourse — for decades. "This is about as widespread a finding as one gets," Harry Reis, a psychologist at the University of Rochester, told Fox News. He called the idea that social scientists are biased against studies showing the value of non-monogamous relationships was "poppycock." **(2015)**

33. Which of the following options can most appropriately continue the passage?

- (a) Sex researcher Debbie Herbenick of Indiana University echoed this view, saying funding is not an issue: "I've never seen much negative reaction or pushback."

(b) More critically, Reis said, reviewers might be dubious about the data collected on open relationships, given their relative rarity making reliable data collection difficult.

(c) Although Lehmiller published his study, he agreed with Conley that a stigma still marks open relationships, even in science.

(d) "People, including many sex researchers," he said, "have a tendency to put monogamy on a pedestal and to be very judgmental when it comes to consensual non-monogamy."

34. From the statements given below, choose the one that can be easily inferred from the lines 'Conley said...suddenly published'. (lines 39-41)

(a) People in monogamous relationships tend to be defensive about their cheating habits and hence will do everything they can to avoid being exposed.

(b) Scientific studies often have difficulty obtaining validation when they feature issues concerning people's private lives and sexual behaviour.

(c) Conley's research put at risk the non-monogamous relationship status of those researchers who otherwise touted their status as monogamous and faithful partners.

(d) Conley faced difficulty in publishing her research because she was challenging the preconceived and well-defended notion that monogamous relationships are preferable.

35. How does the author use the word 'stigma' in the fourth paragraph?

(a) A pessimistic opinion

(b) A mark of disgrace or infamy

(c) A negative reputation

(d) A sense of notoriety

**DIRECTIONS (Qs. 36-41) : The passage given below is followed by a set of six questions. Choose the most appropriate answer to each question.**

Did you know that the Impressionists favored the elimination of the color black from their painter's palette? According to Wilkins et al, Impressionism encouraged this:

"The new color theory emphasized the presence of color within shadows and, in asserting that there was no black in nature, inspired the Impressionists to ban black from their palette."

The founder of Impressionism is Claude Monet (1840-1926), a French painter born in Paris. He was a close associate of the French painter, Edouard Manet, who helped art move away from Realism in the nineteenth century. Monet served along with fellow artist Edgar Degas and author Emile Zola as a pall bearer at Manet's funeral in 1883. Degas later created ballet scenes including 1874's *Ballet Rehearsal* which showed some qualities of Impressionism.

Early in his career, Monet created a style of painting that focused on the light in the shadows. This study of natural light is the focus of his landmark painting, *Impression – Sunrise*, completed in 1872. This work is the source of the term "Impressionism." *Impression – Sunrise* is full of powerful shades of blue, gray, and orange, and a few fishermen in small boats float in the foreground as the sun rises at the top of the painting.

Art historians note that Impressionist paintings such as *Impression – Sunrise* were rejected by the Paris Salon, leading the painters to hold their own autonomous shows. Monet first exhibited this work in Paris in 1874 in a non- Salon-approved

exhibition. Honour and Fleming note that the independent exhibitions by the Impressionists showed how the artists were trying to escape the "tyranny of the official art-world." In other words, if an artist could not get accepted by the Salon, he or she would have no method of becoming a professional artist in France.

Monet contributed many other paintings to the art world over the remainder of his career. He consistently explored how the human eye sees landscapes or scenes in the outdoors. He wanted to capture real events and watch how they related to the light. In *Gare St.-Lazare* (1877), Monet showed that a Paris train station could be the center point of the natural light shining through the glass roof on a sunny day.

The Impressionists also painted "a typically middle-class vision of happiness" in keeping with their bourgeois backgrounds, according to Honour and Fleming. The authors use the example of Monet's sketch for *The Picnic* which predates *Impression – Sunrise* by six years. It was never finished, but it shows middle-class ladies and gentleman at a picnic beneath a beautiful canopy of trees.

As the founder of this a new style of painting, Monet left a huge mark on the art worlds of the 19th and 20th centuries. He died of lung cancer in 1926 and was buried at the church in Giverny, France. **(2015)**

36. Why did the Impressionists favor the elimination of the color black from their painter's palette?
- There is no black in nature.
  - Black is the colour of shadows and not of real things.
  - There exists colour in everything, even shadows.
  - They wanted to imitate nature in minute detail.
37. What was the most significant contribution of Manet to art?
- He helped art to move away from Realism and towards Impressionism.
  - He influenced art towards newer movements in techniques.
  - He helped artists in breaking away from influence of Realism.
  - Cannot be determined from the passage
38. Which of the following is true of Impressionism?
- It received its name from a painting of Monet.
  - It is a study of light in shadows.
  - In its early stage, it was rejected by the Paris Salon.
  - A and B (b) B and C  
(c) C and A (d) A, B and C
39. The passage is most likely
- an article on Monet
  - an article on impressionist art
  - an article on impressionist artists
  - an article on movement of art from Realism to Impressionism
40. What does the author mean by 'a typically middleclass vision of happiness'?
- depiction of a middle class family
  - depiction of middle class people having a good time
  - depiction of normal ladies and gentleman in everyday scenarios
  - depiction of the normality of a middle class life
41. Which of the following was/were artists' attempt(s) to escape the tyranny of the official art-world?
- Holding independent art shows
  - Creating painting that were not commissioned
  - Holding non-Salon-approved exhibition
  - All of the given

**DIRECTIONS for questions 42 to 45: Read the following passage and answer the questions that follow it.**

Organic food is a two-billion pound industry grown fat on the back of celebrity endorsement and a well-heeled middle class seduced by claims that it is good for health. Prince Charles is one of its most enthusiastic and pro-active promoters. Not content with simply consuming it, he has his own lucrative line in overpriced organic products including biscuits which taste more like chalk.

But now questions are being raised about some of the basic assumptions that have contributed to the popularity of organic food and the phenomenal growth of this sector in the past decade. People are asking: is organic food really worth the price which is often three times more than that of normal food?

This follows new research by a group of British scientists who found that organic food offered no extra benefit over the ordinary cheaper foodstuff. In a controversial report, experts from the

London School of Hygiene and Tropical Medicine say there is no evidence that organic food is more nutritional or healthier than food produced using fertilizers. For example, the expensive free-range chicken (sold as a "premium" product) has the same nutritional value as the factory-farmed chicken; and similarly, there is no difference between organic and non-organic vegetables or dairy produce.

The research, based on data published over the past 50 years and said to be the most comprehensive review ever of the relative benefits of organic food, strikes at the very heart of what has been portrayed by campaigners as its USP that it is healthier than conventional food and therefore worth paying a "bit" extra.

Dr. Alan Dangour, who led the study, was unambiguous in rejecting claims made for organic food. "Looking at all of the studies published in the last 50 years, we have concluded that there's no good evidence that consumption of organic food is beneficial to health based on the nutrient content," he said.

The report, commissioned by the government's Food Standards Agency and published in the *American Journal of Clinical Nutrition*, concluded that "organically and conventionally produced crops and livestock products are broadly comparable in their nutrient content." A "small number of differences" were noted but these were "unlikely to be of any public health relevance."

In a pointed reference to the hype over the supposed benefits of organic food, the FSA said the research was aimed at helping people make "informed choices" about what they ate. In other words, it was concerned that the high-profile campaign for organic food, dressed up as an ethical issue, was preventing people from making "informed choices" and they were being sold things on false premises.

"Ensuring people have accurate information is absolutely essential in allowing us all to more informed choices about the food we eat. This study does not mean that people should not eat organic food. What it shows is that there is little, if any, nutritional difference between organic and conventionally produced food and that there is no evidence of additional health benefits from eating organic food," said Gill Fine, FSA's Director of Consumer Choice and Dietary Health.

In the organic food circles, the report has caused fury with campaigners alleging that it is all part of a "cancerous conspiracy" to defame the organic food movement. Newspapers have been full of angry letters denouncing the report as "selective," "misleading" and "limited."

The Soil Association, which campaigns for "planetfriendly organic food and farming," is furious that the research crucially

ignored the presence of higher pesticide residues in conventional food. Some have defended organic food arguing that it is not about health alone but also involves wider environmental and social issues.

However, even those who agree that the report may be "flawed" in some respects believe that it is an important contribution to the debate on organic food.

"Yet the report-for all its alleged flaws-is an important one. For a start, it is certainly not the work of dogmatic and intractably hostile opponents of the causeD In fact, it raises key global issuesD After all, if organic food is no more beneficial in terms of nutrition than other,standard foodstuffs, why should we pay excessive price to eat the stuff? Why devote more land to its production," asked Robin McKie, Science Editor of The Observer.

There is also a view that the fad for organic food is a bit of a class thing-something to do with the idea that if something is expensive it is also good. So, a Marks & Spencer cheese sandwich is supposed to taste better than a similar sandwich at Subway next door; everything at Harrods is out of this world; and similarly you don't know what you are missing if organic food is not your preferred choice. There is said to be a whiff of snobbery about buying into an expensive lifestyle choice. Will science bring them down to earth? (2016)

42. All of the following are the author's views on organic food EXCEPT
- It is insipid
  - It is very costly
  - It is not more nutritious than conventional food
  - It is patronized by the rich
43. Which of the following factors/aspects, related to organic food, has the result of the FSA study primarily called into question?
- The nutritional value
  - The health benefits
  - The celebrity endorsement
  - The presence of pesticides
44. According to the passage, defenders of organic food are of the opinion that the FSA study
- Is not representative and scientific
  - Has been promoted by those who have vested interest in conventional food.
  - Is flawed and has been projected as ethical issue
  - Is not balanced and has not taken a comprehensive view of the issue
45. In this passage, the author essentially
- Analyses the pros and cons of promoting organic food
  - Debunks the findings of a study on organic food
  - Reports the findings of a research on organic food and checks the veracity of its claim
  - Discusses the debate, which has followed the findings of a study on organic food.

**DIRECTIONS (Qs. 46-58): Read the information carefully and answer the questions that follow.**

#### Passage-I

Why are we here? Where did we come from? The answer generally given was that humans were of comparatively recent origin, because it must have been obvious, even at early times, that the human race was improving in knowledge and technology. So it can't have been around that long, or it would have progressed even more. For example, according to Bishop Usher, the Book of

Genesis placed the creation of the world at 9 in the morning on October the 27th, 4,004 BC. On the other hand, the physical surroundings, like mountains and rivers, change very little in a human lifetime. They were therefore thought to be a constant background, and either to have existed forever as an empty landscape, or to have been created at the same time as the humans. Not everyone, however, was happy with the idea that the universe had a beginning.

For example, Aristotle, the most famous of the Greek philosophers, believed the universe had existed forever. Something eternal is more perfect than something created. He suggested the reason we see progress was that floods, or other natural disasters, had repeatedly set civilization back to the beginning. The motivation for believing in an eternal universe was the desire to avoid invoking divine intervention to create the universe and set it going. Conversely, those who believed the universe had a beginning, used it as an argument for the existence of God as the first cause, or prime mover, of the universe.

If one believed that the universe had a beginning, the obvious question was what happened before the beginning? What was God doing before He made the world? Was He preparing Hell for people who asked such questions? The problem of whether or not the universe had a beginning was a great concern to the German philosopher, Immanuel Kant. He felt there were logical contradictions, or antimonies, either way. If the universe had a beginning, why did it wait an infinite time before it began? He called that the thesis. On the other hand, if the universe had existed forever, why did it take an infinite time to reach the present stage? He called that the antithesis. Both the thesis and the antithesis depended on Kant's assumption, along with almost everyone else, that time was Absolute. That is to say, it went from the infinite past to the infinite future, independently of any universe that might or might not exist in this background. This is still the picture in the mind of many scientists today.

However in 1915, Einstein introduced his revolutionary General Theory of Relativity. In this, space and time were no longer Absolute, no longer a fixed background to events. Instead, they were dynamical quantities that were shaped by the matter and energy in the universe. They were defined only within the universe, so it made no sense to talk of a time before the universe began. It would be like asking for a point south of the South Pole. It is not defined. If the universe was essentially unchanging in time, as was generally assumed before the 1920s, there would be no reason that time should not be defined arbitrarily far back. Any so called beginning of the universe would be artificial, in the sense that one could extend the history back to earlier times. Thus it might be that the universe was created last year, but with all the memories and physical evidence, to look like it was much older. This raises deep philosophical questions about the meaning of existence. (2009)

46. Which of the following can be concluded on the basis of the passage?
- Einstein's General Theory of Relativity implied that time before the beginning of the universe cannot be defined.
  - Aristotle conceived the idea that the universe did not have a beginning.
  - Einstein's General Theory of Relativity implied that time cannot be measured.
- Only A
  - B and C
  - A and B
  - Only C

S-58

47. How did the beliefs of Immanuel Kant and Aristotle, regarding the beginning of the universe, differ?
- Kant found logical contradictions in Aristotle's ideas.
  - Both Kant and Aristotle were mistaken as they had assumed time to be Absolute.
  - Aristotle believed the creation of the universe could not be attributed to God whereas Kant disagreed.
  - Kant rejected Aristotle's beliefs as erroneous.
48. Which of the following best captures the impact of Einstein's General Theory of Relativity on the debate regarding the beginning of the universe?
- It proved that all existing theories were incorrect.
  - It resolved the debate beyond any question.
  - It proved that the universe could have been created at any time.
  - It took away a central assumption and rendered the debate pointless.

### Passage-II

Hofstadter approaches the Mind" from the perspective of the computer sciences, in that there are both hardware and software aspects of human intelligence. He looks at the enactment of intelligence in terms of a formal system. In turn, Hofstadter declares that in primal, natural systems, formal systems are embedded. He infers that in relation to what we perceive as explicit in such formal systems, there is also an aspect that is intrinsically implicit. The idea of an embedded implicitness ultimately suggests a "Within" in the heart of things.

To begin, there is a need for a descriptive presentation of Hofstadter's brain system model. He uses the ant colony as an analogy of the human brain system. Hofstadter relays that individual ants seem to be able to cooperate as teammates and not randomly wander off. After billions of years of evolution, these ants have passed a critical threshold...reinforcing themselves into a collective behaviour that results in an ant colony. Hofstadter likens ant teams to signals; and, basically, "the effect of signals is to transport ants of various specialization to approximate parts of the colony." Ultimately, the fully evolved ant colony takes on a holistic aspect, and emerging molecular mechanisms take form. The colony's teams, its signals, are low-level active sub-systems of a complex system. These signals trigger other signals. With this, Hofstadter draws a similarity between these team signals and the human brain's neurons and their interconnections and firings. The colony's team signals exist according to a caste distribution; in the brain, there is no caste distribution...but a counterpart can be found in what Hofstadter calls a "brain state." Now Hofstadter leaps into the full system, whether it is the ant colony or the brain. He believes that the full system is the "agent," that "the full system is responsible for how its symbols trigger each other." At this juncture, Hofstadter poses the question that leads to the other side of his analogy. He ponders on the fact that a single ant brain does not "carry any information about nest structure;" and then he asks, "how then does the nest get created...where does the information reside?" The above questions provide Hofstadter the vehicle in which to launch his probe of the human brain; thus, he asks how this brain carries out the processes of thinking, how it spawns intelligence?

Underlying everything in the hardwired brain is the reality of rules. In the elementary constituents of the brain, down to the level of the nerve cells, there is the presence of the rules. At this neural level, at this substrate level of the brain, there can be no interpretation. There is no imitation, because the rules in the brain's hardware are basic. Hofstadter succinctly states, the brain "has a

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- formal, hidden hardware level which is a formidably complex mechanism that makes transitions from state to state according to definite rules embodied in it."
- Intelligence resides in this brain hardware. Yet, it is of a "different quality" so infers Hofstadter. Intelligence, although brain bound, "can be lifted right out of the hardware in which it resides...or in other words, intelligence [can] be a software property." Hofstadter focuses on the pivot that configures intelligence, mainly information and its various expressions: such as words, stories, messages, and interpretations of meaning. (2009)
49. Hofstadter is most likely to agree with which of the following statements?
- Intelligence has certain components that cannot be examined in functional isolation.
  - At the most basic level of brain activity, rules cease to operate.
  - Formal systems have an implicit aspect to them.
  - Intelligence in natural systems is explicitly dependent on brain structure.
50. Which of the following is not true about the parallels Hofstadter draws between ant colonies and human intelligence?
- Both are complex systems that have several subsystems built into them and in both cases the full system is the agent.
  - Caste distribution in the ant colony is functionally similar to brain states.
  - Ant teams are likened to signals in the brain.
  - The behaviour of an individual ant in a colony is analogous to an emergent molecular mechanism in the brain.
51. "...intelligence [can] be a software property." Hofstadter's implied message is that
- intelligence can be variously interpreted and can have several expressions; however, it operates according to simple rules.
  - intelligence can be conceptualised separately from the brain hardware, which houses it.
  - intelligence is a rule-bound system and it has several expressions.
  - intelligence carries explicit information about the underlying brain structure.

### Passage-III

Much as an electrical lamp transforms electrical energy into heat and light, the visual 'apparatus' of a human being acts as a transformer of light into sight. Light projected from a source or reflected by an object enters the cornea and lens of the eyeball. The energy is transmitted to the retina of the eye whose rods and cones are activated. The stimuli are transferred by nerve cells to the optic nerve and then to the brain, man is a binocular animal, and the impressions from his two eyes are translated into sight—a rapid, compound analysis of the shape, form, colour, size, position, and motion of the things he sees. Photometry is the science of measuring light. The illuminating engineer and designer employ photometric data constantly in their work. In all fields of application of light and lighting, they predicate their choice of equipment, lamps, wall finishes, colours of light and backgrounds, and other factors affecting the luminous and environmental pattern to be secured, in great part from data supplied originally by photometric laboratory. Today extensive tables and charts of photometric data are used widely, constituting the basis for many details of design. Although the lighting designer may not be called

upon to the detailed work of making measurements or plotting data in the form of photometric curves and analyzing them, an understanding of the terms used and their derivation form valuable background knowledge. The perception of colour is a complex visual sensation, intimately related to light. The apparent colour of an object depends primarily upon four factors: its ability to reflect various colours of light, the nature of the light by which it is seen, the colour of its surroundings, and the characteristics and state of adaptation of the eye. In most discussions of colour, a distinction is made between white and coloured objects. White is the colour name most usually applied to a material that diffusely transmits a high percentage of all the hues of light. Colours that have no hue are termed neutral or achromatic colours. They include white, off-white, all shades of gray, down to black. All coloured objects selectively absorb certain wavelengths of light and reflect or transmit others in varying degrees. Inorganic materials, chiefly metals such as copper and brass, reflect light from their surfaces. Hence we have the term "surface" or "metallic" colours, as contrasted with "body" or "pigment" colours. In the former, the light reflected from the surface is often tinted. Most paints, on the other hand, have body or pigment colours. In these, light is reflected from the surface without much colour change, but the body material absorbs some colours and reflects others; hence, the diffuse reflection from the body of the material is coloured but often appears to be overlaid and diluted with a "white" reflection from the glossy surface of the paint film. In paints and enamels, the pigment particles, which are usually opaque, are suspended in a vehicle such as oil or plastic. The particles of a dye, on the other hand, are considerably finer and may be described as colouring matter in solution. The dye particles are more often transparent or translucent. **(2010)**

52. According to the passage, lighting engineers need not  
 (a) Plot photometric curves  
 (b) Utilize photometric data  
 (c) Understand Photometric techniques  
 (d) Have mathematical expertise
53. The colour black is an example of  
 (a) A surface colour (b) An achromatic colour  
 (c) An organic colour (d) A diffuse colour
54. Paint is an example of a substance containing  
 (a) Inorganic material (b) Body colours  
 (c) Surface colours (d) Metallic colours

#### Passage-IV

An expert group has sounded a timely warning on what 'environmentally destructive tourism' will mean to national parks and wildlife sanctuaries and the objectives they are supposed to serve. Given the unique and rare wildlife the country has been endowed with, the rationale for using the resources for attracting tourists from abroad is unassailable. This necessarily postulates that the flora and the fauna should be protected and conserved. As a matter of fact, much of the government's interest in wildlife preservation has to do with the tremendous prospect of tourist traffic on that account. Yet the risk of the revenue-earning motivation overrunning the conservation imperatives is very real, the lure of the coveted foreign exchange that goes with this business only, is serving to enhancing it several folds. Even with the tourist inflow far below the potential, the pressure of visitors is said to have been already felt on the tiger reserves. With the Government of India's declared intent to boost tourism quite justified for its own reasons, the need for eliminating the risk assumes a greater sense of urgency. The study team has noted that most of the 41 national parks and 165 wildlife sanctuaries surveyed are open to the tourists. The less frequented among them

may not require special attention immediately in this respect as much as the ones that are major tourists attraction do. These include the Sanjay Gandhi National Park in Maharashtra, Nandankanan in Orissa and Bannerghatta in Karnataka. Over a year ago, the Indian Board for Wildlife expressed concern over the looming danger, and decided that the core areas of national parks and sanctuaries should be kept totally free from biotic disturbances, and the visitor be permitted to view the wildlife only from the areas marked out for the purpose. And now, the expert group has come up with the suggestion that a case by case evaluation be done of the 'capacity' as well as the 'limitations' of all the national parks and wildlife sanctuaries and based on such assessment an area-specific plan for tourist promotion within the 'safety' norms be charted. That this is the most scientific way of going about the job, and that there is no time to lose can be readily conceded. **(2011)**

55. Biotic disturbances in the context means  
 (a) Attacks from other living things, animals, etc.  
 (b) The disturbances caused by the natives on seeing the strange foreigners.  
 (c) The political disturbances causing the closedown of the parks.  
 (d) Disturbances caused by the wild animals on seeing the tourists.
56. By using the expression "environmentally destructive tourism" the author means  
 (a) The preservation of the wild beasts.  
 (b) Destruction of the wildlife and sanctuaries.  
 (c) Destroying the attractive sources of wild animals and birds.  
 (d) The maintenance of the flora and fauna of the country.
57. To implement the most scientific ways of tourism, we should  
 (a) Get industries and talented persons trained in the field.  
 (b) From a commission and plan out how to implement the suggestions.  
 (c) Send a group of scientists abroad to learn more about tourism.  
 (d) Speed as much finance as possible to better the suggestions made.
58. **Given below is a paragraph from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.** Mountaintop removal is just that. You blow up the top of the mountain with a mixture of ammonium nitrate and diesel fuel and bulldoze millions of tonnes of debris into the valleys and streams below. A slender seam of coal is then exposed at which point a fearsome machine called a dragline is deployed to strip out the coal. The result is that local water supplies are polluted with mercury and the chemicals used in the mining process. The uninterrupted habitat of many rare creatures and plants is destroyed and the landscape is ruined forever.  
 (a) The scars that you are now able to see on satellite pictures will be there until the end of time.  
 (b) It was encouraged by George W Bush after the Republicans received \$20 million from the coal industry.  
 (c) The administration lays waste the great American wilderness in a way that tests your faith in the reason of man.  
 (d) This, though cumbersome, has turned out to be the most profitable way of mining it.

**DIRECTIONS (Qs. 59-64) : The passage given below is followed by a set of six questions. Choose the most appropriate answer to each question.**

"Myth has two main functions," the poet and scholar Robert Graves wrote in 1955. "The first is to answer the sort of awkward questions that children ask, such as 'Who made the world? How will it end? Who was the first man? Where do souls go after death?' ... The second function of myth is to justify an existing social system and account for traditional rites and customs." In ancient Greece, stories about gods and goddesses and heroes and monsters were an important part of everyday life. They explained everything from religious rituals to the weather, and they gave meaning to the world people saw around them.

In Greek mythology, there is no single original text like the Christian Bible or the Hindu Vedas that introduces all of the myths' characters and stories. Instead, the earliest Greek myths were part of an oral tradition that began in the Bronze Age, and their plots and themes unfolded gradually in the written literature of the archaic and classical periods. The poet Homer's 8th-century BC epics the Iliad and the Odyssey, for example, tell the story of the (mythical) Trojan War as a divine conflict as well as a human one. They do not, however, bother to introduce the gods and goddesses who are their main characters, since readers and listeners would already have been familiar with them.

Around 700 BC, the poet Hesiod's Theogony offered the first written cosmogony, or origin story, of Greek mythology. The Theogony tells the story of the universe's journey from nothingness (Chaos, a primeval void) to being, and details an elaborate family tree of elements, gods and goddesses who evolved from Chaos and descended from Gaia (Earth), Ouranos (Sky), Pontos (Sea) and Tartaros (the Underworld).

Later Greek writers and artists used and elaborated upon these sources in their own work. For instance, mythological figures and events appear in the 5th-century plays of Aeschylus, Sophocles and Euripides and the lyric poems of Pindar. Writers such as the 2nd-century BC Greek mythographer Apollodorus of Athens and the 1st-century BC Roman historian Gaius Julius Hyginus compiled the ancient myths and legends for contemporary audiences.

At the center of Greek mythology is the pantheon of deities who were said to live on Mount Olympus, the highest mountain in Greece. From their perch, they ruled every aspect of human life. Olympian gods and goddesses looked like men and women (though they could change themselves into animals and other things) and were—as many myths recounted—vulnerable to human foibles and passions.

(2015)

59. Which of the following is one of the main functions of Myth?
- To answer questions that are yet unexplained by science
  - To satisfy the curiosity of children about our world
  - To explain the rationale behind everyday rituals
  - To answer the unanswerable questions
60. What is the difference between Hindu and Greek Mythology?
- There are texts explaining Hindu Mythology but no such texts exist about Greek mythology.
  - In Hindu mythology all stories and characters can be explained by a single text (or collection) but this is not true of Greek mythology.

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61. (c) Hindu mythology was passed on through written text but Greek mythology was passed on through oral recitation.  
 (d) In Greek mythology the main characters of a story are not as well explained as in Hindu mythology.
61. Who created the first story of Greek Mythology?
- Homer
  - Hesiod
  - Apollodorus
  - Cannot be determined from the passage
62. What is the role played by Theogony in Greek mythology?
- It tells the story of how the world began.
  - It introduces the four main characters of Greek Mythology.
  - It helps explain the myth of Chaos.
  - It tells the story of the Earth and the Sky.
63. What does the author mean by 'pantheon of deities'?
- Temple of all gods
  - The realm of the heroes
  - Place of worship
  - Group of gods
64. What were the similarities between Olympian Gods and Human Beings?
- These Gods looked like humans.
  - They had weaknesses like humans.
  - They were as passionate as humans.
- A and B
  - B and C
  - C and A
  - A, B and C

**DIRECTIONS (Qs. 65 to 75) : Read the passages carefully and answer the questions that follow :**

#### Passage-I

The spiritual interlocutor interacts without preconceived notions. The good discussant receives without barriers and responds in a heightened state of understanding. The shedding of constructs becomes at once a spiritual and humanist pursuit. Most of us, by force of sub-conscious habit, introduce our experiential and intellectual baggage into our interactions with people. This not only distorts our understanding of the material reality, but inhibits our spiritual growth as well. We stew in our 'here and now' boxes, unable to elevate ourselves as a bird would.

Yet, the validity of experience should not be discounted. Experience should be assessed with a certain heightened objectivity for one to draw the right lessons for one's actions. So detachment should be seen as a means to arrive at that state of balanced understanding. It does not preclude pain and compassion; but it discards obfuscation and hypocrisy.

Creativity is said to spring from the angst of experience. Often the outpourings of a tortured mind make for great literature and painting. Ironically, existential pain can bring about work of transcendental quality. The beauty and simplicity of Kahlil Gibran's The Prophet is testimony to the literary virtues of spiritualism. The spiritual world is a rich, fulsome, loving nothingness that opens up the heavens, not a musty blankness. Compassion could liberate us from the boundaries of the mind. The house-holder looks after the family out of a sense of duty and affection, which in due course becomes second nature. The mental and emotional universe of such an individual is able to accommodate reality in virtually all its dimensions. Psychologist

Eric Fromm points out that love must be all-encompassing by nature for an individual to be spiritually liberated. To love some people and resent others is not real love. (2009)

65. Which of the following will be a suitable title for the passage?
- Spiritual Equality
  - Limitations of the Intellectual
  - Creativity and Spirituality
  - Being Spiritual
66. "It does not preclude pain and compassion; but it discards obfuscation and hypocrisy." When paraphrased, how will the given sentence read?
- Experience does not prevent pain and compassion but rejects disguise and insincerity.
  - Detachment does not prevent pain and compassion but rejects disguise and insincerity.
  - Detachment does not prevent pain and compassion but rejects complication and pretense.
  - Experience does not prevent pain and compassion but rejects complication and pretense.

### Passage-II

In a stadium in Prague, 20 years ago today, a hundred thousand people, including my father and me, saw something we were not supposed to see. For decades it had been forbidden. The music, we were told, would poison our minds with filthy images. We would be infected by the West's capitalist propaganda. It was a cool August night in 1990; the Communist regime had officially collapsed eight months earlier, when Vaclav Havel, the longtime dissident, was elected president. And now the Rolling Stones had come to Prague. I was 16 then, and to this day I recall the posters promoting the concert, which lined the streets and the walls of the stadium: "The Rolling Stones roll in, Soviet army rolls out." Soviet soldiers had been stationed in Czechoslovakia since 1968, when their tanks brutally crushed the so-called Prague Spring. My father was 21 at that time, dreaming of freedom and listening to bootlegged copies of "Let's Spend the Night Together." But it would be more than two decades before he would get to see the band live. During those years, you had to tune into foreign stations to hear the Stones. Communists called the band members "rotten junkies," and said no decent socialist citizen would listen to them. I only knew one Stones song, "Satisfaction" — but I knew it by heart. I had heard it for the first time on a pirated tape my father had bought on the black market in Hungary and smuggled into the country. It put an immediate spell on me. I was hugely impressed by the rough, loud guitar riff, so unlike the mellow sound of Czechoslovakian music. (The Communists frowned on the bass and the electric guitar, but they severely disapproved of the saxophone because they said it was invented by a Belgian imperialist.)

Czechoslovakians had been urged for four decades to sacrifice their inner dreams to the collective happiness of the masses. People who went their own way — rebels — often ended up in jail.

That night in August, waiting for the Rolling Stones to come on stage, we felt like rebels.

The concert was held in the same stadium where the Communist government used to hold rallies and organize parades. My classmates and I had spent endless hours in that stadium, marching in formations that, seen from the stands above, were supposed to symbolize health, joy and the discipline of the masses. Now, instead of marching as one, we were ready to get loose. "We gotta get closer," my father whispered into my ear as we tried to make our way through the crowd.

I sensed that everyone was nervous. They were accustomed to being lied to, to having promises broken. They didn't quite believe that the Stones were really coming to play live. I could see that my father didn't either. "We might see their photographs or a movie instead," I heard some people saying, pointing to huge video screens installed inside the stadium. I started to have doubts myself. We had been waiting for five hours.

Suddenly, the lights dimmed. Drums started to pound, and the screens turned on as if by magic. "Oh my God, it is really happening," whispered a woman standing close to me. She was expressing something more than just the thrill of a concert. She was saying that the Communists were truly gone. That we were finally free to do as we pleased. (2009)

67. Which of the following best captures what the Rolling Stones concert stood for in the author's mind?
- A chance to celebrate the demise of the communist regime.
  - An expression of individual choice and freedom.
  - An opportunity to indulge in an activity that had been banned for a long time.
  - A rebellion against conformity.
68. According to the passage, which of the following is not a characteristic of Czechoslovakia while it was under Soviet/ Communist influence?
- Suppressing of individual thoughts and ideas.
  - Mass demonstrations and parades.
  - Censorship of news reporting.
  - Discouragement of rebellious ideas or themes.
69. What can be inferred as the real reason for Communists in Czechoslovakia to oppose 'The Rolling Stones'?
- They were viewed as a form of rebellion by the regime.
  - They were created by outsiders and conflicted with traditional Czech themes.
  - They exposed the audience to vulgar images.
  - They were a form of propaganda for Western governments.

### Passage-III

The idea of dead scientists engaging in an experiment in eugenics is incredible enough. Yet the most striking feature in this episode is the power that is ascribed to science itself. While spiritualism evolved into a popular religion, complete with a heavenly "Summerland" where the dead lived free from care and sorrow, the intellectual elite of psychical researchers thought of their quest as a rigorously scientific inquiry. But if these Victorian seekers turned to science, it was to look for an exit from the world that science had revealed. Darwinism had disclosed a purposeless universe without human meaning; but purpose and meaning could be restored, if only science could show that the human mind carried on evolving after the death of the body. All of these seekers had abandoned any belief in traditional religion. Still, the human need for a meaning in life that religion once satisfied could not be denied, and fuelled the faith that scientific investigation would show that the human story continues after death. In effect, science was used against science, and became a channel for belief in magic.

Much of what the psychical researchers viewed as science we would now call pseudo-science. But the boundaries of scientific knowledge are smudged and shifting, and seem clear only in hindsight. There is no pristine science untouched by the vagaries of faith. The psychical researchers used science not only to deal with private anguish but also to bolster their weakening belief in progress. Especially after the catastrophe of the First World War, the gradual improvement that most people expected would

continue indefinitely appeared to be faltering. If the scripts were to be believed, however, there was no cause for anxiety or despair. The world might be sliding into anarchy, but progress continued on the other side. Many of the psychical researchers believed they were doing no more than show that evolution continues in a post-mortem world. Like many others, then and now, they confused two wholly different things. Progress assumes some goal or direction. But evolution has neither of these attributes, and if natural selection continued in another world it would feature the same random death and wasted lives we find here below.

Darwinism is impossible to reconcile with the notion that humans have any special exemption from mortality. In Darwin's scheme of things species are not fixed or everlasting. How then could only humans go on to a life beyond the grave? Surely, in terms of the prospect of immortality, all sentient beings stand or fall together. Then again, how could anyone imagine all the legions of the dead – not only the human generations that have come and gone but the countless animal species that are now extinct – living on in the ether, forever?

Science could not give these seekers what they were looking for. Yet at the same time that sections of the English elite were looking for a scientific version of immortality, a similar quest was under way in Russia among the "God-builders" – a section of the Bolshevik intelligentsia that believed science could someday, perhaps quite soon, be used to defeat death. **(2010)**

70. How was "science used against science" according to the author?
- People sought science to seek an exit from the world created by science.
  - Science was used to spread the belief of life after death or eternal life.
  - Science was used to destroy the very essence of science.
  - Scientists used the scientific techniques to spread unscientific ideas.
71. What is the confusion of past and present day psychical researchers?
- They confuse progress with immortality.
  - They confuse evolution with progress.
  - They think progress in evolution leads to development.
  - They confuse evolution with progress in life in another world.
72. Which of the following is the most appropriate title for the passage?
- Science and immortality
  - The limits of science
  - Attempts to deny man's mortality
  - Incredible science

#### Passage-IV

The development underlines the great danger we face from the extension of anti-terrorist measures and methods into normal life – the policing of our streets, for example, and the hounding of football fans and climate change protestors.

Just as disturbing is the line of questioning by the police of those who made freedom of information requests before the alleged hacking of computers last year. In a letter to the Financial Times, Sebastian Nokes, a climate change sceptic and businessman, said he was interviewed by an officer who "wanted to know what computer I used, my internet service provider, and also to which political parties I have belonged, what I feel about climate change and what my qualifications in climate science are. He questioned me at length about my political and scientific opinions".

The police have a duty to investigate the alleged crime, but this

kind of questioning smacks of something far more sinister because a person's political and scientific views are being weighed to assess his likely criminality in the eyes of the police officer.

Now you might ask how else the police are going to establish who is a suspect. After all, you would certainly ask people about their views if you investigating a string of racist attacks. But this is not a violent crime or a terrorist matter: moreover, Nokes had simply sent "an FOI request to the university's climate unit asking whether scientists had received training in the disclosure rules and asking for copies of any emails in which they suggested ducking their obligations to disclose data".

On that basis the police felt entitled to examine Nokes on his views. These days it's surprising that they haven't found a way to seize his computer and mobile phone, which is what routinely happens to those involved in climate change protests. Limits need to be set in the policing and investigation of people's legitimate beliefs. Any future government must take a grip on the tendency of the police to watch, search, categorise and retain the personal details of those who express the political, religious or scientific beliefs. We should never forget that under this government the police have used forward intelligence teams to photograph people emerging from a climate change meeting in a cafe in Brighton; have used the ANPR system to track the movement of vehicles belonging to people travelling to demonstrations; have prevented press photographers from carrying out their lawful right to cover news events; and have combed the computers and searched the premises of an MP legitimately engaged in the business of opposition and holding the government to account.

What this adds up to is a failure of understanding in the police force that one of its primary duties is to protect the various and sometimes inconvenient manifestations of a democracy, not to suppress them. That is why they have to be ultra-careful deploying specialist terrorist intelligence units and treating people's opinions as evidence. **(2010)**

73. Which one of these best expresses the author's attitude towards Sebastian Nokes?
- The author considers Nokes' situation as a symptom of a bigger malaise.
  - The author supports Nokes and protests against the treatment meted out to him.
  - The author questions the legality of the actions carried out by the police against Nokes.
  - The author worries about the moral implications of the involvement of the police in such cases.
74. What is the central theme explored by the author in the passage?
- The role of police in a democracy.
  - The extension of the special powers of the police to questionable territory.
  - The abuse of power by the police.
  - The use of the police to stem opposition to the government's ideas.
75. The author is least likely to support which of the following?
- Tracking the movements of a person accused of corporate fraud.
  - Seizing the computer or mobile of an alleged terrorist.
  - Analysing the political beliefs of a person involved in a racist attack.
  - Banning media coverage of an event because it is likely to get violent.

**DIRECTIONS for Questions 76 to 78: Read the passage given below and choose the best answers for the questions that follow.**

On the first page of the novel I am writing, I describe a horse —

a gray mare named Mathilde. The mare is not a principal character in my novel; on page 23, when she briefly reappears in the hold of a ship crossing the Atlantic Ocean on her way to South America, I may, in the confusion of a stormy passage, easily forget about her and call her a pony; worse still, on page 84 where Mathilde is galloping on the plains of the Gran Chaco in Paraguay, I could have her become a filly. My point is that there is a huge difference between a mare, a pony and a filly. My Mathilde is long-legged, elegant, reliable, whereas a pony is tricky, often mean and tends to nip, and a filly is skittish, untrained, ready to bolt and do who knows what.

Misspellings and inaccurate quotations and/or inaccurately rendered foreign phrases (and the writer herself is often the one to notice these most) stop the reader cold on the page. The same is true of typos.

Writing consistently goes beyond getting the facts right. "If it is one, say one," says a Chinese proverb (and not eighteen minus seventeen nor five-sixths plus one-sixth). This is not, I think, a question of keeping it simple but of making it as true as possible. Not an easy task: At every turn, the sentence invites me to show how much I know, to show how smart I think I am; every metaphor, every analogy has the potential for fraudulence. Adverbs are hills I must climb to get to my destination; adjectives are furniture blocking my way. English is a naming language; its power derives from nouns.

"Art," Ken Kesey said, "is a lie in the service of truth," a statement which may appear to be contradictory but is not. Interesting, too, how often a true story sounds both false and boring while a lie sounds quite plausible.; the truth is right there in front of your nose. A lie is more trouble. As the liar/writer, I have to convince. I have to appear sincere and be twice as clever so as not to get caught. One way of doing this is to use a lot of details, to distract the reader: "Making things up — as in fiction — sounds easy and like fun and it may be at first. By page three, to say nothing of by chapter five or six, I guarantee, it becomes harder and harder to sustain that lie or whatever the story is that you have made up. Harder still to continue to sustain the belief of your reader as well as to convince him of the worth of your endeavor; hardest of all for him to trust you with it.

In my case, some of my writing is based on my experience. And if I'm successful, in the end, I won't be able to remember — like a good liar, I suppose — what is true and what is made up. Or I like to write about stuff the average reader may not know a whole lot about: Sufis, Thai culinary customs, Guarani lace-making. Or I do a lot of research and then try my damndest to hide it all — another form of deceit — because every fact, every date, every statistic (however accurate and consistent) in fiction is like a stone hurled into the hull of a boat and with each stone the boat sinks further in the water.

(2012)

76. It can be inferred that the author talks about the mistakes with the horse, filly and mare in order to
- Present herself as an easygoing person who is not afraid to admit to her mistakes
  - Showcase instances where she had also committed mistakes
  - Highlight the details that need to be taken care of while writing a book
  - Provide a framework for young writers
77. What does the author mean by saying "English is a naming language"?
- English is most conducive to indulge in namecalling.
  - The main focus of English literature is names.
  - The power of name-calling is immense in English.
  - English is most suited to talking about different people.

78. What is the author trying to convey by using the imagery of throwing stones into a boat, which sinks further to talk about fiction?
- It becomes more and more difficult to hide the truth.
  - Each section makes the story more accurate.
  - The stones indicate the burden of being a writer.
  - The feeling of claustrophobia and entrapment as a writer.

**DIRECTIONS (Qs. 79-81) : The passage given below is followed by a set of questions. Choose the most appropriate answer to each question.**

Scheibitz's paintings are often difficult to read, though most contain human presences, and many are titled as if they are portraits: Portrait Tracy Berglund; Henry Stand; Ret Marut. The names sound as invented as the shapes that make and unmake the figures in the paintings. Look long enough and Tracy Berglund appears to resolve into a female figure in a long skirt and grey jacket, holding a slice of watermelon. Or it could be cheese. Or a megaphone.

Everything looks deliberate and calculated, but at some point things stop making sense — or rather, start making a kind of sense that is all Scheibitz's own. Flat planes drift into emptiness; distracted brushstrokes wander away like someone getting lost on a walk. Perspectives warp, geometries fall apart. The spaces between things become more insistent than the things themselves. These are very unreasonable paintings.

That's part of the pleasure. Scheibitz's work has been called "conceptual painting". I have always thought painting is a conceptual as well as a physical activity. Using fragments of graphic symbols, compound forms and motifs whose origins are often impossible to trace, the artist arrives at a kind of figuration that is at odds with itself. "I can't invent anything and I can't use what I find as it is," he recently told one interviewer. He also told me, as we looked around his show, that everything connects to everything else.

Part of Scheibitz's collection of source materials is laid out on tables at Baltic — not that they're much help. Here is a gift pack of multicoloured Harrods golf tees, then two patterned cigarette lighters, some dice, a walnut and several stones with naturally occurring right angles. How odd. And now, he has painted various objects yellow: a plaster tortoise, a paintbrush stiff with pigment, a toy car. Among all these things, traces of the shapes and contours in his paintings might be found, like lines of a song or a bit of a tune that goes round your head. There are dozens of these objects. How they are translated into elements in his paintings is anybody's guess.

The overall impression is that nothing is random. There are affinities here. Scheibitz has a good eye for an ambiguous but characterful shape. One "portrait", called John Held, is painted on a small, asymmetrically carved gravestone that sits on a plinth. It looks a bit like a face but has no features.

(2013)

79. Which of the following options best explains why the author terms Scheibitz's paintings as unreasonable?
- The paintings serve to confuse more than to illuminate.
  - The paintings are not what they seem at first and need further pondering.
  - The paintings do not depend on the interpretation of the onlooker but on that of their artist.
  - The paintings require an understanding of art and its related philosophy.

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Past Years Solved Paper (2009-2016)

80. Which of the following options can be inferred from the given passage?
- As an artist, Scheibitz deliberately thrives on creating an art that is difficult to fathom and place.
  - The paintings of Scheibitz are hard to categorise; however, this makes them all the more invigorating.
  - In Scheibitz's paintings nothing is arbitrary; everything has a reason and a place for its existence.
  - The understanding of art cannot be devoid of a philosophical conception; that is what gives art its conceptual framework.
81. Which of the following options best presents the significance of the penultimate paragraph?
- It indicates that everything that the painter is inspired by is interlinked.
  - It allows for the understanding that Scheibitz's paintings though inspired by real life may portray things in an abstract light.
  - It attests that there is a method to the painter's madness.
  - It supports the author's assertion that his paintings have to draw from real life and cannot be entirely invented.

**DIRECTIONS (Qs. 82-84) :** The poem given below is followed by a set of questions. Choose the most appropriate answer to each question.

I would not exchange the sorrows of my heart  
For the joys of the multitude.  
And I would not have the tears that sadness makes  
To flow from my every part turn into laughter.  
I would that my life remain a tear and a smile.  
A tear to purify my heart and give me understanding  
Of life's secrets and hidden things.  
A smile to draw me nigh to the sons of my kind and  
To be a symbol of my glorification of the gods.  
A tear to unite me with those of broken heart;  
A smile to be a sign of my joy in existence.  
I would rather that I died in yearning and longing than that I live  
Weary and despairing.  
I want the hunger for love and beauty to be in the  
Depths of my spirit, for I have seen those who are  
Satisfied the most wretched of people.  
I have heard the sigh of those in yearning and Longing, and it is  
sweeter than the sweetest melody.  
With evening's coming the flower folds her petals  
And sleeps, embracing her longing.  
At morning's approach she opens her lips to meet  
The sun's kiss.  
The life of a flower is longing and fulfilment.  
A tear and a smile.  
The waters of the sea become vapour and rise and come  
Together and area cloud.  
And the cloud floats above the hills and valleys  
Until it meets the gentle breeze, then falls weeping  
To the fields and joins with brooks and rivers to return to the sea,  
its home.  
The life of clouds is a parting and a meeting.  
A tear and a smile.  
And so does the spirit become separated from  
The greater spirit to move in the world of matter  
And pass as a cloud over the mountain of sorrow  
And the plains of joy to meet the breeze of death  
And return whence it came.  
To the ocean of Love and Beauty—to God.

(2013)

82. Which of the following options best reflects the theme of the poem?
- Misery is necessary as it inspires the poor to find new meaning in their lives.
  - The yearning of the heart helps unite those in need and opens a greater space for growth and development.
  - Despair and contentment are both necessary for the growth of the individual self.
  - The challenges and joys that one experiences are a necessary part of the journey of life and of one's destiny.
83. Which of the following options best explains why the poet feels that those who are Satisfied are the most wretched?
- Such people have achieved satisfaction through deplorable means.
  - They lack the longing that brings with it a sense of fulfillment and the ability to understand the secrets of life.
  - They cease to hunger for love and beauty.
  - Their lives no longer have a destiny to fulfill and all the happiness no longer forms a part of it.
84. Which of the following does the author attempt to signify while stating the example of the clouds?
- The cycle of give and take
  - The fact that all forms complete their life-cycle going through a series of partings and meetings
  - The reality that every occurrence has significance apart from the obvious
  - The co-existence of the spiritual and the worldly

**DIRECTIONS for questions 85 to 88:** The passage given below is followed by a set of four questions. Choose the most appropriate answer to each question.

Conscious of her approaching death, she has broken at last a lifetime's practice of concealment, of stashing the truth away in the manner of the papers and mementoes mouldering in her battered travel trunk. The woman in her eighties (her bones aching in the humid heat of summer, her step cautious in winter's frozen treachery) unwinds the past, sends it twisting and spiralling in an unstoppable black flow across the pages. The urgency of the project is insistent: impending foreclosure flays her on, reopening old wounds, forcing her to confront life in all its bewilderment and pain.

This, in the sparest of terms, is the framework of *The Blind Assassin*, the novel which has won for the Canadian writer, Margaret Atwood, this year's Booker Prize. Her previous near-winners were *The Handmaid's Tale*, *Cat's Eye*, and *Alias Grace*. In her latest book, Atwood explores again a theme central to her fictional universe: what happens to relationships, to human potential, to the possibility of happiness when women are kept subordinate, stultified by their inferior status and locked in silence.

Iris Chase, the woman who unravels her past across the pages of *The Blind Assassin*, is at first sight an improbable victim of history. The granddaughter of an entrepreneur who built an empire out of the manufacture of buttons and cheap clothing for the masses, she has lived, for the most part of her life, cocooned from economic hardship. In her narrative, she conjures up the whimsical splendours of Avilion, the evocatively titled domain her grandparents built in celebration of their new wealth and status and the place where she spent her childhood. Reliving her marriage to a young tycoon with political ambitions, she takes us into the sumptuous between-the-Wars world of the highly moneyed: the fur-draped fashions, the dinner parties, the Atlantic crossings on

luxury liners. Such landscapes, replete with nostalgia, have in our own times yielded rich pickings to advertisers and commercial film-makers aware of the power of the past. In Atwood's case, however, evoking a class experience characterized by profligacy and privilege is not done to beguile us or set the book on course for film rights. Rather, it establishes a polarity between material advantage and emotional poverty, between the possibilities opened up by access to plenty and the reality of futile, empty lives. In a real sense, this is not only a political novel but also a morality tale.

In the book's opening pages, information is thrown at the reader from a variety of sources: from a narrative we do not yet understand to be Iris', from newspaper clippings, and from a book written by Laura Chase (Iris' sister). The last carries immediate poignancy, for we already know Laura to be dead, her car having plunged from a bridge; there is speculation that it was suicide.

This choice of structure allows Atwood to introduce, from the start, a sense of the contentious nature of experience: there is a world of difference between the clipped prose of the pro-establishment local paper and the dead Laura's unfolding of emotion (her novel is a high-intensity story of unmarried love which generated shock waves following its publication in the late 1940s). The structure also builds in elasticity, enabling the writer not only to throw the past against the present but also to change pace, to intensify and then release, in a way that tightens her hold on our sensibilities, propelling us deeper into the mystery.

There is a further dimension to this structure: through it we, the readers, find ourselves repeatedly revising the assumptions we formed at the novel's beginning. In the manner of a landscape viewed from a moving vantage point, the story shifts, rearranges itself, discloses elements once hidden from view. To specify the changes would be to give away too much of the plot, reducing the novel's capacity to surprise and challenge. What Atwood is attempting, one senses, is not a bid for authorial cleverness designed to leave the reader stunned and bemused, but rather a journey towards the truth which invites her reader to question, reformulate and reinterpret. Despite its old technology form, this is an interactive novel.

For the reader who accepts the invitation, this is a journey into pain. Atwood wields her pen like the most deadly and delicate of knives, cutting through to the raw edge of emotion, exposing our areas of greatest vulnerability: our relationships with others. Part of the stiletto sharpness of her writing derives from a use of language that is precise and alive to the sheer potency of words.

Atwood's use of analogy, too, can bring the reader up short. When Iris' father, lamed and broken, returns home in his uniform from the First World War, his medals "are like holes shot in the cloth, through which the dull gleam of his real, metal body can be seen". On board a ship at the start of her honeymoon, Iris watches professional dancers perform a passionless tango accompanied by music that is "... jagged, hobbled — like a four-legged animal lurching on three legs; a crippled bull with its head down, lunging".

This is also a book rich in tongue-in-cheek humour that at several points had me laughing out loud. In a narrative that has a strong aural quality to it, a pervasive sense of voice play, Atwood makes artful use of the character of Renee, the housekeeper at the ancestral home to whom Iris and Laura, having lost their own mother, turn for maternal attention.

A working class woman with a nononsense outlook on life, Renee offers, through her repertoire of proverbs, sayings and catch-phrases, a running commentary on events that both entertains and unsettles. But the primary source of humour is Iris herself: curmudgeonly and difficult in old age, she is possessed

of a capacity for wry observation, an ability to lay bare the incongruities of life, with humour jostling the sadness. (2014)

85. If medals "are like holes shot in the cloth", then Atwood is a critic of
- Perpetrators of war
  - Third grade tailoring
  - Glorification of war
  - All medals and awards
86. Pick the odd one out:
- A sense of the contentious nature of experience
  - An interactive novel
  - A moving vantage point
  - A capacity for wry observation
87. What does the author mean by 'the contentious nature of experience'?
- That quality of experience which makes us satisfied with our lot
  - Contextual nature of experience
  - Converging nature of experience
  - Collaborative nature of experience
88. Identify the central theme of Atwood's novel.
- Potential effects of female-subjugation
  - Presence of the past in the working of the present
  - Communality of human experience
  - None of the above

**DIRECTIONS for questions 89 to 92: The passage given below is followed by a set of four questions. Choose the most appropriate answer to each question.**

Attempts to explain prophecy must make suppositions about the future. The most fundamental supposition is that events in the future do not yet exist and cannot, therefore, produce effects in the present. The path of explanation that stems from this view leads necessarily to various ideas of the future as a potential that somehow exists in the present.

In their simplest form, these ideas follow the analogy of the seed and flower. A gardener can examine a seed and predict what flower it will produce. Some premonitions may indeed stem from clues scarcely noticed in a conscious way. An unfamiliar noise in a car, for example, may give rise to an accurate premonition of danger. The weakness of the theory, in this form, is that it requires of the precogniser an uncanny ability to analyze signs and indications that are not only imperceptible to the ordinary eye but also impossible to deduce theoretically. What clues in a dreamer's environment could prompt an accurate precognition of a disaster six months and 3,000 miles away? Some extraordinary suggestions have been made to explain how the future may be unrealized but cognizable in the present. One such suggestion, by Gerhard Dietrich Wasserman, a mathematical physicist at the University of Durliam in England, is that all events exist as timeless mental patterns, with which every living and non-living particle in the universe is associated.

This idea owes something to the ancient belief that the universe — the macrocosm — contains innumerable microcosms, each recapitulating the features and order of the large whole. Thus man was seen as a microcosm of the earth, his veins and arteries corresponding to streams and rivers, and so on.

By the end of the 17th century, the idea had undergone many transformations but was still potent. The great philosopher and mathematician Baron Gottfried Wilhelm von Leibniz, for example wrote, "All the different classes of being which taken together make up the universe are, in the ideas of God who knows distinctly

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their essential graduations, only so many ordinates of a single curve so closely united that it would be impossible to place others between any two of them, since that would imply disorder and imperfection."

Accordingly, the various orders of beings, animate and inanimate, so gradually approximate each other in their attributes and properties that they form a single chain, "so closely linked one to another that it is impossible to determine precisely the point at which one ends and the next begins." In this concept of a "chain of being" then, the animate, and therefore the spiritual or psychic, are connected with the inanimate by a gradation of shared attributes. For Leibniz the implication was that someone with enough insight "would see the future in the present as in a mirror." Another version of the idea that the future lies hidden in the present was advanced by Adrian Dobbs, a mathematician and physicist at the University of Cambridge, in 1965. As events unfold, he proposed, they actualize a relatively small number of the possibilities for change that exist at a subatomic level. In the process, disturbances are caused that create another dimension of time or what Dobbs calls a psitronic wave-front. This wave-front can be registered by the brain's neurons, at least in certain especially sensitive people, and be interpreted. A metaphor may help to clarify the process.

Imagine a pond, at one side of which a toy ship is launched; at the other side of the pond is a very small person. He is unable to see the ship, but as the ship travels forward, the waves it makes reach the shore on which he stands. As they travel across the pond, these waves pass around certain objects — weeds, leaves, a log — that are fixed or slowly drifting on its surface. The objects thus create disturbances in the wave-front, which the small person, who has a lifetime's experience in these things, is able to note in fine detail. From what he learns of the wave-fronts he not only obtains an image of the objects that produced them but also calculates how long it will be before they drift to the shore.

In this metaphor, the toy ship represents an event unfolding in time. Its course across the pond represents one of many paths it might take and the dimension of time it occurs in. The pond itself represents Dobbs's "psitronic wave-front," and the small person is, of course, the neuronal apparatus that receives the wave-front and converts it to a prediction. Granting that Dobbs's theory is purely hypothetical and that no psitronic wave has been discovered, the difficulty is in suggesting a neuronal mechanism by which the observer distinguishes the wave-front of a particular event from the presumable maelstrom of wave-fronts produced by simultaneously unfolding events. Again, the farther away the event is in the future, the more numerous the wave-fronts and the more complex the problem.

Such in general, are some of the theories that regard the future as being, in some way, a potential implicitly accessible in the present, and such are the difficulties and limitations attending them.

(2014)

89. The given passage mentions each of the following EXCEPT
- Extraordinary skills of perception may be required in order to have premonitions.
  - The future does not yet exist.
  - Tremendous insight may be required in order to have premonitions.
  - Psitronic fronts are extremely elusive and stay hidden.
90. In the toy ship example, the author is least likely to agree with the statement that
- It is not possible for several events to unfold simultaneously.

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- (b) Seemingly intangible wave-fronts can be converted to tangible predictions.
- (c) The toy ship could have followed different paths in the pond.
- (d) An analogy to Dobbs' wave-front can be drawn.
91. Which of the following is not correct as per the passage?
- Leibniz's theory did not permit the addition of new beings on the "chain of being".
  - Leibniz was convinced that animate beings share common attributes only with animate ones.
  - Animate beings, as per Leibniz, share attributes with inanimate ones also.
  - None of above
92. The word "uncanny" in the passage specifically refers to:
- The innumerable microcosms, each recapitulating the features and order of the large whole
  - The ability to analyse symptoms and indications that are not visible to the ordinary eye
  - Dobbs' version of the idea that the future lies hidden in the present
  - Premonitions that originate from hints and clues that are hardly noticed at the conscious level

**DIRECTIONS (Qs. 93-98) :** The passage given below is followed by a set of six questions. Choose the most appropriate answer to each question.

From Billie Holiday to Kurt Cobain, Jeff Buckley to Lana Del Rey, we enjoy the music of suffering and sadness, songs that help us through our worst moments — broken relationships, melancholy, mania. Summed up by John Cusack's indie-sad lad in the film of *High Fidelity* — "What came first? The music or the misery?" — we espouse the miserable and the hopeless.

However, the musicians behind the songs are often an afterthought. Or if not that, they're subject to the notion that their depression is a creative spark and their mental illness the driving force behind compelling art. As someone who has suffered from severe depression, the romantic notion of the doomed artist is not all that. You put on weight and then lose it, you sleep too much or too little, and the myriad other symptoms dictate that it's not the gladiola-swinging, woe-is-me fest it's talked up to be. But does this connection between art and angst have any foundation?

Research earlier this year linked high childhood IQ to an increased risk of experiencing bipolar traits in later life. "There is something about the genetics underlying the disorder that are advantageous," said Daniel Smith of the University of Glasgow, who led the study. "One possibility is that serious disorders of mood — such as bipolar disorder — are the price that human beings have had to pay for more adaptive traits such as intelligence, creativity and verbal proficiency."

Marjorie Wallace, chief executive of Sane, a mental health charity, considers this concept potentially harmful, given that not all cases of bipolar disorder are the same. Although tormented geniuses exist — figures such as Robert Schumann and Van Gogh — she says their talents are not necessarily a byproduct of being bipolar. "The majority of people may have the illness but not the gift." "There is," she adds, "the possibility that somebody who has fragile mental health can be sensitive to other dimensions. I also think that there is a 'tormented genius' link, particularly with people who have bipolar disorder. However, not everybody with mental illness can possibly be gifted artistically or musically. So it can make people who aren't feel even less adequate, and even more of a failure."

So is the troubled artist fallacy damaging the music industry? Alanna McArdle, formerly of Joanna Gruesome, believes so. "It's a harmful trope that leads to ignorance and a lack of awareness of what mental illness actually is and what it can do to a person," she says. "I went out with a guy who told me that I shouldn't be so resentful of my mental illness because it's allowed me to create some amazing art. But I think that's wrong, and I also think it's a very offensive stance to take. I would much rather never write another song if the trade-off was to not have my illness."

The idea of mental illness as a creative force is, to most people who suffer from it, a myth. The chronic lack of self-esteem caused by mental illness, the numbing effect of antidepressants and the grip of anxiety on a performer who looks as if they have it easy are barriers that can prevent a musician from doing their job. Pete Doherty, for example, cancelled a number of Libertines shows in September after suffering from a severe anxiety attack. "Depression and anxiety, in different ways, have the effect of limiting someone's capacity for expression and reaching out towards the world," says Simon Procter, a programme director at music therapy charity Nordoff Robbins, who has co-headed a paper on music therapy and depression. (2015)

93. Which of the following options depict the main idea of the passage?
- The idea of mental illness as a positive creative force is unhelpful to the people who suffer from it – and some of them claim it's damaging the music industry.
  - Attitudes towards mental health, while improving, are still poor, and when it involves people making music we love, we tend to ignore it.
  - Glorifying the angsty artist leaves those suffering from mental illness more in the dark than ever.
  - Music can work wonders as therapy for mental illness, but is unhelpful to the people who suffer from it.
94. Which of the following statements by a famous musician can substantiate the perspective that mental illness helps creativity?
- The coming out of the depression is often the period of time where I can create the most.
  - I always have a desire to write out my depression, so I'll make a song as catharsis.
  - High-profile musicians' panic attacks and breakdowns help lift the stigma from mental illness.
  - Both (a) and (b)
95. How is the idea of mental illness as a creative force harmful to people in general?
- People with mental illness give it as an excuse for their bad behavior.
  - People feel it is ok to have a mental illness if the by-product is creative genius.
  - People with mental illness might not be able to convert their creativity into success.
  - It makes those with the illness, but not the artistic genius, feel like a failure.
96. Which of the following can be inferred from the given passage?
- It is not clear if there exists a connection between art and angst.
  - Mental disorders, as a by product of creative genius, is a myth.
  - In most successful artists the presence of a mental disorder is a likely result of their lifestyles.
  - Ignoring mental disorders because it adds to creativity is a common occurrence.

97. What can be inferred about Alanna McArdle from the passage?
- She is an art prodigy.
  - She has suffered from mental illness.
  - She appreciates that her illness has allowed her to be creative.
  - She does not like people commenting on her illness.
98. Which of the following can most likely be the view of Simon Procter?
- Music therapy is a plausible remedy for depression
  - Depression can limit the ability to express oneself
  - Mental illness is most definitely not a cause of creative genius
  - All of the given

**DIRECTIONS for questions 99 to 101: Read the following passage and answer the questions that follow it.**

Some artists go out in a blaze of glory. Pierre-Auguste Renoir went out in a blaze of kitsch. At least, that's the received opinion about the work of his final decades: all those pillow nudes, sunning their abundant selves in dappled glades; all those peachy girls, strumming guitars and idling in bourgeois parlors; all that pink. In the long twilight of his career, the old man found his way to a kissable classicism that modern eyes can find awfully hard to take.

All the same, the Renoir of this period—the three very productive decades before his death in 1919 at the age of 78 fascinated some of the chief figures of modernism. Picasso was on board; his thick-limbed 'neoclassical' women from the 1920 are indebted to Renoir. So was Matisse, who had one eye on Renoir's Orientalist dress-up fantasies like the Concert, with its flattened space and overall patterning, when he produced his odalisques. Given that so much of late Renoir seems saccharine and semi comical to us, is it still possible to see what made it modern to them?

Yes and no. To understand the Renoir in the 20th Century you have to remember that before he became a semi classicist, he was a consummate Impressionist. You need to picture him in 1874, 33 years old, painting side by side with Monet in Argenteuil, teasing out the new possibilities of sketchy brushwork to capture fleeting light as it fell across people and things in an indisputably modern world.

But in the decade that followed, Renoir became one of the movement's first apostates. Impressionism affected many people in the 19th century in much the way the internet does now. It both charmed and unnerved them. It brought to painting a novel immediacy, but it also gave back a world that felt weightless and unstable. What we now call post Impressionism was the inevitable by-product of that anxiety. Artists like Seurat and Gauguin searched for an art that owed nothing to the stale models of academicism but possessed the substance and authority that Impressionism had let fall away.

For Renoir, a turning point came during his honeymoon to Rome and Naples in 1881. Face to face with the firm outlines of Raphael and the musculature of Michelangelo, he lost faith in his flickering sunbeams. He returned to France determined to find his way to lucid, distinct forms in an art that reached for the eternal, not the momentary. By the later years of that decade, Renoir had lost his taste for the modern world anyway. As for modern women, in 1888 he could write, "I consider that women who are authors, lawyers and politicians are monsters". ("The woman who is an artist," he added graciously, "is merely ridiculous.")

Ah, but the woman who is a goddess—or at least harks back to one that is different matter. It would be Renoir's aim to reconfigure the female nude in a way that would convey the spirit of the classical world without classical trappings. Set in "timeless" outdoor settings, these women by their weight and scale and serenity alone—along with their often recognizably classical poses—would point back to antiquity.

For a time, Renoir worked with figures so strongly outlined that they could have been put down by Ingres with a jackhammer. By 1892, he had drifted back toward a fluctuating impressionist brushstroke. Firmly contoured or flickering, his softly scalped women are as full-bodied as Doric columns. This was one of the qualities that caught Picasso's eye, especially after his first trip to Italy, in 1917. He would assimilate Renoir along-side his own sources in Iberian sculpture and elsewhere to come up with a frankly more powerful, even haunting, amalgam of the antique and the modern in paintings like *Woman in a White Hat*.

Renoir was most valuable as a stepping-stone for artists making more potent use of the ideas he was developing. The heart of the problem is the challenge. Renoir set for himself: to reconcile classical and Renaissance models with the 18th century French painters he loved. To synthesize the force and clarity of classicism with the intimacy and charm of the Rococo is a nearly impossible trick. How do you cross the power of Phidias with the delicacy of Fragonard? The answer: at your own risk—especially the risk of admitting into your work the weaknesses of the Rococo. It's fine line between charming and insipid, and 18th century French painters crossed it all the time. So did Renoir.

(2016)

99. All of the following are true in light of the passage EXCEPT.
- Fragonard is an 18<sup>th</sup> century artist
  - Picasso combined classicism and modernism in 'Woman in a white Hat'.
  - Renoir was a semi – Classicist, who became an Impressionist
  - Gauguin suffered from post – Impressionism anxiety
100. We can infer from the passage that the word 'odalisques' means
- |             |                |
|-------------|----------------|
| (a) Pillars | (b) Landscapes |
| (c) Figures | (d) Women      |
101. The passage suggests that
- Renoir was greatly misunderstood in his lifetime
  - Classicism and modernism don't go together
  - Renoir's later work appealed to modern tastes
  - Renoir's artistic appeal waned in the twilight of his career

**DIRECTIONS for questions 102 to 104: Read the following passage and answer the questions the follow it.**

Humans have a basic need to perceive themselves as part of a grand scheme, of a natural order that has a deeper significance and greater endurance than the petty affairs of daily life. The incongruous mismatch between the futility of the human condition and the brooding majesty of the cosmos compels people to seek a transcendent meaning to underpin their fragile existence.

For thousands of years this broader context was provided by tribal mythology and storytelling. The transporting qualities of those narratives gave human beings a crucial spiritual anchor. All cultures lay claim to haunting myths of other-worldliness: from the dreaming of the Australian Aborigines or the Chronicles of Narnia, from the Nirvana of Buddhism to the Christian Kingdom of Heaven. Over time, the humble campfire stories

morphed into the splendour and ritual of organized religion and the great works of drama and literature.

Even in our secular age, where many societies have evolved to a post-religious phase, people still have unfulfilled spiritual yearnings. A project with the scope and profundity of SETI (search for extraterrestrial intelligence) cannot be divorced from this wider cultural context, for it too offers us the compelling promise that this could happen any day soon. As writer David Brin has pointed out, 'contact with advanced alien civilizations may carry much the same transcendental or hopeful significance as any more traditional notion of "salvation from above". I have argued that if we did make contact with an advanced extraterrestrial community, the entities with which we would be dealing would approach godlike status in our eyes. Certainly they would be more godlike than humanlike; indeed, their powers would be greater than those attributed to most gods in human history.'

So is SETI itself in danger of becoming a latter day religion? Science fiction writer Michael Crichton thought so. He said: "Faith is defined as the firm belief in something for which there is no proof," he explained. "The belief that there are other life forms in the universe is a matter of faith. There is not a single shred of evidence for any other life forms, and in forty years of searching, none has been discovered." Writer Margaret Wertheim has studied how the concept of space and its inhabitants has evolved over several centuries. She traces the modern notion of aliens to Renaissance writers such as the Roman Catholic Cardinal Nichols of Cusa, who considered the status of man in the universe in relation to celestial beings such as angels.

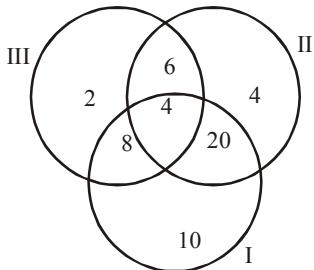
With the arrival of the scientific age, speculations about alien beings passed from theologians to science fiction writers, but the spiritual dimension remained just below the surface. Occasionally it is made explicit, as in Olaf Stapledon's *Star Maker*, David Lindsay's *A Voyage to Arcturus*, or Steven Spielberg's *Close Encounters of the Third Kind*, which is strongly reminiscent of John Bunyan's *A Pilgrim's Progress*. These are iconic images that resonate deeply with the human psyche, and shadow the scientific quest to discover intelligent life beyond Earth. (2016)

102. It can be inferred from the passage that, 'Close Encounters of the Third Kind'
- Is a modern, scientific version of John Bunyan's *Pilgrim's Progress*.
  - Explores the spiritual unknown in the scientific quest to discover the extraterrestrial
  - Is the work of a theologian – turned science fictionist
  - Speculates on intelligent life in outer space and reflects vivid spiritual overtones
103. Which of the following statements reflects or captures the author's view on the search for extraterrestrial intelligence?
- It is a vain attempt by man to underpin his fragile existence
  - It is in danger of becoming a latter day religion
  - Were the search to yield positive results, man would accord those creatures super god status
  - The belief that there are aliens in the universe springs from enormous faith and the pursuit reflects man's spiritual urge.
104. Great literary works, according to the passage
- Had their origins in the spiritual age
  - Evolved from tribal tales
  - Were a product of the Renaissance
  - Dwelt on the spiritual

# ANSWERS & EXPLANATIONS

## Ch- 1. Number System

1. (c) We can see that the difference between the divisor and the respective remainder is the same in each division i.e.  $2 - 1 = 4 - 3 = 6 - 5 = 8 - 7 = 1$   
 Hence the general form of such numbers will be  $\text{LCM}(2, 4, 6 \text{ and } 8)K - 1 = 24K - 1$ , where 'K' is any natural number.  
 Hence the numbers are  $23, 23 + 1 \times 24, 23 + 2 \times 24, \dots, 23 + 40 \times 24$   
 A total of 41 such numbers are there between 0 and 1000.
2. (c) The number needs to be less than  $13 \times 52 = 676$ . The highest power of 13 in  $676!$  is 56.  
 The power of 13 in the smallest such number needs to be exactly 52. If we subtract  $13 \times 3 = 39$  from 676, we get 637. The number  $637!$  will be the smallest number of type  $N!$  that is completely divisible by  $13^{52}$ .  
 The sum of the digits of 637 is 16.
3. (a)  $x^4 + 16$  is always greater than  $x^4$  and  $x^2$  is always greater than  $x^2 - 4$ . Hence,  $\sqrt{x^4}$  will always be greater than  $x^2 - 4$ . So  $\sqrt{(x^4 + 16)}$  is greater than  $x^2 - 4$ .  
 So the given two expressions can never be equal for any real value of  $x$ .
4. (b)  $S = 2001^2 - 2000^2 + 1999^2 - 1998^2 + \dots + 3^2 - 2^2 + 1^2$   
 $= (2001 + 2000)(2001 - 2000) + (1999 + 1998)(1999 - 1998) \dots + (3 + 2)(3 - 2) + 1$   
 $= 2001 + 2000 + 1999 + 1998 + \dots + 3 + 2 + 1$   
 $\Rightarrow S = \frac{2001 \times 2002}{2} = 2001 \times 1001 = 2003001$
5. (c) We have,  $7^{103} = 7(49)^{51} = 7(50 - 1)^{51}$   
 $= 7(50^{51} - 51C_1 50^{50} + 51C_2 50^{49} - \dots - 1)$   
 $= 7(50^{51} - 51C_1 50^{50} + 51C_2 50^{49} - \dots) - 7 + 18 - 18$   
 $= 7(50^{51} - 51C_1 50^{50} + 51C_2 50^{49} - \dots) - 25 + 18$   
 $= k + 18 \text{ (say)} \quad \text{where } k \text{ is divisible by 25,}$   
 $\therefore \text{remainder is 18.}$
6. (c) From the Venn diagram, it follows that  
 $n(\text{sector I}) = 42, n(\text{sector II}) = 34,$   
 $n(\text{sector III}) = 20$   
 $n(I \cap II) = 24, n(II \cap III) = 10,$



$$n(I \cap III) = 12, n(I \cap II \cap III) = 4$$

Now using the formula, we get  $n(I \cup II \cup III) = 42 + 34 + 20 - 24 - 10 - 12 + 4 = 54$ .

7. (a) Let the money be deposited at the time of opening the account be  $m$ .  
 So after 1 year (i.e. 3 years ago) it would amount to  $1.1m$ . Since no money was withdrawn at this point, after 2 years i.e. 2 years ago it would amount to  $1.2m$ . At this point, the person withdraws Rs. 5000.  
 Hence his principal for the next year =  $(1.2m - 5000)$ . Next year, he earns 10% interest on this, which will amount of  $1.1(1.2m - 5000) = (1.32m - 5500)$ . At this point, he withdraws Rs. 6000.  
 Hence his principal for the next year would be  $(1.32m - 11500)$ .  
 He earns 10% interest on this, which amounts to  $1.1(1.32m - 11500) = (1.452m - 12650)$ . But this is equal to Rs. 10000. Hence  $m = \text{Rs. } 15600$ .
8. (c) Let  $P, Q$  and  $R$  be  $n, n + 2$  and  $n + 4$  respectively in ascending order.  
 According to the Question  

$$3n = 2(n + 4) - 3 = 2n + 5$$

$$\therefore n = 5$$
 Thus,  $R = 5 + 4 = 9$
9. (b) Putting  $n = 1$ , we get  $5 + \sqrt{19}$  whose integral part is 9.  
 Putting  $n = 2$ , we get  $25 + 19 + 10\sqrt{19}$  whose integral part is  $25 + 19 + 43$  which is again an odd number. Now, through the options it can be judged that the greatest integer must always be an odd number.
10. (b) The cyclicity of each digit from 0 to 9 is a factor of 4. Hence any digit raised to a power of the type  $4k + 1$  will always end in the same digit. Hence the answer is  $x^{13} + y^{13}$ .
11. (a)  $a^{15} + a^{16} + a^{17} + \dots + a^{50} \mid$   
 $\text{Sum} = a^{15} \{1 + a + a^2 + \dots + a^{35}\}$   
 $= a^{15} \left\{ \frac{a^{36} - 1}{a - 1} \right\} \text{ where } a \neq 1$   
 Since  $a$  is the root of equation  $x^5 - 1 = 0$ ,  
 $a^5 - 1 = 0 \Rightarrow a^5 = 1$   
 $\text{So, Sum} = a^{15} \left\{ \frac{(a^5) \times a - 1}{a - 1} \right\} = 1$
12. (d)  $(x^2 - xy + y^2) = (x + y)$   
 Multiplying both sides by 2:  
 $2(x^2 - xy + y^2) = 2(x + y) \Rightarrow 2x^2 - 2xy + 2y^2 = 2(x + y)$   
 $(x - y)^2 + x^2 + y^2 = 2x + 2y$   

$$(x - y)^2 + (x - 1)^2 + (y - 1)^2 = 2$$

$$\begin{array}{ccccccc} \downarrow & & \downarrow & & \downarrow & & \\ 0 & & 1 & & 1 & & \rightarrow (A) \\ 1 & & 0 & & 1 & & \rightarrow (B) \\ 1 & & 1 & & 0 & & \rightarrow (C) \end{array}$$

Integer solutions for  $(x, y)$ :

**Case 1:**  $(0, 0)$  and  $(2, 2)$

**Case 2:**  $(1, 2)$  and  $(1, 0)$

**Case 3:**  $(2, 1)$  and  $(0, 1)$

So there are six non-negative integer solutions.

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13. (b) Consider  $3^{4n} = (81)^n = (1 + 80)^n = 1 + 80q, q \in \mathbb{N}$

$$\therefore 3^{3^{4n}} = 3^{80q+1} = (81)^{20q} \cdot 3$$

Since the last digit of  $(81)^{20q}$  is 1, so the last digit of

$$3^{3^{4n}} + 1 \text{ is } 1 \times 3 + 1 = 4$$

14. (d) For the younger child ₹ 7.5 lakh should become 21 lakhs in 9 years.

Hence,

$$\text{Amount} = \text{Principal} + \text{Simple Interest}$$

$$21 = P + \frac{P \times R_1 \times T}{100}$$

$$21 = 7.5 \left[ 1 + \left( \frac{R_1}{100} \right)^9 \right]$$

$$21 \times 100 = 7.5 \times 100 + 7.5 \times R_1 \times 9$$

$$7.5 \times R_1 \times 9 = (21 - 7.5) \times 100$$

$$R_1 = \frac{13.5 \times 100}{7.5 \times 9} = 20\%$$

Similarly, for the elder son, ₹ 7.5 lakh should become in 6 years.

$$\text{Hence, Amount} = \text{Principal} + \text{Simple Interest}$$

$$21 = 7.5 \left[ 1 + \left( \frac{R_2}{100} \right)^6 \right]$$

$$21 \times 100 = 7.5 \times 100 + 7.5 \times R_2 \times 6$$

$$7.5 \times R_2 \times 6 = (21 - 7.5) \times 100$$

$$R_2 = \frac{13.5 \times 100}{7.5 \times 6} = 30\%$$

15. (a) From option (a),

$$\frac{2-x}{(1-x)^3} = (2-x)(1-x)^{-3}$$

Using Binomial here

$$= (2-x)(1+3x+6x^2+10x^3+\dots+\frac{(r+1)(r+2)}{2!}x^r+\dots)$$

$$= 2+5x+9x^2+14x^3+\dots$$

this is same series as given

Thus, option (a) is correct answer.

16. (d) The general term is of the form

$$\frac{(X+n(n+2))}{(n+2)}.$$

$n(n+2)$  is always divisible by  $(n+2)$ . So we can say that  $n(n+2) \pm 1$  would never be divisible by  $(n+2)$ . If we put  $X = -1$ , the numerator and denominator of all the terms would be co-prime.

17. (b) One such number is 1 which has no factor other than itself.

If the number has only one prime factor i.e. it is of the form  $p^a$  where  $p$  is a prime number and  $a$  is a natural number, then according to the question:  $(a+1)^2 = p^a$ . This is possible only if  $a=2$  and  $p=3$ . So the number is 9. If the number has two prime factors then it would be of the type  $p^a \times q^b$ , where  $p$  and  $q$  are two distinct prime numbers. Then according to the question:

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$$(a+1)^2 (b+1)^2 = p^a \times q^b$$

This is possible only if  $p$  and  $q$  are both 3. Since they are different, this is not a valid case. So there would no such case with two or more prime factors.

So there are only two such integers - 1 and 9.

18. (b) In the given equation the right hand side contains the powers of 2 and 3 only; therefore the left hand side should contain the powers of 2 and 3 only.

Since  $(x-1)(x-2)(x-3)$  is a product of three consecutive numbers, it will always contain either one or two multiples of 2 and one multiple of 3. Lets make two cases:

- (1) If  $(x-1)$  and  $(x-3)$  are multiples of 2:

Let  $(x-1)$  be equal to  $2k$ ; then  $(x-3)$  is equal to  $2(k+1)$ . Now  $k$  and  $(k+1)$  should both contain powers of 2 or 3 only. This is possible with  $k=1, 2$  or  $3$ . Also if any of  $k$  or  $(k+1)$  is a multiple of 3,  $(x-2)$  will not be a multiple of 3 or 2. So again it will not satisfy.

- (2) If  $(x-2)$  is a multiple of 2:

Here  $(x-1)$  and  $(x-3)$  will both be odd, out of which only one will be a multiple of 3. Hence the other number will be a multiple of an odd number other than 3. So the equation can be satisfied only if that other odd number is 1. Hence taking one odd number as 1 we get  $1 \times 2 \times 3$  which is equal to 6.

Hence the equation is satisfied for  $x=4$  only.

19. (b) Here find the number of two-digit natural numbers such that unit digit is greater than their ten's digit. In such natural numbers, we cannot take 0 or 1 in units place.

When we take 2 at unit's place, we obtain only 1 Such number is 12.

When we take 3 at unit's place, we obtain 2 such numbers are 13 and 23.

When we take 9 at unit's place, we obtain 8 such numbers.

So, number of such numbers is  $(1+2+3+\dots+8) = 36$

Hence, the required number has 72 digits.

20. (d) Let first integer =  $(x-1)$ , then

Second integer =  $x$ ; so.... on

According to question.

$$\Rightarrow (x-1)^2 + x^2 + (x+1)^2 = (x+2)^2 + (x+3)^2$$

$$\Rightarrow x^2 + 1 - 2x + x^2 + x^2 + 1 + 2x = x^2 + 4 + 2x, 2 + x^2$$

$$+ 9 + 2x, 3$$

$$\Rightarrow 3x^2 + 2 = x^2 + 4 + 4x + x^2 + 9 + 6x$$

$$\Rightarrow 3x^2 + 2 = 2x^2 + 10x + 13$$

$$\Rightarrow 3x^2 + 2 - 2x^2 - 10x - 13 = 0$$

$$\Rightarrow x^2 - 10x - 11 = 0$$

$$\Rightarrow x^2 - 11x + x - 11 = 0$$

$$\Rightarrow x(x-11) + 1(x-11) = 0$$

$$\Rightarrow (x+1)(x-11)$$

$$\therefore x = -1 \text{ or } 11$$

21. (c) Sum of  $a_0 + a_1 + \dots + a_{50} = 1 + 3 + \dots + 101$

$$= \left( \frac{\text{last number} + 1}{2} \right)^2 = \left( \frac{101+1}{2} \right)^2 = 2601.$$

22. (c)  $500! + 505! + 510! + 515!$

$$= 500! (1+5k) \text{ (where } k \text{ is a natural number)}$$

So  $(5k+1)$  won't be a multiple of 5.

Minimum value of  $n$  for which  $500!$  is divisible by  $5^n = 1$ .

Maximum value of  $n$  for which  $500!$  is divisible by  $5^n$

$$\left[ \frac{500}{5} \right] + \left[ \frac{500}{5^2} \right] + \left[ \frac{500}{5^3} \right] + \left[ \frac{500}{5^4} \right]$$

$$= 100 + 20 + 4 = 124$$

Hence, there are 124 possible values of  $n$ .

23. (a) Prime factorization of 44 is  $= 2 \times 2 \times 11$   
To express 44 as product of five distinct integers  
So, we'll have to put 1 and  $-1$ .  
The only possible way comes out to be:  
 $44 = 2 \times (-2) \times 11 \times 1 \times (-1)$   
In this case the value of  $n$  would be 11 which is also the only possible value.
24. (c) LCM of 6, 4 and 3 = 12  
Multiply by 12 of each number in power

$$\Rightarrow 2^{\frac{7}{2} \times 12}, 3^{\frac{3}{4} \times 12}, 5^{\frac{2}{3} \times 12}$$

$$\Rightarrow 2^{14}, 3^9, 5^8$$

So, ascending order is

$$5^8 > 3^9 > 2^{14} \text{ or } 5^{2/3} > 3^{3/4} > 2^{7/6}$$

25. (b)  $E = 3 + 8 + 15 + 24 + \dots + 195 = 1 \times 3 + 2 \times 4 + 3 \times 5 + 4 \times 6 + \dots + 13 \times 15$   
 $\therefore T_n = n(n+2)$  and  $n = 13$

$$\therefore E = \sum_{n=1}^{13} T_n = \sum_{n=1}^{13} n(n+2) = \frac{n(n+1)(2n+1)}{6} + 2 \times \frac{n(n+1)}{2}$$

$$= \frac{13 \times 14 \times 27}{6} + 2 \times \frac{13 \times 14}{2} = 1001$$

$$= 7 \times 11 \times 13$$

Hence the sum of the prime factors of  $E$

$$= 7 + 11 + 13 = 31.$$

26. (b) Since 'ab' is a two - digit prime number and one of its digit is 3, it can assume any of the values among 13, 23, 31, 37, 43, 53, 73 and 83.  
As the absolute difference between the digits of the number is not a factor of 2, the number among the obtained numbers that satisfy the aforementioned condition are 37, 73 and 83. Hence, the number of values that 'ab' can assume is 3.

27. (d) Let the number be  $N$ .

In order to maximize the number of factors of  $N^3$ ,  $N^2$  must be expressed as a product of as many prime factors as possible.

$$\text{No. of factors of } N^2 = 105 = 3 \times 5 \times 7$$

$$\text{where } a = 2, b = 4, c = 6$$

then power original number

$$= (2+1)(4+1)(6+1)$$

$\therefore N^2 = (a)^2 (b)^4 (c)^6$ , where  $a, b$  and  $c$  are prime numbers.

$$\therefore N^3 = (a)^3 (b)^6 (c)^9$$

$$\text{Where } N = a^p b^q c^r \text{ no} = (p+1)(q+1)(r+1)$$

Hence, the number of factors of  $N^3$

$$= (3+1) \times (6+1) \times (9+1) = 4 \times 7 \times 10 = 280.$$

28. (a)  $1080 = 2^3 \times 3^3 \times 5^1$

$$(\text{where } N = a^p b^q c^r)$$

$$\therefore \text{No. of factors } (p+1)(q+1)(r+1)$$

$$\therefore \text{No. of factors of } 1080 (3+1)(3+1)(1+1)$$

$$= 4 \times 4 \times 2 = 32$$

$$1800 = 2^3 \times 3^2 \times 5^2$$

$$(\text{where } N = a^p b^q c^r)$$

$$\therefore \text{No. of factor } (p+1)(q+1)(r+1)$$

$$\therefore \text{Number of factor of } 1800 = (3+1)(2+1)(2+1)$$

$$= 4 \times 3 \times 3 = 36$$

$$\therefore \text{HCF of } 1080 \text{ and } 1800 = 2^3 \times 3^2 \times 5$$

$$\text{where } N = a^p, b^q, c^r$$

$$\text{No. of factors HCF} = (p+1)(q+1)(r+1)$$

$$\therefore \text{No. of factors HCF of two numbers} = (3+1)$$

$$(2+1)(1+1)$$

$$= 4 \times 3 \times 2 = 24$$

So, the required number of divisors

$$= (32+36) - 2 \times 24 = 20$$

$$\therefore f(2n) = 1^4 + 2^4 + 3^4 + 4^4 + 5^4 + \dots + (2n)^4$$

$$\Rightarrow f(2n) = (1^4 + 3^4 + 5^4 + \dots + (2n-1)^4) + (2^4 + 4^4 + 6^4 + \dots + (2n)^4)$$

$$\therefore 1^4 + 3^4 + 5^4 + \dots + (2n-1)^4$$

$$= f(2n) - (2^4 + 4^4 + 6^4 + \dots + (2n)^4)$$

$$= f(2n) - 2^4 \times (1^4 + 2^4 + 3^4 + \dots + n^4)$$

$$= f(2n) - 16 \times f(n)$$

30. (d) For  $d = 1$ , Total = 46

$$(1, 2, 3, 4, 5), (2, 3, 4, 5, 6) \dots \dots \dots (46, 47, 48, 49, 50)$$

$$\text{For } d = 2, \text{ total} = 42$$

$$(1, 3, 5, 7, 9), (2, 4, 6, 8, 10) \dots \dots \dots (42, 44, 46, 48, 50)$$

$$\text{For } d = 3, \text{ total} = 38$$

$$(1, 4, 7, 10, 13), (2, 5, 8, 11, 14) \dots \dots \dots (38, 41, 44, 47, 50)$$

$$\text{For } d = 12, \text{ total} = 2$$

$$(1, 13, 25, 37, 49), (2, 14, 26, 38, 50)$$

$$\text{So total} = 46 + 42 + 38 \dots \dots \dots 2$$

$$\text{Possible APs} = \frac{12}{2} (2+46) = 288.$$

31. (c) Let the two numbers be  $x$  and  $y$  according to question,

$$x + y = 600 \text{ and } \frac{x}{y} = \frac{7}{8}$$

$$\therefore x + y = 600 \dots \dots \dots \text{(i)}$$

$$\frac{x}{y} = \frac{7}{8} \Rightarrow 8x - 7y = 0 \dots \dots \dots \text{(ii)}$$

From equation (i) and (ii)

$$x = 280 \text{ and } y = 320$$

$$\therefore \text{LCM of } 280 \text{ and } 320 = 2240$$

32. (a) Put  $n = 5$ , in the given relation then,  $P_5 = 267$

Again,

$$P_6 = P_5 - P_4 + P_3 - P_2$$

$$\Rightarrow P_6 = -P_1$$

$$P_7 = -P_2,$$

$$\text{Similarly, } P_8 = -P_3$$

$$P_9 = -P_4$$

$$P_{10} = -P_5$$

The sequence repeats its terms after every 10 terms.

Here, we observe following pattern

$$P_{531} = P_{(530+1)} = P_1 = 211$$

$$P_{753} = P_{(750+3)} = P_3 = 420$$

$$P_{975} = P_{(970+5)} = P_5 = 267$$

$$\text{So, } P_{531} + P_{753} + P_{975} = 211 + 420 + 267 = 898.$$

33. (a) Let the batsman scored a 2's, b 4's and c 6's.

$$\Rightarrow 2a + 4b + 6c = 100$$

$$\Rightarrow a + 2b + 3c = 50. \dots \dots \dots \text{(i)}$$

- When  $c = 1$ , (i) becomes  $a + 2b = 47$   
 $\Rightarrow a = 47 - 2b$  ....(ii)  
 Since  $a \geq 1$  and  $b \geq 1$ , the number of solutions of (ii) is 23.
- When  $c = 2$ , (i) becomes  $a + 2b = 44$   
 $\Rightarrow a = 44 - 2b$  ....(iii)  
 Since  $a \geq 1$  and  $b \geq 1$ , the number of solutions of (iii) is 21.
- When  $c = 3$ , (i) becomes  $a + 2b = 41$   
 $\Rightarrow a = 41 - 2b$  ....(iv)  
 Since  $a \geq 1$  and  $b \geq 1$ , the number of solutions of (iv) is 20.
- When  $c = 4$ , (i) becomes  $a + 2b = 38$   
 $\Rightarrow a = 38 - 2b$  ....(v)  
 Since  $a \geq 1$  and  $b \geq 1$ , the number of solutions of (v) is 18.
- Thus, we see a pattern emerging.  
 $\therefore$  The total number of ways  
 $= 23 + 21 + 20 + 18 + \dots + 3 + 2 = 184.$
34. (d) Here, we take the 1st option, a delete all perfect squares and perfect cubes, then a total of 22 perfect square will be deleted ( $1^2, 2^2, \dots, 22^2$ ) and a total of 7 perfect cubes will be deleted ( $1^3, 2^3, \dots, 7^3$ ) and Two numbers are common in between them viz.  $1^6$  and  $2^6$  which are perfect squares as well as perfect cubes  
 Thus, 500 is the  $(500 - 22 - 7 + 2) = 473$  rd term.  
 So, 476th term  $= 500 + 3 = 503.$
35. (c) Here,  $343^b = 676$   
 $\Rightarrow 7^{3b} = 26^2$   
 Now,  $7^a = 26$   
 $\Rightarrow 7^{3b} = (7^a)^2$   
 $\Rightarrow 2a = 3b$
36. (c) In order to maximize the power of 2 in the product, one of the ten numbers has to be 64 as this is the highest two-digit number of the form  $2^k$ , where  $k$  is a natural number.  
 There has to be maximum number of multiples of 8 among the ten numbers. In a set of ten consecutive natural numbers, there can be a maximum of two numbers that will be a multiple of 8.  
 The possible sets of ten consecutive natural numbers that satisfy the aforementioned conditions are 55 to 64, 56 to 65, 63 to 72 and 64 to 73. The highest power of 2 in the product of any of these sets of ten numbers will be 13.
37. (245) Let  $x$  be the initial quantity of wine in the vessel.  $y$  litres of content is removed twice. The part of wine left is  $x \left(1 - \frac{y}{x}\right)^2$   
 Now in 98 L of sample 18 L is wine which is same as  $\frac{18}{98}$  part of the solution  

$$\left(1 - \frac{y}{x}\right)^2 = \frac{(x-y)^2}{x^2} = \frac{18}{98} = \frac{9}{49}$$

$$\Rightarrow \frac{(x-140)^2}{x^2} = \frac{9}{49} \Rightarrow x = 245.$$

38. (d)  $x = \text{L.C.M. of } (7, 8, 9) - 3 = 504 - 3 = 501$   
 $x^3 + 2x^2 + x - 3 = (x-1)(x+1)(x+2) - 1$   
 $= 500 \times 502 \times 503 - 1$   
 Remainder when  $500 \times 502 \times 503 - 1$  is divided by:  
 $11 = 4$   
 $3 = 0$   
 $4 = 3$   
 Required remainder = least possible number which when divided by 11, 3 and 4 leaves remainder 4, 0 and 3 respectively.  
 Such least no. is 15.
39. (12) For the amount to get tripled, the increase is 200% of the principal. If it happens in 24 years then it will take 12 years for the increase to be 100% of the principal.
40. (b)  $P = 15^{100} (1 \times 2 \times 3 \times \dots \times 100)$   
 $= 15^{100} \times 100!$   
 Highest power of 2 in  $P = 97$  (2 will be deciding factor for number of zeroes because number of lives will be greater than number of zeroes in this number)  
 $Q = 25^{20 \times 50} (1 \times 2 \times 3 \times \dots \times 50) = 5^{2000} \times 50!$   
 Highest power of 2 in  $Q = 47$   
 So Highest power of 2 in  

$$\frac{P^2}{Q} \times 10^{1767} = 2 \times 97 + 1767 - 47 = 1914$$
  
 Hence, number of zeroes = 1914.  
 Solve by option.  
 Option (a): If the product of the digits is 6, then the factors of 6 are 1, 2, 3 and 6. This combination of digits is not suitable. So it is not the answer.  
 Option (b): If the product of the digits is 8, then the factors of 8 are 1, 2, 4 and 8. So only possible combination is 1, 1, 2, 4.  
 Hence, the number is 4112. It is suitable for answer.  
 Similarly, we can check options (c) and (d).  
 Let  $n$  be  $xyz$  and since  $n$  is odd  $z$  can take only odd values i.e. 1, 3, 5 and 9. Now,  $x \leq y$  and  $x \geq z$
- | Possible values |                    |               |    |
|-----------------|--------------------|---------------|----|
| x               | y                  | z             | n  |
| 1               | 1, 2, 3, 4, ..., 9 | 1             | 9  |
| 2               | 2, 3, 4, ..., 9    | 1             | 8  |
| 3               | 3, 4, ..., 9       | 1, 3          | 14 |
| 4               | 4, 5, 6, ..., 9    | 1, 3          | 12 |
| 5               | 5, 6, ..., 9       | 1, 3, 5       | 15 |
| 6               | 6, 7, ..., 9       | 1, 3, 5       | 12 |
| 7               | 7, 8, 9            | 1, 3, 5, 7    | 12 |
| 8               | 8, 9               | 1, 3, 5, 7    | 8  |
| 9               | 9                  | 1, 3, 5, 7, 9 | 5  |
- $\therefore$  Total number of elements in  $P = 95.$   
 $x = 106^{90} - 49^{90}$   
 $\because (x^n - a^n)$  is divisible by both  $(x - a)$  and  $(x + a)$  whenever  $n$  is even  
 $\Rightarrow (106^{90} - 49^{90})$  is divisible by both 57 and 155  
 $57 = 19 \times 3$   
 $155 = 31 \times 5$   
 Therefore,  $(106^{90} - 49^{90})$  will be divisible by  $(19 \times 31) = 589$  as well.  
 Also, note that  $(106^{90} - 49^{90})$  will be odd and options (b) and (c) are even. Hence, they can be rejected.
43. (a)

44. (b)  $1000 = 2^3 \times 5^3$  and  $2000 = 2^4 \times 5^3$

Since LCM (c, a) and LCM (b, c) is  $2^4 \times 5^3$  and LCM (a, b) =  $2^3 \times 5^3$ , so the factor  $2^4$  must be present in c. Hence c =  $2^4 \times 5^x$ , where x ranges from 0 to 3

Therefore, there are four possible values of C.

Since, HCF of (a, b) = K  $\times 5^3$ , it means

$$a = 2^y \times 5^3$$

$$b = 2^z \times 5^3$$

x = 0 to 3, y = 0, then z = 3  $\rightarrow$  4 cases.

x = 0 to 3, y = 1, then z = 3  $\rightarrow$  4 cases.

x = 0 to 3, y = 2, then z = 3  $\rightarrow$  4 cases.

x = 0 to 3, y = 3, then z = 3  $\rightarrow$  4 cases.

x = 0 to 3, y = 3, then z = 2  $\rightarrow$  4 cases.

x = 0 to 3, y = 3, then z = 1  $\rightarrow$  4 cases.

x = 0 to 3, y = 3, then z = 0  $\rightarrow$  4 cases.

Hence, total cases = 28.

45. (31) Let the four numbers are XA, XB, XC and XD respectively

where X is the common factor of each pair of numbers and A, B, C, D are prime to each other.

Then,

$$310 = 2 \times 5 \times 31$$

$$651 = 31 \times 21 = 3 \times 7 \times 31$$

$$\therefore \text{GCF}(310, 651) = 31$$

$\therefore$  highest common factor of all = 31

46. (a) Here,  $7^4 = 2401$

$$\therefore 7^{100} = (7^4)^{175} = (2401)^{175}$$

Any power of 2401 will end with 1 as the units digit and 0 as the tens digit.

$\therefore$  When it is divided by 100, the remainder is 1.

47. (d) Let the 4-digit sequence be abcd.

In base 6, this represents  $216a + 36b + 6c + d$  and each of a, b, c, d is less than 6.

In base 10, it represents  $1000a + 100b + 10c + d$ .

Given  $4(216a + 36b + 6c + d)$

$$= 1000a + 100b + 10c + d$$

$$\Rightarrow 136a = 44b + 14c + 3d \dots (\text{A})$$

By trial a = 1, b = 2, c = 3, d = 2

If a = 2, the LHS = 272

[If we consider b = 5, we need 272 - 220 or 52 from  $14c + 3d$  (c, d) = (2, 8) but 8 is not a proper digit in base 6.

If a = 3, the LHS = 408, while  $44b + 14c + 3d$  can at the most be  $(44 + 14 + 3)5$  or 305.

$\therefore$  There are no other possible values that satisfy (A)]

$$\therefore abcd = 1232 \text{ and } a + b + c + d = 8$$

48. (b) Remainder [N/625]

$$= \text{Remainder} \left[ \frac{\text{the number formed by the last four digits}}{625} \right]$$

$$= \text{Remainder} \left[ \frac{8888}{625} \right]$$

$$= \text{Remainder} \left[ \frac{14 \times 625 + 138}{625} \right] = 138$$

49. (b) Here,  $120 \leq n \leq 240$ .

$$120 = 2^3 (3)(5) \text{ and } 240 = 2^4 (3)(5)$$

So, the prime factors involved in 120 and 240 are the same.

So, number of co-primes of 240 lying between 120 and

$$240 = \phi(240) - \phi(120).$$

$$= 240 \left(1 - \frac{1}{2}\right) \left(1 - \frac{1}{3}\right) \left(1 - \frac{1}{5}\right) - 120 \left(1 - \frac{1}{2}\right) \left(1 - \frac{1}{3}\right) \left(1 - \frac{1}{5}\right)$$

$$= (240 - 120) \left(\frac{1}{2}\right) \left(\frac{2}{3}\right) \left(\frac{4}{5}\right) = 32$$

## Ch-2. Set Theory

1. (c) Starting from 1, in every set of 6 consecutive natural numbers there will be 4 elements that belong to S3 (e.g. 2, 3, 4, 6). So we can say that the 104th element of S3 will be  $\frac{(4 \times 104)}{6} = 156$ . The next element i.e. the 105th element will be 158.

2. (c) For a stack of 5 cubes to be hazardous atleast 3 cubes of uranium have to be together. So there are 3 cases: Case I: 3 uranium and 2 lead cubes are present. They can be arranged in 3 ways (with the uranium cubes at positions (1, 2, 3 or 2, 3, 4 or 3, 4, 5) when uranium is together.

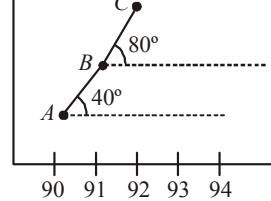
Case II: 4 uranium & 1 lead cube:

If the 4 uranium cubes are together then they can be arranged in 2 ways (UUUUL and LUUUU). If 3 uranium cubes are together then they can be arranged in 2 ways (UULU, and ULUUU).

Case III: 5 uranium cubes which can be arranged in 1 way. So in all  $3 + 4 + 1 = 8$  ways.

3. (b) The rise in food prices is double that of fuel prices and the rise in miscellaneous groups prices is double that of rent. Only option 'b' satisfies the above criteria.

4. (a)



From statement I we can find the graph given above. So, we can easily get the ratio of growth in revenue between 1991-92 and 1990-91.

5. (c) To find Geetanjali Express' speed we need to find the length of the bridge as :

$$\text{Speed} = \frac{\text{length of train} + \text{length of bridge}}{\text{time}}$$

I – provides the length of Bombay Mail + the length of bridge.

II – provides the length of Bombay Mail.

Thus, we can combine I & II to find the length of bridge.

### For Questions 6 to 8 :

Given that the increase in the number of applicants in the Commerce stream in 2008 as compared to 2007 is 70000 and that the average number of applicants in the four given streams in 2008 is 400000.

Therefore, the increase in the number of applicants in the Engineering stream in 2008 will be  $70000 + 20000 = 90000$ .

Thus, the corresponding, increase in the number of applicants in the Medical Science stream in 2008 will be  $90000 - 69000 =$

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21000 and subsequently the increase in the number of applicants in the Arts stream will be  $21000 + 59000 = 80000$ .

6. (d) So, the values of C, E and F will be  $(70000 - 21000 = 49000)$ ,  $(80000 - 90000 = -10000)$  and  $(80000 - 70000)$  respectively.  
So, the options (a), (b) and (c) are true.

**For questions 7 and 8 :**

Let the number of applicants in the Engineering, Medical Science, Commerce and Arts stream in 2007 be 'x', 'y', 'z' and 'w' respectively.

Therefore, the number of applicants in the Engineering, Medical Science, Commerce and Arts stream in 2008 will be  $(x + 90000)$ ,  $(y + 21000)$ ,  $(z + 70000)$  and  $(w + 80000)$  respectively.

7. (a) So,  $x + y + z + w + 261000 = 400000 \times 4 = 1600000$ .  
Or,  $x + y + z + w = 1339000$ .

8. (b) Required percentage

$$= \left( \frac{80000}{1339000} \right) \times 100 = 5.97 \% \approx 6\%$$

9. (c) Here set S has 6 composite and 4 prime numbers.  
The number of subsets of S comprising composite numbers only =  $2^6 - 1$   
The number of subset of S comprising prime numbers only  $2^4 - 1$   
Hence, the required difference =  $(2^6 - 1) - (2^4 - 1) = (63 - 15) = 48$ .

10. (c) There would be two cases.  
They are as follows :

**Case I :**  $x \geq 0$  ... (i)

The inequality becomes,

$$\begin{aligned} \frac{1}{x-2} &< 0.5 \\ \Rightarrow (x-2) &< 0.5(x-2)^2 \\ \Rightarrow (x-2)^2 - 2(x-2) &> 0 \\ \Rightarrow (x-2)(x-4) &> 0 \\ \Rightarrow x &> 4 \text{ or } x < 2 \end{aligned}$$

Using (i), the range becomes

$$x > 4 \text{ or } 0 \leq x < 2$$

**Case II :**  $x < 0$  ... (iii)

The inequality becomes,

$$\begin{aligned} \frac{1}{-x-2} &< 0.5 \\ \Rightarrow \frac{1}{x+2} &> -0.5 \\ \Rightarrow 2(x+2) + (x+2)^2 &> 0 \\ \Rightarrow (x+2)(x+4) &> 0 \\ \Rightarrow x &> -2 \text{ or } x < -4 \end{aligned}$$

Using (iii), the range becomes

$$-2 < x < 0 \text{ or } x < -4 \quad \dots \text{(iv)}$$

Combining (ii) and (iv),

$$\text{The range is } (x < -4) \cup (-2 < x < 2) \cup (x > 4).$$

11. (c) If n is a factor of 360, then according to the pattern of movement followed by the robot, it will cover a regular polygon of an external angle of  $n^\circ$  and number of sides

$$= \frac{360}{n}.$$

The length of each side will be  $2n$  metres. Hence the robot will come back to O in this case. However, if n is

### Past Years Solved Paper (2009-2016)

not a factor of  $360^\circ$ , then the robot will now come back to O, but will continue moving till it covers 1000 metres and then stop.

Note : The robot may come back to O for other values of n, which are not factors of  $360^\circ$  but are factors of  $720^\circ$ ,  $1080^\circ$ ... etc. However, in such cases the distance required to be covered before reaching O will be greater than 1000 m.

Since the robot came back to O, n must be a factor of  $360^\circ$  and also the total distance covered = (number of sides of the regular polygon)  $\times$  (length of each side) =

$$\frac{360}{n} \times 2n = 720 \text{ m}$$

Note that the distance is independent of N.

If n is a factor of 360, then according to the pattern of movement followed by the robot, it will cover a regular polygon of an external angle of  $n^\circ$  and number of sides

$$= \frac{360}{n}.$$

The length of each side will be  $2n$  metres. Hence the robot will come back to O in this case. However, if n is not a factor of  $360^\circ$ , then the robot will not come back to O, but will continue moving till it covers 1000 metres and then stop.

Note : The robot may come back to O for other values of n, which are not factors of  $360^\circ$  but are factors of  $720^\circ$ ,  $1080^\circ$ , ... etc. However, in such cases the distance required to be covered before reaching O will be greater than 1000 m.

If the robot covered less than 1000 m, then it must have come back to O. The factors of 360 in the range

$[1, 60]$  are  $\frac{360}{1} = 360$  sides to  $\frac{360}{60} = 6$  sides. All other rational values of n, for 359 sides, 358 sides and so on till 6 sides are possible.

Hence a total of  $(360 - 6) + 1 = 355$  values are possible.

### Solution (13-16)

According to question, the ratio of the number of cars of brand A and B sold in the last year is 3 : 2

Last year	A	B
	<u>3</u>	<u>2</u>
Last Year		Present Year
A	<u>2</u>	3
B	<u>2</u>	5

In the above numbers, the underlined numbers represent the same value. Similarly the encircled numbers also represent the same value. So make them same.

Last year	A	B
	6	4
Last Year		Present Year
A	6	9
B	4	10
C	—	81

13. (a) From the above ratio it is clear that for every 6 cars of A sold last year, 19 cars of A and B are sold this year and 81 cars of C are sold this year.

$$\therefore \text{Number of cars of 'C' sold this year is } \frac{24}{6} \times 81 = 324$$

14. (c) From the previous question and the given ratios, it is clear that for every 10 cars sold last year, 100 cars are sold this year.  
 $\therefore$  The percentage increase is 900%

15. (d) According to above data.

For every 10 cars sold last year, 100 cars are sold this year and he wants to sell 180 cars in the next year. It is clear that out of this 180, 80 cars will be of brand D.

$\therefore$  Number of cars to be sold in the next year will be 700% more than the total sales of last year.

16. (b) According to above data, a total of 380 cars are sold this year. From the above ratios it is clear that for every 19 cars sold this year 6 cars of brand A were sold in the last year.

$\therefore$  Number of cars of brand A sold last year is

$$\frac{380}{19} \times 6 = 120$$

### Ch-3. Functions

1. (a)  $\{x\} = x - [x]$  or  $\{x\} + [x] = x$

The given equation

$$5[x] + 3\{x\} = 6 + x \Rightarrow 2[x] + 3([x] + \{x\}) = 6 + x$$

reduces to

$$2[x] + 3x = 6 + x$$

$$\text{or } 2[x] + 2x = 6$$

$$\text{or } [x] + x = 3$$

Since 3 and  $[x]$  are both integers, in the above equation  $x$  must also be an integer.

$$\Rightarrow [x] = x$$

$$\text{Hence, } 2x = 3 \text{ or } x = \frac{3}{2}$$

This contradicts what we assumed above.

So no real value of  $x$  satisfies the given equation.

2. (c)  $2f(x) + f(1-x) = x^2$

Replacing  $x$  by  $(1-x)$  in the above equation, we get:

$$2f(1-x) + f(x) = (1-x)^2$$

Solving the above pair of equations, we get:

$$f(x) = \frac{(x^2 + 2x - 1)}{3}$$

$$\text{Thus, } f(5) = \frac{34}{3}.$$

3. (c) Distance of origin  $(0, 0)$  from the line  $3y - 4x - 15 = 0$ :

$$\left| \frac{3(0) - 4(0) - 15}{\sqrt{3^2 + 4^2}} \right| = \frac{15}{5} = 3 \text{ units}$$

Let the new lines drawn parallel to  $3y - 4x - 15 = 0$  be  $L_1$  and  $L_2$ .

Distance of  $L_1$  from origin  $= 3 + 3 = 6$  units

Distance of  $L_2$  from origin  $= 3 - 3 = 0$  units

The circle  $x_2 + y_2 = 25$  has a radius of 5 units.

Hence line segment of  $L_1$  lying inside the circle will be of zero length ( $L_1$  does not cut the circle).

Chord cut by  $L_2$  will be diameter  $= 10$  units

4. (c) It can be concluded that 5 and  $k$  are the two distinct roots of the equation  $ax^2 + bx + 1 = 0$ .

$$\text{Also, product of the roots } = \frac{1}{a} < 0 \text{ (as } a < 0\text{).}$$

Hence,  $5k < 0 \Rightarrow k < 0$ .

5. (c) The given graph must be of an equation of type

$$\frac{3-x}{y+5} = -\frac{1}{k} \text{ where } k > 1.$$

$$\frac{3-x}{y+5} = \frac{-1}{k}$$

$$y+5 = kx - 3k$$

$$y = kx - (3k + 5)$$

This is the equation of a line in the  $x-y$  plane, whose slope ( $k$ ) is greater than zero and it has a negative intercept (of length  $3k + 5$ ) on the  $y$ -axis.

Only one graph satisfies the condition.

6. (d)  $\frac{a^2 + a + 1}{3} \geq (a^2 \times a \times 1)^{1/3}$  ....By AM-GM relation

$$\text{Hence, } \frac{a^2 + a + 1}{3} \geq a \text{ or } \frac{a^2 + a + 1}{a} \geq 3$$

Similarly, a similar relation for  $b, c, d$  and  $e$  and then multiplying, we get

$$\frac{(a^2 + a + 1)(b^2 + b + 1)(c^2 + c + 1)(d^2 + d + 1)(e^2 + e + 1)}{abcde} \geq 3^5 = 243$$

7. (a)  $mx^m = nx^n$

$$\therefore x^m = \frac{nx^n}{m}$$

$$\therefore \text{Given } \left( \frac{1}{\frac{nx^n}{m} + x^n} + \frac{1}{\frac{nx^n}{m} - x^n} \right)$$

$$= \left( \frac{m}{x^n(n+m)} + \frac{m}{x^n(n-m)} \right) = \frac{2mn}{x^n(n^2 - m^2)}.$$

8. (d)  $f\left(x + \frac{y}{8}, x - \frac{y}{8}\right) = xy$

$$\text{put } \frac{y}{8} = k, f(x+k, x-k) = 8xk$$

$$\text{put } x+k = A, x-k = B \text{ or } x = \frac{A+B}{2} \text{ and } k = \frac{A-B}{2}$$

$$\text{Now, } f(A, B) = 8 \left( \frac{A+B}{2} \right) \left( \frac{A-B}{2} \right)$$

$$f(A, B) = 2(A^2 - B^2); f(B, A) = 2(B^2 - A^2)$$

then  $f(m, n) + f(n, m) = 0$  for all  $m, n$

9. (a) The number of triangles with vertices on different lines  $= {}^p C_1 \times {}^p C_1 \times {}^p C_1 = p^3$

The number of triangles with 2 vertices on one line and the third vertex on any one of the other two lines

$$= {}^p C_1 ({}^p C_2 \times {}^2 {}^p C_1) = 6p \cdot \frac{p(p-1)}{2} = 3p^2(p-1)$$

$\therefore$  the required number of triangles  $= p^3 + 3p^2(p-1)$

$$= 4p^3 - 3p^2 = p^2(4p - 3)$$

(The work "maximum" shows that no selection of points from each of the three lines are collinear).

10. (c) Since  $a, b, c$  are in H.P.

$$\therefore b = \frac{2ac}{a+c}, \Rightarrow b(a+c) = 2ac$$

Now  $\log(a+c) + \log(a-2b+c)$

$$\begin{aligned} &= \log[(a+c)(a-2b+c)] \\ &= \log[(a+c)^2 - 2b(a+c)] \\ &= \log[(a+c)^2 - 2 \times 2ac] \\ &= \log(a-c)^2 \text{ or } \log(c-a)^2 \\ &= 2 \log(a-c) \text{ or } 2 \log(c-a) \end{aligned}$$

$$\therefore \log(a+c) + \log(a-2b+c) = 2 \log(c-a)$$

11. (a) Let the roots of the equation  $x^3 - Ax^2 + Bx - C = 0$  be  $\alpha, \beta, \gamma$  respectively.

So the roots of  $x^3 + Px^2 + Qx - 18 = 0$  will be  $\alpha + 2, \beta + 2, \gamma + 2$ .

$$(\alpha+2)(\beta+2)(\gamma+2) = 18$$

$$\Rightarrow 4(\alpha + \beta + \gamma) + 2(\alpha\beta + \beta\gamma + \gamma\alpha) + \alpha\beta\gamma + 8 = 18$$

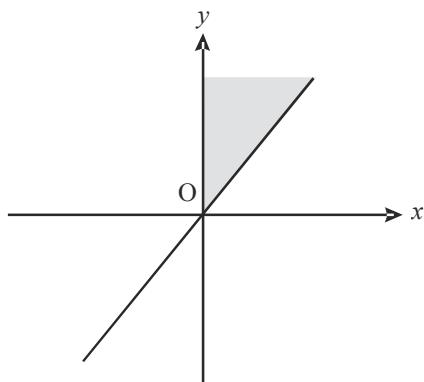
$$\Rightarrow 4A + 2B + C = 10$$

12. (a) Each of the answer choices in the form of the product of two factors on the left and  $a \geq 0$  or  $a \leq 0$  on the right.

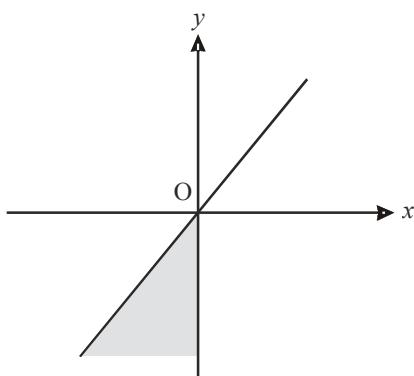
The product will be negative when the two factors have opposite signs, and it will be positive when the factors have the same sign. Choice (a), for example, has  $a \geq 0$ , so you'll be looking for other factors to have the same sign.

Either :  $x \geq 0$  and  $y - 2x \geq 0 \Rightarrow x \geq 0$  and  $y \geq 2x$  or  $x \leq 0$  and  $y - 2x \leq 0 \Rightarrow x \leq 0$  and  $y \leq 2x$

The graph of  $x \geq 0$  and  $y \geq 2x$  looks like this :



The graph of  $x \leq 0$  and  $y \leq 2x$  looks like this.



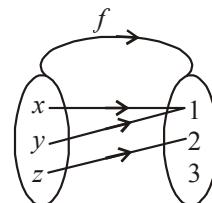
Together, they make the graph in the figure.

13. (b) There are following three cases arise :

**Case (I) :**

When  $f(x) = 1$ , is correct

then  $f(y) = 1$  and  $f(z) = 2$



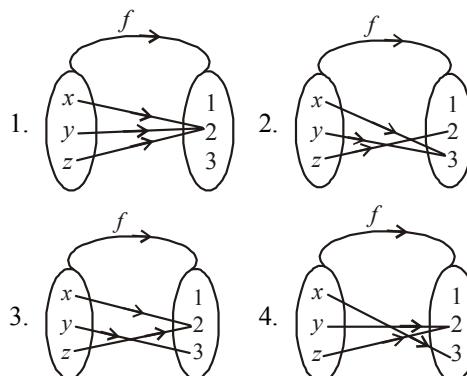
clearly the mapping  $f$  is not injective (i.e., not one-one). Hence this case is not possible.

**Case (II) :**

When  $f(y) \neq 1$ , is correct

then  $f(x) \neq 1$  and  $f(z) = 2$

Hence  $z$  mapped to 2 but  $x$  and  $y$  or mapped to 2 or 3 or one of them mapped to 2 and the other mapped to 3.



Clearly in all the above 4 sub-cases, we see that the mapping  $f$  is not injective (i.e. not one-one). Hence, this case is not possible.

**Case (III) :**

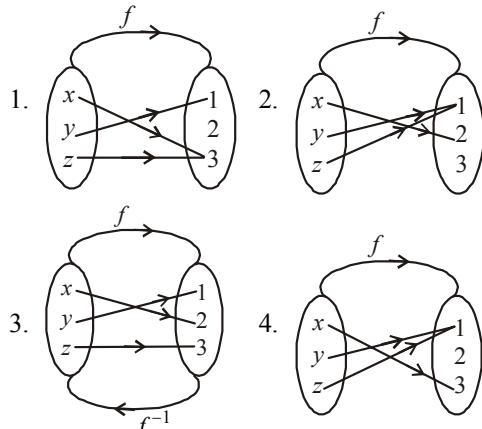
If  $f(z) \neq 2$ , is correct

then  $f(x) \neq 1$  and  $f(y) = 1$

Hence  $y$  mapped 1 but  $x$  mapped 2 or 3

Whereas  $y$  mapped 1 or 3.

The possible four mapping are as follows :



Clearly in sub case (c), the mapping is injective (i.e., one-one). Hence this case is possible and

$$f^{-1}(1) = y$$

$$14. (c) f(x) = \frac{1}{\log_{5-|x|} \sqrt{x^3 - 7x^2 + 14x - 8}}$$

$$= \frac{1}{\log_{5-|x|} \sqrt{(x-1)(x-2)(x-4)}}$$

Base of the logarithmic function  $5-|x| > 0$  and  $5-|x| \neq 1$   
 So,  $x \in (-5, -4) \cup (-4, 4) \cup (4, 5)$  ... (i)  
 Also,  $(x-1)(x-2)(x-4)$  must be greater than zero as well  
 So,  $x \in (1, 2) \cup (4, \infty)$  ... (ii)  
 Combining (i) and (ii) :  $x \in (1, 2) \cup (4, 5)$

$$15. (a) \text{ Given that } F(n-1) = \frac{1}{(2-F(n))} \text{ and } F(1) = 2.$$

$$\text{For } n = 2 : F(1) = \frac{1}{(2-F(2))}$$

$$\Rightarrow F(2) = \frac{3}{2},$$

Similarly, we can find the values of  $F(3), F(4), F(5)$

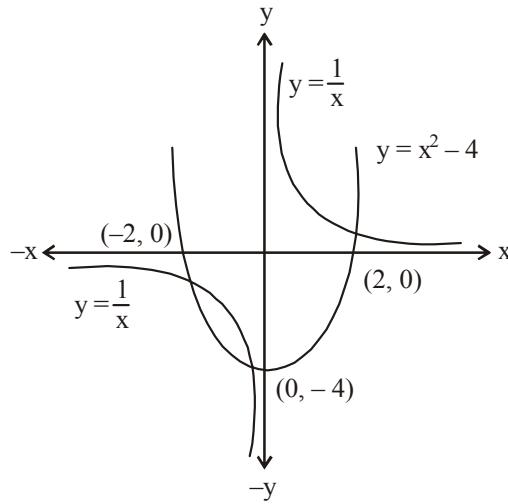
as  $\frac{4}{3}, \frac{5}{4}$  and  $\frac{6}{5}$  respectively.

$$\Rightarrow F(n) = \frac{n+1}{n}$$

From this we can say that every term except  $[F(1)]$ , of the series  $[F(1)] + [F(2)] + \dots + [F(50)]$  is equal to 1 as for 'n' > 0,  $F(n)$  lies between 1 and 2.

Therefore,  $[F(1)] + [F(2)] + \dots + [F(50)] = 51$ .  
 Hence, option (a) is the correct choice.

16. (d) The graphs of the two functions are shown below:



From the above figure, it is obvious that the graphs of the two functions intersect at three points.

$$17. (b) \text{ At } x = \frac{\pi}{4}, f(x) = 0$$

$$\text{At } x = \frac{\pi}{2}, f(x) = \infty$$

Hence,  $f(x)$  lies in the range of  $(0, \infty)$

18. (a) The sum of the roots of  $ax^2 + bx + c = 0$  is  $\frac{-b}{a}$ .

By differentiating we get  $2ax + b = 0$

$ax^2 + bx + c$  attains its maximum value at  $x = \frac{-b}{2a}$ .

$$\therefore \frac{-b}{2a} = 2 \Rightarrow \frac{-b}{a} = 4$$

Hence, the sum of the roots = 4.

Let us assume  $f(0) = K$ , where 'K' is a constant.

Then,  $f(0+y) = f(0.y) = f(0) = K$

and  $f(x+0) = f(x.0) = f(0) = K$ .

This proves that the function is a constant function.

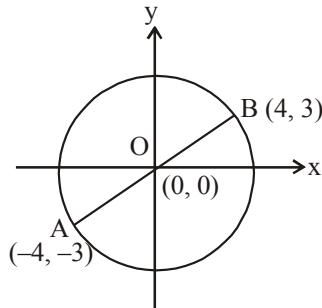
Thus, the value of

$$f(-49) = f(49) = 7$$

$$\text{Hence, } f(-49) + f(49) = 14.$$

19. (b)

20. (c)



Other two vertices will make two right angled triangles with AB as the common hypotenuse. So they must lie on the circle with AB as the diameter and O as the centre. Radius of that circle will be 5 units.

There will be 5 such pairs in which both the coordinates are integers.

$$[(5, 0), (-5, 0), (4, 3), (4, -3)],$$

$$[(-3, 4), (3, -4)] [(-3, -4), (3, 4)] \text{ and } [(0, 5), (0, -5)]$$

21. (0) Clearly,  $x > 0$

$$\text{So, } 2x = x^2 + 2x + 1$$

$$\Rightarrow 0 = x^2 + 1$$

Here, no any real roots.

Hence, there are no solutions.

22. (c)  $[\log_{10} x] = 0$ , for any value of  $x \in \{1, 2, \dots, 9\}$  ... (1)

Similarly  $[\log_{10} x] = 1$ , for  $x \in \{10, 11, 12, \dots, 99\}$  ... (2)

and  $[\log_{10} x] = 2$ , for  $x \in \{100, 101, 102, \dots, 999\}$  ... (3)

Now consider,  $1 \leq n \leq 9$ , then

$$[\log_{10} 1] + [\log_{10} 2] + [\log_{10} 3] \dots [\log_{10} n] = 0 \text{ (i.e., } \neq n)$$

Hence the expression given in the question cannot be satisfied.

Now consider,  $10 \leq n \leq 99$ , then  $[\log_{10} 1] + [\log_{10} 2] \dots [\log_{10} n]$

From (1) and (2), the above expression becomes  $(0 + 0 \dots 9 \text{ times}) + (1 + 1 + \dots (n-9) \text{ times}) = n - 9$

Using the same approach, for

$$100 \leq n \leq 999, [\log_{10} 1] + [\log_{10} 2] \dots [\log_{10} n] = 90 + 2(n - 99)$$

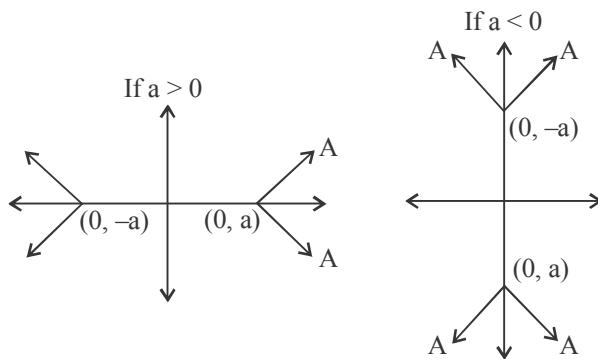
If can be seen that, only for the third case i.e.,  $100 \leq n \leq 999$ , can the expression given in the question be satisfied.

$$\text{Hence } 90 + 2(n - 99) = n$$

$$\Rightarrow n = 198 - 90 = 108$$

$$\therefore 107 \leq n < 111.$$

23. (b) The lines represented by A where  $a > 0$  and when  $a < 0$  are given in the following figures



The area enclosed by A and D would be zero if  $d < |a|$ . In choice (b),  $d = 1$  and  $a = -2$  i.e.,  $d < |a|$ . If  $a > 0$ , then the only case when the area enclosed by A and D will be zero, is when  $d = 0$ .

#### Ch-4. Average, Ratio & Proportion

1. (c) Total age of the 6 people on 1st January 2000 =  $6A$   
 Total sum of ages (including child's) of the family after 5 years =  $6(A + 5) = 6A + 30$   
 Total sum of ages (including child's) of the family after 6 years =  $6A + 30 + 7 = 6A + 37$

$$\text{Average} = \frac{(6A + 37)}{7} = A$$

Hence,  $7A = 6A + 37$  or  $A = 37$ .

2. (d) Let cost of one *roti*, one *tadka*, and one tea be ₹  $x, y, z$  respectively

$$\therefore 10x + 4y + z = 80$$

$$7x + 3y + z = 60$$

$$\therefore 10x + 4y = 80 - z \dots (i)$$

$$7x + 3y = 60 - z \dots (ii)$$

Solving this, we get

$$x = z/2 \text{ and } y = 20 - \frac{3}{2}z$$

Now we required

$$5x + 5y + 5z$$

$$= 5 \left[ \frac{z}{2} + 20 - \frac{3}{2}z + z \right] = 5 \times 20 = ₹ 100$$

3. (a) Let the %age of honey and milk in the two solutions be  $(a\%, b\%)$  and  $(c\%, d\%)$  respectively. According to

$$\text{the question: } \frac{(a-10)}{(10-c)} = \frac{(b-16)}{(16-d)}$$

Solving, we get,

$$16a - ad - 160 + 10d = 10b - 160 - bc + 16c$$

$$\text{So, } ad - bc = 16a - 10b - 16c + 10d \dots (1)$$

Similarly from the second and third proportions we can say that  $ad - bc = 12a - 12b - 12c + 12d$ .  $\dots (2)$   
 and  $ad - bc = xa - 16b - xc + 16d \dots (3)$

$$\text{From (1) and (2), we get } \frac{(a-c)}{(d-b)} = \frac{1}{2}$$

Also from (2) and (3), we get

$$\frac{(a-c)}{(d-b)} = \frac{4}{(12-x)}$$

$$\text{Hence, } \frac{4}{(12-x)} = \frac{1}{2}$$

$$8 = 12 - x \text{ and } x = 4.$$

4. (d) The total age of the family at the birth of first child =  $18 \times 3 = 54$   
 While the total age of the couple at marriage =  $25 \times 2 = 50$ .  
 $\Rightarrow$  The years from marriage till the first child's birth =  $\frac{54-50}{2} = 2$  years.

The total age of family at the birth of the second child =  $15 \times 4 = 60$  years.

$$\Rightarrow \text{Second child was born} = \frac{60-54}{3} = 2 \text{ years after the first.}$$

$$\text{Similarly the twins were born} = \frac{(12 \times 6) - 60}{4} = 3 \text{ years.}$$

After the second child and today the twins are 4 years old.

( $\therefore$  average age of the family became 16 years from 12 years)

$\therefore$  Age of eldest son =  $4 + 3 + 2 = 9$  years.

5. (c) Let the number representing A be a, and the common difference be d.  
 $\Rightarrow a + (a + 2d) + (a + 4d) = 36 \dots (i)$   
 and  $(A + C + E + G) - (A + C + E) = 60 - 36$   
 $\Rightarrow G = 24$   
 $\Rightarrow a + 6d = 24 \dots (ii)$   
 From (i) and (ii)  
 $(3a + 6d) - (a + 6d) = 12$   
 $\Rightarrow 2a = 12 \Rightarrow a = 6 \text{ and } d = 3$   
 So,  $B + D + F + H = 4a + 16d = 24 + 48 = 72$

6. (b) Let the total amount involved in this game in \$K.

The first person has  $\frac{7}{18}K$  in the beginning and  $\frac{6}{15}K$  in the end. Thus he won something.

Second person has  $\frac{6}{18}K$  in the beginning and  $\frac{5}{15}K$  in the end. So he neither gains nor loses. At this point it is very clear that third person loses something.

$$\Rightarrow \frac{6}{15}K - \frac{7}{18}K = 12$$

$$\Rightarrow \frac{36K - 35K}{90} = 12$$

$$\text{So, } K = 1080$$

So, the winner must have started with \$ 420.

7. (b) Let the required number of hour be h.

$$\therefore \frac{1 \times \left(1 - \frac{5}{100}\right)^h}{9 \left(1 - \frac{20}{100}\right)^h + 1 \times \left(1 - \frac{5}{100}\right)^h} \geq \frac{18}{100}$$

- Going through the options,  $h = 4$  comes out to be the correct answer.
8. (d) If all are of equal height, number of handshakes  $= {}^{40}C_2$ .  
If all are of different heights, number of handshakes  $= 0$   
 $\therefore$  Required difference  $= {}^{40}C_2 - 0 = {}^{40}C_2$ .
9. (b) Let the number of Re. 1,50 paise and 25 paise coins be 360, 432 and 576 respectively (ratio 5 : 6 : 8).

Re. 1	50 paise	25 paise
360	432	576

I transaction:  $3/5$  th of Re. 1 coins changed 216 coins of Re. 1 would be changed with 144 coins of 50 paise and 576 coins of 25 paise (so that total 50 paise coins = 576 and total 25 paise coins = 1152 in the ratio 1 : 2)

Re. 1	50 paise	25 paise
144	576	1152

II transaction: Half of 50 paise coins to Re. 1 and all 25 paise coins to Re. 1 and 50 paise in the ratio 7:4  
Half of 50 paise coins  $\Rightarrow$  144 coins of Re. 1  
1152 coins of 25 paise  $\Rightarrow$  224 coins of Re. 1 and 128 coins of 50 paise

Re. 1	50 paise	25 paise
512	416	0

$$\text{Ratio} = 512 : 416 = 16 : 13.$$

## Ch-5. Algebra 1

1. (c) As  $p, q, r$  are non-negative integers, the maximum will be achieved when the value of each variable is closed to each other.

i.e.  $p, q, r$  are 3, 3, 4 (not necessarily in the same order). Hence the value of

$$\begin{aligned} pq + qr + pr + pqr \\ = 3 \times 3 + 3 \times 4 + 3 \times 4 + 3 \times 3 \times 4 \\ = 9 + 12 + 12 + 36 = 69 \end{aligned}$$

2. (c) The expression can be written as  $a + \frac{1}{b+x}$ , where  $x$  lies in the interval  $(0, 1)$ . Since  $(1.25)^3 = 1.953125$  and  $(1.3)^3 = 2.197$ , it can be concluded that  $\frac{1}{2^3}$  belongs to the interval  $(1.25, 1.3)$ .

Hence,  $a = 1$ . This implies that  $\frac{1}{b+x}$  lies in the interval  $(0.25, 0.3)$ . The only possible value of  $b = 3$ .

3. (b) Let  $\alpha, \beta$  are roots of

$$\ell x^2 + nx + n = 0$$

$$\therefore \alpha + \beta = \frac{-n}{\ell}, \alpha\beta = \frac{n}{\ell}$$

$$\text{Now } \frac{\alpha}{\beta} = \frac{p}{q}$$

$$\therefore \sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} = \sqrt{\frac{\alpha}{\beta}} + \sqrt{\frac{\beta}{\alpha}}$$

$$= \frac{(\alpha + \beta)}{\sqrt{\alpha\beta}} = \frac{\left(\frac{-n}{\ell}\right)}{\sqrt{\frac{n}{\ell}}} = -\sqrt{\frac{n}{\ell}}$$

$$\therefore \sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} = -\sqrt{\frac{n}{\ell}}$$

$$\therefore \sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} + \sqrt{\frac{n}{\ell}} = 0$$

4. (a) We have  $x = 1 + 2a + 3a^2 + 4a^3 + \dots \quad \dots \dots (1)$   
 $\Rightarrow ax = a + 2a^2 + 3a^3 + \dots \quad \dots \dots (2)$   
Subtracting (2) from (1), we get

$$(1 - a)x = 1 + a + a^2 + a^3 + \dots = \frac{1}{1-a} \quad [\text{sum of an infinite G.P.}]$$

$$\Rightarrow x = \frac{1}{(1-a)^2} \quad \dots \dots (3)$$

$$\text{Next } y = 1 + 3b + 6b^2 + 10b^3 \quad \dots \dots (4)$$

$$b \times y = b + 3b^2 + 6b^3 + 10b^4 \quad \dots \dots (5)$$

Subtracting (5) from (4) we get,

$$(1 - b)y = 1 + 2b + 3b^2 + 4b^3 + \dots = \frac{1}{(1-b)^2} \quad [\text{shown above}]$$

$$\Rightarrow y = \frac{1}{(1-b)^3} \quad \dots \dots (6)$$

$$\text{From (3) we get } 1 - a = \frac{1}{\sqrt{x}} \text{ or } a = 1 - \frac{1}{\sqrt{x}}.$$

$$\text{From (6) we get } 1 - b = \frac{1}{y^{1/3}} \text{ or } b = 1 - \frac{1}{y^{1/3}}.$$

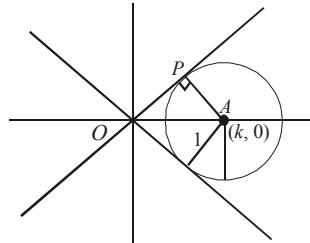
Now,  $1 + ab + (ab)^2 + (ab)^3 + \dots$

$$= \frac{1}{1-ab} = \frac{1}{1 - \left(1 - \frac{1}{\sqrt{x}}\right)\left(1 - \frac{1}{y^{1/3}}\right)}$$

$$= \frac{x^{1/2} \times y^{1/3}}{x^{1/2}y^{1/3} - (x^{1/2} - 1)(y^{1/3} - 1)} = \frac{x^{1/2}y^{1/3}}{x^{1/2} + y^{1/3} - 1}.$$

5. (d)  $r + t = 2s$  would be correct option as  $s$  is the average of  $r$  and  $t$ .

6. (c)



$$(x - k)^2 + y^2 = 1, \text{ represents a circle with centre } (k, 0) \text{ and radius } = 1.$$

For a positive unique solution the line  $y = x$  will be tangent to the circle at point  $P$ .

$$OA^2 = AP^2 + OP^2 \Rightarrow OA = \sqrt{1^2 + 1^2} = \sqrt{2}$$

7. (a) Let,  $\frac{bx - ay}{bc} = \frac{ay - cz}{ac} = \frac{cz - bx}{ab} = k$

So,

$$\therefore bx - ay = kbc \quad \dots(i)$$

$$ay - cz = kac \quad \dots(ii)$$

$$cz - bx = kab \quad \dots(iii)$$

On addition of (i), (ii) and (iii)

We get,  $K(ab + bc + ca) = 0$

or,  $ab + bc + ca = 0$ .

8. (c) Quadratic equation  $ax^2 + bx + c = 0$  must have two roots which may or may not be identical.

Let  $f(x) = ax^2 + bx + c$ .

$$\begin{aligned} f(1) &= a(1)^2 + b(1) + c \\ &= a + b + c = 0 \end{aligned}$$

So,  $x = 1$  is definitely a root of  $ax^2 + bx + c = 0$ .

Product of roots of  $ax^2 + bx + c = 0$  is  $\frac{c}{a}$ .

So if one of the roots is 1 then the other root must be

$$\frac{c}{a}.$$

9. (b) Let the fund value follow the quadratic polynomial  $f(x) = ax^2 + bx + c$ .

When  $x = 0$ ,  $f(x) = 10 \Rightarrow c = 10$

When  $x = 2$ ,  $f(x) = 5$

$$\Rightarrow 4a + 2b + 10 = 5$$

$$\Rightarrow 4a + 2b = -5$$

... (i)

When  $x = 4$ ,  $f(x) = 15$

$$\Rightarrow 16a + 4b + 10 = 15$$

$$\Rightarrow 16a + 4b = 5$$

... (ii)

Solving (i) and (ii), we get

$$a = \frac{15}{8}, b = \frac{-25}{4}$$

∴ Required difference

$$= \left( \frac{15}{8} \times 8^2 - \frac{25}{4} \times 8 + 10 \right) - 10 = 70$$

10. (a)  $(x - 2)$  is a factor of  $R(x)$

$$\therefore R(2) = 0$$

$$\Rightarrow m(2)^3 - 100(2)^3 + 3n = 0$$

$$\Rightarrow 8m - 400 + 3n = 0$$

$$\Rightarrow m = \frac{400 - 3n}{8} = 50 - \frac{3n}{8}$$

∴  $m$  and  $n$  are positive integers, so  $n$  must be a multiple of 8. i.e.  $n = 8, 16, 24, \dots, 128$ , then we get  $m = 47, 44, 41, \dots, 2$  respectively.

So, the number of ordered pairs  $(m, n)$  is 16.

11. (d) General term expansion of

$$(a^2 + b)^{13} = {}^n C_r x^{n-r} y^r$$

To get coefficient of  $a^{12} b^8$

$$(a^2)^6 b^8 \text{ where } 6 + 8 \neq 13.$$

So the term is not possible

12. (d) Here,  $(x - 1)(x - 2)(x - 3) = 0$

$$\Rightarrow (x^2 - 3x + 2)(x - 3) = 0$$

$$\Rightarrow x^3 - 6x^2 + 11x - 6 = 0$$

According to question,

$$x = 3, a_n = -6, a_1 = -6$$

Substitute the above values in the option,

$$\text{Option (a)} : (-6)^3 \geq 3^3 \times -6$$

$$\Rightarrow -216 \geq -168$$

This is incorrect, thus option (a) is incorrect.

$$\text{Option (b)} : 3^3 \geq (-6)^3 \times -6$$

$$27 \geq 6^4$$

This is incorrect, thus option (b) is incorrect.

$$\text{Option (c)} : (-6)^3 \geq 3^3 \times -6$$

$$\Rightarrow -216 \geq -168$$

This is incorrect, thus option (c) is incorrect.

Thus, none of the options is necessarily true.

We obtain the sum of all the coefficients of a polynomial by equating all the variables to 1. Here by putting  $x = 1$  in the polynomial, the required sum comes out to be zero.

13. (a)

The equations formed by the roots of the equation  $(x - a)(x - b)(x - c) = 0$  can be as follows:

$$(i) (x - a)(x - b) \Rightarrow \text{Roots are } a, b$$

$$(ii) (x - b)(x - c) \Rightarrow \text{Roots are } b, c$$

$$(iii) (x - c)(x - a) \Rightarrow \text{Roots are } c, a$$

$$(iv) (x - a)^2 \Rightarrow \text{Roots are } a, a$$

$$(v) (x - b)^2 \Rightarrow \text{Roots are } b, b$$

$$(vi) (x - c)^2 \Rightarrow \text{Roots are } c, c$$

Adding all these roots, we get  $4(a + b + c)$ .

15. (a)

$n$ th term of the series can be written as

$$\frac{1}{n! + (n+1)!} = \frac{1}{n!(n+2)}$$

$$= \frac{(n+1)}{(n+2)!}$$

$$= \frac{1}{(n+1)!} - \frac{1}{(n+2)!}$$

Put  $n = 1, 2, \dots, 10$  to get

$$\left( \frac{1}{2!} - \frac{1}{3!} \right) + \left( \frac{1}{3!} - \frac{1}{4!} \right) + \dots + \left( \frac{1}{10!} - \frac{1}{11!} \right)$$

$$= \frac{1}{2!} - \frac{1}{11!}$$

16. (c)

According to question,

$$x(x - 3) = -1$$

cubing on both side.

$$\Rightarrow x^3(x - 3)^3 = (-1)^3$$

$$\Rightarrow x^3(x^3 - 27x^2 + 27x) = -1$$

$$\Rightarrow x^3(x^3 - 18) + x^3(-9 - 9x^2 + 27x) = -1$$

$$\Rightarrow x^3(x^3 - 18) - 9x^3(x^2 - 3x + 1) = -1$$

$$\Rightarrow x^3(x^3 - 18) - 9x^3(-1 + 1) = -1$$

$$\Rightarrow x^3(x^3 - 18) = -1$$

17. (c)

Take roots as 2, 2

$$\Rightarrow r = -4 \text{ & } s = 4$$

$$\Rightarrow \frac{r+s+1}{s-r} = \frac{1}{8} = +\text{ve } (R > 0)$$

18. (c)

By assuming the values of  $x, y, z$  and  $t$ , (a) and (b) can be very easily ruled out.

Checking option (c), if  $x > y + z$ , then  $x > y$  and  $x > z$  (since all numbers are positive).

So, using statements I and II,  $x > z > t > y$ .  
So, option (c) is correct.

19. (d)  $3x + y + 4 = 2x y$   
 $\Rightarrow 3x + 4 = y(2x - 1)$   
 $\Rightarrow y = \left(\frac{3x + 4}{2x - 1}\right)$

When  $x = 6 \Rightarrow y = 2$

When  $x = 1 \Rightarrow y = 7$

These two are the only possible pairs of values of x and y. Where x and y are natural numbers.

$$\therefore \text{Required ratio} = \frac{(6+1)}{(2+7)} = \frac{7}{9}.$$

20. (c) By observing we can find that  $x > 1$  and  $x < 2$ .  
Else the RHS  $\neq 8$ .

So the combinations are  $[x] = 1$ ,  $[2x] = 2$  or 3.  
 $[3x] = 4$  or 5

The combinations that give RHS = 8 are  $1 + 2 + 5$  or  $1 + 3 + 4$ .

For any value of x, the case of "1 + 2 + 5" is not possible. Hence it has to be the case of "1 + 3 + 4".

Which will occur

$$\text{when } x \geq \frac{3}{2} \text{ and } x < \frac{5}{3}.$$

Hence the solution is  $\frac{3}{2} \leq x < \frac{5}{3}$ .

21. (c)  $x^2 + (x+1)(x+2)(x+3)(x+6) = 0$   
 $(x+1)(x+2)(x+3)(x+6) = -x^2$   
 $(x^2 + 7x + 6)(x^2 + 5x + 6) = -x^2$

$$x^2 \left( x + 7 + \frac{6}{x} \right) \left( x + 5 + \frac{6}{x} \right) = -x^2$$

$$\text{Let } x + \frac{6}{x} = y$$

$$\text{then, } (y+7)(y+5) = -1$$

$$\Rightarrow y^2 + 12y + 35 = -1$$

$$y^2 + 12y + 36 = 0$$

$$\Rightarrow (y+6)^2 = 0$$

$$\Rightarrow y = -6$$

$$\therefore x + \frac{6}{x} = -6$$

$$x^2 + 6x + 6 = 0$$

$$x = \frac{-6 \pm \sqrt{36 - 4(6)}}{2} = \frac{-6 \pm 2\sqrt{3}}{2} = -3 \pm \sqrt{3}$$

22. (a) Here,  $(x+1)(x+9) + 8 = 0$   
 $x^2 + 10x + 17 = 0$   
 The roots of the equation are a and b

$$\therefore a + b = -10$$

$$ab = 17$$

$$(x+a)(x+b) - 8 = 0$$

$$x^2 + (a+b)x + ab - 8 = 0$$

$$x^2 - 10x + 9 = 0$$

Therefore, roots of  $(x+a)(x+b) - 8 = 0$  are 1 and 9.

23. (d)  $\therefore S = 0.2 + 0.06 + 0.012 + 0.0020 + 0.00030 + 0.000042 + \dots$   
 $\Rightarrow S = 0.274342 + \dots$

Going from answer choices, choice (a) = 0.2666 ....

Choice (b) = 0.268888 ....; choice (c) = 0.27222 ...

Choice (d) = 0.27434 ...

So, choice (d) is answer.

24. (b) Let  $S = (2-d)\left(\frac{2}{3}\right) + (2+d)\left(\frac{4}{9}\right) + (2+3d)\left(\frac{8}{27}\right)$

$$\therefore S\left(\frac{2}{3}\right) = (2-d)\left(\frac{4}{9}\right) + (2+d)\left(\frac{8}{27}\right) + \dots$$

Subtracting,

$$\frac{S}{3} = (2-d)\left(\frac{2}{3}\right) + 2d\left(\frac{4}{9}\right) + 2d\left(\frac{8}{27}\right) + \dots$$

$$= (2-d)\left(\frac{2}{3}\right) + 2d\left[\frac{4}{9} + \frac{8}{27} + \dots\right]$$

$$= (2-d)\left(\frac{2}{3}\right) + (2d)\left[\frac{4}{9}\left(\frac{3}{1}\right)\right] = \frac{4}{3} + 2d$$

$$\Rightarrow S = 4 + 6d. \text{ Given } S = \frac{5}{2} - 2 = \frac{1}{2}$$

$$\therefore d = \frac{-7}{12}$$

## Ch-6. Algebra 2

1. (c) The value of y will be minimum at all values of  $x \leq 2$ .

2. (a)  $\log(0.57) = \bar{1.756} \Rightarrow \log 57 = 1.756$

[ $\because$  mantissa will remain the same]

$$\therefore \log 57 + \log(0.57)^3 + \log \sqrt{0.57}$$

$$= \log 57 + 3 \log\left(\frac{57}{100}\right) + \log\left(\frac{57}{100}\right)^{1/2}$$

$$= \log 57 + 3 \log 57 - 3 \log 100 + \frac{1}{2} \log 57 - \frac{1}{2} \log 100$$

$$= \frac{9}{2} \log 57 - \frac{7}{2} \log 100 = \frac{9}{2} \times 1.756 - \frac{7}{2} \times 2$$

$$= 7.902 - 7$$

$$= 0.902.$$

3. (c) This can be checked by taking arbitrary values of  $a$  and  $b$  in the given terms. Taking  $a = 2$  and  $b = 3$ , we conclude that (c) is not true.

4. (c) Let  $a = b^2 = c^3 = d^4$

$$a = b^2 \Rightarrow \log_a a = 2 \log_a b \Rightarrow \log_a b = \frac{1}{2}$$

$$a = c^3 \Rightarrow \log_a a = 3 \log_a c$$

$$\Rightarrow \log_a c = \frac{1}{3}$$

$$\text{Similarly, } \log_a d = \frac{1}{4}$$

Consider,

$$\log_a(abcd) = \log_a a + \log_a b + \log_a c + \log_a d$$

$$= 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} \text{ (By putting values)}$$

5. (a)  $\log_{16} 5 = \frac{1}{4} \times \frac{\log 5}{\log 2} = m$  ... (i)

$$\log_5 3 = \frac{\log 3}{\log 5} = n$$
 ... (ii)

From equations (i) and (ii), we get

$$m \times n = \frac{\log 5}{\log 2} \times \frac{1}{4} \times \frac{\log 3}{\log 5} \text{ or } \frac{\log 2}{\log 3} = \frac{1}{4mn}$$

Let  $\log_3 6$  be equal to  $k$ ; therefore,

$$\log_3 6 = \frac{\log 6}{\log 3} = \frac{\log 3 + \log 2}{\log 3} = 1 + \frac{\log 2}{\log 3} = k$$

$$\therefore k = \frac{1 + 4mn}{4mn}.$$

6. (a) Given that  $x + y = 1$

$$\Rightarrow x + y - 1 = 0$$

$$\Rightarrow x^3 + y^3 - 1 = -3xy$$

$$(a^3 + b^3 + c^3 = 3abc \text{ if } a + b + c = 0)$$

$$\Rightarrow x^3 + y^3 + 3xy = 1$$

7. (c)  $X = (\log_{10} 1 + \log_{10} 2 + \dots + \log_{10} n)$

$$- (\log_{10} 1 + \log_{10} 2 + \dots + \log_{10} p)$$

$$- (\log_{10} 1 + \log_{10} 2 + \dots + \log_{10} (n-p))$$

$$\Rightarrow X = \log_{10} n! - \log_{10} p! - \log_{10} (n-p)!$$

$$\log(m \times n) = \log m + \log n$$

$$\log \left( \frac{m}{n} \right) = \log m - \log n$$

$$\Rightarrow X = \log_{10} \frac{n!}{p!(n-p)!}$$

$X$  is maximum when  $\frac{n!}{p!(n-p)!}$  is maximum.

$$\Rightarrow \frac{8!}{p!(8-p)!} \text{ is maximum, i.e. } {}^8C_p \text{ is maximum}$$

$$\Rightarrow p = 4$$

$$\Rightarrow X = \log_{10} \frac{8!}{4!(8-4)!} = \log_{10} 70 = 1 + \log_{10} 7.$$

8. (c) Take  $-y$  in place of  $y$

$$\text{Then equation is } \sqrt{3}x - y = \sqrt{3}.$$

$$\Rightarrow y = \sqrt{3}x - \sqrt{3}$$

9. (b) According to question,

$$\log_3 (2^x - 5) - \log_3 2 = \log_3 \left( 2^x - \frac{7}{2} \right) - \log_3 (2^x - 5)$$

$$\Rightarrow \log_3 \left( \frac{2^x - 5}{2} \right) = \log_3 \left( \frac{2^x - \frac{7}{2}}{2^x - 5} \right)$$

$$\Rightarrow \frac{2^x - 5}{2} = \frac{2^x - \frac{7}{2}}{2^x - 5}$$

$$\text{Let } 2^x = a$$

$$\Rightarrow \frac{a-5}{2} = \frac{a - \frac{7}{2}}{a-5}$$

$$\Rightarrow a^2 - 10a + 25 = 2a - 7$$

$$\Rightarrow a^2 - 12a + 32 = 0$$

$$\Rightarrow (a-4)(a-8) = 0$$

$$\Rightarrow a = 4 \text{ or } 8$$

$$\therefore x = 2 \text{ or } 3$$

Hence,  $2^x - 5 = -1$ ,  
when  $x = 2$ , which is not possible.  
 $\therefore x = 3$ .

**Or**

All numbers are in AP,

$$2 \log_3 (2^x - 5) = \log_3 2 + \log_3 (2^x - 7/2)$$

$$\text{Suppose } 2^x = t$$

$$2 \log_3 (t - 5) = \log_3 2 + \log_3 (t - 7/2)$$

$$\Rightarrow \log_3 (t - 5)^2 = \log_3 (2t - 7)$$

$$\Rightarrow (t - 5)^2 = 2t - 7$$

$$\Rightarrow t^2 - 10t + 25 = 2t - 7$$

$$\Rightarrow t^2 - 12t + 32 = 0$$

$$\Rightarrow t = 4.8$$

$$2^x = 4.8$$

$$\therefore x = 2, 3.$$

10. (c) Let the number of balls with

$$P_i = a_i \text{ (i = 1 to 11)}$$

$$a_1 + a_3 + a_5 + \dots + a_{11} = 6 (a_6) = 72.$$

As  $a_6$  would be the arithmetic mean of these 11 numbers and

$$2(a_6) = (a_1 + a_{11})$$

$$= (a_2 + a_{10})$$

$$= (a_3 + a_9)$$

$$= (a_4 + a_8)$$

$$= (a_5 + a_7)$$

$$\therefore a_1 + a_6 + a_{11} = 3 (a_6)$$

$$= 36$$

11. (17)  $\therefore x^4 - y^4 = 15$  (where  $(a^2 - b^2) = (a + b)(a - b)$ )

$$\therefore (x^2 - y^2)(x^2 + y^2) = 15$$

$$\Rightarrow (x^2 - y^2)(x^2 + y^2) = 1 \times 15 = 3 \times 5$$

$$\Rightarrow x^2 - y^2 = 3 \text{ and } x^2 + y^2 = 5$$

(because  $x$  and  $y$  are natural numbers)

$$\therefore 2x^2 = 8$$

$$\Rightarrow x^2 = 4$$

$$\therefore y^2 = 1$$

$$\therefore x^4 + y^4 = 4^2 + 1^2 = 17.$$

12. (d) If a positive number  $a$  is expressed as the sum of two positive numbers  $s_1$  and  $s_2$  then  $[a]$  could be at the most 1 more than  $[s_1] + [s_2]$ , i.e., the fractional parts of  $s_1$  and  $s_2$  together, can provide at most 1.

Similarly, the fractional parts of  $s_1, s_2, s_3, s_4, s_5$  can together, provide at most 4.

Conversely, if  $[a]$  is 4 more than  $[s_1] + [s_2] + [s_3] + [s_4] + [s_m]$ , then  $m$  has to be at least 5.

Similarly, the least value of  $n$  is 4.

$$\therefore (m + n)_{\min} = 5 + 4 = 9$$



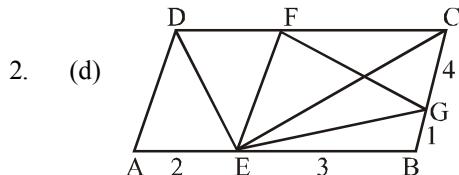


So  $BE = 4$  cm  
In  $\triangle ADE$ ,  $\angle ADE = 30^\circ$

$$\tan 30^\circ = \frac{AE}{2} = \frac{1}{\sqrt{3}}$$

$$AE = \frac{2}{\sqrt{3}} \text{ cm}$$

$$AB = BE - AE = 4 - \frac{2}{\sqrt{3}} = \frac{4\sqrt{3} - 2}{\sqrt{3}} \text{ cm}$$



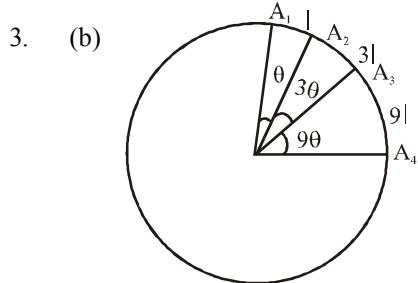
Area of  $\triangle ADEC$  = Area of  $\triangle DBC$  .....(  $\Delta$ 's between same parallel line and same base)

$$= \frac{1}{2} \times \text{Area of parallelogram } ABCD$$

$$\text{Area of } \triangle EFG = \frac{1}{2} \times \text{Area of parallelogram EBCF}$$

$$= \frac{1}{2} \times \frac{3}{5} \times \text{Area of parallelogram } ABCD$$

$$\text{So, } \frac{\text{Area of } \triangle ADEC}{\text{Area of } \triangle EFG} = \frac{\frac{1}{2} \times \text{area}(ABCD)}{\frac{1}{2} \times \frac{3}{5} \times \text{area}(ABCD)} = \frac{5}{3}$$



$$\text{Arc length} = \frac{\theta}{360} \times 2\pi r$$

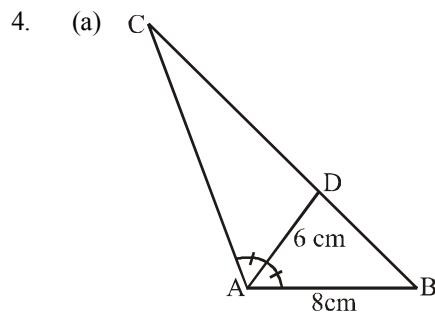
As the radius is fixed, the arc length is directly proportional to the angle subtended by the arc at the centre. So if the arc length is getting tripled the angle is also getting tripled.

$$\text{Therefore } (\theta + 3\theta + 9\theta + 27\theta + 81\theta) = \frac{1}{8} \times 2\pi r$$

$$\Rightarrow 121\theta = \frac{\pi}{4} \quad \Rightarrow \theta = \frac{\pi}{484}$$

Angle subtended by  $A_2 A_3$  at the centre is  $3\theta$

$$3 \times \frac{\pi}{484} = \frac{3\pi}{484}$$



$$\text{Area of triangle } ABC = \frac{1}{2} AB \times AC \times \sin \angle BAC \dots (i)$$

$$\text{Area of triangle } = \frac{1}{2} \times AB \times AD \times \sin \angle BAD \dots (ii)$$

$$\text{Area of triangle } ACD = \frac{1}{2} \times AC \times AD \times \sin \angle CAD \dots (iii)$$

Also,  $\angle BAD = CAD = \frac{1}{2} BAC = 60^\circ$  and

(i) = (ii) + (iii)

Hence

$$\frac{1}{2} \times 8 \times AC \times \frac{\sqrt{3}}{2} = \frac{1}{2} \times 8 \times 6 \times \frac{\sqrt{3}}{2} + \frac{1}{2} \times AC \times 6 \times \frac{\sqrt{3}}{2}$$

$$\Rightarrow AC = 24 \text{ cm}$$

5. (c) Sum of length of all perpendiculars drawn on the sides of any equilateral triangle is constant. Perpendicular (D) = Perpendicular (E)

6. (c)  $\angle PQS = \angle PRS = 90^\circ$

[Diameter subtends  $90^\circ$  at the centre]

PR = RS and PR  $\parallel$  QS

$\therefore$  Rectangle PQRS is a square.

$$PS = \sqrt{2} \times QS \quad [\text{Diagonal} = \sqrt{2} \times \text{side}]$$

$$= \sqrt{2} \times 10\sqrt{2} = 20 \quad \therefore \text{Radius} = 10$$

$$\pi = 3.14 = 3 \text{ (approx)}$$

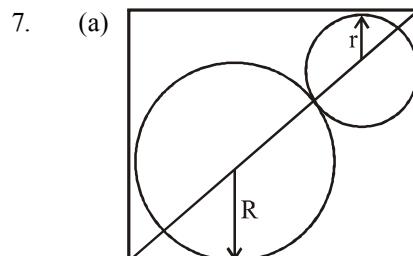
$$\text{Area of circle} = \pi r^2 = 3 \times 10 \times 10 = 3000$$

$$\text{Area of square} = (10\sqrt{2})^2 = 200$$

$\therefore$  Area of shaded region

$$= \frac{1}{2} (\text{Area of circle} - \text{Area of square})$$

$$= \frac{1}{2} \times 100 = 50 \text{ sq. units.}$$



From the above figure

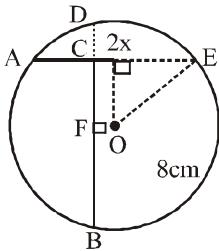
s-86

Past Years Solved Paper (2009-2016)

$$R\sqrt{2} + R + r + r\sqrt{2} = 10\sqrt{2}$$

$$\Rightarrow R + r = \frac{10\sqrt{2}}{\sqrt{2} + 1} = 10(2 - \sqrt{2})$$

8. (c)

Given,  $AC = 4$  and  $BC = 12$ .Let  $DC = 2x$ .Now,  $AC \times CE = BC \times CD$  or  $4 \times CE = 12 \times 2x$ .Hence,  $CE = 6x$ . $AE = AC + CE = 4 + 6x$ 

$$EG = \frac{AE}{2} = 2 + 3x.$$

 $BD = BC + CD = 12 + 2x$  and

$$CF = OG = \frac{BD}{2} - CD = 6 - x.$$

As  $OG$  is perpendicular to  $AE$ , in right triangle  $EGO$ :

$$EG^2 + OG^2 = EO^2$$

$$(2 + 3x)^2 + (6 - x)^2 = 8^2$$

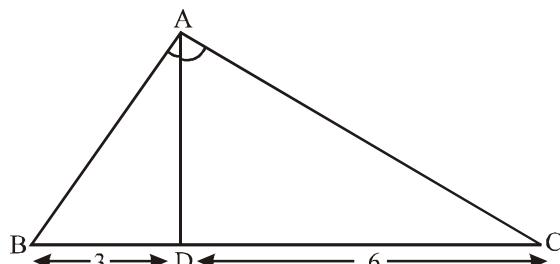
$$(2 + 3x)^2 + (6 - x)^2 = 8^2$$

$$(4 + 9x^2 + 12x) + (36 + x^2 - 12x) = 64$$

$$10x^2 + 40 = 64, \quad x = \sqrt{\frac{12}{5}}$$

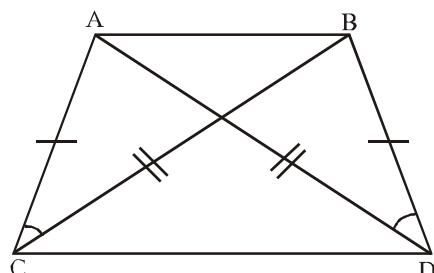
$$\text{Hence, } CD = 2x = 2\sqrt{\frac{12}{5}} \text{ cm.}$$

9. (a)

Line  $AD$  bisects  $\angle CAB$ 

$$\text{Then } \frac{AB}{DB} = \frac{AC}{DC} \Rightarrow \frac{8}{6} = \frac{AC}{3} \Rightarrow AC = 4 \text{ cm}$$

10. (c)

In  $\Delta ADB$  and  $\Delta ABC$ , we have

$$AD = BC, \quad BD = AC,$$

AB is the common side.

By SSS congruency,  $\Delta ADB \cong \Delta ABC$ 

$$\Rightarrow \angle ADB = \angle ACB \quad \dots(i)$$

Also,  $ABCD$  is a cyclic quadrilateral.

$$\Rightarrow \angle ABD = \angle ACD \quad \dots(ii)$$

In  $\Delta ACD$  and  $\Delta BDC$ , we have

$$AD = BC,$$

$$BD = AC,$$

CD is the common side.

By SSS congruency,  $\Delta ACD \cong \Delta BDC$ 

$$\Rightarrow \angle ACD = \angle BDC$$

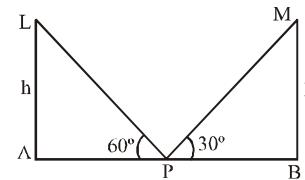
Since  $\angle BDC = \angle BAC \therefore \angle ACD = \angle BAC$ .11. (b) Let  $AB$  be the road between the lamp-posts  $AL$  and  $BM$ .  $AB = 50$  m.

$$\text{From triangle LAP, } \frac{AL}{AP} = \tan 60^\circ \Rightarrow AP = \frac{h}{\sqrt{3}}.$$

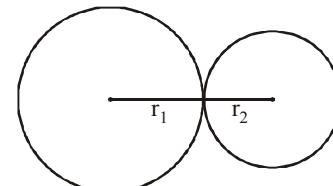
$$\text{From triangle MPB, } \frac{BM}{PB} = \tan 30^\circ \Rightarrow PB = h\sqrt{3}$$

$$PA + PB = AB = 50 \text{ [Given]}$$

$$\Rightarrow \frac{h}{\sqrt{3}} + h\sqrt{3} = 50 \Rightarrow h = \frac{50}{\sqrt{3} + \frac{1}{\sqrt{3}}}$$



$$\therefore AP = \frac{50}{\sqrt{3} + \left(\sqrt{3} + \frac{1}{\sqrt{3}}\right)} = 12.5 \text{ m.}$$

12. (a) Let the radii be  $r_1$  and  $r_2$ 

$$\pi r_1^2 + \pi r_2^2 = 153\pi$$

$$r_1^2 + r_2^2 = 153 \quad \dots(i)$$

$$r_1 + r_2 = 15 \quad \dots(ii)$$

$$\Rightarrow r_1^2 + r_2^2 + 2r_1r_2 = 225$$

$$\Rightarrow 2r_1r_2 = 72 \Rightarrow r_1r_2 = 36$$

If  $r_1$  and  $r_2$  are roots of equation

$$\text{then, } r^2 - 15r + 36 = 0$$

$$\Rightarrow r^2 - 12r - 3r + 36 = 0 \Rightarrow (r-12)(r-3) = 0$$

$$\therefore \frac{r_1}{r_2} = 4$$



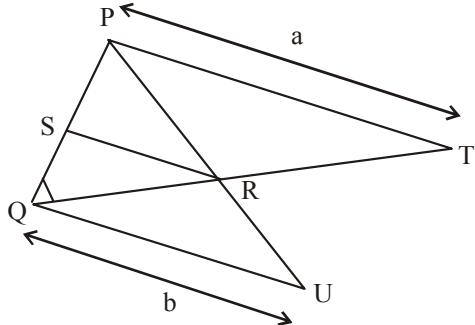
Let D be a point O is the greater arc AC.  
 $\angle OAC = \angle OCA = 20^\circ$   
 $\Rightarrow \angle AOC = 140^\circ$

$$\therefore \angle ADC = \frac{1}{2} \angle AOC = 70^\circ$$

ABCD is a cyclic quadrilateral  
 $\therefore \angle ABC = 180^\circ - 70^\circ = 110^\circ$ .

19. (b) Option (a) – The length of AE is always equal to the length of CF because E and F is midpoint of side AB and CD.  
 So, statement – I is always true.  
 Option (b) : the Length of BC is equal to length of EF so statement II is always False.  
 Option (c) : Length of AE is equal to the length of DF because of EF is parallel to BC  
 Option (d) :  $\angle AEF = \angle EFC = 90^\circ$   
 So statement III is also true.

20. (c)



Given that  $PT \parallel SR \parallel QU$   
 $PT = a$  units,  $QU = b$  units.  
 $\triangle PQT$  and  $\triangle SRQ$  are similar.  
 $\therefore$  We have

$$\frac{PQ}{PT} = \frac{SQ}{SR}$$

$$\text{or } \frac{PQ}{a} = \frac{SQ}{SR} \quad \dots(i)$$

$\triangle UQP$  and  $\triangle RSP$  are similar.

$$\therefore \text{We have } \frac{PQ}{QU} = \frac{PS}{SR}$$

$$\text{or } \frac{PQ}{b} = \frac{PS}{SR} \quad \dots(ii)$$

Combining (i) and (ii)

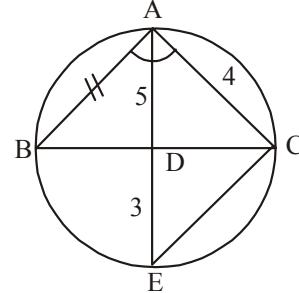
$$\frac{PQ}{a} + \frac{PQ}{b} = \frac{SQ + PS}{SR}$$

$$\text{or } PQ \left( \frac{1}{a} + \frac{1}{b} \right) = \frac{PQ}{SR} \quad [\text{As } SQ + PS = PQ]$$

$$PQ \left[ \frac{a+b}{ab} \right] = \frac{PQ}{SR}$$

$$\text{or } SR = \frac{ab}{a+b}.$$

21. (d)



The figure would be as shown above.  
 Join EC.

$$\begin{aligned} \text{Let } \angle BAD &= x^\circ \\ \text{and } \angle ABD &= y^\circ. \\ \Rightarrow \angle DAC &= x^\circ \\ \text{and } \angle AEC &= y^\circ. \end{aligned}$$

In  $\triangle ABD$  and  $\triangle AEC$ ,  
 $\angle ABD = \angle AEC$   
 $\angle BAD = \angle EAC$   
 $\therefore \triangle ABD \sim \triangle AEC$

$$\Rightarrow \frac{AB}{AD} = \frac{AE}{AC}$$

$$\Rightarrow AB = \frac{AE}{AC} \times AD = \frac{8}{4} \times 5 = 10 \text{ cm.}$$

22. (c) Here,  $\angle EOQ = 85^\circ$  and

$$\angle BOD = 15^\circ$$

$$\therefore \angle EOD = 180^\circ - (85^\circ + 15^\circ) = 80^\circ$$

$\therefore$  In  $\angle OED$

$OE = OD$  (radius),  $\angle OED = \angle ODE = \theta^\circ$  (let)

$$\therefore \theta + \theta + 80^\circ = 180$$

$$\Rightarrow 2\theta = 180 - 80 = 100^\circ$$

$$\therefore \theta = \frac{110^\circ}{2} = 55^\circ$$

$$\therefore \angle OED = \angle ODE = 55^\circ$$

In  $\angle EOC$ ,

$$\angle EOC = 80^\circ + 15^\circ = 95^\circ$$

and  $\angle OEC = 55^\circ$

$$\therefore \angle ECA = 180^\circ - (95^\circ + 55^\circ) = 30^\circ$$

23. (d) PQ is perpendicular to line  $y = \frac{x}{\sqrt{3}}$ 

$$\therefore \text{Slop of } PQ = \frac{-1}{\frac{1}{\sqrt{3}}} = -\sqrt{3}$$

Let equation of line PQ be  $y = -\sqrt{3}x + c$

At point M, when  $x = \sqrt{3}$ ,  $y = 1$ .

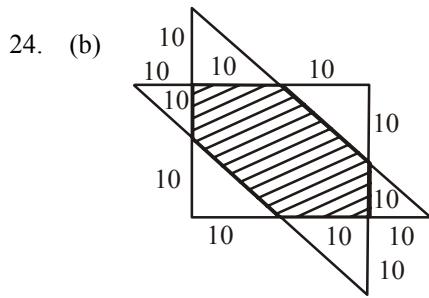
$$\therefore c = 4$$

$$\Rightarrow y = -\sqrt{3}x + 4$$

$$\therefore \text{Co-ordinates of point Q} = \left( \frac{4}{\sqrt{3}}, 0 \right) \text{ and}$$

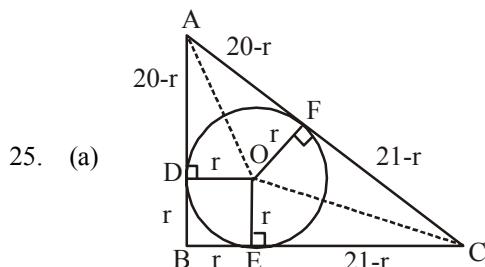
Co-ordinates of point P = (0, 4).

$$\text{Hence, } PQ = \sqrt{\left( \frac{4}{\sqrt{3}} \right)^2 + 4^2} = 4\sqrt{\frac{1}{3} + 1} = \frac{8}{\sqrt{3}} \text{ units.}$$



Area of the shaded region

$$\frac{1}{2} \times 30 \times 30 - 3 \times \left( \frac{1}{2} \times 10 \times 10 \right) = 300 \text{ sq. cm.}$$



$$\therefore AB = 20 \\ BC = 21$$

$$\therefore AC = \sqrt{AB^2 + BC^2} = \sqrt{(20)^2 + (21)^2} = 29 \text{ cm}$$

$$\text{and } (20-r) + (21-r) = 29$$

$$\text{or, } 2r = 41 - 29$$

$$\Rightarrow r = 6 \text{ cm}$$

$\triangle OEC \cong \triangle OFC$  (RHS)

$$\text{Area } (\square FOEC) = 2 \times \text{Area } (\triangle OEC)$$

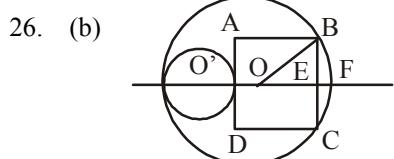
$$= 2 \cdot \frac{1}{2} \cdot 15 \cdot 6 = 90 \text{ cm}^2$$

Similarly,  $\triangle AOD \cong \triangle AOF$  (RHS)

$$\text{Area } (\square ADOF) = 2 \times \text{Area } (\triangle AOD)$$

$$= 2 \cdot \frac{1}{2} \cdot 14 \cdot 6 = 84 \text{ cm}^2$$

$$\text{So, Required ratio} = \frac{\text{Area } (\square FOEC)}{\text{Area } (\square ADOF)} = \frac{90}{84} = \frac{15}{14}$$



Let the radius of the bigger circle be R and the smaller circle be r and the side of the square is 2a.

$$\therefore OE = R - EF$$

$$= R - [2R - (2r + 2a)]$$

$$OE^2 + EB^2 = OB^2$$

$$\text{i.e. } [2a + 2r - R]^2 + a^2 = R^2$$

$$a = 9 \text{ (since } 2a = 18\text{); } R = 15$$

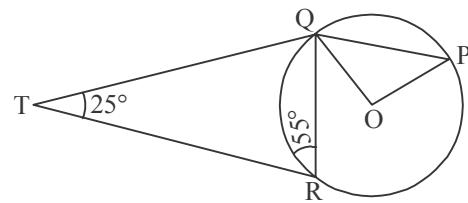
$$\therefore (18 + 2r - 15)^2 + 9^2 = 15^2$$

$$\therefore 2r + 3 = 12$$

$$\therefore r = \frac{9}{2} = 4.5 \text{ cm}$$

Radius of smaller circle = 4.5 cm.

27. (c)



In  $\triangle QTR$ ,

$$\angle QTR + \angle QRT + \angle RQT = 180^\circ$$

$$\angle RQT = 180^\circ - (55^\circ + 25^\circ) = 100^\circ$$

$$\angle ORT = 90^\circ \quad (\text{TR is a tangent to the circle at R})$$

$$\angle QRT + \angle ORQ = 90^\circ$$

$$\angle QRQ = 90^\circ - 55^\circ = 35^\circ$$

$$OQ = OR \quad (\text{Both are radius of circle})$$

$$\therefore \angle OQR = \angle ORQ = 35^\circ$$

$$\angle RQT + \angle PQR = 180^\circ \quad (\text{PQT is a straight line})$$

$$100^\circ + 35^\circ + \angle PQO = 180^\circ$$

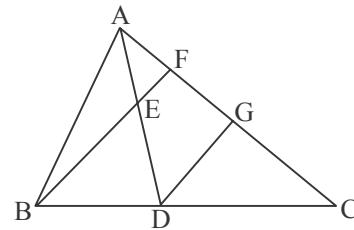
$$\therefore \angle PQO = 45^\circ$$

$$\text{In } \triangle OQP, OQ = OP \quad (\text{radius of circle})$$

$$\therefore \angle OPQ = \angle PQO = 45^\circ$$

$$\angle POQ = 90^\circ$$

28. (d) Let G be a point on AC such that DG is parallel to BF.



$$\text{Here, } BD = 8 \text{ cm}$$

$$DC = 6 \text{ cm and}$$

$$AE : ED = 3 : 4$$

$$AF = 12 \text{ cm}$$

$$AC = ?$$

$$\frac{AF}{FG} = \frac{AE}{ED} = \frac{3}{4}, \frac{FG}{GC} = \frac{BD}{DC} = \frac{8}{6} = \frac{4}{3}$$

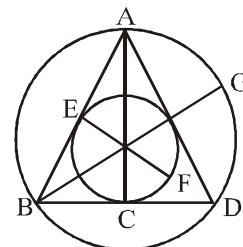
$$\therefore AF : FG : GC = 3 : 4 : 3.$$

$$\therefore AC = \frac{10}{3} (AF) = \frac{10}{3} (12) \text{ cm} = 40 \text{ cm}$$

## Ch-9. Mensuration

26. (b)

1. (b)



Let arc side of equilateral triangle = a

$$\text{Then height} = \frac{a\sqrt{3}}{2}$$

$$\text{Area} = \frac{\sqrt{3}}{2} a^2; S = \frac{a + a + a}{2} = \frac{3a}{2}$$

$$\text{Diameter of inner circle} = \frac{2 \times \text{Area}}{S}$$

$$= \frac{\sqrt{3}}{2} a^2 \times \frac{2}{3a} = \frac{a}{\sqrt{3}}$$

$$\text{Diameter of outer circle} = \frac{a^3}{2 \times \text{Area}} = a^3 \times \frac{a}{\sqrt{3}a^2}$$

$$\Rightarrow \frac{2a}{\sqrt{3}}$$

$$\text{Ratio} = \frac{a}{\sqrt{3}} : \frac{2a}{\sqrt{3}} : \frac{a\sqrt{3}}{2} \Rightarrow \text{Ratio} = 1 : 2 : 3$$

2. (c) If  $R$  is the resistance,  $l$  is the length and  $r$  is the radius.

$$R \propto \frac{l}{r^2} \quad \therefore R = \frac{k l}{r^2} \quad (\text{where } k \text{ is a constant})$$

$$\therefore \frac{R_1}{R_2} = \frac{\frac{k \times 162}{81}}{\frac{k \times l}{64}} ; \text{ But } R_1 = R_2.$$

$$\therefore \frac{k \times 162}{81} = k \times \frac{l}{64} \quad \therefore \frac{162}{81} = \frac{l}{64}$$

$$\therefore l = 128 \text{ cms.}$$

3. (b) Area of any polygon =  $r \times s$  (where  $r$  is the inradius and  $s$  is the semiperimeter)

Hence, for any  $n$  sided regular polygon with inradius  $r$  and side  $x$  units,

$$\text{Area} = \frac{1}{2}(nx) \times r$$

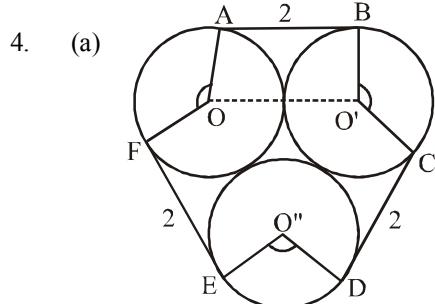
Since the area is given as  $10x$  sq units

$$\frac{1}{2} \times n \times x \times r = 10x$$

$$\Rightarrow n \times r = 20$$

Here  $n$  must be more than or equal to 3.

So the possible values of  $(n, r)$  are  $(4, 5)$ ,  $(5, 4)$ ,  $(10, 2)$ , and  $(20, 1)$ .



In this figure, the sides  $AB = CD = FE =$  distance between 2 radii = 2 cm

$\angle AOP = \angle BO'C = \angle EO''D = 120^\circ$

So perimeter of the bigger triangle =  $(2 + 2 + 2 + 2 \times 3.14 \times 1)$  (because 3 sectors of circles of  $120^\circ = 1$  full circle of same radius)

Let the radius of longer circle be =  $R$

$$\text{Then } 2 \times \pi \times R = 12.28 \Rightarrow R = \frac{12.28}{2 \times 3.14} = 2$$

Area =  $AR^2 \Rightarrow 3.14 \times 4 \Rightarrow 13 \text{ cm}^2$  (approximately)  
Option (a) is closest to the answer.

5. (b)

	Vessel 1	Vessel 2
<b>Operation 1</b>	20 litres alcohol	Empty
<b>Operation 2</b>	$(20 - x)$ alcohol	$(20 - x)$ litres, water and $x$ litres alcohol
<b>Operation 3</b>	$(20 - x)$ litres alcohol + $x$ litres mixture i.e.,	$(20 - x)$ litres mixture

$$\left( \frac{x^2}{20} \text{ litres alcohol} \right)$$

Now  $\frac{1}{3}$  rd of  $C_1$  is poured into  $C_2$

Quantity of alcohol in  $C_1 = C_2 = 10$  litres

$$\Rightarrow \text{In } C_1 \Rightarrow \frac{2}{3} \left[ 20 - x + (x) \left( \frac{x}{20} \right) \right] = 10$$

Solving we get,  $x = 10$  litres

$\therefore 10$  litres of alcohol was initially poured from  $C_1$  to  $C_2$ .

6. (c) Let the base radius be  $r$  and the total height of the cone (without cut) be  $nr$  (where  $n$  is a constant).

$$V = \frac{1}{3} \pi r^2 (nr) = \frac{n}{3} \pi r^3$$

Let the radius at the beginning of the 1st day be  $r_1$ .

$$\text{So, } \frac{n}{3} \pi r_1^3 = V - \frac{2V}{3} = \frac{V}{3} = \frac{n}{9} \pi r^3$$

$$r_1 = \frac{r}{3^{1/3}}$$

Area at the beginning of the 1st day

$$= A_1 = \pi r_1^2 = \frac{\pi r^2}{3^{2/3}}$$

Volume lost to evaporation on the 1st day

$$\Rightarrow V_1 = \frac{2V}{3} - \frac{V}{2} = \frac{V}{6}$$

It is also given that:

$$\frac{V_1}{A_1} = \text{constant } K \text{ (say)}$$

Similarly, radius at the beginning of the 2nd day

$$\Rightarrow r_2 = \frac{r}{2^{1/3}}$$

Area at the beginning of the 2nd day =  $\frac{\pi r^2}{2^{2/3}}$

Volume lost to evaporation on the 2nd day

$$\Rightarrow KA_2 = \frac{K\pi r^2}{2^{2/3}} = \frac{V_1}{A_1} \frac{\pi r^2}{2^{2/3}} = \frac{V}{6} \left( \frac{3}{2} \right)^{2/3}$$

7. (c) Volume of each smaller cube

$$= \frac{12 \times 12 \times 12}{64} = 27 \text{ cm}^3$$

Edge of each smaller cube = 3 cm

Let the number of cubes along the length and the breadth of the cuboid be  $4x$  and  $x$  respectively.

$$4x \times x = 64 \text{ or } x = 4$$

Length of the cuboid =  $4x \times 3 = 48 \text{ cm}$

Breadth of the cuboid =  $x \times 3 = 12 \text{ cm}$

Required surface area =  $48 \times 12 = 576 \text{ cm}^2$

8. (a)  $AO = CO = DO = OB = \text{radius of bigger circle} = r$  (let)

$$\text{Then area of } (G + F) = \frac{\pi r^2}{2}$$

Area of  $2(G + F) = \pi r^2$ . Also area of  $2G + F + E = \pi r^2$

$$\text{i.e. } 2G + F + F = 2G + F + E \Rightarrow F = E$$

So the ratio of areas E and F = 1 : 1

9. (c) Volume of a cylinder =  $\pi r^2 h$ , where

$r$  = radius of the cylinder

$h$  = height of the cylinder

Volume of the graphite cylinder

$$= \pi \left( \frac{1}{10} \right)^2 \times 10 = \frac{\pi}{10} \text{ cm}^3$$

Volume of the layer of wood

$$= 10\pi \left[ \left( \frac{7}{10} \right)^2 - \left( \frac{1}{10} \right)^2 \right] = \frac{48\pi}{10} \text{ cm}^3$$

Cost of the material in a pencil

$$= \frac{\pi}{10} \times 2.10 + \frac{48\pi}{10} \times 0.70 = ₹11.22$$

10. (d) Volume of Equipment =  $\frac{1}{3} \times 3.14 \times (0.25)^2 \times 7$

$$= \frac{3.14 \times 0.0625 \times 7}{3} = 0.4579 \text{ cm}^3$$

$\therefore 0.4579 \text{ cm}^3$  can write 330 words

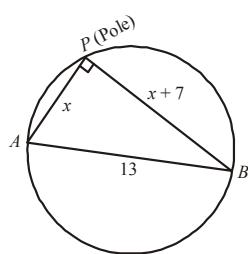
$$\therefore 1 \text{ cm}^3 \text{ can write} = \frac{330}{0.4579} \text{ words}$$

Now, 1 litre =  $1000 \text{ cm}^3$  = 1000 ml

$$\therefore \frac{3}{5} \text{ litre} = \frac{3}{5} \times 1000 = 600 \text{ cm}^3$$

$$\therefore 600 \text{ cm}^3 \text{ can write} = \frac{330}{0.4579} \times 600 \text{ words} \\ = 432408 \text{ words}$$

11. (c)

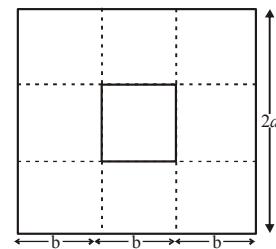


In right  $\triangle APB$ ,

$$x^2 + (x + 7)^2 = 13^2$$

$$\Rightarrow x = 5 \quad \therefore x + 7 = 12.$$

12. (c) Since cubic shape will be the greatest volume (as volume = side $^3$ )



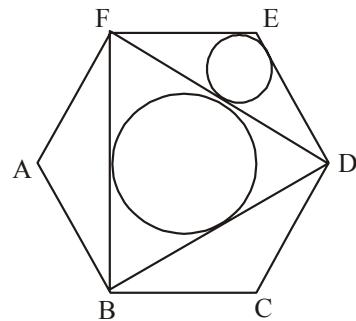
Hence,  $3b = 2a$

$$\therefore b = \frac{2}{3}a$$

13. (a) Centre of the circle will be mid-point of the hypotenuse of the triangle. So, hypotenuse =  $2 \times 6.5 = 13 \text{ cm}$ . According to Pythagorean triples, other sides are 5 cm and 12 cm because all sides are natural number.

$$\therefore \text{So perimeter} = 5 + 12 + 13 = 30 \text{ cm}$$

14. (d)



Let  $EF = s$  unit

$$\text{In } \triangle DEF : DF = 2EF \cos 30^\circ = \sqrt{3}s$$

Semi perimeter of  $\triangle DEF$  (in units) =  $S$

$$= \left( 1 + \frac{\sqrt{3}}{2} \right) s$$

Area of  $\triangle DEF$  (in unit $^2$ ) =  $\Delta$

$$= \frac{1}{2} (EF \sin 30^\circ) DF = \frac{\sqrt{3}s^2}{4}$$

Inradius of  $\triangle DEF$  (in units) =  $r_2$

$$= \frac{\Delta}{S} = \frac{\sqrt{3}s^2}{4 \left( 1 + \frac{\sqrt{3}}{2} \right) s} = \frac{\sqrt{3}s}{4 \left( 1 + \frac{\sqrt{3}}{2} \right)} = \frac{\sqrt{3}s}{2(2 + \sqrt{3})}$$

In radius of triangle DEF (in units) =  $r_2$

$$= \frac{1}{3} \left( \frac{\sqrt{3}}{2} DF \right) = \frac{DF}{2\sqrt{3}} = \frac{s}{2}.$$

Ratio of area =  $r_1^2 : r_2^2 = 3 : 7 + 4\sqrt{3}$

15. (d) Let the lengths and breaths of each, Small rectangles be 'x' meter and 'y' meter respectively.





Here,  $\Delta PED$  is similar to  $\Delta GFP$   
Ratio of area = 9: 16  
of  $\Delta PED$  and  $\Delta PFG$

$$\therefore \text{ratio of sides} = \sqrt{\frac{9}{16}} = 3:4$$

Hence, P divides GD in the ratio 3:4.

$$\therefore \Delta AGD = \left(\frac{7}{3}\right)^2 \times 9 = 49 \text{ sq. cm}$$

[ $\Delta AGD$  similar to  $\Delta FGP$ ]

So area of  $AEPF = 49 - [16 + 9] = 24$  sq. cm

$$\text{Similarly area of } BFI = \left(\frac{10}{3}\right)^2 \times 9 = 100 \text{ sq. cm}$$

Therefore area of  $BHPG = 100 - (49 + 9) = 42$  sq. cm

$$\text{Similarly area of } PDCI = \left(\frac{11}{7}\right)^2 \times 49 - 49 - 16 = 56 \text{ sq. cm}$$

$$\text{Area of triangle } ABC = (9 + 16 + 49 + 24 + 42 + 56) = 196 \text{ sq. cm}$$

25. (58) There are a total of 78 B-schools that place their students  
 $\therefore$  No. of B-schools which are reputed and place their

$$\text{students} = \frac{1}{6} \times 78 = 13$$

Let No. of B-schools that are recognised = x

According to question,

$\therefore$  No. of recognised B-schools that place their

$$\text{students} = \frac{1}{4}x$$

$\therefore$  No. of recognised B-schools that do not place their

$$\text{students} = \frac{3x}{4}$$

$$\therefore \frac{3x}{4} = 39 \Rightarrow x = 52$$

Out of 13 reputed B-schools, 6 are recognised too

$\therefore$  Number of B-schools that are either recognised and place their students or reputed and place their students

$$= 13 + 13 - 6 = 20$$

$\therefore$  Number of B-schools that are neither reputed nor recognised but place their students =  $78 - 20 = 58$ .

26. (b) Here, HCF of 24 and 56 = 8 then, the side of the identical square plots = factors of 8.

The factors of 8 are 1, 2, 4 and 8

If side of the square plot is 1 m. the length of fencing material required is  $(25 \times 56 + 57 \times 24) = 2768$  m

But  $2768 \text{ m} > 2700 \text{ m}$ . (So, It is not possible)

If side of the square plot is 2 m. the length of fencing material required is

$$(29 \times 24 + 13 \times 56) = 1464 \text{ m} < 2700 \text{ m}$$

$\therefore$  minimum fencing material to be left the side of identical square plot = 2m.

27. (d) Let the number of sides be  $2n$ . Let the length of the side of S and the length of the perpendicular from the

### Past Years Solved Paper (2009-2016)

centre to each side be P. Since the number of sides is even, the opposite sides will be parallel and the distance between any two opposite sides is equal to  $2P$ .

$$\text{Also, area of the polygon (A)} = 2n \left( \frac{SP}{2} \right) \quad \dots(1)$$

According to question,

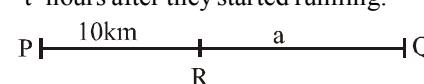
$$S(2P) = A/4 \text{ or } SP = A/8$$

$$\therefore (1) \Rightarrow A = n(A/8)$$

$$\Rightarrow n = 8 \text{ or } 2n = 16$$

$\therefore$  number of sides = 16.

### Ch- 10 Time, Distance & Work

1. (d) Let's assume that each worker completes W units of the job in a day. The number of units completed by 10 workers in 10 days =  $10 \times 10 = 100W$ .  
If one more worker joins them, then the number of units completed on the 11th day will be  $11W$ .  
As it took exactly 20 days to finish the job, it can be concluded that the job consisted of  $(100W + 11W + 12W + \dots + 20W) = 255W$  units of work.  
In the second situation, let the number of workers who started the job be n.  
Hence,  $nW + (n-1)W + (n-2)W + \dots + W \geq 255W$   
or  $\frac{n(n+1)}{2} \geq 255$   
The minimum possible value of n which satisfies the above inequality is 23. However, it must be noticed that  $23 + 22 + 21 + \dots + 7 = 255$ .  
Hence, the work will get completed in exactly  $23 - 6 = 17$  days.
2. (b) Let the speeds of Tarun and Sumit be  $2x$  and  $5x$  respectively. Let's assume that Sumit turned back from point Q as shown in the figure given below, ran at a speed of  $x$  after turning back and met Tarun at point R, 't' hours after they started running.
- 
- From the given conditions,  
 $2x \times t = 10 = 5x \times 2 - x \times (t-2)$   
 $\Rightarrow t = 4$
- So the running speed of Tarun =  $2x = \frac{10}{4} = 2.5 \text{ km/hr.}$
3. (c) Rahul will come to rest after 20 seconds. The combined distance covered by them every second is 60 m. Since the track length is 120 m, they will meet after every 2 seconds. So they would have met 10 times by the time Rahul comes to rest.
4. (b) Assume that the software fails  $a$ ,  $b$ , and  $c$  times in a single stage, in two stage, and in all stages respectively.  
 $\therefore a + 3c = 6 + 7 + 4 = 17$   
but  $c = 4$ , hence  $b = 5$   
Similarly, we have  
 $a + 2b + 3c = 15 + 12 + 8 = 35$   
 $a = 35 - 12 - 10 = 35 - 22 = 13$
5. (d) The watch gains  $(5 + 10) = 15$  min in 30 hours (12 Noon to 6 PM next day). This means that it will show the correct time when it gains 5 min in 10 hours or at 10 PM on Monday.

6. (d) Total time taken to build the server = 60 man hours.  
6 of them starts at 11 : 00 am and works till 5 pm  
They will complete  $6 \times 6 = 36$  man hours of work.  
At 5 pm they will have 24 more man hours of work to complete.  
Between 5 pm and 6 pm they will complete 7 man hours.  
Between 6 pm and 7 pm they will complete 8 man hours.  
Between 7 pm and 8 pm they will complete 9 man hours.  
So, totally they will complete  $36 + 7 + 8 + 9 = 60$  man hours by 8 pm.

7. (a) Rate of admission of water  

$$= \frac{2}{6} \text{ tonnes/min.} = \frac{1}{3} \text{ tonnes/min}$$
Rate of pumping out of water  

$$= \frac{12}{60} \text{ tonnes/min.} = \frac{1}{5} \text{ tonnes/min.}$$
Rate of accumulation =  $\left( \frac{2}{6} - \frac{12}{60} \right) \text{ tonnes/min.}$ 
Time to accumulate 80 tonnes of water  

$$= \frac{\text{Amount of water}}{\text{Accumulation rate}} = \frac{80}{\left( \frac{1}{3} - \frac{1}{5} \right)} = 600 \text{ min.}$$

$$= 10 \text{ hours}$$

$$\therefore \text{Average sailing rate so as avoid sinking}$$

$$= \frac{\text{Distance}}{\text{Time}} = \frac{55}{10} \text{ km/h} = 5.5 \text{ km/h}$$

8. (c) Let the slowest runner covers a distance of  $x$  ms. from the starting point.  
Then the fastest runner will cover a distance of  $1000 + x$  ms from the starting point.  
Let the speed of the slowest runner be  $y$ .  
Then, speed of the fastest runner will be  $2y$ .  

<b>Slowest</b>	<b>Fastest</b>
$S : y$	$2y$
$D : x$	$1000 + x$
$T : \frac{x}{y}$	$\frac{1000 + x}{2y}$

But time taken for both is same.  

$$\text{Hence, } \frac{x}{y} = \frac{1000 + x}{2y} \Rightarrow x = 1000$$

$$\therefore \text{Fastest runner completes a distance of } 2000 \text{ m in } 5 \text{ mins.}$$

$$\therefore \text{Fastest runner can complete a distance of } 4000 \text{ m in } 10 \text{ min.}$$

9. (c) Let the length of train =  $x$  metres  

$$\text{Speed} = \left( 45 \times \frac{5}{18} \right) \text{ m/sec} = \left( \frac{25}{2} \right) \text{ m/sec}$$
Distance covered in crossing the platform  

$$= (x + 100) \text{ m}$$

$$\therefore (x + 100) \times \frac{2}{25} = 60$$

$$\text{or } 2x + 200 = 1500 \text{ or } x = 650$$
Now, time taken to cross the pole  

$$= \left( 650 \times \frac{2}{25} \right) \text{ sec} = 52 \text{ sec}$$

10. (b) Area of cross section for  $P_1$  pipe =  

$$= A_1 = \left( \frac{22}{7} \right) 7^2 = 154 \text{ m}^2$$
Volume of water flowing through  $P_1$  in one second  

$$= 154 \times 10 = 1540 \text{ m}^3$$
Volume of tank =  $V = 1540 \times 2 \times 3600$   

$$= 11088 \times 10^3 \text{ m}^3$$
Area of cross section for  $P_2$  pipe  

$$= A_2 = \left( \frac{22}{7} \right) 14^2 = 616 \text{ m}^2$$
Let the rate of water flowing through  $P_2$  =  $s$  m/s  
Volume of water flowing through  $P_2$  in one second  

$$= 616s \text{ m}^3$$
Volume of water flow in the tank when  $P_1$  is used as inlet and  $P_2$  is used as outlet pipe:  $(1540 - 616s)$   
Time taken to fill = 4 hours =  $4 \times 3600$  seconds  

$$\text{So, } (1540 - 616s) \times 4 \times 3600 = V$$

$$\Rightarrow (1540 - 616s) \times 4 \times 3600 = 11088 \times 10^3$$
or  $1540 - 616s = 770$   
or  $s = 1.25 \text{ m/s}$ 

$$\therefore \text{Rate of water flow through } P_2 = 1.25 \text{ m/s}$$

11. (d) Let the time at which Mr. Clockil entered the museum be 'm' minutes past 12 noon.  

$$\therefore \left| \frac{11}{2}m - 30 \times 0 \right| = 20 \Rightarrow m = 3 \frac{7}{11}$$
As he spent more than 3 hours and less than 4 hours in the museum, and the angle between the minute and hour hands at the time of leaving was  $220^\circ$ , he must have left the museum between  $3 : 3 \frac{7}{11}$  p.m. and  $4 \frac{7}{11}$  p.m.  
Let the time at which he left the museum be 'n' minutes past 3 pm.  

$$\therefore \left| \frac{11}{2}n - 30 \times 3 \right| = 220 \Rightarrow n = 56 \frac{4}{11} \text{ or } 41 \frac{9}{11}$$
Hence, the time spent by Mr. Clockil in the museum was either 3 hours  $52 \frac{8}{11}$  minutes or 3 hours  $38 \frac{2}{11}$  minutes.

12. (d) Let the efficiencies of Anirudh and Anushka be 'a' and 'b' units/day respectively.  
according to question,  

$$\therefore (a + b)x + a \times \frac{x}{2} = (a + b) \frac{3x}{4} + a \times x \Rightarrow \frac{a}{b} = 1$$
So, the required ratio is  $1 : 1$ .

13. (b) The rabbit overstretched his sleeping time by  $1 \frac{1}{6}$  min.  

$$\therefore t + 1 \frac{1}{6}t = 14 + t \Rightarrow t = 12$$
Let the speed (in km/min) of the rabbit and tortoise be  $6x$  and  $x$  respectively.  
Had the rabbit not overstretched his nap, he would have beaten the tortoise by 13 min.

$$\therefore \frac{2}{6x} + 12 + 13 = \frac{2}{x} \Rightarrow x = \frac{1}{15}$$

Hence the time taken by the tortoise to complete the

$$\text{race} = \frac{2}{x} = \frac{2}{1/15} = 30 \text{ min.}$$

14. (d) The distance covered by R in 2 hours (3 PM to 5 PM) is same as the distance covered by P in 4 hours (1 PM to 5 PM).

Ratio of speeds of P and R = 1 : 2.

Now, R takes over Q in another hour by doubling his speed, so R has covered a total distance in 3 hours (3 PM to 6 PM) which he would have covered in 4 hours without changing his speed.

To cover the same distance, a takes 5 hours (1 PM to 6 PM) Ratio of speed of Q and R = 4 : 5  
 $\Rightarrow$  Ratio of speed of P and Q = 5 : 8.

15. (b)



Let's take there are two ants.

Considering worst possible case we can see easily the required time is same as the time taken by an ant to reach one extreme point to another extreme point. Which will be same when there are 1000 ants.

$$\text{i.e. maximum time} = \frac{100}{50} \text{ min.} = 2 \text{ min.}$$

16. (16) Let the distance be x

According to question,

$$\therefore 15 + \frac{x}{4} = \frac{x/2}{7/2} + \frac{x/2}{9/2} = \frac{60+x}{15} = \frac{32x}{126}$$

$$x = 3780$$

Total time taken by the second boat

$$= \frac{3780}{7} + \frac{3780}{9} = 960 \text{ sec} = 16 \text{ min.}$$

17. (a) Let BC = 5 k

Given, by the time Q reaches C, P was halfway to C, i.e., AC/2 = 3k and AC = 6k.

As Q met P, 165 km away from A, the distance to the meeting point from A is 3k

$$+(3k)\left(\frac{3}{5+3}\right) \text{ i.e., } \frac{33k}{8}$$

$$\text{Given, } \frac{33k}{8} = 165 \Rightarrow k = 40$$

$\therefore$  Distance between A and C is 240 km and that between B and C is 200 km.

From the data, as distance between A and B is twice that between B and C, it is 400 km.

$$\therefore \text{Speed of P} = \frac{400}{\left(6\frac{2}{3}\right)} = 60 \text{ kmph}$$

$$\Rightarrow \text{Speed of Q} = \frac{5}{3}(60) = 100 \text{ kmph}$$

$$\therefore \text{Time taken by Q to reach C from A} = \frac{240}{100} = 2\frac{2}{5} \text{ hr.}$$

### Ch-11. Permutation, Combination & Probability

1. (b) Probability that the man finds all three traffic lights

$$\text{red} = \frac{5}{8} \times \frac{5}{6} \times \frac{3}{5} = \frac{5}{16}$$

Probability that he finds at least one light which is not

$$\text{red} = 1 - \frac{5}{16} = \frac{11}{16}$$

2. (b) In his first throw A's chance is 1/6, in his second throw

it is  $\frac{5}{6} \times \frac{5}{6} \times \frac{1}{6}$ , because each player must have failed once before A can have a second throw, in his third

throw his chance =  $\left(\frac{5}{6}\right)^4 \times \frac{1}{6}$  because each player must have failed twice, and so on.

Thus A's chance is the sum of the infinite series

$$= \frac{1}{6} \left\{ 1 + \left(\frac{5}{6}\right)^2 + \left(\frac{5}{6}\right)^4 + \dots \right\}$$

Similarly, B's chance is the sum of the infinite series

$$= \frac{5}{6} \cdot \frac{1}{6} \left\{ 1 + \left(\frac{5}{6}\right)^2 + \left(\frac{5}{6}\right)^4 + \dots \right\}$$

$\therefore$  A's chance is to B's as 6 is to 5.

Their respective chances are therefore 6/11 and 5/11, and their expectations are Rs. 6 and Rs. 5 respectively.

3. (b) Total number of arrangements are  $6! = 720$ .

A, B, D can be arranged in 6 ways out of which D would be somewhere between A and B in exactly two cases.

$$\text{Hence the answer is } 720 \times \frac{2}{6} = \frac{720}{3} = 240.$$

4. (a) The number of ways of picking two small cubes

$$= {}^{64}C_2 = \frac{64 \times 63}{2 \times 1} = 32 \times 63$$

The number of small cubes with exactly two faces painted red =  $2 \times 12 = 24$  (Since two such cubes will be obtained from each edge of the large cube.)

The number of ways of picking two such cubes

$${}^{24}C_2 = \frac{24 \times 23}{2} = 12 \times 23$$

$$\text{So the required probability} = \frac{23 \times 12}{63 \times 32} = \frac{23}{168}.$$

5. (d) The number of yellow balls initially in the box is the

same as the number of green balls. None of the ten operations involved after this favour any particular colour between the two. So the probability of the final ball picked being yellow ( $p(Y)$ ) must be the same as that of being green ( $p(G)$ ).

Thus,  $p(Y) = p(G)$  and the ball picked should be either yellow or green, which means that  $p(Y) + p(G) = 1$ .

$$\text{Hence, } p(Y) = p(G) = \frac{1}{2}$$

6. (b) An integer can end with any of ten digits = (0, 1, 2, .....9) but (0, 1, 5, 6) has same unit of ten product of two integers.  
So, the probability of an integer ending with 0 or 1 or 5 or 6.

$$= \frac{4}{10} = \frac{2}{5}$$

and the probability of 2nd integer =  $\frac{1}{10}$

$$\therefore \text{Required probability} = \frac{2}{5} \times \frac{1}{10} = \frac{1}{25}.$$

7. (c) Since the number of candies received by each child must get at least 2 candies.

Once each child has received 2 candies, the remaining 2 candies should be distributed in such a manner that the number of candies with any child after the distribution remains a prime number.

The remaining 2 candies are given to exactly two children in such a way that both the children receive one candy each.

Hence, the number of ways of distribution =  ${}^8C_2 = 28$ .

8. (b) If there are 60 chairs around a circular table, consider a scenario wherein there are two chairs vacant between every two consecutive people. Thus, there will be exactly 20 people sitting and exactly 40 vacant seats between them and in such a scenario, next person coming to sit will have to sit next to someone.

9. (a)  $p + q = 1$ , i.e.  $q = 1 - p$  ( $0 = p, q = 1$ )

Now when the sum of two variables is a constant then their multiplication is the maximum when they are

equal. So,  $pq$  will be maximum and  $\left(\frac{1}{p}\right)\left(\frac{1}{q}\right)$  the

minimum when  $p = q = \frac{1}{2}$ .

Thus, the minimum value of  $X = 0.25 + 4 = 4.25$ .

10. (a) First let the 6 other students be seated in 6 chairs. The number of spaces between the 6 students = 7.

$\therefore$  Amar, Akbar and Anthony can be seated in the 7 places in  ${}^7C_3$  ways.

Thus, the number of ways in the class photo can be taken such that no two of Amar, Akbar and Anthony are sitting together is

$$= {}^7C_3 \times 3! \times 6! = 151200.$$

11. (b) Total number of the cases =  ${}^6C_3 = 20$ .

The favourable cases for B surviving are:

(B : Bullet; N : No Bullet)

BNBBNN or BNBNNB or BNBNNB or BNBNB or NBBNN or NBNBN.

$$\text{Required probability} = \frac{6}{20} = 0.3.$$

12. (c) Letters of the word 'KAKA' can be arranged in

$$\left(\frac{4!}{2! \times 2!}\right) = 6 \text{ ways}$$

If we will take all vowels are together, then arrangements are

$$\left(\frac{3!}{2!}\right) = 3 \text{ arrangements.}$$

So,  $(6-3)=3$  arrangements, where vowels are not together.

$$\text{So, required probability} = \frac{3}{6} = \frac{1}{2}.$$

13. (a) If  $n$  is even, i.e., say  $n = 2m$  then the number of ways is  $2 \times m! \times m!$ , i.e.,  $m$  odd numbers in alternate places and  $m$  even numbers in alternate places.  
If  $n$  is odd, i.e., say  $n = 2m + 1$ , then the number of ways =  $m!(m+1)!$   
Hence, either  $2(m!)^2 = 72$  or  $m!(m+1)! = 72$   
If  $2(m!)^2 = 72 \Rightarrow m! = 6 \Rightarrow m = 3$   
for  $m!(m+1)! = 72$ , there is no solution.  
Hence  $m = 3$ , and  $n = 2m = 6$ .

## Ch-12. Line & Bar Chart

1. (b) The Unhealthiness Index is maximum for the year 2003 and the value is

$$= \frac{2,00,000 \times (1.2)(0.85)(1.1)(1.2)}{5200} = 51.8$$

2. (c) The number of patients in 2008 = The number of patients in 2006  $\times (0.7)^2$  which comes out to be 95,596. The number of hospitals in 2008 will be =  $5700 \times (1.1)^2 = 6897$

$$\text{Therefore, Unhealthiness Index} = \frac{95,596}{6897} = 13.86$$

3. (d) As per the given data (using graph information), the number of patients in 2006 = 1,95,093. The number of patients in 2007 will be  $1,95,093 \times 0.6 = 1,17,056$ . To have an Unhealthiness Index of 15, the number of

hospitals needed will be  $\frac{1,17,056}{15} = 7804$ . Therefore the percentage increase needed in the number of hospitals will be

$$= \frac{7804 - 5700}{5700} \times 100 = 36.9\%$$

4. (b) Average cost of each bottle

$$= 5[3^2 + 3^2 + 4^2 + 5^2 + 3^2 + 4^2 + 3^2]$$

$$= 5[9 + 9 + 16 + 25 + 9 + 16 + 9] = 5 \times 93 = 465$$

Average cost of the project =  $465 \times 800 = 372000$ .

5. (b) Profit % =  $\frac{510 - 465}{465} \times 100 = \frac{45}{465} \times 100$   
=  $9.67 \approx 10\%$

6. (c) For the year (2005–06 to 2008–09)  
Efficacy Ratio

	Total	Corporate	Individual
2004–05	0.96	0.98	0.89
2005–06	<b>1.03</b>	<b>0.98</b>	<b>1.6</b>
2006–07	0.98	1.01	0.79
2007–08	0.96	0.99	0.86
2008–09	<b>1.02</b>	<b>1.12</b>	<b>0.79</b>

So only two years (2005 – 2006) and (2008 – 2009) efficacy ratio is greater than 1.

S-98

Past Years Solved Paper (2009-2016)

7. (a) For the year 2005 – 06 in the Corporate I – Tax collectios the percentage growth of I-Tax over the previous year for both the Budgeted and the actual is approximately same.

	Corporate (Budgeted)	% Growth	Corporate (Actual)	% Growth
2004–05	275	–	285	–
2005–06	345	25.5	335	17.5
2006–07	395	14.5	405	20.9
2007–08	520	31.6	540	33.3
2008–09	730	40.4	715	32.4

	Corporate (Budgeted)	% Growth	Corporate (Actual)	% Growth
2004–05	235	–	240	–
2005–06	300	27.7	307	27.9
2006–07	340	13.3	335	9.1
2007–08	425	25	430	28.4
2008–09	560	31.8	500	16.3

8. (d) I. Percentage contribution of Corporate I -Tax to the Total I-Tax in the year 2005-06

$$= \left( \frac{307}{335} \right) \times 100 = 91.6\%$$

$$\text{In the year 2008-09} = \left( \frac{500}{715} \right) \times 100 = 70\%$$

- II. Simple Annual Growth Rate

$$= \frac{(215-45)}{45} \times 100 \times \left( \frac{1}{4} \right) = 94.4\%$$

- III. This is also true as evident from the table provided in solution 16.

So, all statements are true.

**Solution (9–11) :** Gender wise deaths due to NCDs in five countries for 2008 and 2009.

Countries	NCD deaths in 2008			NCD deaths in 2009		
	Male	Female	Total	Male	Female	Total
Indonesia	582	815	1397	275	850	1125
Russia	827	892	1719	950	925	1875
India	2967	2273	5240	3160	2020	5180
China	4323	3670	7993	4195	3850	8045
USA	1054	1150	2204	1150	530	1680
<b>Total</b>	<b>9753</b>	<b>8800</b>	<b>18553</b>	<b>9730</b>	<b>8175</b>	<b>17905</b>

9. (c) Indonesia, India and USA, were the number of deaths due to NCDs in 2009 was less than that in 2008.

10. (a) Total number of female death due to NCDs in five countries in 2008 = 8800

Total number of Female death due to NCDs in five countries in 2009 = 8175

$$\therefore \text{Required percentage} = \frac{8800 - 8175}{8800} \times 100 \\ = 7.10\% \text{ (decrease)}$$

11. (b) Total number of male death due to NCDs in five countries in 2008 = 9753  
Total number of male death due to NCDs in five countries in 2009 = 9730

$$\therefore \text{Required difference} = (9753 - 9730) \times 1000 = 23000.$$

12. (b)  $\therefore \text{Profitability} = \frac{\text{Profit}}{\text{Revenue}}$

$$\text{Profitability of NIIT in 1999} = \frac{106}{481} = 0.2204$$

$$\text{Profitability of Aptech in 1999} = \frac{51}{320} = 0.1594$$

$$\text{Profitability of SSI in 1999} = \frac{34}{85} = 0.4$$

$$\text{Profitability of Tata Infotech in 1999} = \frac{6}{420} = 0.0143$$

$$\therefore \text{Average of the profitabilities of the four companies in 1999} = \frac{0.2204 + 0.1594 + 0.4 + 0.0143}{4} = 0.1985.$$

$\therefore$  Only two companies Tata Infotech and Aptech have a profitability less than the average of the profitabilities in 1999.

13. (b) Total revenues of four companies in 2001  
= 509 + 285 + 231 + 523  
= 1548 crore  
Total profit of four companies in 2001 = 20 + 54 + 51 + 27 = 152 crore  
 $\therefore$  Total cost = Revenue – Profit  
 $\therefore$  Total cost = (1548 – 152) = 1396 crore  
In 2002, total revenue  $\approx$  (1548 – 155) crore

After decrease by 10% = 1393 crore.

$$\text{Total cost} = (1396 + 140) = 1536 \text{ crore}$$

After increasing by 10%

$$\text{Hence, net profit} = (1393 - 1536) = -143 \text{ crore}$$

$$\therefore \text{Profitability} = \frac{-143}{1393} = -10.25\%$$

14. (a) The profitability of NIIT, Aptech, SSI and Tata Infotech in 2001 is  $\frac{20}{509} = 0.039, \frac{54}{285} = 0.189, \frac{51}{231} = 0.220$  and  $\frac{27}{523} = 0.051$  respectively.

Thus, the increasing order is NIIT, Tata Infotech, Aptech and SSI.

15. (c) The profitability of NIIT in 2000 =  $\frac{138}{625} = 0.2208$

The profitability of Aptech in 2000 =  $\frac{82}{404} = 0.2029$

The profitability of SSI in 2000 =  $\frac{49}{131} = 0.3740$

The profitability of Tata Infotech in 2000 =  $\frac{6}{500} = 0.012$

So SSI company has the highest profitability in 2000.

**Solution (16 to 18) :**

B-school	No. of companies	No. of students	No. of offers	Offers per company	Offers per student
FMS	60	100	125	2.08	1.25
IMT	90	150	225	2.5	1.5
IMI	50	120	150	3	1.25
K.J. Somai	70	150	150	2.14	1
Narsee Monjee	80	150	200	2.5	1.33

16. (a) IMT has the highest number of offers per student.

17. (c) According to above table, IMT has the highest ratio of offers per company.

18. (d) Total salary for FMS =  $100 \times 7 = ₹ 700$  lakh

$$\text{Total salary of PPO holders} = (25\% \text{ of } 100) \times 10 \\ = 250 \text{ lakh}$$

$$\therefore \text{Total salary of people not getting PPOs} = 700 - 250 \\ = 450$$

$$\therefore \text{Average annual salary of people not getting PPOs} \\ = \frac{450}{75} = 6 \text{ lakhs.}$$

**Solution (19 to 21):**

The table below gives all the possible values of B, C, D, E, F, G, H, I and J if the value of A is assumed to be 'x'.

A	x
B	$x \pm 1$
C	$x \pm 1; x \pm 3$
D	$x; x \pm 2; x \pm 4; x \pm 6$
E	$x \pm 1; x \pm 3; x \pm 5; x \pm 7$
F	$x \pm 1; x \pm 3; x \pm 5; x \pm 7; x \pm 9$
G	$x; x \pm 2; x \pm 4; x \pm 6; x \pm 8; x \pm 10; x \pm 12$
H	$x \pm 1; x \pm 3; x \pm 5; x \pm 7; x \pm 9; x \pm 11; x \pm 13$
I	$x \pm 1; x \pm 3; x \pm 5; x \pm 7; x \pm 9; x \pm 11; x \pm 13; x \pm 15$
J	$x; x \pm 2; x \pm 4; x \pm 6; x \pm 8; x \pm 10; x \pm 12; x \pm 14; x \pm 16; x \pm 18$

19. (d) Clearly, if the value of A is known then 19 distinct values are possible for J.

20. (b) If, 'x' is even then A, D, G and J are even. If 'x' is odd then B, C, E, F, H and I are even.

So, four numbers A, D, G and J are even.

21. (a) If  $x = 1$ , then a possibility is that B = 2, C = 4, D = 1, E = 2, F = 4, G = 1, H = 2, I = 4 and J = 1 in which case 7 values are perfect squares. This is the maximum number of perfect squares which can occur at the same time i.e. in a single case.

22. (a) Let the total investment in education sector by India = x Then, Total investment in education sector by China =  $1.6x$

According to question,

For China. 32% of  $1.6x$  was from ADB loans

$$A = \left( \frac{0.32 \times 1.6P}{360} \right) \times 100\%$$

For India, 20% of x was from ADB loans.

$$B = \left( \frac{0.2 \times P}{360} \right) \times 100\%$$

Required ratio A : B = 256 : 135

23. (b)

24. (a) Loan amount invested in education = 20% of 150 = ₹ 30 r

Loan amount invested in Health = 22% of 120 = ₹ 26.4 cr

Loan amount invested in Agriculture = 16% of 400 = Rs 64 cr

$$\therefore \text{Total loan amount invested in India} = \frac{40}{360} \times 7200$$

$$\text{The required percentage} = \left( \frac{30 + 26.4 + 64}{\frac{40}{360} \times 7200} \right) \times 100$$

$$= \frac{120.4}{800} \times 100 = 15.05\%$$

25. (c) Total investment will be maximum when maximum loan amount is invested in education i.e. ₹ 440 cr. And ₹ 30 cr each is invested in power and transport sectors.

$\therefore$  Total investment in the 3 sectors

$$= 440 \times \frac{100}{20} + 30 \times \frac{100}{30} + 30 \times \frac{100}{50} \\ = ₹ 2360 \text{ cr.}$$

26. (c) Companies for which the expenses are less than 60% of the sales, will have a profit more than 40% of the sales. There are six such companies.

27. (b) According to graph, Only three software companies are the sales, more than Rs. 2500 crore and expenses are less than rs. 2100 crore.

## Ch- 13. Pie Chart

1. (d) Out of 100 we get 306 run

$$\therefore \text{For } 43.14 \text{ we get } \frac{43.14 \times 306}{100} = 132.00 \text{ runs}$$

$$\therefore \text{No. of } 4 = \frac{132}{4} = 33$$

$$\text{For } 3.92 \text{ we get } \frac{3.92 \times 306}{100} = 12 \text{ runs}$$

$$\therefore \text{No. of } 6s = \frac{12}{6} = 2$$

2. (d) According to the question total runs =  $306 + 20 - 4 = 322$   
From previous question runs scored in fours = 132  
So, runs scored in fours =  $132 + 20 = 152$

$$\text{So, central angle} = \frac{152}{322} \times 360 = 169.93 \approx 170^\circ$$

3. (b) The difference between Budgeted Expenditure and Budgeted Revenue when expressed as a percentage of Budgeted Revenue

$$= \frac{625}{500} \times 100 = 125\%$$

4. (c) The sum of Planned Revenue Account and Planned Capital Account (Rs. 281.25 thousand crores) exceeded the Non-Tax Revenue (Rs. 95 thousand crores) by Rs. 186.25 thousand crores.

5. (d) Since nothing is mentioned about the break-up of Budgeted Revenue in FY 2011-12, the percentage share of Tax Revenue cannot be determined.

6. (d) Total sales turnover of the detergent in East region of India in the year 2009 = 974 crores.

Total sales turnover of the detergent in West region of India in the year 2009 = 893 crores.

Total sales turnover of the detergent in North region of India in the year 2009 = 799 crores.

Total sales turnover of the detergent in South region of India in the year 2009 = 742 crores.

$\therefore$  Total sales turnover of all the detergent in 2009  
 $\Rightarrow 974 + 893 + 799 + 742 = 3408$  crore.

7. (b) Percentage increase in price per unit in 2009.

$$\text{For brand A} = \frac{\text{Sales} - 2009}{\text{Sales} 2008} \times \frac{\text{Market share} - 2008}{\text{Market share} - 2009}$$

$$\Rightarrow \frac{734}{725} \times \frac{15}{13} = 1.168\%$$

$$\text{For brand B} \Rightarrow \frac{314}{207} \times \frac{10}{12} = 1.264\%$$

$$\text{For brand C} \Rightarrow \frac{686}{709} \times \frac{22}{23} = 0.925\%$$

$$\text{For brand D} \Rightarrow \frac{560}{513} \times \frac{18}{20} = 0.982\%$$

$$\text{For brand E} \Rightarrow \frac{384}{317} \times \frac{10}{10} = 1.211\%$$

So, brand B registered the maximum percentage increase in the price per unit in 2009.

8. (a) Let a total of 100N units be sold in both the years 2008 and 2009.

**Statement 1:**

A brand could not register growth in South and C brand could not register growth in both South and East in 2009.

So, Statement 1 is true

**Statement 2:**

Number of units sold by B in 2009 in South

$$= \left( \frac{12}{100} \times 100N \right) \frac{77}{314} = 2.94N$$

Number of units sold by B in 2008 in South

$$= \left( \frac{10}{100} \times 100N \right) \frac{17}{207} = 0.82N$$

Percentage increase

$$= \left( \frac{2.94 - 0.82}{0.82} \right) \times 100 = 258\%$$

So, Statement 2 is false.

**Statement 3 :**

Number of units sold by C in 2009 (23N) is greater than the number of units sold by C in 2008 (22N).

So, Statement 3 is false.

**Solution (9 to 11)**

The total number of athletes sent by :

$$\text{USA} = 2400 \times \frac{8}{24} = 800 \text{ athletes}$$

$$\text{China} = 2400 \times \frac{11}{24} = 1100 \text{ athletes}$$

$$\text{Russia} = 2400 \times \frac{5}{24} = 500 \text{ athletes}$$

9. (c) Total number of Cycling athletes sent by the three countries together

$$= 0.15 \times 800 + 0.12 \times 1100 + 0.16 \times 500 = 332$$

$\therefore$  Total number of female cycling athletes sent by the three countries together = 166

Number of female cycling athletes sent by Russia

$$= \frac{1}{20} \times (0.16 \times 500) = 4$$

Number of female cycling athletes sent by USA

$$= \frac{4}{5} \times (0.15 \times 800) = 96$$

Hence, the number of female cycling athletes sent by China =  $166 - (4 + 96) = 66$ .

10. (a) Maximum number of athletes sent by China for a game =  $0.25 \times 1100 = 275$

Minimum number of athletes sent by Russia for a game =  $0.03 \times 500 = 15$

$\therefore$  The required difference =  $275 - 15 = 260$

11. (d) The total number of Water Polo athletes sent by the three countries put together

$$= 0.15 \times 800 + 0.25 \times 1100 + 0.10 \times 500$$

$$= 120 + 275 + 50 = 445$$

$\therefore$  Total number of athletes sent by three countries = 2400

So, the required percentage

$$= \frac{445}{2400} \times 100 = 18.54$$

12. (c)  $\therefore$  Minimum percentage required to pass in a subject = 33.33%  
Thus,  $40^\circ$  out of  $360^\circ$  represents 33.33%  
 $\Rightarrow 60^\circ$  represents 50%.  
 $\therefore$  So, minimum percentage scored by Arya = 50%.
13. (b) Let maximum marks for each subject other than maths. = 100  
 $\therefore$  Maximum marks in maths = 200  
For Geoffrey,  $144^\circ = 200$  marks  
 $\Rightarrow 360^\circ = 500$  marks.  
For Tommen, if  $120^\circ = 200$  marks then  
 $72^\circ > 100$  marks,  
So, this is not possible, then  
 $\therefore$  For Tommen,  $72^\circ = 100$  marks  
 $\Rightarrow 360^\circ = 500$  marks  
 $\therefore$  Ratio of maximum marks, in all the subjects put together, by Geoffrey and Tommen = 1 : 1.
14. (d) Before the change in pattern of examination  
For maths :  
 $\therefore 144^\circ = 100$  marks  
 $\Rightarrow 360^\circ = 250$  marks.  
After the change in pattern of examination,  
 $80^\circ = 100$  marks  
 $\Rightarrow 360^\circ = 450$  marks  
 $\therefore$  Required ratio =  $450 : 250 = 9 : 5$ .
15. (a) According to question,  
 $144^\circ = 100$  marks  
 $\Rightarrow 360^\circ = 250$  marks  
 $\therefore$  Average percentage =  $\frac{250}{500} \times 100$   
Marks scored by Geoffrey = 50%.
- Solution (16 to 18)**  
The total number of different days of the week in January and February 2008 are as follows:  
Mondays: 8 (4 each in January and February)  
Tuesdays: 9 (5 in January and 4 in February)  
Wednesdays: 9 (5 in January and 4 in February)  
Thursdays: 9 (5 in January and 4 in February)  
Fridays: 9 (4 in January and 5 in February)  
Saturdays: 8 (4 each in January and February)  
Sundays: 8 (4 each in January and February)  
Total number of days in January and February 2008 = 60 days  
Total number of days on which he drove the car of brand Honda = 25% of 60 =  $\frac{60 \times 25}{100} = 15$  days  
Total number of days on which he drove the car of brand BMW = 15% of 60 =  $\frac{60 \times 15}{100} = 9$  days  
Total number of days on which he drove the car of brand Hyundai = 10% of 60 =  $\frac{60 \times 10}{100} = 6$  days.  
Here, HO > ME > CH > BM > HY > FE (given)  
So, we get that  $15 > ME > CH > 9 > 6 > FE$ .  
Then,  
 $ME + CH + FE = 60 - (15 + 9 + 6) = 30$  days
16. (d) Here that the number of days on which Mr. Alfonso drove the car of brand in January 2008 is the maximum.

- Now, the car of brand Honda is only driven on either of the three days of any week, i.e. Monday, Tuesdays and Saturdays.  
Total number of Mondays, Tuesdays and Saturdays in January 2008  
 $= 4 + 5 + 4 = 13$  days  
Total number of days in February 2008 on which he drove the car of brand Honda is  $= 15 - 13 = 2$  days  
Mr. Alfonso drove Chevrolet on all possible Saturdays in January 2008 i.e. 4 days and all possible Thursdays in January 2008 and February 2008 i.e. 9 days.  
 $\Rightarrow$  He drove Chevrolet on 13 days and Mercedes on 14 days as  $15 > ME > CH$   
 $\Rightarrow$  Number of days on which he drove Ferrari  $= 30 - (13 + 14) = 3$  days.  
Maximum number of days on which Mr. Alfonso can drove the Mercedes in two months = 14 days  
To minimize the number of number of days when he drove Mercedes in the given two months, we will maximize the number of days on which he drove Ferrari and Chevrolet.  
He could drove Ferrari for a maximum of 5 days as  $FE < 6$   
 $\Rightarrow ME + CH = 25$  and  $ME > CH$   
 $\Rightarrow$  The minimum value of ME = 13 days  
Difference between maximum and minimum value of ME =  $14 - 13 = 1$  day  
19. (c) Let the production be  $100x$  and export (volume) be  $100y$   
As the share in export for three products (i.e. A, D and F is more than that in production but A witness the maximum change in share.)  
For maximizing the export (volume) assume all volume of A is exported  
 $\therefore 8x = 10y \Rightarrow \frac{y}{x} = 0.08 = 80\%$   
20. (b) Let the expenses and export by value be  $100x$  and  $100y$  respectively.  
As D is making profit  
 $\therefore 16x > 18y \Rightarrow x > \frac{9}{8}y$   
So, three products B, C and F were loss making products for the company.  
21. (d) Let export (by volume) and export by value be  $100x$  and  $100y$  respectively then price per unit for all products is  
 $A = \frac{14y}{10x}, B = \frac{12y}{17x}, C = \frac{20y}{15x}, D = \frac{15y}{25x}$   
 $E = \frac{16y}{11x}, F = \frac{20y}{22x}$   
So, E product has the highest price per unit.  
22. (c) Let the production and export is  $100x$  and  $100y$  respectively.  
Rejection rate of all products is  
 $A = 1 - \frac{10y}{8x}, B = 1 - \frac{17y}{20x}, C = 1 - \frac{15y}{20x}$   
 $D = 1 - \frac{25y}{22x}, E = 1 - \frac{11y}{15x}, F = 1 - \frac{22y}{18x}$   
So, E product has the maximum rejection rate.

## Solution (23-26)

Product	Total cost of production (In Rs. Crore)		Total profit (in Rs. Lakh)		Total cost of product (in crore)
	Type P	Type Q	Type P	Type Q	
A	13.64	11.36	204.6	340.8	25
B	38.71	36.29	967.6	725.8	75
C	15	22.5	225	450	37.5
D	16.67	20.83	250.1	208.3	37.5
E	14.3	10.7	357.5	214	25
F	25	25	500	375	50

23. (B,D,E,F) Only four products – B, D, E and F, are the profit made on items of type Q not more than the profit made on item of type P.
24. (c) According to above data, product D is the ratio of total profit is total productive on cost is the 10 lowest.
25. (c) A, B and E overall profit percentage is more than 26%.
26. (55) Total Cost incurred in producing type P of products A, D & F =  $13.64 + 16.67 + 25 = ₹ 55.31$  crore.
27. (b) To find the least number of states in which company A sold cement, we have to assume that company A had its sales in states in which the total sales were the maximum. Even if we assume company A had 50% market share in the states with maximum sales, there must be at least 5 states where company A sold cement.
28. (c) To find the maximum number of states where company E was present, we have to assume it had sales in the states where the total sales are minimum and it had a share of only 25% in the states.  
 $\therefore$  Company E had its sales in at most 7 states (S, U, X, T, Q, W and Y). It cannot include R also as 25% of sales in R is 2.5% of total and already at least 25% of  $51\% = 12.75\%$  is accounted by the seven states.  
 According to graph, only one company ie (A) which had sales in more than two states.
29. (a)

## Ch- 14. Data Tabulation

1. (d) The total number of families in the society is either 113 or 128.
2. (c) The number of families reading both Marathi and Hindi newspapers is 23.
3. (d) Current account balance in 2010  
 $= -3.268\% \text{ of } 73555.34$   
 $= -240378 \text{ (in ₹ billions)}$   
 Current account balance in 2005  
 $= -1.272\% \text{ of } 35662.2$   
 $= -453.62 \text{ (in ₹ billions)}$   
 $\therefore \text{Ratio} = \frac{-2403.78}{453.62} = 5.36 \text{ (approx.)}$
4. (c) Only option (c) is necessarily true.
5. (a) The number of unemployed persons  
 $= \text{unemployment rate} \times \text{population}$   
 $= \text{Unemployment rate} \times \frac{\text{GDP}}{\text{GDP per capita}}$   
 $= \frac{8.9}{100} \times \frac{41159.73}{36553.93}$   
 $= 0.1002 \text{ Billion} \approx 100 \text{ million.}$

## For (Qs. 6 to 10)

According to the question, cost of total production by all the seven companies = ₹ 25 crores.

Company Name	Production cost (in Rs. Crores)	Cost of Item I (in Rs. Crores)	Cost of Item II (in Rs. Crores)
A	3.75	1.5	2.25
B	2.75	1.65	1.1
C	5.5	4.4	1.1
D	2	0.75	1.25
E	6.75	4.21875	2.53125
F	1.25	0.25	1
G	3	1	2

6. (d) Required % age  $= \frac{0.25}{1.25} \times 100 = 20\%$
7. (a) Total Profit earned by G for both items I and II  $= 30\% \text{ of } 1 \text{ crore} + 24\% \text{ of } 2 \text{ crore}$   
 $= 30 \text{ lakhs} + 48 \text{ lakhs} = 78 \text{ lakhs.}$
8. (c)  $\frac{\text{Cost of production of I by company A}}{\text{Cost of production of I by company D}}$   
 $= \frac{1.5}{0.75} = \frac{2}{1} = 2 : 1$
9. (d) Cost of production of both items together by company E = 6.75 crores  
 Cost of production of C & D = 7.50 crores; of B & G = 5.75 crores; of A and D = 5.75 crores; of C & F = 6.75 crores.
10. (a) Cost of production of item I by A and item II by B  $= 1.5 + 1.10 = 2.60$  crores.
11. (c) Let the GDP of Belgium by E Euros.  
 $\therefore y \times \frac{4.8}{100} \times 1.5 = x \Rightarrow y = \frac{100}{7.2} x$   
 Hence, the debt (in Euros) of Belgium in FY 2011–12  
 $\frac{100.8}{100} \times \frac{100}{7.2} x = 14x.$
12. (c) According to given data  
 Two countries, viz. Denmark and Finalnd, were rated AAA among the fourteen in FY 2011–12.
13. (a) Let the GDP (in Euros) of Italy = x.  
 Therefore, the GDP (in Euros) of Finland = 1.5x.  
 The fiscal-deficit of  
 $\text{Italy} = \left( \frac{x \times 5.1}{100} \right) = 0.051 X$   
 $\text{Finland} = \left( \frac{1.5x \times 3.4}{100} \right) = 0.034 \times 1.5x = 0.051 x.$   
 Hence, the required percentage = 0.

## Solution (14–17) According to question.

	Total Capacity (in MW units)	Units Sold (in MW units)
A	8, 500	7,565
B	6, 250	5,437.50
C	10, 000	9,000
D	8, 500	7,225
E	9, 500	7,600

14. (d)  $\therefore$  Total capacity of power plant B of India = 6250.  
 $\therefore$  Total capacity of India =  $6,250 \times \frac{100}{12.5}$   
 $= 50,000$  MW units  
 $\therefore$  Thermal capacity of India = 95% of total capacity  
 $\Rightarrow 50,000 \times \frac{95}{100} = 47,500$  MW units  
Total capacity of these five power plants =  $(8500 + 6250 + 10,000 + 8500 + 9500) = 42,750$  MW units  
Required percentage =  $\frac{42,750}{47,500} \times 100 = 90\%$
15. (b) According to above table, The correct order is C > E > A > D > B
16. (d) Profitability can be compared by comparing the ratio of total revenue to total cost.
- Profitability for A =  $\frac{(89\% \text{ of TC}) \times 3.4}{(93\% \text{ of TC}) \times 2.1} = \frac{89 \times 3.4}{93 \times 2.1}$   
 $= 1.549.$   
(where TC is the total capacity of that power plant.)
- Profitability for B =  $\frac{(87\% \text{ of TC}) \times 3.2}{(88\% \text{ of TC}) \times 2.25} = 1.40$
- Profitability for C =  $\frac{(90\% \text{ of TC}) \times 2.9}{(92.5\% \text{ of TC}) \times 2} = 1.41$
- Profitability for D =  $\frac{(85\% \text{ of TC}) \times 3.0}{(86\% \text{ of TC}) \times 2.35} = 1.26$
- Profitability for E =  $\frac{(80\% \text{ of TC}) \times 2.8}{(81\% \text{ of TC}) \times 2.2} = 1.25$
- So, B has the third highest profitability.
17. (b) Only statement 'b' is true.

## Ch- 15. Data Sufficiency

1. (d) Here, Tarun scored the highest number of centuries among Tarun, Rajan and Pavan.  
 $\therefore$  From I, we can say that Pavan scored more runs than Tarun and is one of the persons selected  
But we cannot say who is the other person selected.  
 $\therefore$  I alone is not sufficient.  
From II, we can only say that Pavan is not the person who scored the highest number of centuries between the persons selected.  
 $\therefore$  II is not sufficient.  
Using both the statements Tarun or Rajan is one of the other persons selected.  
 $\therefore$  Either Tarun or Rajan is not selected.
2. (c) Either statement alone will not give the answer.  
Combining both the statements we can find AB + BC.  
Let c and a be AB and BC, then  $\left(\frac{a+b+c}{2}\right)$  in radius  
 $= \frac{1}{2}ac$   
And  $a^2 + c^2 = b^2$   
Here radius =  $\frac{10}{2}$ , and a = 2x circumradius, (b + c) can be solved for.

3. (c) From statement I, we cannot determine the total percentage of questions attempted by Ramya as we do not know the % of questions attempted by Ramya but not by Swathi. From statement II, the number of questions attempted by both Ramya and Swathi together is not known.  
But by combining both the statement, If x is the percentage of questions attempted by Ramya  $\frac{38}{8} \times x = 30 \Rightarrow x = 80$   
 $\therefore$  80% of the questions are attempted by Ramya
4. (d) Neither of the statements alone is sufficient, as each statement give only partial information.  
Combining both the statements, if Ankit is a truth teller, Bhanu cannot be a truth teller.  
 $\therefore$  Bhanu is a liar.  
If Ankit is a liar, then Bhanu can be a truth teller or a liar.  
 $\therefore$  We cannot answer the question.

## Ch- 16. Logical Reasoning

### 1 to 3 : Solution for the set:

1. Total distance of the walking track = 500 m  
2. Distance covered by Miss Hussain = 500 m = 1 round  
3. Since Miss Yadav over takes Miss Hussain two times so the number of rounds she covered = 3  
4. Miss Toppo overtakes Miss Hussain 3 times so the number of rounds covered by her = 4  
5. Miss Sharma crosses Miss Hussain 3 times so the number of rounds by her = 3  
1. (a) Total distance travelled by both the ladies =  $3 \times 500 + 4 \times 500 = 3500$  m  
2. (d) They both were walking in opposite direction so they cross each other 5 times ,3 times in the mid and two times at the end point  
3. (c) Two times , because Miss Toppo completed 4 rounds and Miss Yadav completed 3 rounds  
So first cross would be on the 2nd round and second cross would be on the third round.  
4. (b) Dablu and Ritesh  
5. (a) Rahul  
6. (d) The sum of the ranks of H4 was the lowest and was equal to 7. Hence, H4 must have won the jackpot.  
7. (d) According to question,

Set A	Set B	Set C	Set D	Set E
7	28	196	34	5

Now in the first rearrangement, 7 from set A is exchanged with 2 of set B to get the following :

Set A	Set B	Set C	Set D	Set E
2	78	196	34	5

Now in the second rearrangement, 4 from set D is exchanged with 5 of set E to get the following :

Set A	Set B	Set C	Set D	Set E
2	78	196	35	4

Now in the third rearrangement, 9 from set C is exchanged with 5 of set D to get the following :

Set A	Set B	Set C	Set D	Set E
2	78	156	39	4

Thus, a minimum of 3 rearrangement are required. So, option (d) is the correct answer.

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8. (e) From the previous solution we get that Set A and Set E contains 2 and 4.  
So, option (e) is the correct answer.
9. (b) The value of 'n' cannot be 2.
10. (c) Kamal and Kapil can never sit adjacent to each other.

## Ch- 17. Analytical Reasoning

1. (c) We must have both S and C, which forces A into the out column. Since we're looking the greatest number of additional elements we can add P to the in column for a total of 3 additional elements.
2. (d) We could have C, P, S and T IN with A and L OUT.
3. (c) We could have P, S, C, L and T IN with A OUT. We could have P, S, C and L IN with A and T OUT. We could have P, S, C and T IN with A and L OUT. We could have P, S, C IN with A, L and T OUT.
4. (b) We could have T and S IN and the rest OUT.
5. (d) 6. (a)
7. (d) Order of fatness :  
 $E < D$  .....(i)  
 $B > A > D$  .....(ii)  
 $E < C < D$  .....(iii)
- From (i), (ii) and (iii),  
 $B > A > D > C > E$   
So E is the thinnest.
8. (d) It can happen with 0 upsets and 3 draws: Delhi Challengers Vs Peshawar Pehalwans Delhi Challengers Vs Rajasthan Badshahs Peshawar Pehalwans Vs Rajasthan Badshahs The above three teams would end with 2 wins and 2 draws each. Rajasthan Badshahs can have Rank 4 based on the total goals scored in the tournament.
9. (c) Except the two matches given below all the matches can result in upsets. Hobart Rockets Vs Rajasthan Badshahs Hobart Rockets Vs Peshawar Pehalwans. If both the above matches are won by Hobart Rockets, then Hobart Rockets and Rajasthan Badshahs would end with 4 wins each. Hobart Rockets can have Rank 3 based on the total goals scored in the tournament.
10. (b) If the only match that doesn't result in an upset is Delhi Challengers Vs Peshawar Pehalwans and it is won by Delhi Challengers, then both the teams would retain their initial ranks.
11. (c) Taking the statements made by C, we can say that one of the two statements I and II must be true, which means that statement III is definitely false.  
So, A took a blue ball.
12. (d) Taking the statements made by C, we can say that one of the two statements I and II must be true, which means that statement III is definitely false.

### Taking the statements made by E and A:

Both statements II and III by E state that B took a blue ball and hence both are false as only one statement made on B is true. So statement I of both A and E are correct.

**So, F took a red ball and B took a green ball.**

Hence statement II by A was false.

**So, C took a red ball.**

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13. (b) Considering the statements made by C, we can conclude that one of the two statements I and II must be true, which means that statement III is definitely false.

Considering the statements made by B:

We know that statement I is definitely false as A took a blue ball. Also, statement III is false.

**So, statement II made by B is true.**

Considering the statements made by F: We already know that A took a blue ball and C took a green ball. Hence, both the statements I and II are false and therefore statement III made by F is true.

**So, neither D took a yellow ball nor did he took a red ball.**

Consider the statements made by D: We already know that statement II is false as F took a red ball.

So, one of the statements I and III is true.

It is also given that balls of two different colours were not taken by any of the mentioned persons.

**Case I:** E took a yellow ball

D must have taken a blue ball and balls of white and black colour are not taken by any of the mentioned persons.

**Case II:** D took a green ball

E could have taken either a white or a black ball.

For four persons viz. A, F, C and B the exact color of the balls taken by them can be determined.

### Solution (14-16)

According to question,

Name	Salaries	Cities
Ashok	13 or 7	B/K/V
Amit	8	Joka
Ajay	11	B/K.V.
Akansh	7 or 13	K/V
Abhishek	9	P

Where 'B', 'K', 'V' and 'P' stand for Banerghatta, Kunnamangalam, Vastrapur and Prabandhnagar respectively.

14. (d) Data is not sufficient

15. (c) Abhishek stays in Prabandhnagar.

16. (d) Since, Amit lives in Joka, so Ajay must be living at Kunnamangalam.

So, Akansh lives in Vastrapur.

### Solution (17 to 19):

According to question

Day	Match played between	Winner
Monday	T1 & T4	T1
Tuesday	T2 & T3	T3
Wednesday	T1 & T3	T3
Thursday	T3 & T4	T4
Friday	T2 & T4	T2
Saturday	T1 & T2	T2

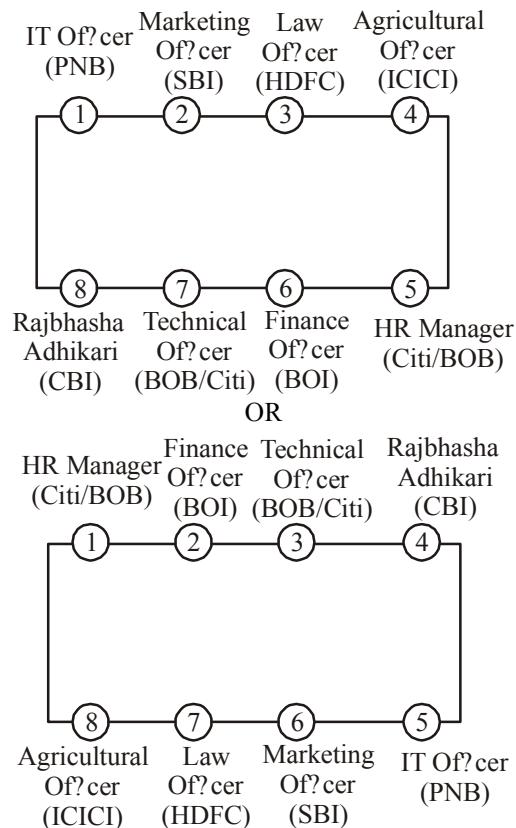
17. (a) T4 scored 2 point in the tournament.

18. (c) T3 lost against T4 on Thursday.

19. (d) The match played on Friday was between T2 and T4.

**Solution (20-22)**

According to question,



20. (d) HR Manager is sitting to the immediate right of the Finance officer.  
 21. (b) For six persons, we can definitely determine the banks in which they work.  
 22. (a) The person who is sitting opposite the Law Officer works in BOI.

**For questions 23 to 25:**

From statement (V), B and G cannot be together in the team. Therefore, there are three possible cases.

**Case I: When B is selected.**

F cannot be selected as F can only be selected when both G and N are selected. Thus, when B is selected, the team comprises exactly four bowlers. Also, J must be the wicketkeeper in the team, as selection of F ensures selection of F. Following table gives the possible compositions for the team.

Batsmen	Bowlers	Wicketkeeper
A, D, L, N, O, K/M	B, H, C, E	J

The number of ways in which the team can be formed  
 $= 2 \times 1 \times 1 = 2$

**Case II: When G is selected.**

H cannot be selected as H can only be selected when B is selected. Thus, when G is selected, then again the team comprises exactly four bowlers.

Following table gives the possible compositions for the team.

Batsmen	Bowlers	Wicketkeeper
A, D, L, N, O, K/M	G, F, C, E	I/J

The number of ways in which the team can be formed  
 $= 2 \times 1 \times 2 = 4$ .

**Case III: When neither B nor G is selected.**

When both B and G are not selected, then there is no possible composition for the team.

23. (d) The total number of ways in which the team can be formed  $= 2 + 4 = 6$ .  
 24. (c) If G is one of the bowlers in the team, then either of the two (i.e., I and J) can be selected as the wicket keeper in the team.  
 25. (c) If H is selected, G cannot be selected.

**For questions 26 to 29:**

Number of eggs laid on each day

$$\begin{aligned} &= \text{Number of hens in the poultry farm} \\ &= 60. \end{aligned}$$

Out of the eggs laid on each day, the number of eggs that got rotten is either 2 or 3 or 4.

Out of the eggs laid on each day, the number of eggs that got broken is either 4 or 5 or 6.

Maximum possible number of eggs taken to the market for sale on day 1  
 $= 60 - (2 + 4)$   
 $= 54$ .

Minimum possible number of eggs taken to the market for sale on day 1

$$\begin{aligned} &= 60 - (4 + 6) \\ &= 50. \end{aligned}$$

The minimum number of eggs that are left unsold each day must be 5, as the number of eggs that are rotten and broken among them needs to be an integer. It can be at max 10, since number of eggs left unsold on any day is less than 20% of the number of eggs laid on each day, i.e. 20% of 60 = 12. So, the number of eggs that are sold on day 1 ranges from  $(50 - 10 = 40)$  to  $(54 - 5 = 49)$ , (both inclusive).

On the next day again 60 eggs are laid, so from the above logic the range of number of eggs sold should again come out to be from 42 to 49 (both inclusive), but there are eggs that remain unsold at the end of the previous day.

Minimum possible number of eggs that are left over from the previous day and are taken along with the eggs laid on a day to the market for sale

$$= 5 - (40\% \text{ of } 5) - (2\% \text{ of } 5) = 2.$$

Maximum possible number of eggs that are left over from the previous day and are taken along with the eggs laid on a day to the market for sale

$$= 10 - (40\% \text{ of } 10) - (20\% \text{ of } 10) = 4.$$

So, the range of number of eggs that are sold on day 2 varies from  $(40 + 2 = 42)$  to  $(49 + 4 = 53)$  (both inclusive) and this holds true for day 3, day 4 and day 5 also,

	Eggs Laid	Rotten	Broken	Sold	Unsold
Day 1	60	2 - 4	4 - 6	40 - 49	5 or 10
Day 2	60	2 - 4	4 - 6	42 - 53	5 or 10
Day 3	60	2 - 4	4 - 6	42 - 53	5 or 10
Day 4	60	2 - 4	4 - 6	42 - 53	5 or 10
Day 5	60	2 - 4	4 - 6	42 - 53	5 or 10

26. (c) The minimum possible number of eggs that were sold on day 4 can be 42,  
 42 eggs are sold in the scenario when 10 eggs are left unsold.  
 So, the next day i.e. day 5, the minimum number of eggs that were sold can be calculated as

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Out of the 60 eggs that were laid – maximum rotten and broken eggs can be removed which are 4 and 6 respectively. Thus, left with 50 eggs. Also, from the 10 eggs of the previous day maximum rotten and broken can be removed which are 4 and 2 respectively, thus left with 4 eggs only. So, out of the total 54 eggs, a maximum of only 10 eggs can be left unsold. Therefore, the minimum eggs that were sold on day 5 were

$$54 - 10 = 44.$$

Hence, aggregate sum of eggs is  $42 + 44 = 86$ .

**Note:** Most of the students will make a mistake of considering 42 eggs for both the days but this is not possible on any two consecutive days simultaneously.

27. (b) Number of eggs that got rotten and broken is maximum possible.

So, assume that on each day 10 eggs remain unsold at the end of each day.

So, out of these 10 eggs that remain unsold at the end of each day, the number of eggs that get rotten and broken on the next day is 4 and 2 respectively.

The maximum number of eggs that got rotten and broken from among the eggs laid each day is 4 and 6 respectively.

So, the number of eggs that got broken across all the five days

$$= 6 \times 5 + 2 \times 4 \\ = 38.$$

Number of eggs that got rotten across all the five days

$$= 4 \times 5 + 4 \times 4 = 36.$$

Required difference =  $38 - 36 = 2$ .

28. (a) The maximum number of eggs that were left unsold at the end of the fifth day can be 10.

29. (a) The maximum number of eggs that were sold on day 1 can be 49, in a scenario when 5 eggs were left unsold. In this case, the maximum number of eggs that were sold on day 2 can be calculated as

60 (laid on day 2) – 2 (minimum rotten out of 60) – 4 (minimum broken out of 60) + 5 (previous days unsold eggs) – 2 (rotten out of 5) – 1 (broken out of 5) – 5 (minimum unsold) = 51

Since, on day 2 also, 5 eggs were left unsold the maximum number eggs sold on day 3 will again be 51. The same holds true for day 4 and day 5.

So, the maximum number of eggs that can be sold in the entire week can be  $49 + 51 \times 4 = 253$ .

**Note:** Most of the students will make a mistake of considering 53 eggs for any two consecutive days but this is not possible on any two consecutive days simultaneously.

### Solution (30 to 33):

According to question,

Name	Wife	Place	Game
Gurvinder		Jaipur/ Guntur	TT/Cricket
Surinder		Guntur / Jaipur	Cricket / TT
Mahinder	Sita	Ambala	Snooker
Bhupinder		Noida	Badminton
Harinder	Monica	Kapurthala	Volleyball
Joginder	Rama	Jammu	Football

30. (b) Monica is married to Harinder and he belongs from Kapurthala.  
 31. (b) Mahinder plays Snooker and he belongs to Ambala.  
 32. (a) Badminton is being played by Bhupinder.  
 33. (d) The wife of Surinder can't be determined because data is not sufficient.

### For questions 34 to 37:

According to the given conditions, the minimum score that a winning team can score in the first four sets is 25 and in the last set is 15.

From statements (iii) and (vi), it can be inferred that in one of the sets the score of Brazil and Russia were 12 and 25 respectively.

From statements (ii), (v) and (vi), there are two possibilities –

**Case I:** Russia scored the maximum score 30. In this case Russia cannot win any other set as it can win only two sets. In this scenario, Russia must lose a set with a score of either 25 or 30. With a score of 30 it cannot lose a set as 30 is the maximum score, thus it must have lost a set with a score of 25. In that case, Brazil must have scored 27.

Also, Russia scored 23 points in one of sets, which means Brazil must have scored 25 points (as Russia lost the set). Now, to make the total of Russia as 116, it must have scored 13 and to make the total of Brazil as 108, it must have scored 16 in the final set, which is not possible. Brazil can reach a score of 16 only when Russia scored 14 otherwise Brazil must have won at the score of 15. Thus, it can be said that Russia did not score 30 points.

	Brazil	Russia
Set 1	12	25
Set 2	28	30
Set 3	27	25
Set 4	25	23
Set 5	16	13 (Not possible)
Total Score	108	116

**Case II:** Brazil scored 30 points and Russia scored 28. Also, in one of the sets Russia scored 23 points. Now, there are again two possibilities – either Russia won the set as Brazil scored 21 points then it must be the fifth set or Russia lost the set as Brazil scored 25 points and it is one of the first four sets. If the first possibility is considered, in that case. Brazil must win the remaining two sets as Russia has already won two sets (12–25, 21–23) and to win two sets the minimum score of Brazil must be 25 in each set. But in this case. the total score of Brazil in all the five sets will become more than 108. Hence, Russia lost the set with the score of 23.

So the scores of three sets are tabulated below –

	Brazil	Russia
Set 1	12	25
Set 2	30	28
Set 3	25	23
Set 4		
Set 5		
Total Score	108	116

Now, the sum of the scores of Russia in the remaining two sets is  $116 - (25 + 28 + 23) = 40$ .

Also, from statement (ii) one of the scores of the remaining two sets of Russia must be one of 23 or 25 or 28.

So, the possible scores of Russia in the remaining two sets are (23, 17), (25, 15) and (28, 12). Also, the sum of the scores of Brazil in the remaining two sets must be  $108 - (12 + 30 + 25) = 41$ . The various possibilities are—

	Brazil	Russia
Set 4	23	25
Set 5 (NP)	18	15

	Brazil	Russia
Set 4	27	25
Set 5 (NP)	14	15

	Brazil	Russia
Set 4	21	23
Set 5 (NP)	20	17

	Brazil	Russia
Set 4	25	23
Set 5 (NP)	16	17

	Brazil	Russia
Set 4	30	28
Set 5 (NP)	11	12

	Brazil	Russia
Set 4	26	28
Set 5 (NP)	15	12

\* NP – Not Possible

34. The maximum difference by which a team won a set is 13 points.
35. The score of Russia in the fifth set is 12 points.
36. In three of the sets the score of Brazil was an even number.
37. The required common score was 25.
38. (10) Since L is the winner of the tournament, it must have won at least five matches. E is not qualified for second stage, it means E definitely won less than six matches. Only possible case is shown below:  
Number of matches won by E = Number of matches won by L = 5  
Hence, required number =  $5 + 5 = 10$ .
39. (b) Any team who had won two matches, there is a possibility that the team will qualify for second stage. A possible case for the number of wins =  $2 \ 2 \ 2 \ 2 \ 2 \ 6 \ 6 \ 6$ .
40. (b) Statement (i) is obviously true.  
Three teams in group 1 and three teams in group 2 can win one match each in stage 1.  
Statement (ii) is incorrect because maximum number of teams which could have three wins in the first stage would be 14.  
Possible case: 3 3 3 3 3 3 7 i.e. seven teams in each group would have three wins in the first stage.

Statement (iii) is clearly correct.

Hence, statement (i) and (iii) are correct

41. (22) Four teams cannot have six wins each hence maximum number of matches won in the first stage by teams A, B, C and D together would be 22  
Possible case for number of wins: 2 1 1 2 4 6 6 6.  
Required number =  $4 + 6 + 6 + 6 = 22$ .

42. (d) Option (a) Violates the condition that Rahul and John want to be selected together.  
Option (b) Violates the condition that Kamal cannot be in the group with Nusarat.

Option (c) Violates the condition that Rahul and John are to be selected together.

- Option (d) Rohit, Nusarat, Rehana – is acceptable  
Option (a) Violates the condition that John and Rahul are selected together.

Option (b) Violates the condition that Kamal has to be with Rehana.

- Option (c) Rahul, John, Rehana, Kamal – is acceptable  
Option (d) Violates the condition that Nusarat cannot be with Kamal.

44. (d) Option (a) is not correct as if Kavya and Rohit both the selected then Rahul and John cannot be selected and Kamal and Rehana must be selected. If Kamal is selected then Nusarat cannot be selected but as Rohit is selected Nusarat must be selected which is contradictory.

Option (b) is also incorrect.

Both women  $\Rightarrow$  Rehana and Kavya

Kavya  $\Rightarrow$  Kamal

Now, one more male is required. He cannot be Rahul or John because they should necessarily be together. Rohit cannot exist in the group without Nusarat and Nusarat cannot exist because Kamal is already selected. Hence, a group of 4 having both women is also not possible.

Option (c) is not correct as Kamal should not be with Nusarat and Rohit cannot be with Rahul.

45. (a) The only possible group:  
Kamal, Kavya, Rehana, Rahul and John.

46. (b) Alonso finished on podium in each of the first six races and scores 54 points.

He can score 54 points as

10, 10, 10, 8, 8, 8 [in any order]

10, 10, 10, 10, 8, 6

So, he can get 2nd rank in at most 3 races.

47. (c) Alonso finishes the next race on podium.  
 $\Rightarrow$  his total points are 60 or 62 or 64.

For finding lowest rank obtained by Schumacher, we take Alonso's score as 60 (lowest among 60, 62, 64)

To win the championship Schumacher needs 61 points.

$\Rightarrow$  in the last three races he has to score  $61 - 39 = 22$  points.

For lowest rank 22 can be scored as 10, 10, 2 (in any order).

Hence, the lowest rank obtained by Schumacher is 7th (corresponding to 2 points).

48. (c) If Fisichella finishes on podium in race 9 (or in any of the last 3 races), the points scored by Renault will be 87 (or more).

Hence, even if Honda drivers take top two ranks in all three races they will end up with 85 points.

i.e.  $31 + 3 (8 + 10) = 31 + 54 = 85$  points.

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## Past Years Solved Paper (2009-2016)

- Hence, in this case Honda won't be able to win the 'Constructor's Championship'.
49. (b) After first six races Schumacher's total points are 39. He didn't score any point in 1 race. Hence effectively, he scored 39 points in 5 races and 0 points in 1 race. If in any of the 5 races he scores 7th rank or 2 points. then in other four races he has to score 37 points, which is not possible in any combination.
50. (a) A bus to Uttam Nagar departs after every 15 min. One of the buses to Mehrauli leaves after every 10 min. Other bus to Mehrauli can leave after every 12 min or 20 min. Let us assume bus on route no. 427 leaves after every 10 min between 9:00 am & 10:00 am c.e. at 9:00. 9:10. 9:20, 9:30, 9:40, 9:50 and 10:00 a.m.
- 12 min**  
If timings of buses plying after 12 & 10 min clash then the bus plying after every 12 min will go. If timings of any of the buses plying after 12 min coincides with departure time of 427 then the next bus timings will clash only after 60 min (LCM of 12 & 10)  
So maximum of 1 bus timings can clash with route no. 427 in a given hour.  
Hence, a minimum  $7 - 1 = 6$  buses on route 427 can depart in an hour.
- 20 min**  
If timings of buses plying after 20 & 10 min clash then the bus plying after every 20 min will go. If timings of any of the bus plying after 20 min coincides with departure time of 427 then the next bus timings will clash again after 20 min (LCM of 20 & 10)  
If the timings of two buses clash at 9:00 AM then timings will again clash at 9:20. 9:40 and 10:00  
Hence, a minimum  $7 - 4 = 3$  buses on route 427 can depart in an hour.
51. (c) If frequency of all buses increases by 5 min then new time intervals become 5, 5, 7, 10, 15 and 25 min. So now one of the bus to Mehrauli departs after every 5 min. The Other bus can depart after every 7 min or 15 min.  
The minimum time difference between buses plying after 5 and 7 min can be 1 min (GCD of 5 and 7).
52. (d) The difference in time intervals between a particular bus to Mehrauli and Uttam Nagar is same as the difference in time intervals between two buses plying towards Uttam Nagar.  
Hence, time intervals between Buses for Mehrauli and Uttam Nagar can only be:  
Mehrauli – 10 and 12 / 20  
Uttam Nagar – 15 and 10 / 20  
So the time interval between two different routes to Uttam Nagar is always a multiple of 5.
53. (d) If condition (iii) is waved off then there can be possibility of 3 buses plying to Uttam Nagar.  
Then 3 buses to Uttam Nagar can ply between intervals 10, 12 and 15 mins or between intervals of 10, 15, 20 mins.

So, the minimum time interval can be in the first case i.e. when 3 buses ply after an interval of 10, 12, 15 mins.

Minimum difference between time interval =  $12 - 10 = 2$  minute.

**Solution (54-56).** Let the countries to which the persons belong i.e. Australia, Canada, Pakistan, India and Japan be represented by A, C, P, I and J respectively. Let the countries that they are coaching i.e. Australia, Wales, Bangladesh, Bermuda and China be represented by Au, Wa, Ba, Be and Ch respectively.

Name	Anishman		Buchanan		John		Whatmore		Chappel	
Country of Origin	*	✓	*	✓	*	✓	*	✓	*	✓
Country he is coaching	A C P	I or J	-	A	J A P	C	A	J or I	C	P
	Au Wa Ba Be	Ch	Ba Be Au Ch	Wa	Au Wa Ba Ch	Be	Wa	Au	Ch Au Wa Be	Ba

54. (d) What more can be from India on Japan, So, can be determined.  
55. (a) According to above data. Buchanan is from Australia.  
56. (b) Wales had Buchanan, who from Australia as their coach.  
57. (d) The conditions related to G are, if G is included, F also must be included and C and I cannot be included. There are no other conditions related to G. Hence, a team that includes G can be  
(a) AEJGDF  
(b) ADGFE  
(c) EGFH  
More arrangement are possible. Hence, the number of members in the team is 4 or 5.  
58. (c) The largest possible team can have six members. As one of, (E, B) and (D, H) and two of (C, G, I) must definitely be excluded. Hence, a minimum of four members must be excluded. So size of the largest possible team is 6.  
59. (b) If a team includes H, neither A nor D can be included in that team and further one of (E, B) and two of (C, G, I) must be excluded making the size of the team as 5.  
60. (b) If C is included, G, I and F must be excluded.  
As F is excluded, J also must be excluded.  
As F and I are excluded, the only remaining defender D must be included.  
As D is included, A must be included and thus H must be excluded.  
As G and H are excluded, the only remaining point guard B must be selected.  
As B is included, E must be excluded.  
∴ The team is (A, B, C, D)  
So, size of the team that includes C is 4.

## Ch- 18. Verbal Ability

1. (d) The correct usage is 'hand in glove' which means 'in extremely close relationship or agreement'.
2. (a) The correct usage is 'put pen to paper' which means 'to start to write something'.
3. (d) 'show' is used to depict an occasion when a collection of things are brought together for people to look at. Show is also used to make it clear that you have a particular quality. Show can be used in 'goes to show' to say that something proves something. The correct usage in (d) should be "showed me up" which means to make somebody feel embarrassed by behaving badly.
4. (c) 'Job of work' means a work that you are paid to do or that must be done. 'just the job' means exactly what is needed in a particular situation. The correct expression in (c) should be 'a long job' which means a particular task or piece of work that you have to do. Job can also be used as in statement (d) to describe a crime, especially stealing.
5. (c) In (c) sort has been used in incorrect manner, as it refers to sorts of farmers i.e. types. In (a), (b) and (d) the word sort has been used in the correct way.
6. (c) (c) is the correct choice, as over here host refers to home, which can't be taken in the sense. (a), (b) and (d) used the word host correctly.
7. (c) In option (a) use of the word 'note' is correct. In the given context 'note' refers to explanation/s that the author has provided for reference of the readers. In option (b) the word 'note' has been used to refer a person who is distinguished or famous. In option (d) the word 'note' has been used correctly. The word 'note' is used in this context to refer to grief, condolence or similar emotional qualities. In option (c) there is incorrect use of the word 'note'. The word has been incorrectly used in the expression 'rings a note' in place of the idiom 'rings a bell'. The idiom 'rings a bell' is used to refer to something which evokes memory or recollection. So option (c) is the correct answer.
8. (c) In option (a) use of the word 'hit' is correct. The phrase 'hits off' means to be friendly with each other immediately. Option (b) is also correct; 'hit the front page' means to be published in front page of a newspaper or magazine. Option (d) is correct; 'hit out' means to make a violent verbal attack. Option (c) is incorrect; it has wrong use of the idiom 'hit the high spots' which means visiting the most exciting places in a town. So option (c) is the correct answer.
9. (b) Except option (b) all other options contradict the thought contained in the given sentence. Option (b) keeps the thought intact that Mahatma Gandhi was respected for his convictions even by his critics. So option (b) is the correct answer.
10. (a) A quick review of question indicates that the first blank should be filled with a word similar to society or the population. Similarly, in the second blank, an adjective

- for the word 'love' is needed. Option (b) is incorrect because 'irrevocable' means irreversible which doesn't fit in the sentence. Option (c) is also incorrect because 'unrequited' means unreturned which does not logically fit in the sentence. Option (d) is incorrect because 'civil obedience' cannot be demanded from the opposition. The words given in option (a) fit perfectly in the blanks; 'populace', meaning the ordinary people of a country, fits in the first blank and 'unquestioning' goes well with obedience. So option (a) is the correct answer.
11. (b) Options (a), (c) and (d) do not fit in the given context and are incorrect. Since the sentence mentions a yearning for the glorious past, the word 'wistful', as given in option (b), which means 'full of yearning or desire tinged with melancholy' fits in the blank and makes it meaningful. So option (b) is the correct answer.
  12. (b) Gauche means unsophisticated or socially awkward and blandness means the quality of being boring, plain or insipid. So option (b) is the correct answer.
  13. (a) Divisiveness means creating dissension or discord and nationalist refers to a common thread or a binding force. So option (a) is the correct answer.
  14. (d) To stick one's neck out means to take a risk. If someone is described as a pain in the neck, it means he/she is an annoyance. If something is an albatross around your neck, it's something that keeps causing you problems. The correct idiom in option (d) should be 'neck and neck' which is used if two persons are competing very closely. So option (d) is the correct answer.
  15. (a) A bird's eye view means a view from a very high place which allows one to see a large area. Roving eye refers to people who are sexually attracted to persons other than their partner. The idiom 'stars in one's eyes' means to be dazzled or enraptured. Option (a) is incorrect as the correct phrase is 'to cry one's eyes out' not 'to cry one's eyes after'. So option (a) is the correct answer.
  16. (b) In Statement 1, the word 'pull' implies to take something out of or away from a place, especially using physical effort.  
In Statement 3, the word 'pull' implies to attract a person or people.  
In Statement 4, the word 'pull' implies to remove or stop something because it is found to be offensive or not accurate.  
The correct answer is Statement 2, as the usage of word 'pull' here is inappropriate. Since 'pull away' implies to physically move away; however the statement implies metaphorical moving away.
  17. (d) Statement 1 is correct, the word 'shade' here implies a colour, especially with regard to how light or dark it is or as distinguished from one nearly like it.  
Statement 2 is also correct; the word 'shady' here implies something/someone of doubtful honesty or legality.

- Statement 3 is also correct; the word 'shade' here implies the comparative darkness and coolness caused by shelter from direct sunlight.
- The correct answer is Statement 4 as the word 'shade' here is incorrect as 'fear' is an emotion/feeling, that does not have a shade.
18. (d) The 'It' in A refers to the forum in E.EA forms a mandatory pair and this helps rule out option (b). Option (a) can be ruled out because C does not follow B; however, B can be used to substantiate C – as done in option (d). Option (c) can be ruled out for the same reason as B is cited as an example and it follows C. Option (d) is the answer as C should start the sequence as the word 'Ironically' cannot otherwise be logically justified.
19. (c) (E-B) is a mandatory pair as statement B gives the correct inference that should be made from the data in statement E. Statements D & E should also come together as they both present data pertaining to natural disasters. Statement A begins a new idea and therefore has to come in the end.
20. (b) (E-A) is a mandatory pair as is (B-D). Statement C starts talking about a new idea that of taking a pledge. It could come either at the end or the beginning. However, statement C starts with 'that future'. This reference does not make sense if we put statement C at the end of the paragraph. Therefore statement C has to begin the paragraph.
21. (d) (C-E) is a mandatory pair as it builds upon the idea through contrast. 'It is not the critic who counts...' in statement C and 'the credit belongs to the man who is actually in the arena' in statement E. Statements B and D should also come together as they build on the idea of the man in the arena. (D-A) is another mandatory pair as the conclusion in statement A is based on statement D.
22. (a) 23. (b)
24. (c) The paragraph begins with statement A. Statements D and E discuss the definition and hence have to come together. Similarly, B describes the idea which begins in C. The 'dilution' in C is followed by B which gives an example of this dilution. 'Already by 1762.....there was no meaningful difference between the authority of a despot and that of a monarch'.
25. (a) The word 'plea' is ruled out as we have the justice minister dealing with the incivility of the local police (he is in a position of power over them). 'Sanction' and proscription suggest a legal or social ban. As the minister appeals to god **malediction** (curse) is an appropriate.
26. (a) The correct adjective that could describe the refutation of opponents' claims would be ingeniously (cleverly, resourcefully) rather than ingenuously (honestly, innocently, naively). The second sentence states the astonishment at how he pulled it off successfully. The
- word incredible (difficult to believe) instead of incredulous (not willing to believe) fits here.
27. (a) Literati means class of learned people. Literate is for a person who can read and write. A literate is not necessarily learned person.
28. (b) It is important to understand the comparison in the two sentences. In the first sentence we are in awe of the pyramids despite being aware of the misery that accompanied their construction. Therefore in the first blank we need a negative word, whereas for the second blank we would need a positive word. 'smother' and 'art' fit best.
29. (d) 'langourously' and 'quietly' would be the only appropriate words for the first blank. The second blank can effectively help at arriving at the answer option as 'abyss' would be inappropriate. 'refrain' which means 'a regularly occurring melody or chorus of a song' would be more appropriate.
30. (d) 'Exhaustive' means comprehensive. 'Secure' and 'complete' do not fit in the context of taking printouts. 'Manual' means involving or using human effort and this fits in the context of a contrast with tracking messages on a real-time basis. The answer is option (d).
31. (b) 'Constructive' means promoting further development or advancement. 'Advanced' means further along in progress. Though 'preliminary' and 'advanced' can be used to describe discussions, they do not fit in the context as the rest of the sentence says that 'he remains optimistic that a positive outcome can be achieved'. 'Reassert' means to state with assurance or state strongly. The answer is option (b).
32. (c) In sentence A there is incorrect use of article 'a' before 'tarot'; it should be 'the tarot'. Sentence B has an incorrect phrase 'all the outcry'; it should be 'all the outcries'. Sentence C has incorrect use of pronoun 'whom' in place of 'which'. Sentences D and E do not contain any error, so option (c) is the correct answer.
33. (c) The paragraph should begin with sentence A or D. On comparing sentences A and D, it is found that sentence A is not suitable as an introductory sentence because it's express a conclusion. Sentence D and E should go together followed by sentences B and C sentence A should follow sentence C as it is concluding sentence in the paragraph. So option (c) is the correct answer.
34. (c) Sentence 1 is incorrect because there is incorrect use of the word 'countries' in place of 'country'. Sentence 2 is also incorrect; article 'the' is required before 'precise extent to which ....'. In sentence 3 there is incorrect use of preposition 'on' after 'to live...'. It should be 'live by....'. There is subject-verb disagreement in sentence 4, so it is also incorrect. Only sentence 5 is correct grammatically, so option (c) is the correct answer.
35. (d) Sentences A, B or E cannot be introductory sentence of the paragraph. Since sentence C mentions - '...these paragons of...' it cannot be first sentence of paragraph.

- The paragraph should begin with sentence D followed by sentence C. Sentences B, E and A should follow DC in order to make the paragraph coherent. So option (d) is the correct answer.
36. (c) Sentence C is the first sentence of the paragraph as suggested by given options. It talks about a jewel heist carried out during an important event. Sentence D should follow sentence C which is its logical continuation. Sentence B should follow D because it gives more details of the heist. Sentences E and A should follow sentence B in order to make the paragraph coherent. So option (c) is the correct answer.
37. (d) A quick review of all options reveals that no other sentence except E is fit to be the introductory sentence of this paragraph. This eliminates options (a) and (c) as they begin with sentence B. Sentence E should be followed by C because it focuses on the details of Queen's coronation. Next, sequence BAD is a logical continuation of ideas expressed in sentences E and C. Sentence B tells that conferring of state headship is an exclusive Anglican ritual; sentence A tells what happens in the ritual and sentence D states how the ritual concludes. Option (d) presents right sequence of sentences in the paragraph and is the correct answer.
38. (a) In this paragraph, E should be the introductory sentence as it is a general statement while other sentences are examples. Next, sentences C, A and B form a logical sequence. Sentence C includes the fact that conventional wisdom has been turned over by new restaurants. Sentence A supports its preceding sentence by arguing that Japanese food should not do well in North Indian markets. Sentence B presents a contrasting fact that Sushi is a favourite among teenagers. Options (b), (c) and (d) are incorrect as they do not contain sequence CAB. Option (a) presents correct sequence of sentences and is the correct answer.
39. (a) Options (c) and (b) should go together as the deep intertwining between modernity and nostalgia mentioned in option (c) is explained in option (b). Also, options (d) and (b) should go together as 'that hunger' mentioned in option (d) refers to the harking back of the human mind to 'a supposedly simpler time' in the past 'when life was more peaceful' in option (b). Option (a) does not fit into the sequence as it talks about the reaction of observers of the artist's work rather than how the work evokes such a reaction. So it is the correct answer.
40. (d) Option (a) uses the word 'buy' correctly. 'Buy time' means to delay something. Option (b) has correct use of phrase 'bought into an idea' which means to believe in an idea. Option (c) uses phrase 'Bought it' correctly, which means to die. In option (d), there is incorrect use of phrase 'buying out'. 'Buying out' means to pay somebody for their share in a business in order to get total control of it for yourself. The correct phrase should be 'buying in' which means to buy something in large quantities. So option (d) is the correct answer.
41. (b) Sentences A and C are correct grammatically. In sentence B, there is incorrect use of the singular pronoun 'it' to refer to plural noun 'elements'. The correct sentence should be - "...elements, most of them...". There is incorrect use of phrase 'gained in' in sentence D in place of 'gained by'. The phrase 'gained in' means an increase or growth in something. Sentence E is also incorrect because the different pronouns have been used in the sentence. 'One' should be replaced by 'you' to make the sentence correct. So option (b) is the correct answer.
42. (a) Sentences C and D are correct grammatically. Sentence A is incorrect as there is wrong use of 'ing' after the word 'answer'. An 'infinitive' should not be followed by the '-ing'. Sentence B is wrong because there is wrong use of degree of comparison in 'gravest of charge', it should be 'gravest of charges' instead. Sentence E has the error of subject-verb disagreement. The plural pronoun 'them' should be used to refer to plural word 'actions' instead of 'it'. So option (a) is the correct answer.
43. (a) Sentence B is about what the author is focusing on. Sentence D is about challenge that she has taken up. Sentence C tells about her latest title. Sentence E is about how it has been inspired by her life and sentence A describes an instance. So option (a) is the correct answer.
44. (d) One can easily solve this question by focusing on options C and D. One can easily match C-H and D-F. So option (d) is the correct answer.
45. (a) Sentences A and C form a pair as both are about the importance of knowledge workers in the era of global competition. Sentences E, B and D are related as they discuss means of keeping workers happy. So option (a) is the correct answer.
46. (d) Sentences B and D make a pair. Next, sentence E mentions aspects of his early life and sentence A continues this. Sentence C should be the concluding sentence of the sequence as it talks about his relationship with his friends. So option (d) is the correct answer.
47. (c) Leech refers to bloodsucking parasites that feed on others while leach means to drain away from soil, ash, or similar material. Gulled means fooled while culled means slaughtered. Abrasion means process of wearing down by friction and aberration means deviation or abnormality. To attenuate means to lessen the intensity of something and to accentuate means to intensify or emphasize. Amorphous means shapeless while amorous means passionate and lustful. The correct answer is AAABB. So option (c) is the correct answer.
48. (d) Bellow means to roar or shout while billow means to puff, swell or fill with something. Blandish means to coax someone with kind words and brandish means

- to exhibit something aggressively. Credence means belief in something and cadence means rhythm or beat. Delirious means to be in a disturbed state of mind while deleterious means harmful. To decry means to denounce or criticize someone while descry means to catch sight of something. The correct answer is AAAAB. So option (d) is the correct answer.
49. (b) Diffident means lacking self-confidence while dissident means a rebel or a non-conformist. Conflagrate means to inflame or incite and conflate means to mix different types of elements together. Immiseration means economic impoverishment and commiseration means pity or sympathy. Secede means to withdraw or disaffiliate from an organization while cede means to yield or surrender. Beacon means a shining example or a guiding light while beckon refers to a gesture to summon someone. The correct answer is BAABB. So option (b) is the correct answer.
50. (c) Options (b), (d) and (a) make a coherent sequence. Option (b) should be the first sentence as it is about filming of videos by drones around the world. Next, option (d) is about one such video recorded on a safari in the Serengeti. Option (a) should follow option (d) as it continues the idea by giving details of what the video contains. Option (c) does not fit into this sequence as it is about waves and surfers. So option (c) is the correct answer.
51. (b) Options (d), (c) and (a) make a coherent sequence. Sentence (d) criticizes England's trickeries and amateurishness in the final session. Sentence (c) continues this idea by giving an example and questioning the practice in English public schools. Sentence (a) should follow (c) as it mentions the consequence of the situation. Option (b) is the odd as it compares England's and Australia's spirit of cricket. So option (b) is the correct answer.
52. (b) Options (c), (a) and (d) make a coherent sequence. Option (c) mentions that the US dishes out military aid to Mexico without bothering about how it is used. Option (a) continues the same idea. Option (d) talks about the possibility of the aid being spent on extrajudicial executions. Option (b) does not fit into this sequence as it mentions that America should look at alternatives to a military response. So option (b) is the correct answer.
53. (d) Options (a) and (b) have subject verb disagreement. Option (c) incorrectly uses 'their' instead of 'there'. Option (d) is correct grammatically.
54. (b) Sentences 1 and 4 are correct. Sentence 2 incorrectly uses 'their' in place of 'its' before 'sequel'. Sentence 3 is incorrect as it misses article 'the' before 'easier'. So option (b) is the correct answer.
55. (d) Sentences a, b, c and e form a paragraph which is about poets. The correct sequence of sentences is abce. Sentence d is does not fits in this sequence as it talks about the origin of poetry. So option (d) is the correct answer.
56. (c) Sentences a, b, d and e form a paragraph and their correct sequence is abde. Sentence a mentions name of the novel so it should be the first sentence of the sequence. Sentences b and d make a pair because the pronoun 'Its' mentioned in sentence d refers to 'the novel' in sentence b. Sentence e mentions the word 'here', so it should follows sentence d as it makes the paragraph coherent. Sentence c is an opinion about James Joyce, so it is the odd one out.
57. (d) Sentences a, b, c and e form a paragraph and their correct sequence is abce. Sentence d is odd one out as it talks about Red dwarfs whereas the paragraph is about a particular planet.
58. (d) Statement A talks about the welcoming of renewed corporate interest in power, which sounds like an expression of opinion; thus it is 'Judgment'. Statement B starts with the word 'reportedly', which is an expression of true events; thus it is 'Fact'. Statement C, the word 'in tandem' means 'in conjunction' and talks about the need for a proactive policy; hence signifying a 'Judgment'. Statement D talks about the 'intentions of gathering data and using it further', which implies conclusions drawn about the unknown; hence 'Inference'. Statement E talks about the need; implying opinion of 'Judgment'. Hence, the correct sequence is option (d). JFJIJ
59. (c) In Statement A, the use of the word 'prevent' with the word 'laws' is incorrect; it should have been 'prevents'; thus this statement is incorrect. Statement B is also incorrect, the first half of the statement is presenting a fact and the second half is stating the result of that fact, so a conjunction should have been used between the two. Statement D is also incorrect, the use of word 'causing', which is the present participle form of verb is incorrect here. Since the statement talks about the effect in infinite time, it should be 'cause'. The correct answer is Statement C as it uses both the words 'prevents' and the right conjunction between two sentences.
60. (a) In Statement B, the use of word 'which' is incorrect. 'Which' is used in case of no defining clauses whereas the sentence talks about human talents, a defined clause. In Statement C the correct form should be 'appreciating the achievements of others'. Use of word 'the' is required as a definite article. Similarly in Statement D also usage of the word 'which' is incorrect ; and absence of the word 'the' in 'the achievements' is incorrect. The correct answer is Statement A which uses the correct form of defined clause 'that' and definite article 'the'.
61. (d) The word 'counselor' means a person who provides advice. 'Councilor' means a member of a council.

- 'Adopted' means legally take another's child and bring it up as one's own.
- 'Adoptive' means of a child or parent in that relationship by adoption.
- 'Venal' means showing or motivated by susceptibility to bribery; corrupt.
- 'Venial' means of a fault or offence slight and pardonable
- 'Further' is used for metaphorical or figurative distance.
- 'Farther' is used for physical distance.
- So the correct answer is Option (d). ABAAB
62. (d) 'Precedence' means the condition of being considered more important than someone or something else; priority in importance.
- 'Precedent' means an earlier event or action that is regarded as an example or guide to be considered in subsequent similar consequences.
- 'Alternately' means set up or following by turns, one after the other.
- 'Alternatively' refers to or implies a choice between two things.
- 'Noticeable' is worthy of note; significant
- 'Notable' is useful or profitable.
- "Discrete" means individually separate and distinct.
- 'Discreet' means careful and prudent in one's speech or actions.
- So the right answer is Option (d). ABBA
63. (eadbc) Sentence (e) should be the first sentence because it has the full name of the sportsperson. Sentence a should come next because it mentions the situation which leads it to d. Sentences d and b should be together. The idea contained in d is supported by b. Sentence c is the concluding statement.
64. (eabcd) Sentences e and a make a pair as e begins with 'One' and a begins with 'Another'. Sentence b continues the idea with the word 'elsewhere'. Sentence c should be the next sentence. Sentence d is a conclusion, so it should be the last sentence.
65. (dcbae) Sentence d introduces the subject: bacteria. Sentences c and b are a pair, c introduces cyanobacteria and b gives information about it. Sentence a gives general information. Sentence e follows a, 'that interval' in e refers to the 'gap' mentioned in a.
66. (abecd) Sentences a and b make a pair (anorexic young woman - young lady). Sentence e explains why the young girl is breaking Olive's heart. Sentence c should be the next as it is the young girl's response to Olive. Sentence d should be the last sentence.
67. (a) Since Statement A talks about nuclear power, the most suitable part next to it will be Statement D, which carries forward the topic and talks about nuclear cycle. Next in series will be Statement C as it talks about effects of nuclear cycle. Next most suitable option will be Statement E as it talks about CO<sub>2</sub> which is a greenhouse gas. The last option is Statement B which is the concluding statement.
68. (b) Hence, the correct answer is option (a). DCEB
69. (b) Statement 3 & 4 are incorrect as they talk about 'Mahatama' which is not mentioned in the paragraph. Statement 1 is also incorrect, as the paragraph talks about Nehru and his mindset towards religion. The correct answer is Statement 2 which carries the idea of last line of the paragraph and gives a concluding remark to his opinion.
70. (b) Statement 3 & 4 are incorrect as the paragraph talks more about the voluntary usage of birth control and not government's view point for the same. Statement 1 is also incorrect as 'population bomb' has not gone off completely. Birth rate has reduced but not become negligible. The correct answer is Statement 2, as the paragraph emphasizes on the voluntary usage of birth control.

## Ch- 19. Critical Reasoning

1. (a) Sentence b is nowhere mentioned in the paragraph. Sentence c misses the central idea of the paragraph. Sentence d is too narrow. Sentence a talks about the ecological impact of the disintegration of the glacier which is the central idea, so it is the correct answer.
2. (a) Paragraph is saying that mental illness of patients improve more and more if therapist patient relationship continue which patients interpret good. They don't care much about large amounts they pay to therapists ever many years, as relationships reduce to eight percent after termination of formal paid visits.
3. (c) The author is not happy with the huge amount of expenses incurred in research of things which have no use in day to day life. (c) weakens this argument because we can apply something to the use of mankind only if we have the knowledge of it.
4. (d) The passage clearly emphasizes that practising Hatha-Yoga is really difficult and only a few resolute souls go through all the stages of its practice (refer sentence 3). So E strengthens the idea of the passage. C and D are out of context as the passage doesn't talk about Yoga schools teaching Raja Yoga. A and B are also out of context as they restrict themselves to people in a given ashram.
5. (d) The main argument is that the tax - payer's money need not be wasted by printing official documents in many language. But if multilingual people are paying maximum taxes, then the government can afford to do so. Hence option (c) weakens the argument.
6. (a) Emotive argument is used in the passage which is referring to the safety of the children to get people interested. Every line of the passage is indicative of the dangers to which the children are exposed and measures which need to be taken for the safety of the children.

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7. (a) If the given statement that CEO of small organization come from good educational background is true it will strengthen the speaker's argument, the reason being the speaker wants that CEOs of big and small organizations should be paid similarly and if the CEO of small organization comes from good educational background they should receive a similar amount which a CEO of big organization receives.
8. (b) Option (b) which states different ways of looking at History can produce altogether different knowledge is true because each and every line of the above paragraph shows how study of History can provide altogether different knowledge. These days history is not mere date wise representation of facts rather it is turning to be scientific in its approach.
9. (b) The author argues that the consumers have a choice weather or not to view advertisements and therefore, they should not complain about increasing adverts. Option (b) weakens this argument. If people are not aware that the piece of art or public information they are viewing is a form of adverts, then it is impossible to consciously avoid it.
10. (c) This is a narrative paragraph in past tense which talks of invisible form of theatre. Option (a) does not form a part of this paragraph for two reasons. First, it jumps to conclusion without any reasoning and second, it is in the present tense. Option (b) appears to be relevant but a closer examination reveals that it does not have the flow of thoughts mentioned in preceding sentences in the paragraph. Option (d) also does not continue the tone of the paragraph and abruptly jumps to the conclusion. Option (c) continues the tone as well as flow of thought given in the paragraph. As concluding sentence of the paragraph, option (c) explains what invisible theatre is all about and is the correct answer.
11. (a) The tone of author as indicated by first sentence of the paragraph is moderate. The author of paragraph praises the author of the novel yet believes '... there is much to ponder'. Among the given options, option (b) and (d) have negative tone which does not match with the tone of the paragraph. Option (c) admires author too much which does not go well with flow of paragraph. In option (a), the author has put forward his view moderately which is coherent with rest of paragraph. So option (a) is the correct answer.
12. (b) Options (a), (c) and (d) are incorrect. Option (a) is incorrect because the passage discusses destructive activities of Israelis and not Palestinians. Option (c) is incorrect because the passage talks about Israeli occupation of Palestine and not of Palestinian occupation of Israel. Option (d) is incorrect because it expresses a far reaching and unrealistic idea which does not match with tone of the passage. Option (b) goes well with the tone and flow of the passage. So it is the correct answer.
13. (d) The second last sentence provides important clue about

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- the concluding sentence of the paragraph. The guard seems indifferent initially but it is apparent that something will change about him in the next moment. Option (a) is not correct because it does not talk about the guard at all. Option (b) is incorrect because it talks about a painting which is nowhere mentioned in the paragraph. Option (c) is also incorrect because it does not indicate any change in attitude of the guard. Option (d) expresses a change in the guard's attitude. It goes well with the preceding sentence and makes the paragraph coherent. So option (d) is the correct answer.
- The paragraph presents historical overview of Bangalore. The author has discussed how the city was established and how it developed during different time periods in reign of different rulers. The concluding sentence of this paragraph should be the one which talks about historical perspective of the city. Option (a) is incorrect because it is suitable as the introductory not the concluding sentence of the paragraph. Option (b) is incorrect because it focuses on the importance of Cantonment instead on the history of Bangalore. Same is the case with option (d), so it is also incorrect. Only option (c) maintains the continuity of ideas mentioned in paragraph, so it is the correct answer.
14. (c) Option (a) is incorrect as it talks about the cost of liberalization whereas the paragraph talks about the failure of foreign firms in earning forex for India. Option (b) is also excluded as it refers to events beyond the scope of topic covered in the paragraph. Option (c) is incorrect because it is nowhere mentioned in the paragraph that policy of favouring foreign capital was adopted by India. Option (d) explains how and why the expectations of foreign firms were belied and is the correct answer.
15. (d) In this paragraph, options (d), (b) and (a) form a sequence as they talk about the core catcher, its structure and function. Sentence (d) should be the first in this sequence as it introduces the core catcher. Next, sentence (b) provides its structural details. Sentence (a) is about the function of the core catcher in case of an accident. Option (c) seems to be related but it does not fit into the sequence because it talks about the things which are not immediately connected with the passage. So option (c) is the correct answer.
16. (c) Sentences 2, 3 and 4 are correct. Sentence 1 incorrectly uses the word 'herbivores'; it should be 'herbivorous' birds. So option (b) is the correct answer.
17. (b) Options (a) and (b) are not relevant because they are nowhere mentioned in the passage. The passage implies that when someone is asked to recall something, the wording of the question may distort their recollections. So option (c) is the correct answer.
18. (c) The second sentence of the first paragraph specifically mentions - "This very peculiar kind ... some metal details". So option (c) is the correct answer.
19. (a)
20. (c)

21. (a) The opening sentence of the second paragraph mentions - "And if we agree ..... perceive signs of instability". So option (a) is the correct answer.
22. (b) In the second paragraph, refer to the sentences - "Designers know this well and they are the first to perceive signs of instability ... Fashion delights us by playing on the tensions between these couples". So option (b) is the correct answer.
23. (b) In the second paragraph, the last sentence mentions - "...nobody is interested in starting the ultimate trend, the final one". So option (b) is the correct answer.
24. (c) The scope of sentence a is narrow so it cannot be the central idea. Sentence d is incorrect as authors are not the central idea of the paragraph. Sentence b doesn't match the tone of the author. Proponents of Buddhism haven't exaggerated rather it was done by few authors. Sentence c contains the central idea of the paragraph.
25. (d) Sentence a is incorrect because Volkswagen is not pressurizing employees to take the blame. Sentence c is incorrect it is narrow. Sentence b is wrong; the amnesty programme is not the reason why Volkswagen is pressurizing the employees. Sentence d best summarizes the paragraph, so it is the correct answer.

## Ch- 20. Reading Comprehension

1. (b) 2. (a) 3. (c)
4. (b) The author of the passage makes this point twice in the opening paragraph (the nearly forgotten Women's Trade Union League ... the WTUL made a contribution far greater than did most historical footnotes) and again in the final sentence of the passage. The entire passage serves to focus readers' attention on "an overlooked contributor to American history," the WTUL.
- Process of Elimination is helpful here: (a) is incorrect because the passage is about a defunct historical union, not contemporary working women; (c) is incorrect because the WTUL's achievements, not its methods, are the focus of the passage; and (d) is incorrect because no such rebuke is ever stated.
5. (d) This answer is a good paraphrase of this excerpt from the second paragraph: Because the AFL's power stemmed from its highly skilled labour force, the organization saw little economic benefit in working with the WTUL. The affiliation provided the AFL with political cover, allowing it to claim support for women workers...
6. (a) This answer choice describes the AFL, not the WTUL. The passage specifically states that the WTUL represented a largely unskilled labour force [and so] had little leverage against [its] powerful opponents.
7. (b) Most reading comprehension passages ask some form of this question. Choice (b) best summarizes the main idea of the passage: that despite some potential problems, strategic planning can allow a company to expand and grow.
8. (c) According to the passage, the difficulty in implementation of strategic plans is a more modern phenomenon, not related to the weaknesses of the 1980s.
9. (d) Skim the passage quickly to find the survey, then read that portion carefully. According to the passage, the survey shows that companies with strategic plans outperformed companies without strategic plans.
10. (b) Two factors are noted in the given passage. First, the per capita production rate has not been as high as the production increase, without regard to population size. Second, the rate of increase over the last ten years has been slower. Therefore (b) is correct.
11. (c) Even if it were true that there are more self-employed women than men it does not explain why this number increases five times faster than men. Answer choice (a) supports the argument by showing that it has become more convenient for women to be self-employed. Choice (b) gives a means to that end. Answer (d) provides evidence to support the claim.
12. (b) Choice (b) is the best answer. The statement is an admonition for people to be aware of "contaminants," a reference to physical and chemical hazards. Alternatives (a) and (c) might be implied, but they are not such good choices as (b). Alternative (d) is not implied.
13. (c) The conclusion that can be drawn from the passage is "precise measurement is both a necessary and sufficient condition to ensure validity of conclusions resulting from an experiment". The clue regarding this lies in the following lines of the passage - "because of the wide margins of error they had attributed to their measurements, all of these alternative laws pass the test."
14. (b) As per Mayo's perspective the phrase scientific explanation means one which survives examinations better than other explanations.
15. (d) The author's use of Snell's law of refraction to illustrate Mayo's perspective can best said to be illustrative the clue regarding this lies in the following line of the passage - her idea can be explained by some simple example.
16. (d) In the passage, the author uses the arguments of the *philosophes* and the Romantics attacking the church in the fourth paragraph. In the beginning of the paragraph the author mentions - "The *philosophes* had also attacked the church because it blocked human reason. The Romantics attacked the Enlightenment because it blocked the free play of the emotions and creativity." This indicates that the Romantics and the *philosophes* were fighting against each other over dependence on reason and harking back to emotions. So option (d) is the correct answer.
17. (c) In the last sentence of the third paragraph author argues - "The Romantics were conscious of their unique

- destiny. In fact, it was self-consciousness which appears as one of the key elements of Romanticism itself". So option (c) is the correct answer.
18. (d) In the second paragraph the author clearly mentions - "To speak of a Romantic era is to identify a period in which certain ideas and attitudes arose, gained currency and in most areas of intellectual endeavor, became dominant. That is, they became the dominant mode of expression. Which tells us something else about the Romantics: expression was perhaps everything to them". It is implicit in the argument that the Romantics could not be submissive. So option (d) is the correct answer.
19. (b) In the fifth paragraph of the passage, the author talks about '.... promotion-driven world of entertainment which is sometimes called critic proof...'. So option (b) is the correct answer.
20. (c) In the sixth paragraph, the author talks about Charles Rosen and other critics. The opening sentence of this paragraph mentions - 'But it's less common, critics say, for one of their kind to draw an audience's attention to an overlooked work'. So option (c) is the correct answer.
21. (b) The quoted sentence is the last sentence of the first paragraph of the passage. This sentence highlights importance given to the critic in the films in 1950s. The expression - '...in both scornful and reverent tones' - in the sentence clearly indicates that people acknowledged them both ways; either by respecting or looking down upon them. So option (b) is the correct answer.
22. (b) In the eighth paragraph of the passage, Hickey compares the job of an art critic with a nighttime disk jockey or a sewing machine repairman and says his job is 'a one - or two - generation job'. The professions quoted by Hickey generally do not remain vibrant for a longer period of time and last for only a few decades. So option (b) is the correct answer.
23. (d) This passage contains many arguments against the capital punishment. It has been argued in the passage that there is a mismatch to the crime committed and punishment. The fact that it does not deter people from committing crime has also been pointed out. First three paragraphs attempt to establish that the death penalty is unfair. Fourth and fifth paragraphs attempt to establish that it does not serve its purpose. The sixth paragraph asserts that it does not deter people from committing crime. Option (a) is incorrect because it sticks to one viewpoint only instead of presenting different angles of the argument. Option (b) is incorrect because the passage does not suggest reconsideration of the death penalty. Option (c) is incorrect as it mentions only one reason against the death penalty. Option (d) appropriately sums up all the arguments in the passage and so it is the correct answer.
24. (b) First sentence of fifth paragraph talks about how capital punishment provides insufficient retribution. So we can infer sentence A without any confusion. Sentence C can also be inferred from the first sentence of the second paragraph, which mentions how there is more suffering to the accused due to the dreadful wait before death. Sentence D can be inferred from the sentence of the first paragraph. It is mentioned nowhere in the passage that death penalty may be misused to punish innocents. So sentence B cannot be inferred from the passage, which makes option (b) the correct answer.
25. (b) The option (a) is incorrect as it indicates that the death penalty is given for crimes besides murder too, which cannot be inferred from the passage. Option (c) is incorrect because anticipatory suffering is mentioned as a feature that makes the death penalty unfair not unique. Option (d) is beyond the scope of the passage. The author mentions that in case of crimes other than murder, the accused does not receive a punishment that is equivalent to the crime. It is assumed by the author that the death penalty mirrors the crime and this makes the punishment unique. Thus, option (b) is the correct answer.
26. (c) The answer is contained in the last sentence of the first paragraph. So option (c) is the correct answer.
27. (b) The author explains that education results in the destruction of energy in the second and third paragraphs. So option (b) is the correct answer.
28. (b) The fifth paragraph mentions - "... controlling or disciplining this energy and letting it out in one direction and restricting it in another becomes merely a social convenience; ....and thereby its energy is gradually dissipated". So option (b) is the correct answer.
29. (d) It is mentioned in the fifth paragraph - "What is this energy which we all have? This energy is thinking, feeling; it is interest, enthusiasm, greed, passion, lust, ambition, and hate". So option (d) is the correct answer.
30. (d) Option (a) is incorrect as it makes the event seem to be a failure. Option (b) is incorrect as it focuses on David Cameron only. Option (c) is not related to the passage. Option (d) appropriately summarizes the passage so it is the correct answer.
31. (a) Option (b) is incorrect because it calls para 4 a connecting link whereas it is an independent paragraph. Option (c) is factually incorrect and. Option (d) is also incorrect as it presents analogies which are not mentioned in the passage. Option (a) appropriately tells how the visit of Sisi affected the relationship between Egypt and the UK, so it is the correct answer.
32. (c) Option (a) can be inferred from para 2, option (b) from para 1 and 3, and option (d) from para 6. Option (c) is not mentioned in the passage, so it is the correct answer.
33. (b) Option (a) talks about 'funding' which has not been mentioned in the passage. Option (c) talks about studies of two researchers but preceding sentences are missing in the passage. Option (d) is a supporting argument that cannot stand alone. Option (b) is about the paucity of evidence which links itself to the last

- sentence. So (b) is the correct answer.
34. (d) Options (a) and (b) are incorrect because they generalize people's behaviour and scientific study and its viability in publishing. Option (c) is also incorrect as it assumes that there were researchers involved in affecting publication of Conley's work. Option (d) correctly infers that the study did not go well with the group that it aimed at exposing, so it is the correct answer.
35. (b) Option (a) is incorrect as stigma is not an opinion but a notion. Options (c) and (d) are incorrect as they indicate that stigma has to do with the status of a person which is not true. The term 'stigma' means a sense of infamy or disgrace associated with a concept or an idea. So, option (b) is correct.
36. (a) The quoted text in the first paragraph gives the answer - "The new color theory...in asserting that there was no black in nature...their palette." So option (a) is correct.
37. (b) Refer to sentence in the third paragraph - "Edouard Monet, who helped art move away from Realism in the nineteenth century". So option (b) is the correct option.
38. (c) Option B cannot be inferred from the passage. Only A and C can be true according to the passage. So (c) is the correct answer.
39. (a) Option (b), (c) and (d) are incorrect because they are not relevant. The passage is about Monet who was a proponent of impressionism. So option (a) is the correct answer.
40. (b) Option (a) is incorrect because the author doesn't refer to one family only. Option (c) is incorrect because 'the normal ladies and gentlemen' may be from any class. Option (d) is also incorrect because 'normality' is not defined by the author. The sixth paragraph has answer to the question, so option (b) is correct.
41. (c) Option (a) is incorrect because it is not mentioned in the passage; option (b) is excluded as it talks about 'noncommissioned paintings' which is not true; so option (d) is also incorrect. It is mentioned in the fifth paragraph "after being rejected by the Paris Salon, the artists held their own exhibitions." So option (c) is the correct answer.
42. (c) The author mentions the findings of the report commissioned by the governments Food Standards Agency published in the American Journal of Clinical Nutrition that organically and conventionally produced crops and livestock products are broadly comparable in their nutrient content.  
So the correct answer is option (c).
43. (b) The author mentions the statement of Gill Fine, FSA's Director of Consumer Choice, which clearly states that there is no evidence of additional health benefits from eating organic food.  
So the correct answer is option (b).
44. (d) The author mentions that the response of supporters of organic food towards the report was called as "Cancerous Conspiracy" and report as "Selective, misleading and limited".  
So the correct answer is option (d).
45. (d) The author's viewpoint is neutral; he has simply put together the facts about organic food and opinion of those who are in favor and against it.  
So the correct answer is option d.
46. (a) Refer to the last paragraph "...Einstein introduced his revolutionary General Theory of Relativity. In this, space and time were no longer Absolute, no longer a fixed background to events. Instead, they were dynamical quantities that were shaped by the matter and energy in the universe. They were defined only within the universe, so it made no sense to talk of a time before the universe began." From this we can conclude option (a).
47. (a)
48. (d) The answer can be arrived at by reading the last two paragraphs. The argument being described was essentially between two groups. One group believed the universe had existed forever and the other that believed it had a beginning. However, both sides had assumed something. "Both the thesis and the antithesis depended on Kant's assumption, along with almost everyone else, that time was Absolute."
49. (c) Option (c) is correct; it can be inferred from the lines "he infers that in relation to....a "Within" in the heart of things".
50. (d) Option (d) cannot be concluded from the passage. Refer to the lines "Ultimately, the fully evolved ant colony takes on a holistic aspect, and emerging molecular mechanisms take form". Here, the analogy is between the holistic aspect of a fully developed ant colony and emergent molecular mechanisms in the brain. Individual ants have not been compared to such mechanisms.
51. (b) Option (b) comes directly from the passage as the passage mentions that intelligence (though resides in the brain hardware and is thus brain bound) can be lifted out. Thus, it can be conceptualised separately from brain hardware which house it.
52. (a) Refer the sentence, 'Although the lighting designer ..... derivation form valuable background knowledge. So he is not required to plot photometric curves.
53. (b) Colours that have no hue are termed neutral or achromatic colours. They include white, off-white, all shades of gray, down to black.
54. (b) Most paints have body or pigment colours.
55. (d) In the context of the passage, 'Biotic disturbances' means the disturbances caused by the wild animals on seeing the tourists. The visitors must be permitted to view the wildlife only from the areas marked out for the purpose.
56. (c) 'Environmentally destructive tourism' means the destruction of the attractive sources of birds and animals due to the increasing inflow of tourists.

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57. (b) As per the last part of the passage, (b) is the most appropriate option.
58. (a) The passage describes the destruction caused by mountain top removal and only option (a) carries forward the idea.
59. (b) Option (a) is incorrect because it refers to science which is not mentioned in the passage. Option (c) is incorrect as it is about rituals. Option (d) is also incorrect as it refers to unanswerable questions. Answer to the question is in the first and second sentences of the first paragraph which mention two main functions of myth. So option (b) is the correct answer.
60. (b) Option (a) is wrong because it is not mentioned in the passage that there is no such text in Greek mythology. Options (c) and (d) are not relevant. First sentence of the second paragraph mentions - "In Greek mythology, there is no single original text ... all of the myths' characters and stories" which explains the difference between Greek and Indian mythology. So option (b) is the correct option.
61. (d) The passage mentions poets or authors like Homer, Hesiod and Apollodorus but it doesn't state who wrote 'first story of Greek mythology'. So option (d) is the correct answer.
62. (a) Options (b), (c) and (d) cannot be deduced from the passage. The third paragraph answers this question as it mentions - "Around 700 BC, the poet Hesiod's Theogony... ....Tartaros (the Underworld)". So option (a) is the correct answer.
63. (d) Option (a) is incorrect because the given term doesn't mean a temple of all Gods. Options (b) and (c) are also incorrect. The last paragraph talks about deities who lived on Mount Olympus. So option (d) is the correct answer.
64. (a) Sentences A and B can be deduced from the last paragraph. Sentence C is incorrect as the paragraph doesn't mention the degree of passion of Olympian gods. So option (a) is the correct answer.
65. (d) The passage highlights the various aspects to following a spiritual path. The author also provides characteristics of different kinds of spiritualists – the spiritual interlocutor, the creative and the one with compassion. It can thus also be inferred that the author is speaking about different spiritual types. Option (d) is the answer.
66. (c) The selected line refers to detachment that has been spoken of in the previous sentence. Experience is not the reference point for the selected line. The use of the conjunction "but" indicates dissimilarities between the first and second halves of the sentence. Pain is linked with obfuscation and compassion with hypocrisy. While paraphrasing, 'obfuscation' would not convey the meaning of disguise. Option (c) correctly paraphrases to say that detachment does not prevent pain but rejects complication (which can give rise to pain) and it does not prevent compassion but rejects

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- pretense (which can prevent compassion).
67. (b) The answer can be inferred from the last line in the passage "She was expressing something more than just the thrill of a concert. She was saying that the Communists were truly gone. That we were finally free to do as we pleased."
68. (c)
69. (a)
70. (b) The author states that the most striking feature of this discussion was the power ascribed to science. Science and Darwin's theory of evolution had revealed a world that looked meaningless and in order to satisfy the human need of 'meaning in life', the researchers were now trying to use science to confirm the existence of life after death. The author says that science became a channel for belief in magic (life after death) and this is how science was used against science. This means that science was used to propagate the belief in life after death. Hence correct option is (b).
71. (b)
72. (c) Throughout the passage the author has argued how scientists attempted to find ways in which they could demonstrate that human lives had a purpose and meaning that continued after death. Option (c) comes closest to capturing the essence of the passage.
73. (a)
74. (b) The author is fundamentally concerned with the idea that special powers, which are supposed to be exercised only in extreme cases, are being used where they are not warranted. This makes option (b) correct.
75. (d) In all the other instances a crime has been committed and therefore the police is justified in carrying out various tasks to nab the person or convict him or her. However, option (d) is not something that the author would support. In the passage it is mentioned that 'one of its primary duties is to protect the various and sometimes inconvenient manifestations of a democracy, not to suppress them.'
76. (c) In this passage the author talks about mistakes which are made during writing a book. In the first paragraph, the author points out the mistake of referring to a character (Mathilde) of the novel differently (as horse, mare or filly) at different places. The author also points out other mistakes such as misspellings, inaccurate quotations, wrong use of metaphors, adverbs and adjectives, and inappropriate analogies. It is clear that the author intends to highlight points that should be taken care of while writing a book. So option (c) is the correct answer.
77. (b) Options (a) and (c) are wrong because name-calling is a negative term which is different from naming. Option (d) is mentioned nowhere in the passage, so it is wrong. In the third paragraph of the passage, the last sentence talks about power of English language which derives from nouns. So option (b) is the correct answer.
78. (a) The imagery of throwing stones into a boat is used by author in the concluding sentence of the last paragraph of the passage. With the help of this imagery, the author

- points out deliberate efforts to hide a lie under the pile of accurate facts, figures or statistics. These unnecessary details make it difficult to sustain accuracy in the story. So option (a) is the correct answer.
79. (c) Option (a) is incorrect as it fails to present a complete perspective. Option (b) is also incorrect as it seems incomplete and cannot be inferred from the passage. Option (d) is also excluded as it cannot be deducted from the information provided in the passage. It is not mentioned that one must understand art and its related philosophy in order to understand Scheibitz's paintings. Option (c) appropriately sums up ideas contained in the passage. In the second paragraph Scheibitz's paintings have been told as unreasonable. The first paragraph establishes the fact that the paintings are not what they seem at first or even second glance. The second paragraph indicates that the onlooker needs to understand the paintings not from their individual perspectives but from the artist's perspective. So option (c) is the correct answer.
80. (c) Option (a) is incorrect because it cannot be inferred that the artist intentionally creates art that is difficult to fathom and place. The last sentence of this paragraph suggests that in the artist's mind, everything in his paintings is interconnected with real life. Option (b) is also incorrect because it cannot be inferred from the passage that Scheibitz's paintings are hard to categorize. Option (d) is incorrect as it presents only the philosophical perspective which is not the main idea of the passage. Option (c) can be inferred from the last sentence of the third paragraph and the entire fourth paragraph, so it is the correct answer.
81. (c) Option (a) is incorrect because it makes a general statement which cannot be inferred from the fourth paragraph of the passage. The paragraph indicates that the source materials are interconnected which necessarily may not be the source of artist's inspiration. Option (b) is incorrect because it contradicts the last sentence of the third paragraph. Option (d) is also incorrect as it talks about the author's assertion. The assertion mentioned in the paragraph is that of the painter. Option (c) appropriately paraphrases the fourth paragraph, so it is the correct answer.
82. (d) Option (a) is incorrect because the poet mentions those in yearning and longing; he does not refer to the poor here. Option (b) should also be excluded because theme of the poem is the importance of 'tears and smiles' and not the development of the needy. Option (c) is incorrect because it does establish the fact that both joys and sorrows play a role in inspiring people. The poet also feels that tears purify heart while smiles bring one closer to the gods. The theme of the poem is appropriately summarized by option (d), so it is the correct answer.
83. (c) Option (a) is not correct as it focuses on the manner in which people achieve satisfaction; but the means to achieve it is neither stated nor implied in the poem.
- Option (b) is incorrect because the ability to understand the secrets of life has been linked with the challenges. The poem does not provide any information on that. Option (d) is incorrect because it assumes something which is not mentioned in the poem. It is nowhere mentioned in the poem that unsatisfied persons are happy and their happiness will be lost once they are satisfied. Option (c) best explains poet's feelings about satisfied people. The poet feels that it is better to live a life in which one constantly yearns for fulfillment. The poet also indicates that a person who is satisfied cannot experience the joys that yearning and longing bring with them. So option (c) is the correct answer.
84. (b) Option (a) is incorrect because cycle of give and take suggests 'exchange' whereas the poet talks about parting, meeting and returning to one's origins. Option (c) is incorrect because it is not implied in the poem that there is obvious explanation for the formation of cloud. Option (d) is also incorrect because no line of distinction has been drawn in the poem between spiritual and worldly phenomenon. Option (b) presents an accurate explanation. Lines 24-32 of the poem clearly mention that similar to clouds one eventually returns to one's origins. So option (b) is the correct answer.
85. (c) Medals are symbols of the glorification of war. By stating that medals are nothing more than holes in a cloth, Atwood is criticizing the glorification of war. So option (c) is the correct answer.
86. (d) Options (a), (b) and (c) are different features of Atwood's novel. Option (d) is the odd one out - the author has used this term to describe a character in the novel.
87. (b) In the fifth paragraph it is mentioned - "...a sense of the contentious nature of experience: there is a world of difference between the clipped prose of the pro-establishment local paper and the dead Laura's unfolding of emotion ..." So option (b) is the correct answer.
88. (a) The second paragraph states - "In her latest book Atwood explores again a theme central to her fictional universe: what happens to relationships, to human potential, to the possibility of happiness when women are kept subordinate, stultified by their inferior status and locked in silence". So option (a) is the correct answer.
89. (d) Options (a), (b) and (c) have been mentioned in the passage, except option (d). So option (d) is the correct answer.
90. (a) In the seventh paragraph refer to the sentence - "Its course across the pond represents one of many paths it might take..." Option (a) contradicts it, so it is the correct answer.
91. (b) Option (b) contradicts ideas contained in the fifth paragraph. So option (b) is the correct answer.
92. (b) In the second paragraph, author mentions - "...an

- uncanny ability to analyze signs and indications....". So option (b) is the correct answer.
93. (a) Options (c) and (d) can be excluded as their scope is too narrow. Option (b) is wrong because the passage doesn't focus on how attitude of the world towards mental health has improved. Option (a) is the central idea of the passage. So it is the correct answer.
94. (d) Option (c) is not relevant as it doesn't mention the creation of artistic work. The passage is about the 'troubled artist fallacy' which suggests that people who suffer from mental illness create great work as a result of their struggle. Both options (a) and (b) can be inferred from the passage. So (d) is the correct answer.
95. (d) Option (a) is incorrect as it mentions bad behaviour which is not described in the paragraph. Options (b) and (c) are not relevant. One sentence in the fourth paragraph - "However, not everybody with mental illness..... more of a failure" - answers the question. So option (d) is the correct answer.
96. (a) Option (b) is incorrect because it cannot be deduced from the passage. Option (c) is incorrect because the passage doesn't mention it. Option (d) is incorrect due to the term 'common occurrence'. Only option (a) can be inferred from the passage so it is the correct answer.
97. (b) Option (a) is incorrect because it cannot be inferred that she is an art prodigy. Option (c) is incorrect because she doesn't appreciate her illness. Option (d) is an extreme conclusion. Option (b) can be inferred from the passage so it is the correct answer.
98. (b) In the last paragraph, Simon Procter mentions that depression can limit the ability to express oneself, so (b) is the correct option.
99. (c) In the third paragraph, the author mentions clearly "before he became a semi classicist, he was a consummate Impressionist".
100. (d) The word 'odalisques' refers to a female slave or concubine in a harem.
101. (b) The author in the last paragraph mentions "To synthesize the force and clarity of classicism with the intimacy and charm of the Rococo is a nearly impossible trick." Since Rococo is an early to late French 18th-century artistic movement and style, affecting many aspects of the arts.
102. (d) The author mentions in the last paragraph, "These are iconic images that resonate deeply with the human psyche, and shadow the scientific quest to discover intelligent life beyond Earth".
103. (c) The author mentions "writers such as the Roman Catholic Cardinal Nichols of Cusa, who considered the status of man in the universe in relation to celestial beings such as angels".
104. (b) The author mentions in paragraph second, "The transporting qualities of those narratives gave human beings a crucial spiritual anchor".