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Instructions:

Answers of the Question are either in **bold Letters** or Underline in it.



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List of Content

- Basic Mathematics
 - Divisibility
 - HCF and LCM
 - Numbers, decimal fractions and power
- Applied Mathematics
 - Profit and Loss
 - Simple and Compound Interest
 - Time, Speed and Distance
- Engineering Mathematics
 - Logarithms
 - Permutation and Combinations
 - Probability

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1.Basic Mathematics

1.1 Divisibility

- What is Divisibility ?

Divisible means when you divide one number by another the result is a whole number.

Eg. 14 is divisible by 7, because $14 \div 7 = 2$ exactly.

- Rules for Divisibility
- Divisibility by 2

Rule : The last digit which is either even or 0, is divisible by 2

Ex. 34, 2532, 1290

- Divisibility by 3

Rule : If the sum of the digits of a number is divisible by 3, then the number is also divisible by 3

Ex. 2451, so required sum $2+4+5+1=12$ divisible by 3 so the number 2451 is also divisible by 3

- Divisibility by 4

Rule 1: If the last two digits of a number is divisible by 4, the number is also divisible by 4

Rule 2: The number having two or more zeros at the end is also divisible by 4

Ex. 7285~~24~~ since the last two digits are divisible by 4 so the number is also divisible by 4

Ex. 15600 last two digits are 00 so the number is also divisible by 4

- Divisibility by 5

Rule :If a number ends with 5, 0 then the number will be divisible by 5

Ex. 1765, 12330



- Divisibility by 6 both two rule should be full filled

Rule 1: The number should end with an even digit or 0

Rule 2 :The sum of the digits should divisible by 3

Ex. 174 is divisible by 6 as the number ends with even digit 4 and sum of the digits 12 is divisible by 3
Ex. 8520 is divisible by 6, as it ends with 0 and sum of the number 15 is divisible by 3

- Divisibility by 7

There is no any strict rule for it

Ex. 896

Solution: 896

$89-6*2=77$ as 77 is divisible to 7 so this number 896 is also divisible to 7
Ex. 4753

Solution: $475-3*2=469$

$46-9*2=28$ as 28 is divisible by 7 so the number 4753 is divisible to 7

- Divisibility by 8

Rule 1: If the last three digits of the number is divisible by 8 , the number is also divisible by 8

Rule 2: If the last three digits of the number is three zeros 000 then the number is also divisible to 8

Ex. 14873258376256 find out divisiblty by 8
Solution: 14873258376~~256~~ is divisible to 8 , so the whole number is divisible to 8

- Divisibility by 9

Rule: If the sum of all the digits of a number is divisible by 9, hence the number is also divisible by 9
Ex. 8758323 Solution: Sum of the number is $8+7+5+8+3+2+3=36$ which is divisible by 9, so the number is divisible by 9

- Divisibility by 11

Rule: If the sum of the digits at odd places and even places are equal or differ by an amount of 11, then the number will be divisible by 11
Ex. 589743671 Check the

divisiblty by 11
Solution: Sum of the digits at odd places $5+9+4+6+1=25$

Sum of the digits at even places $8+7+3+7=25$



So the number is divisible by 11Ex. 9754239 check the divisibility by 11

Solution: Sum of the numbers at odd places $9+5+2+9=25$

Sum of the numbers at even places $7+4+3=14$, the difference $25-14=11$, so the number will be divisible by 11

- Divisibility by 12

Rule: Any number which is divisible by both 4 and 3, is also divisible by 12

- Divisibility by 14

Rule: for divisibility with 14, the number should be even and should be divisible by 7

- Divisibility by 15

Rule: Any number which is divisible by both 3 and 5 is also divisible by 15

- Divisibility by 16

Rule: any number whose last four digits number is divisible by 16 is also divisible by 16



Exercise

1.What least value must be assigned to * so that the number 63576*2 is divisible by 8?

- a) 1 b) 2 c) 3 d) 4

2.Which of the following numbers is exactly divisible by 24 ?

- a) 35718 b) 63810 c) 537804 d) **3125736**

3.The number nearest to 15207, which is divisible by 467, is:

- a) 14342 b) 15211 c) 14944 d) **15411** Option 5 : None of these



4.In a division problem, the divisor is twenty times the quotient and five times the remainder. If remainder is 16, the number will be:

- a) 3360 b) **336** c) 1616 d) 20516 Option 5 : None of these

5.If a number is exactly divisible by 85, then what will be the remainder when the same number is divided by 17?

- a) 3 b) 1 c) 4 **d) 0**

6.The least perfect square number which is exactly divisible by 3, 4, 7, 10 and 12 is:

- a) 8100 b) 17600 **c) 44100** d) None of these

7. $(xn+yn)$ is divisible by $(x-y)$:

- a) for all values of n b) only for even values of n c) only for odd values of n **d) for no values of n**

8.The greatest number that will divide 63, 138 and 228 so as to leave the same remainder in each case:

- a) 15** b) 20 c) 35 d) 40

9.Find the largest number, smaller than the smallest four-digit number, which when divided by 4,5,6 and 7 leaves a remainder 2 in each case.

- a) 422 **b) 842** c) 12723 d) None of these

10.What is the highest power of 5 that divides $90 \times 80 \times 70 \times 60 \times 50 \times 40 \times 30 \times 20 \times 10$?

- a) 10** b) 12 c) 14 d) None of these

11.If a and b are natural numbers and $a-b$ is divisible by 3, then a^3-b^3 is divisible by:

- a) 3 but not by 9 **b) 9** c) 6 d) 27

12.What is the greatest positive power of 5 that divides $30!$ exactly?



- a) 5 b) 6 c) 7 d) 8

13.What is the Smallest number,which when divided by 7,18,56 and 36,leaves a remainder zero?

- a)504 b)392 c)390 d) 1012

14.What least number must be added to 2010 to obtain a number which is completely divisible by 19?

- a)4 b)6 c)8 d) None

15. What least number must be subtracted from 9400 to get a number exactly divisible by 65?

- a)40 b)20 c)80 d) none of these

16.Which smallest number should be added to 86237 to make it exactly divisible by 9?

- a) 11 b) 9 c) 10 d) 2 e) None of these

17.What is the smallest digit which should replace * in the number 296*12 to make it divisible by 12?

- a) 1 b) 2 c) 3 d) 4 e) None of these

18. How many 3 digit number formed 2,3 ,5, 9 , 7, 4 , divisible by 5 not repeated?

- a)2 b)10 c) 5 d)6

19.If an Integer "K" is divisible by 2,5, and 13 what is the next largest number that is divisible by all the three given numbers?

- a)2k b) $k + 13$ c) $2k+13$ d) $2k + 65$ e) $k+130$



Space for Notes



1.2 HCF and LCM

- What is HCF?
- **Highest Common Factor** :-HCF of two or more numbers is the greatest number that divides each of them exactly.
- **Method of Prime Factors** - Break the given numbers into prime factors and find the product of common prime factors, product will be HCF **Find the HCF of 42 and 70**

Solution- $42=2 \times 3 \times 7$, $70=2 \times 5 \times 7$ So HCF will be $2 \times 7 = 14$

Find the HCF of 24, 45, 60

Solution- $24 = 2^3 \times 3$

$$45 = 3^2 \times 5$$

$$60 = 2^2 \times 3 \times 5 \text{ so HCF of 24, 45 and 60 is } 3$$

- **Second Method = Writing in a row and division by a common divisor of all-**

Step 1: Write the numbers in a row

Step 2: Divide by a common divisor of all

Step 3: Write the remainders in second row

Step 4: Continue this process till we get all the remainders prime to one another:

Ex. Find the HCF of 12, 18 and 24

Solution :-

2	12, 18, 24
2	6, 9, 12
3	3, 3, 6
	1, 1, 2

So product of Numbers
prime to one another

$$\text{H.C.F} = 1 \times 2 \times 3 = 6$$



- **Method of division :** When two numbers are large then method of Factor is not convenient, Then we find the HCF by division method

Step 1: Divide the greater number by smaller number and find the remainder

Step 2: Now repeat this process with the first remainder as divisor and first

divisor as dividend and continue this process until we get zero as remainder.

Last divisor is HCF

Ex. Find the HCF of 1365, 1560 and 1755

Find the HCF of 1365, 1560
and 1755

$$\begin{array}{r} 1365) 1755 (1 \\ \underline{1365} \\ \hline 390) 1365 (3 \\ \underline{1120} \\ \hline 155) 390 (2 \\ \underline{390} \\ \hline \end{array}$$

$$\begin{array}{r} 195) 1560 (8 \\ \underline{1560} \\ \hline \end{array}$$

$$\text{So, HCF} = 195$$

- **HCF of decimals**

Ex. Find the HCF of 16.5, 0.45 and 15

Solution: These numbers can be written as 16.50, 0.45 and 15.00

Now find the HCF of 1650, 45 and 1500 , we get HCF as 15, now convert to equivalent fraction which comes as 0.15 This is our required HCF

- **HCF of Fractions**

HCF of two or more fractions means the highest fraction which exactly divides each of the fractions

Step 1: **Express all fractions in their lowest terms**

Step 2: **Find the HCF of all the numerators**

Step 3: **Find the LCM of all the Denominators**



$$\text{HCF} = \frac{\text{HCF of Numerators}}{\text{LCM of Denominators}}$$

- **Ex.** Find the HCF of $\frac{54}{9}$, $\frac{3}{(9/17)}$, $\frac{36}{51}$

Solution: Express all fractions in their lowest terms $\frac{6}{1}$, $\frac{60}{17}$, $\frac{12}{17}$

$\text{HCF} = \text{HCF of Numerators} / \text{LCM of Denominators} = \text{HCF of } (6, 60, 12) / \text{LCM of } (1, 17, 17) = 6/17$

Ex. Find the greatest number which will divide 410, 751 and 1030 so as to leave the remainder 7 in each case ?

Solution: Greatest number will be = HCF of $(410-7)$, $(751-7)$ and $(1030-7)$ = HCF of 403, 744 and 1023

- **Ex.** Find the greatest possible length which can be used to measure exactly the lengths 25 m 20 cm, 198 m, 9m 36 cm. **Solution :** Required length = HCF of 2520 cm , 19800 cm, 936 cm

$$2520 = 2^3 \times 3^2 \times 5 \times 7, \quad 19800 = 2^3 \times 3^2 \times 5^2 \times 11$$

$$936 = 2^3 \times 3^2 \times 13 \quad \therefore \text{HCF} = 2^3 \times 3^2 = 72 \text{ cm}$$

So required length will be 72 cm

- **Ex.** The maximum number of students among them 1001 pens and 910 pencils can be distributed in such a way that each student gets the same number of pens and same number of pencils is : **Solution :** Required number of students= HCF of 1001 and 91

$$\begin{array}{r}
 1001 \\
 \overline{910} \\
 \underline{-910} \\
 \hline
 101 \\
 \underline{-910} \\
 \hline
 101 \\
 \underline{-910} \\
 \hline
 101 \\
 \end{array}$$

$1001 \div 910 = 1 \text{ R } 91$

- **Important Rules :**

(1)= Product of two numbers = Product of their HCF and LCM

(2)=Co-prime numbers:Two numbers are said to be co-primes if their HCF is 1



- What is LCM?

Lowest Common Multiple(LCM): LCM of two or more numbers is the least or smallest number which is exactly divisible by each of them.

Ex. Find out LCM of 12, 16 Solution :- Multiples of 12 are 12, 24 ,36, **48**, 60

Multiples of 16 are 16, 32, **48**, 64

So the least common multiple of both is 48 that is required LCM

- **Methods of Finding LCM**

1. Method of Prime Factors

Step-1 Resolve each of the given numbers into prime factors

Step-2 Find the product of the highest powers of all the factors that occur in the resolution of the given number. This product will be required LCM**Ex. Find the LCM of 8, 12, 15 and 21**

Solution:- $8 = 2^3$ $12 = 2^2 \cdot 3$ $15 = 3 \cdot 5$ $21 = 3 \cdot 7$

$$12 = 2^2 \cdot 3 = 2^2 \cdot 3$$

$$15 = 3 \cdot 5$$

$$21 = 3 \cdot 7$$

So Product of prime numbers with highest powers $(2^3) \cdot 3 \cdot 5 \cdot 7 = 840$ required LCM

- **Method 2 : Short Cut Method**

Write down the given numbers in a line separating them by commas. Divide by any one of prime numbers 2, 3, 5, 7 which at least exactly divide at least any two of the given numbers . Repeat down the process until you get a line of prime numbers. Now the product of all divisors and the numbers in the last



line will be the required LCMEx. Find out the LCM of 16, 18, 15, 135, 176

Find out L.C.M of
16, 18, 15, 135, 176

$$\begin{array}{r}
 2 | 16, 18, 15, 135, 176 \\
 2 | 8, 9, 15, 135, 88 \\
 2 | 4, 9, 15, 135, 44 \\
 2 | 2, 9, 15, 135, 22 \\
 3 | 1, 9, 15, 135, 11 \\
 3 | 1, 3, 5, 45, 11 \\
 5 | 1, 1, 5, 15, 11 \\
 \quad \quad \quad 1, 1, 1, 3, 11 \\
 \text{Lcm} = 2^4 \times 3^3 \times 5 \times 11 \\
 = 23760
 \end{array}$$

- Ex. The traffic lights at three different road crossings change after every 24, 36 and 48 secs respectively. If they all change simultaneously at 09 : 10 : 00 hours , then at what time will they again change simultaneously
Solution : Here time requirement is least so we will find LCM

Change interval will be LCM of 24, 36, 48 = 144 sec

144 sec= 2 min 24 sec, So interval of change will be at 09 : 12 : 24 hours

- Ex. The least number, which when divided by 48, 60, 72, 108 and 140 leaves 38, 50, 62, 98 and 130 as remainders respectively, is :
Solution : Here $(48 - 38) = (60 - 50) = (72 - 62) = (108 - 98) = (140 - 130) = 10$ in every case

Least number will be LCM of (48, 60, 72, 108, 140) - 10

$$\text{LCM} = 15120$$

$$\text{So, required number} = 15120 - 10 = 15110$$



Exercise

1.If the sum of two numbers is 55 and the H.C.F. and L.C.M of these numbers are 5 and 120 respectively, then the sum of the reciprocals of the numbers is equal to:

- a) 55/601 b) 601/55 c) **11/120** d) 120/11



2.The L.C.M. of two numbers is 4800 and their G.C.M. is 160. If one of the numbers is 480, then the other number is:

- a) 1600 b) 1800 c) 2200 d) 2600 Option 5 : None of these

3.The L.C.M. of two numbers is 140. If their ratio is 2:5, then the numbers are:

- a) 28,70 b) 28,7 c) 8,70 d) 8,40 Option 5 : None of these

4.The product of two numbers is 16200. If their LCM is 216, find their HCF.

- a) 75 b) 70 c) 80 d) Data inconsistent

5.M and N are two distinct natural numbers. HCF and LCM of M and N are K and L respectively. A is also a natural number, which of the following relations is not possible?

- a) $K \times L = A$ b) $K \times A = L$ c) $L \times A = K$ d) None of these

6.The ratio of two numbers is 3:4 and their HCF is 4.Their LCM is:

- a) 12 b) 16 c) 24 d) 48

7.What will be obtained if 8 is subtracted from the HCF of 168, 189, and 231?

- a) 15 b) 10 c) 21 d) **None of these**



Space for Notes



1.3 Numbers, decimal fractions and power

Numerals: Figures representing a number is called numeral.

Types Of Number

Natural Number : Numbers used in counting are termed as natural numbers

Ex. $N=\{ 1, 2, 3, 4, 5, \dots\}$

Whole Number: Natural numbers with 0 are termed as whole number

Ex. $W=\{0, 1, 2, 3, 4, \dots\}$

Prime number : A number which is not divisible by other numbers except the number itself and 1 is termed as prime number

Ex. Is 419 a prime number ?

Solution: The square root of 419 is 20 approx. The prime numbers less than 20 are 2, 3, 5, 7, 11, 13, 17, 19 419 is not divisible by any one of them , so 419 is a prime number.

Composite Numbers: Numbers other than one which are not prime are termed as Composite numbers

Ex. 4, 6, 8, 9, 12

Even Numbers: Numbers which are divisible by 2 ae termed as even numbers. Ex. 2, 4, 6, 8, 10

Odd Numbers: The number which is not divisible by 2 are termed as odd numbers. Ex. 3, 7, 9, 11

Consecutive numbers: Numbers increasing by one are termed as consecutive numbers. Ex. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

Integers: The set of numbers which consists of Negative numbers and whole numbers is known asIntegers.

$I= \{ \dots -5, -4, -3, -2, -1, 0, 1, 2, 3, 4\dots \}$

Rational Numbers: The numbers which can be written in the form P / Q , where P and Q are integersand Q not equal to zero is termed as Rational Numbers. Ex. $(1/2)$, $(3/7)$, $(7/11)$



Irrational Numbers: The numbers which can not be written in P / Q form are termed as Irrational Numbers

Real Numbers: Real number consists of both rational as well as irrational numbers

Ascending or Descending Order in Rational Numbers

When numerator and denominator of the fractions increase by a constant value, the last fraction will be greatest

$$\frac{x}{y}, \frac{x+p}{y+q}, \frac{x+2p}{y+2q}, \frac{x+3p}{y+3q} \dots$$

then $\frac{x+np}{y+nq}$ will be highest

For $p=q$ or $p > q$

Ex: Which one of the following fraction is the biggest

$$\frac{3}{2}, \frac{4}{3}, \frac{5}{4}$$

Sol: since $p \geq q$ and numerator and denominator both increases by a constant number 1 so the last fraction will be greater.



Ex: which one will be biggest?

$$\frac{1}{8}, \frac{3}{9}, \frac{5}{10}, \frac{7}{11}, \frac{9}{12}$$

Sol: Since $P > q$ and both numerator and denominator increases by constant numbers 2 and 1 so the last fraction will be greatest.

* When $P < q$ then

$$(1) = \text{If } \frac{\text{Increase In Num}}{\text{Increase In Deno}} > \text{First fraction}$$

The last value will be greatest

$$(2) = \text{If } \frac{\text{Increase In Num}}{\text{Increase In Deno}} < \text{First fraction}$$

The last value will be least

$$(3) = \text{If } \frac{\text{Increase In Num}}{\text{Increase In Deno}} = \text{First fraction, All the values are equal}$$

Ex: Arrange the following in ascending order $\frac{1}{2}, \frac{3}{7}, \frac{3}{5}, \frac{2}{3}$

Sol: Take the LCM of 2, 7, 5, 3

$$\text{LCM} = 210$$

$$\frac{1 \times 105}{210}, \frac{3 \times 30}{210}, \frac{3 \times 52}{210}, \frac{2 \times 70}{210}$$

$$\frac{105}{210}, \frac{90}{210}, \frac{140}{210}, \frac{156}{210}$$

$$\frac{90}{210} < \frac{105}{210} < \frac{140}{210} < \frac{156}{210}$$

Important Rules on Counting:-

Rule 1: Sum of first n natural numbers :



$$= \frac{n(n + 1)}{2}$$

Rule 2: Sum of first n odd numbers :

$$= n \times n = n^2$$

Rule 3: Sum of first n even numbers = $n(n+1)$

Rule 4: Sum of squares of first n natural numbers :

$$= \frac{n(n + 1)(2n + 1)}{6}$$

Rule 5: Sum of cubes of first n natural numbers :

$$= \left[\frac{n(n + 1)}{2} \right]^2$$

Rule 6: If n is the number of numbers and n is even then $n/2$ numbers will be even and $n/2$ numbers will be odd among first n natural numbers.

Rule 7: If n is odd , then there are $(n+1)/2$ odd numbers and $(n-1)/2$ even numbers

Rule 8: The difference between the squares of two consecutive numbers is always an odd number.

Eg. $9^2 - 8^2 = 17$

Rule 9: The difference between the squares of two consecutive numbers is the sum of the two consecutive numbers

Ex. In the above example $9 + 8 = 17$

Ex. Find out the number of all even numbers from 1 to 300 ?

Solution : Since 300 is an even number so total number of even numbers wil be $(n/2) = (300/2) = 150$ even numbers

Ex. What is the sum of all the even numbers from 1 to 381

Solution : Even numbers will be $= (381-1)/2 = 190$
Sum of even numbers = $n * (n+1) = 190 * (190+1) = 36,290$

Ex. Find out of sum of all the odd numbers from 50 to 200

Solution : Required Sum = Sum of all odd numbers from 1 to 200 - Sum of all odd numbers from 1 to 50 :



$$= 100^2 - 25^2 = 9375$$

Rule 10 : Dividend = (Divisor * Quotient) + Remainder

Ex. What least number must be added to 7963 to make it exactly divisible by 65 ?

Solution : On dividing 7963 by 65 we get 33 as remainder, So the number to be added will be $65 - 33 = 32$

Ex. What least number must be subtracted from 7963 to make it exactly divisible by 65 ?

Solution : On dividing 7963 by 65 we get 33 as remainder, So the number to be subtracted will be 33

Ex. Find the least number of five digits which is exactly divisible by 73 ?

Least number of five digits will be 10000, on dividing 10000 by 73 we get 72 as remainder, so the number will be $= 10000 + 72 = 10072$

Rule : for finding least number add the remainder to the least number

Ex. find the greatest number of five digits which is exactly divisible by 147 ?

Solution : The greatest number of five digit will be 99999, on dividing it by 147 we get 39 as remainder, so the required number will be $99999 - 39 = 99960$

Rule : For finding greatest number subtract the remainder to the greatest number

Finding out the number at the unit place :

Rule 1: When the given number is **odd** then try to get the **last digit as 1**

Ex. Find the number at the unit place in $(723)^{43}$

$$\begin{aligned}
 (\text{Ex}) &= (723)^{43} = (723)^{40} \cdot (723)^3 \\
 &= (723)^{4 \times 10} \cdot (723)^3 \\
 &= (-\dots 1) \times (-\dots 7) \\
 &= (-\dots 7) \Rightarrow \text{so } 7 \text{ will be at} \\
 &\quad \text{unit place}
 \end{aligned}$$



Ex. Find the number at the unit place in $(257)^{61}$

$$\begin{aligned} (\text{Ex}) &= (257)^{61} = (257)^{60} (257) \\ &= (257)^{4 \times 15} (257) \\ &= (\dots 1) (\dots 7) \\ &= 7 \Rightarrow \text{So } 7 \text{ will be at unit place} \end{aligned}$$

Rule 2 : When the given number is **Even** then try to get the **last digit as 6**

Ex. Find the number at the unit place in $(142)^{65}$

$$\begin{aligned} (\text{Ex}) &= (142)^{65} = (142)^{64} (142) \\ &= (142)^{4 \times 16} (142) \\ &= (\dots 6) (\dots 2) = (\dots 2) \\ &\text{So number at unit place } 2 \end{aligned}$$

Ex. Find the number at the unit place in $(88)^{59}$

$$\begin{aligned} (\text{Ex}) &= (88)^{59} = (88)^{56} (88)^3 \\ &= (88)^{4 \times 14} (88)^3 \\ &= (\dots 6) (\dots 2) = (\dots 2) \\ &\text{Last digit will be } 2 \end{aligned}$$

Ex. How many prime numbers exist in $6^5 \times 21^4 \times 13^6$

Solution :

$$\begin{aligned} 6^5 \times 21^4 \times 13^6 &= (2 \times 3)^5 (7 \times 3)^4 (13)^6 \\ &= 2^5 \times 3^9 \times 7^4 \times 13^6 \end{aligned}$$

So, total number of prime numbers will be , Sum of powers of prime= $5 + 9 + 4 + 6 = 24$

Ex. A watch ticks 90 times in 95 seconds and another watch ticks 315 times in 323 seconds. If both the watches are started together, how many times will they tick together in first hour ?

The first watch ticks every $95 / 90$ seconds, second watch ticks every $323 / 315$ seconds.



They will tick together after (LCM of 95 / 90 and 323 / 315) seconds.

$$= \text{LCM of } (95, 323) / \text{HCF of } (90, 315) = (19 * 5 * 17) / 45$$

The number of times they will tick in the first 3600 seconds = $3600 / (1615 / 45) = 100.30 = 100 + 1$, as it has already ticked first time.

Rule : Number of Zeroes in an expression

Ex. Find out the number of zeroes in $8 \times 15 \times 23 \times 17 \times 25 \times 22$?

Solution : $(2^3) \times (3 \times 5) \times (23) \times (17) \times (5^2) \times (11 \times 2)$

Zeroes are formed by combination of $2 * 5$, here number of pairs of (2, 5) is 3 so the numbers of zeros will be three

Ex. The product of two numbers is 60480 and their HCF is 12 . Find the numbers ?

Solution : Since HCF is 12, so the two numbers will be multiple of their HCF

let the first number is 12P and the second number be 12Q

$$\therefore 12P \times 12Q = 60480$$

$$\therefore P \times Q = 420$$

Now pair of numbers whose product is 420 is

$$(420, 1) (210, 2) (140, 3) (105, 4) (60, 7) (20, 21)$$

Out of these (210, 2) is not prime so neglected

Now the required numbers will be $(420 \times 12, 1 \times 12) (140 \times 12, 3 \times 12) (105 \times 12, 4 \times 12) (60 \times 12, 7 \times 12) (20 \times 12, 21 \times 12)$

$(5040, 12) (1680, 36) (1260, 48) (720, 84) (240, 252)$ be the required numbers

Ex. Find the greatest number that will divide 37, 109 and 157 so as to leave the same remainder in each case ?

Solution : Let the remainder be x, then the numbers :

$(37 - x) (109 - x) (157 - x)$ must be divisible by the required number.

Also if two numbers are divisible by the certain number then their difference is also divisible by that number

$$(109 - x) - (37 - x) = 72$$

$$(157 - x) - (109 - x) = 48$$

$$(157 - x) - (37 - x) = 120$$

So, the numbers 72, 48, 120 will also be divisible by that number, So HCF of 72, 48, 120 is 24, therefore required number will be 24



Ex. Find out the number of zeros at the end of products $20 \times 15 \times 16 \times 44 \times 72 \times 95 \times 25$

Solution :

Note : Zeroes can be produced by two ways

- (1) If there is any zero at the end of any multiplicand.
- (2) If 5 or its multiple are multiplied by any even number.

Now $20 \times 15 \times 16 \times 44 \times 72 \times 95 \times 25 =$

$$(2^2 \times 5) \times (3 \times 5) \times (2^4) \times (2^2 \times 11) \times (2^3 \times 3^2) \times (5 \times 19) \times (5^2)$$

$$(2^{11}) \times (5^5) \dots$$

So total number of zeros are 5



Exercise

1. The number of prime factors of $(3 \times 5)^{12} (2 \times 7)^{10} (10)^{25}$ is:

- a) 47 b) 60 c) 72 d) **None of these**

2. The smallest number, which is a perfect square and contains 7936 as a factor is:

- a) 251664 b) 231564 c) **246016** d) 346016 Option 5 : None of these

3. There are four prime numbers written in ascending order of magnitude. The product of first three is 385 and that of last three is 1001. Find the first number.

- a) 5 b) 7 c) 11 d) 17

4. Every time x is increased by a given constant number, y doubles and z becomes three times. How will log(y) and log(z) behave as x is increased by the same constant number?

- a) **Both will grow linearly with different slopes**
 same slopes c) y will grow linearly, while z will not
 will not
- b) Both will grow linearly with
 d) z will grow linearly, while y



5. Rajeev multiplies a number by 10, the log (to base 10) of this number will change in what way?

- a) Increase by 10 b) **Increase by 1** c) Multiplied by 10 d) None of these

6. If n numbers are in geometric progression, the logarithm of the number will be in which of the following?

- a) Geometric Progression b) **Arithmetic Progression** c) Harmonic Progression d) None of these

7. How many 3 digit numbers can be formed from the digits 2, 3, 5, 6, 7 and 9, which are divisible by 5 and none of the digits is repeated ?

- a) 5 b) 10 c) 15 d) **20**

8. The number of possible selections of one or more questions from 8 given questions, each question having an alternative, is

- a) $2^8 - 1$ b) **$3^8 - 1$** c) $4^8 - 1$ d) none of these

9. A five -digit number divisible by 3 is to be formed using numerals 0,1,2,3,4 and 5 without repetition. The total number of ways this can be done is

- a) **216** b) 240 c) 600 d) 3125

10. Let A be containing 10 distinct elements ,then the total number of distinct functions from A to A IS

- a) $10!$ b) **10^{10}** c) 210 d) 210-1

11. The number obtained by interchanging the two digits of a two-digit number is more than the original number by 27. If the sum of the two digits is 13, what is the original number?

- 1) 63 2) 74 3) 85 **4) 58** 5) None of these

12. The number obtained by interchanging the two digits of a two-digit number is less than the original number by 18. The sum of the two digits of the number is 16. What is the original number?

- 1) 97** 2) 87 3) 79 4) Cannot be determined 5) None of these



13. When the digits of a two-digit number are interchanged, the number obtained is less than the original number by 36. What is the original number if the difference of the two digits is 4?

- 1) 84 2) 51 3) 73 4) **Cannot be determined** 5) None of these

14. If the positions of the digits of a two-digit number are interchanged, the number obtained is smaller than the original number by 27. If the digits of the number are in the ratio of 1:2, what is the original number?

- 1) 36 2) **63** 3) 48 4) Cannot be determined 5) None of these

15. If the digits of a two-digit number are interchanged, the number formed is greater than the original number by 45. If the difference between the digits is 5, what is the original number?

- 1) 16 2) 27 3) 38 4) **Cannot be determined** 5) None of these

16. The sum of four consecutive even numbers is 44. What is the sum of the original squares of these numbers?

- 1) 288 2) 502 3) 696 4) 920 5) **None of these**

17. A, B, C, D and E are five consecutive odd numbers. The sum of A and C is 146. What is the value of E?

- 1) 75 2) 81 3) 71 4) **79** 5) None of these

18. The product of two successive numbers is 4692. Which is the smaller of the two numbers?

- 1) 69 2) 62 3) **68** 4) 67 5) None of these

19. The product of two successive numbers is 9506. Which is the smaller of the two numbers?

- 1) 96 2) **97** 3) 98 4) 99 5) None of these

20. The product of two consecutive even numbers is 3248. Which is the larger number?



1)**58** 2)62 3)56 4)60 5) None of these

21.The sum of five consecutive even numbers is 200. What is the sum of the next set of the consecutive even numbers?

1)215 2)235 3) 240 **4) 250** 5) None of these

22.The sum of five consecutive odd numbers is 575. What is the sum of the next set of the consecutive odd numbers?

1)615 2)635 3) 595 4) Cannot be determined **5) None of these**



Space for Notes



2. Applied Mathematics

2.1 Profit and Loss

Profit = Selling Price - Cost Price

Loss = Cost Price - Selling Price

Gain or Loss Percentage = (Loss or Gain / Cost Price) * 100

Ex. If a man purchases 11 balls for Rs 10 and sells 10 balls for Rs. 11 , How much profit or loss does he make ?

Solution : Cost price of one ball = $10 / 11$, Selling Price of one ball $11 / 10$

So % profit or loss will be = $[(11 / 10 - 10 / 11) / 10 / 11] * 100 = 21 \%$

Rule : If a grocer sells its goods at cost price, but uses a false weight instead of true weight. Then Gain percentage will be :

$$\% \text{ Gain} = \left(\frac{\text{True Weight} - \text{False weight}}{\text{False Weight}} \right) \times 100$$

Ex. A dealer sell its rice at cost price, but uses its weight 900 gm for kg. Find hig gain percentage.

Solution : % Gain = [True Weight - False Weight] / False Weight

$$\text{Gain \%} = [(1000 - 900) / 900] * 100 = 1 * 100 / 9 = 11 . 11 \%$$

Rule : If a shopkeeper sells his goods at $x \%$ loss on cost price but uses y gm instead of z gm, then his % profit or loss is

$$[100 - x] \frac{z}{y} - 100$$

Rule : If a shopkeeper sells his goods at $x \%$ gain on cost price but uses y gm instead of z gm, then his % profit is

$$[100 + x] \frac{z}{y} - 100$$

Ex. A seller uses 900 gm in place of one kg to sell his goods. Find his actual % profit or loss When he sells his articles at 5 % loss on cost price ?



$$[100 - x] \frac{z}{y} - 100 = [100 - 5] \frac{1000}{900} - 100 = 5.56 \%$$

Ex. A seller uses 900 gm in place of one kg to sell his goods. Find his actual % profit or loss When he sells his articles at 5 % profit on cost price ?

$$[100 + x] \frac{z}{y} - 100 = [100 + 5] \frac{1000}{900} - 100 = 16.67 \%$$

Rule : If a businessman marks his goods at x % above his cost prie and allowed purchasers a discount of y % for cash, then % profit or % loss according to + ve or - ve sign is will be

$$\left[x - y - \frac{xy}{100} \right] \%$$

Ex. A grocer allows a discount of 8 %. How much % above cost price he must mark his goods to make a profit of 12 % ?

Solution :

$$x - 8 - \frac{8x}{100} = 12, \quad \text{so } x = 21.73 \%$$

Rule : Goods Passing through successive hands :- If A sells a good to B at profit of x %, B sells it to C at a profit of y %. If P Rs. is paid by C then what was the cost price for A?

$$\text{Cost Price for A} = \frac{100}{(100 + x)} \times \frac{100}{(100 + y)} \times P$$

Ex. If A sells a good to B at profit of 15 %, B sells it to C at a profit of 20 %. If 300 Rs. is paid by C then what was the cost price for A?

$$\text{Cost Price for A} = \frac{100}{(100 + 15)} \times \frac{100}{(100 + 20)} \times 300 = 217.40$$

Rule : If A takes a profit of x % by selling it to B and B takes a profit of y % by selling it to C then the resultant profit percentage is given by -

$$\left(x + y + \frac{xy}{100} \right)$$

Rule : If A takes a profit of x % by selling it to B and B takes a loss of y % by selling it to C then the resultant profit percentage is given by -

$$\left(x - y - \frac{xy}{100} \right)$$



Ex. If A sells a good to B at profit of 15 %, B sells it to C at a profit of 20 %. What is the resultant profit and loss ?

$$\left(15 + 20 + \frac{15 \times 20}{100} \right) = 38 \%$$

Ex. By selling a shirt at price 500 a trader get loss of 10 %. At what price he must sell the shirt in order to get 5 % of profit ?

Solution : Use the formula of Goods Passing through successive hands, here for loss x will be -10 %

$$\text{Cost Price of shirt} = \frac{100}{(100 - 10)} \times 500 = 560, \text{Selling Price} = 560 + 560 \times \frac{5}{100} = 588$$



Exercise

1.Rakesh buys a scooter worth Rs. 10,000. He sells it to Mohan at a profit of 10%. If after sometime Mohan sells it back to Rakesh at a loss of 10%, then totally:

- a) Rakesh loses Rs. 100 b) Rakesh loses Rs. 1100 c) Rakesh gains Rs. 100 d)
Rakesh gains Rs. 1100 Option 5 : None of these

2.Prabodh bought 30 kg of rice at the rate of Rs. 8.50 per kg and 20 kg of rice at the rate of Rs. 9.00 per kg. He mixed the two. At what price (App.) per kg should he sell the mixture in order to get 20% profit?

- a) Rs. 9.50 b) Rs. 8.50 c) **Rs. 10.50** d) Rs. 12.00

3.A, B, C started a business with their investments in the ratio 1:3:5. After 4 months, A invested the same amount as before and B as well as C withdrew half of their investments. The ratio of their profits at the end of the year is:

- a) 4:3:5 b) **5:6:10** c) 6:5:10 d) 10:5:6

4.A man bought a number of clips at 3 for a rupee and an equal number at 2 for a rupee. At what price per dozen should he sell them to make a profit of 20% ?

- a) Rs 4 b) Rs 5 c) **Rs 6** d) Rs 7

5.A sells a bicycle to B at a profit of 20%. B sells it to C at a profit of 25%. If C pays Rs. 225 for it, the cost price of the bicycle for A is:

- a) Rs. 110 b) **Rs.120** c) Rs. 125 d) Rs. 150-

6. Naresh purchased a TV set for Rs11,250 after getting discount of 10% on the labeled price. He spent Rs150 on transport and Rs800 on installation. At what price should it be sold so that the profit earned would be 15% if no discount was offered?



1) Rs12,937.50 2) Rs14,030 3) Rs13,450 4) **Rs15,467.50** 5) None of these

7. Manoj sold an article for Rs15,000. Had he offered a discount of 10% on the selling price, he would have earned a profit of 8%. What is the cost price?

1) **Rs12,500** 2) Rs13,500 3) Rs12,250 4) Rs13,250 5) None of these

8. If Ramu buys books at 11 books for Rs10 and sells at 10 books for Rs12, then what will be his gain percent?

1) 11% 2) 22% 3) **32%** 4) 15% 5) None of these

9. A watch was sold at a loss of 9%. It was observed that if the selling price was Rs420 more, the profit made would have been 5%. What is the actual selling price of the watch?

1) Rs2700 2) **Rs2730** 3) Rs3270 4) Rs3000 5) None of these

10. After selling a book, Rohan found that he had made a loss of 12%. He also found that had he sold it for Rs36 more, he would have made a profit of 6%. What was the initial loss?

1) Rs12 2) Rs18 3) Rs20 4) Data inadequate 5) **None of these-**



Space for Notes



2.2 Simple and Compound Interest

Simple Interest:

Principal : The money borrowed or lent for a certain period is called Sum or Principal

Interest : The extra money paid for the money borrowed is termed as Interest.

Simple Interest : Interest paid on principle amount for certain period of time is termed as simple interest.

$$S.I = \left(\frac{P \times R \times T}{100} \right)$$

Where P is Principle, T is Number of years, R is Rate of Interest

Rule : Simple Interest for D number of days, If P is Principle amount and R is Rate.

$$S.I = \left(\frac{P \times R \times D}{100 \times 365} \right)$$

Ex. Mohan borrowed some money at the rate of 5 % p. a. for the first two years, at a rate of 8 % p. a for the next three years, and at the rate of 10 % for the period beyond five years.. If he pays total interest of Rs. 12500 at the end of 8 years, how much mony did he borrows ?

Solution : Let P be the sum borrowed

$$\left(\frac{P \times 5 \times 2}{100} \right) + \left(\frac{P \times 8 \times 3}{100} \right) + \left(\frac{P \times 10 \times 3}{100} \right) = 12500, \quad P = 19531.25$$

Ex. A sum of money doubles itself in 8 years at simple interest. What is the rate of interest ?

Solution : Let the Sum is Rs 100, after 8 years it will become 200
So Interest will be = 200 - 100 = 100 , so the rate of interest will be :

$$RI = \left(\frac{100 \times SI}{P \times T} \right) = \left(\frac{100 \times 100}{100 \times 8} \right) = 12.5 \%$$

Ex. A sum of money amounts to Rs. 9800 after 5 yers and Rs. 12005 after 8 years at the same rate of simple interest. What is the rate of interest per annum ?

Solution : Simple interest for 8 years - Simple interest of 5 years = Simple interest for 3 years =
12005 - 9800 = 2205

$$\text{Principle} = (9800 - 3675) = 6125, \quad RI = \left(\frac{100 \times 3675}{6125 \times 5} \right) = 12 \%$$

Compound Interest :



If P is Principal amount, R is Percentage Rate, n is number of years

Rule : When interest is compound annually :

$$\text{Amount} = P \left(1 + \frac{R}{100}\right)^n$$

Rule : If interest is compounded Half-yearly :

$$\text{Amount} = P \left(1 + \frac{(R/2)}{100}\right)^{2n}$$

Rule : When interest is compounded Quarterly :

$$\text{Amount} = P \left(1 + \frac{(R/4)}{100}\right)^{4n}$$

Rule : When rate of interest are X % , Y %, Z % for 1st, 2nd and third year respectively. Then amount will be :

$$\text{Amount} = P \left(1 + \frac{x}{100}\right) \left(1 + \frac{y}{100}\right) \left(1 + \frac{z}{100}\right)$$

Rule : When interest is compounded annually but time is in fraction such as

$5\frac{2}{3}$ years

$$\text{Amount} = P \left(1 + \frac{R}{100}\right)^5 \times \left(1 + \frac{\frac{2}{3}R}{100}\right)$$

Ex. A sum of money doules itself at compound interest in 15 years. In how many years will it become eight times ?

Solution :

$$P \left(1 + \frac{R}{100}\right)^{15} = 2P, \quad \text{Also } P \left(1 + \frac{R}{100}\right)^n = 8P \text{ or } \left(1 + \frac{R}{100}\right)^n = \left\{ \left(1 + \frac{R}{100}\right)^{15 \times 3} \right\},$$

so number of years = 45



Ex. The difference between compound interest and simple interest on an amount of Rs. 15,000 for 2 years is Rs. 96. What is the rate of interest per annum?

$$\left[\left[15000 \times \left(1 + \frac{R}{100} \right)^2 - 15000 \right] - \left[\frac{15000 \times R \times 2}{100} \right] = 96 \right]$$

$$15000 \left[\left(1 + \frac{R}{100} \right)^2 - 1 - \frac{2R}{100} \right] = 96, R^2 = \frac{96 \times 2}{3}, R = 8$$

Ex. A sum of money is lent out at compound interest rate of 20 % per annum for two years. It would fetch Rs. 482 more if interest is compounded half-yearly. Find the sum



Exercise

1. A certain sum of money at simple interest becomes Rs. 1062 in 2 years and Rs. 1183.50 in $3\frac{1}{2}$ years. What is rate of interest per annum?

- a) 7% b) 6% c) **9%** d) 5%

2. If the simple interest on a sum at 4% per annum for 2 years is Rs. 80, then the compound interest on the same sum for the same period is:

- a) Rs. 86.80 b) Rs. 86.10 c) Rs. 88.65 d) **Rs. 81.60**

3. A committee is to be formed comprising 7 members such that there is a simple majority of men and at least 1 women. The shortlist consists of 9 men and 6 women. In how many ways can this be done?

- a) 3,724 b) 3,630 c) **4,914** d) 5,670

4. Consider the following statements : If a sum of money is lent at simple interest, then the

1. Money gets doubled in 5 years if the rate of interest is $50/3\%$.
2. Money gets doubled in 5 years if the rate of interest is 20%.
3. Money becomes

- a) 1 and 3 are correct b) **2 alone is correct**- c) 3 alone is correct d) 2 and 3 are correct

5. The difference between simple interest and compound interest on Rs.1200 for one year at 10% per annum reckoned half-yearly is:

- a) Rs. 2.50 b) **Rs. 3** c) Rs. 3.75 d) Rs. 4 Option 5 : None of these

6. The simple interest on Rs. 10 for 4 months at the rate of 3 paise per rupee per month is:

- a) **Rs. 1.20** b) Rs. 1.60 c) Rs. 2.40 d) Rs. 3.60



7.If the compound interest on a sum for 2 years at 25/2 % per annum is Rs. 510, the simple interest on the same sum at the same rate for the same period of time is:

- a) Rs. 400 b) Rs. 450 c)Rs. 460 d) **Rs. 480**

8.In a town the population grows at a simple rate of 10% in a decade and compounds from decade to decade. Find the population at the beginning of the 1970s if the population at the beginning of the 1990s is 3,63,000 people.

- a) 30,000 b) **3,00,000** c)30,00,000 d) 3,15,000

9.In approximately how many years will a certain sum of money triple itself at 22% simple interest?

- a) 10 years b) 11 years c)**9 years** d) 12 years



Space for Notes



2.3 Time, Speed and Distance

Formulae :

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

$$\text{Distance} = \text{Speed} * \text{Time}$$

$$X \text{ km / hr} = \left(X \times \frac{5}{18} \right) \text{ m/sec}$$

$$X \text{ m / sec} = \left(X \times \frac{18}{5} \right) \text{ km/hr}$$

Rule : If certain distance is covered at x km/hr and the same distance is covered at y km / hr then the average speed during whole journey is :

$$\frac{2xy}{x + y} \text{ km/hr}$$

Ex. Ram can cover a certain distance in 1 hr 30 min. By covering two third of the distance at 4 kmph and the rest at 5 kmph. Find the total distance covered ?

Solution : Let the total distance be x km then:

$$\frac{\frac{2}{3}x}{4} + \frac{\frac{1}{3}x}{5} = 1 + \frac{1}{2} = \frac{3}{2}, x = 6.43 \text{ km}$$

Ex. Walking at $4 / 5$ of its normal speed, a school bus is 10 minutes late. Find its usual time to cover the journey.

Solution : New Speed = $4 / 5$ of original speed, since the speed and time has inverse relation so,

New Time taken by bus = $5 / 4$ of the normal time

$$(5 / 4 \text{ of usual time}) - (\text{usual time}) = 10 \text{ min.}$$



$1/4$ of the normal time = 10 min

normal time = 40 min

Ex. The distance between two stations Delhi and Lucknow is 500 km. A train starts at 5 pm from delhi and moves towards Lucknow at an average speed of 50 km / hr, Another train starts at 4.20 pm and moves towards delhi at an average speed of 70 km/hr. How far from delhi the two trains meet and at what time ?

Solution : Let the two trains meets at a distance of x km from delhi.

Now [Time taken by train from Lucknow to cover $(500-x)$ km] - [Time taken by train from delhi to cover x km] = $40 / 60$

$$\frac{500 - x}{70} - \frac{x}{50} = \frac{40}{60}, \quad x = 188.9 \text{ kms}$$

Ex. Bullcart A cover a certain distance at the speed of 15 km/hr, another bullcart B covers the same distance at the speed of 16 km/hr. If Bull cart A takes 16 minutes longer than B to cover the same distance find the distance?

Solution : let the distance is x km

Time taken by A= $x / 15$ hrs

Time taken by B= $x / 16$ hrs

$$\frac{x}{15} - \frac{x}{16} = \frac{16}{60}, \quad x = 64 \text{ km}$$

Ex. A train travells at average speed of 100 km / hr, it stops for 3 mins after travelling 75 kms of diatance. How long it takes to reach 600 kms from the starting point.

Solution : Time taken to travel 600 kms= $600 / 100 = 6$ hrs

But it stop after travelling 75 kms , so number of stoping point in 600 kms will be= $600 / 75 = 8$, but the last stoping point is actual end stoping so

Number of stoping point will be 7, and time taken= $7 * 3 = 21$ minutes
So total time = 6 hrs 21 mins

Ex. A is faster than B . A and B each walk 24 km. The sum of their speeds is 7 km / hr and the sum of their time taken is 14 hrs. Then A's speed is equal to :

Solution : Let A's speed = x km / hr and B's speed is = $7 - x$ km / hr



$$\frac{24}{x} - \frac{24}{7-x} = 14, \quad x^2 - 7x + 12 = 0$$

$$(x-3)(x-4) = 0$$

$x=3, x=4$, So A's speed is 4 km / hr, B's speed is 3 km / hr

Ex. A man on tour travels first 180 km at 60 km / hr and next 180 km at speed of 80 km / hr . The average speed of first 360 km of the tour is :

Solution : Total time taken = $(180 / 60) + (180 / 80) = 21 / 4$ hrs

$$\text{Average speed} = \frac{\text{total distance}}{\text{total time}} = \frac{360}{\frac{21}{4}} = \frac{480}{7} = 68.57 \text{ km/hr}$$

Ex. A train running at $3/7$ of its own speed reached the destination in 14 hours, how much time could be saved if the train would have run at its own speed ?

Solution : New speed = $3/7$ of normal speed

So, New Time will be = $7/3$ of normal time. (Invers relation)

As $7/3$ of normal time is = 14 hours

So, normal time = $(14 * 3/7) = 12$ hrs

So time saved = $14 - 12 = 2$ hours

Ex. Speed ratio of two school buses A and B in covering a certain distance is 4 : 5, If A takes 30 minutes more than B covering the distance, then time taken by B to reach the destination is :

Solution : Since speed ratio is 4 : 5

Time ratio will be 5 : 4 , let A takes $5x$ hrs and B takes $4x$ hrs to reach the destination then ,

$$5x - 4x = \frac{30}{60} = \frac{1}{2}, x = \frac{1}{2}, \text{Time taken by B} = 4 \times \frac{1}{2} = 2 \text{ hrs}$$



Exercise

1. Walking $\frac{6}{7}$ th of his usual speed, a man is 12 minutes too late. The usual time taken by him to cover that distance is:

- a) 1 hour b) **1 hr 12min** c) 1 hr 15 min d) 1 hr 20 min

2. A boat running upstream takes 8 hours 48 minutes to cover a certain distance, while it takes 4 hours to cover the same distance running downstream. What is the ratio between the speed of the boat and speed of the water current respectively?

- a) 2 : 1 b) 3 : 2 c) **8 : 3** d) Cannot be determined Option 5 : None of these

3. A car is 250 metres behind the bus. The car and bus are moving with speed 60 km/hr and 35 km/hr respectively. The car will be ahead of bus by 250 metres in:

- a) 37 seconds b) 48 seconds c) **72 seconds** d) 68 seconds

Option 5 : None of these

4. A man covers a distance of 1200 km in 70 days resting 9 hours a day, if he rests 10 hours a day and walks with speed $1\frac{1}{2}$ times of the previous in how many days will he cover 750 km?

- a) 30 b) **31.25** c) 31 d) 33

5. A ship is moving at a speed of 30 kmph. To know the depth of the ocean beneath it, it sends a radiowave which travels at a speed 200 m/s. The ship receives back the signal after it has moved 500 m. What is the depth of the ocean?

- a) 4 km b) 8 km c) **6 km** d) 12 km

6. A ship is moving at a speed of 30 kmph. To know the depth of the ocean beneath it, it sends a radiowave which travels at a speed 200 m/s. The ship receives back the signal after it has moved 500 m. What is the depth of the ocean?

- a) 4 km b) 8 km c) **6 km** d) 12 km

7. A man rows a boat at a speed of 5 km/hr in still water. Find the speed of a river if it takes him 1 hr to row a boat to a place 2.4 km away and return back.

- a) **1 km/hr** b) 6 km/hr c) 3 km/hr d) 4 km/hr

8. A boat covers 40 km upstream and 90 km downstream in 5 hr. It can also cover 60 km upstream and 60 km downstream in 5 hr. The speed of the water current is

- a) 4 km/hr b) **5 km/hr** c) 20 km/hr d) 25 km/hr

9. Two champion swimmers start a two-length swimming race at the same time, but from opposite ends of the pool. They swim at constant but different speeds. They



first pass at a point 18.5 m from the deep end. Having completed one length, each swimmer take

- a) 90 m b) 45 m c) 26.5m d) Data insufficient

10. A locomotive engine, without any wagons

attached to it, can go at a speed of 40 km/hr. Its speed is diminished by a quantity that varies proportionally as the square root of the number of wagons attached. With 16 wagons, its speed is 28 km/hr. The

- a) 99 b) 100 c) 101 d) 120



Space for Notes

3. Engineering Mathematics

3.1 Logarithms

Definitions

1. $\log_a x = N$ means that $a^N = x$.

2. $\log x$ means $\log_{10} x$. All \log_a rules apply for \log . When a logarithm is written without a base it means common logarithm.

3. $\ln x$ means $\log_e x$, where e is about 2.718. All \log_a rules apply for \ln . When a logarithm is written "ln" it means natural logarithm.

Note: $\ln x$ is sometimes written $\text{Ln } x$ or $\text{LN } x$.

Rules

1. Inverse properties: $\log_a a^x = x$ and $a^{(\log_a x)} = x$

2. Product: $\log_a (xy) = \log_a x + \log_a y$

3. Quotient: $\log_a \left(\frac{x}{y} \right) = \log_a x - \log_a y$

4. Power: $\log_a (x^p) = p \log_a x$



$$\log_a x = \frac{\log_b x}{\log_b a}$$

5. Change of base formula:

Careful!!

$$\log_a (x + y) \neq \log_a x + \log_a y$$

$$\log_a (x - y) \neq \log_a x - \log_a y$$



Exercise

1. If $\log x (0.1) = -1/3$, then the value of x is:

- a) 10 b) 100 c) **1000** d) 1/1000

2. If $ax = by$, then:

- a) $\log(a/b) = x/y$ b) **$\log(a) / \log(b) = x/y$** c) $\log(a) / \log(b) = y/x$ d) None of these

3. If $\log_8 x + \log_8 (1/6) = 1/3$ then the value of x is:

- a) **12** b) 16 c) 18 d) 24

4. If $\log x + \log y = \log (x + y)$, then:

- a) $x = y$ b) $xy = 1$ c) **$y = (x-1)/xd$** d) $y = x/(x-1)$

5. If $\log_{10} 7 = a$, then $\log_{10}(1/70)$ is equal to:

- a) **$-(1 + a)$** b) $(1 + a) - 1$ c) $a/10$ d) $1/10a$

6. If $\log\{(a+b)/3\} = 0.5(\log a + \log b)$, then the correct relation between a and b is:

- a) **$a^2 + b^2 = 7ab$** b) $a^2 - b^2 = 7ab$ c) $(a+b)^2 = 2$ d) $(a+b)/3 = (1/2)(a+b)$ Option 5 :
None of these

7. If $\log x = \log 3 + 2 \log 2 - (3/4) \log 16$. The value of x is:

- a) $1/2$ b) 1 c) **$3/2$** d) 2 Option 5 : None of these



8.If $\log x = (1/2) \log y = (1/5) \log z$, the value of $x^4y^3z^{-2}$ is:

- a) 0 b) 1 c) 2 d) 3 Option 5 : None of these

9.If $\log_{10} 10000 x = -1/4$, then x is given by:

- a) 1/100 b) 1/10 Option- 3 : **1/20** d) none of these

10.The value of $3 - 1/2 \log_3(9)$ is:

- a) 3 b) **1/3** c) 2/3 d) none of these

11. $\log_e xy - \log_e |x|$ equals to:

- a) $\log_e x$ b) $\log_e |x|$ c) $-\log_e x$ d) **none of these**

12.The value of $(\log_a n) / (\log_b n)$ is given by:

- a) **1 + log_a b** b) $1 + \log_b a$ c) $\log_a b$ d) $\log_b a$

13.If $(a^4 - 2a^2b^2 + b^4)x^{-1} = (a-b)^2x(a+b)^{-2}$, then x equals to:

- a) $(a - b) / (a + b)$ b) $\log(a^2 - b^2)c \log(a + b) / \log(a - b)$
b) d) $\log(a - b) / \log(a + b)$



Space for Notes



3.2 Permutation and Combinations

Permutation : The Different arrangements which can be made by taking some or all of the given things or objects at a time is called Permutation.

Eg. All permutations (arrangements) made with the letters a, b, c by taking two at a time will be ab, bc, ca, ba, ac, cb

Number of Permutations : Number of all permutations of n things, taking r at a time is :

$${}^n P_r = \frac{n!}{n-r!} = n(n-1)(n-2)(n-3) \dots (n-r+1)$$

Note : This is valid only when repetition is not allowed.

Rule : Permutation of n different things taken r at a time **When repetition is allowed :**

$$n \times n \times n \dots \dots \dots r \text{ times} = n^r \text{ ways}$$

Rule : Permutation of n things taking all n things at a time = n!

Rule : Out of n objects n₁ are alike one type, n₂ are alike another type, n₃ are alike third type, n_r are alike another type such that (n₁ + n₂ + n₃ +n_r)= n

$$\text{Number of permutations of these n things are} = \frac{n!}{n_1! n_2! \dots n_r!}$$

Combination : Each of the different selections or groups which is made by taking some or all of a number of things or objects at a time is called combination .

$${}^n C_r = \frac{n!}{r!(n-r)!}$$

Eg. Let we want to select two out of three objects p, q, r, then possible number of selection will be pq, qr, rs

here pq and qp denotes same selection, similarly qr and rq denotes the same selection.

Difference between Permutation and combination :

Let we take three objects a, b, c from this all possible arrangements



(Permutations) taking all three at a time will be (abc, acb, bac, bca, cab, cba)

All possible selection taking all three at a time will be only one abc

Important points :

if ${}^nC_p = {}^nC_q$ then either $p = q$ or $p + q = n$

We can also express it as : ${}^nC_p = {}^nC_{n-p}$

also ${}^nC_n = 1$ and ${}^nC_0 = 1$

Ex. In how many ways can the letters of the word PATANA can be arranged ?

Solution : Word PATANA has 6 letters 1P, 3A, 1T, 1N

$$\text{No of arrangements} = \frac{6!}{1! 3! 1! 1!} = 120$$

Ex. How many words can be formed from the letters of the word " ENGINEERING" , so that vowels always come together ?

Solution : Word ENGINEERING has 11 letters, from which EIEEI are vowels, they can be treated as single letter (EIEEI)NGNRNG,

So seven letters has 3 N, 2 G , 1 R and single (EIEEI)

$$\text{No of arrangements} = \frac{7!}{2! 3!} = 420$$

$$\text{arrangement of EIEEI} = \frac{5!}{2! 3!} = 10$$

total number of arrangements = $420 * 10 = 4200$ (by rule of multiplication)

Ex. In how many different ways can the letters of the word COMPUTER can be arranged in such a way that vowels may occupy only odd positions ?

Solution : Here odd and even positions are :

C O M P U T E R
(O) (E) (O) (E) (O) (E) (O) (E)

Now 3 vowels O, U , E



In 5 odd places 3 vowels arranged as ${}^5P_3 = \frac{5!}{2!} = 60$

Also remaining 5 places can be arranged by C, M, P, T, R

Remaining 5 consonants arranged as ${}^5P_5 = 5! = 120$ ways

So, required number of ways = $120 * 60 = 7200$

Ex. In how many ways can a group of 5 men and 2 women be made out of a total of 7 men and 3 women ?

Solution :

$$\text{Required number of ways} = {}^7C_5 \times {}^3C_2 = \frac{7!}{5! \times 2!} \times \frac{3!}{2! \times 1!} = 63$$

Ex. In a group of 5 boys and 3 girls, 3 childrens are to be selected. In how many different ways can they be selected such that at least 1 boy should be there ?

Solution : (1boy and 2 Girls) or (2 boys and 1 girl) or (3 boys)

$$\text{Required number of ways} = ({}^5C_1 \times {}^3C_2) + ({}^5C_2 \times {}^3C_1) + ({}^5C_3) = 55$$

Ex. A box contains 2 white balls, 3 black balls and 4 red balls. In how many ways can 3 balls be drawn from the box, if at least one black ball is to be included in the draw ?

Solution : No of ways = (drawing 1 black AND 2 others) OR (drawing 2 black AND 1 others) OR (drawing 3 blacks)

$$\text{Number of ways} = ({}^6C_2 \times {}^3C_1) + ({}^3C_2 \times {}^6C_1) + ({}^3C_3)$$

$$= \left(\frac{6!}{2! \times 4!} \times \frac{3!}{1! \times 2!} \right) + \left(\frac{3!}{2! \times 1!} \times \frac{6!}{1! \times 5!} \right) + \left(\frac{3!}{3!} \right) = 64$$

Ex. There are 5 boys and 5 girls. In how many ways they can be seated in a row so that all the girls do not sit together ?

Solution : There are 5 boys and 5 girls, so total number of ways of sitting will be 10 ! in a row.



Now, when all girls sit together, then 5 boys and (group of 5 girls as one person) , so total numbers will of six persons, also 5 girls can be arrenged in $5!$ ways,

No of ways when 5 girls sit together= $6! \times 5!$

So total no. of ways when all 5 girls do not sit together= total number of ways of sitting 10 boys and girls - No of ways when 5 girls sit together

$$\text{no.of ways all 5 girls do not sit together} = (10!) - (6! \times 5!) = 3542400$$

Ex. In a party every guest shakes hand with every other guest. If there was total of 105 handshakes in the party, find the number of persons persent in the party ?

Solution : For every handshake two persons are required, let n be the number of persons persent in the party. So,

$${}^n C_2 = 105 \text{ or } \frac{n(n-1)}{2} = 105, \quad n^2 - n - 210 = 0 \\ \text{so } n=15, -14$$

Total number of persons present in the party were 15

Ex. Five digits are given as 3, 1, 0, 9, 5

(1) From these digits how many five digits numbers can be formed, without repetition of the digits ?

(2) How many of them are divisible by 5 ?

(3) How many of them are not divisible by 5 ?

Solution : (1) Total number of 5 digit numbers will be $5!$ but when 0 be at last place then it will become 4 digits so ,

Total numbers will be : $5! - 4! = 96$

(2) For divisibility with 5, **at unit place number should be 0 or 5**

(a) when unit place has 0,(ex. 39510) then remaning 4 numbers can be arrenged in $4! = 24$ ways

(b) when unit place has 5 (ex, 90135) then remaning 4 numbers can be arrenged in $4! = 24$ ways , but when 0 wll be at last place (ex. 09315) then Total number of ways reduced to $4! - 3! = 18$

So , Total numbers divisible by 5 will be = $24 + 18 = 42$



(3) Numbers not divisible by 5 = (Total numbers - Numbers divisible by 5) = 96 - 42
= 54

Ex. From the word **MATHEMATICS**

(a) How many different arrangements can be made by using all the letters in the word MATHEMATICS ?

Solution : Word MATHEMATICS has total 11 letters out of which 2Ms, 2As, 2Ts, rest all single

$$\text{Total No. of arrangements} = \frac{11!}{2! \times 2! \times 2!} = 4989600$$

(b) How many of them begin with I ?

Solution : when I will be fixed at first place , then there will be 10 letters left having 2Ms, 2As, 2Ts

$$\text{Total No. of arrangements} = \frac{10!}{2! \times 2! \times 2!} = 453600$$

(c) How many of them begin with M ?

Solution : when M will be fixed at first place , then there will be 10 letters left having 2As, 2Ts

$$\text{Total No. of words} = \frac{10!}{2! \times 2!} = 907200$$



Exercise



1. In how many different ways can 5 persons stand in a row for a photograph?
 1) 100 **2) 120** 3) 50 4) 5 5) None of these

2. How many different words can be formed using the letters of the word 'BANKER'?
 1) 120 2) 6 **3) 720** 4) 12 5) None of these

3. In how many ways can the letters of the word COMPUTER be arranged?
 1) 6! 2) 7! **3) 8!** 4) 5040 5) None of these

4. How many different 4 digit numbers can be formed using the digits 1, 2, 3, 6, 7 and 9?
 1) 120 2) 24 3) 720 4) 360 5) None of these

5. How many different words can be formed using the letters of the words
 (i) MIRROR (ii) BANANA (iii) SUCCESSFUL
1) 120, 60, 151200 2) 6!, 6!, 10! 3) 4!, 3!, 6!
 4) 120, 120, 360 5) None of these

6. A set of 12 books has 3 identical Quant books, 3 identical Reasoning books, 4 identical English books and 2 different books on General Awareness. In how many different ways can these 12 books be arranged in a book-shelf?
 1) 12! 2) **12!/(3!x3!x4!)** 3) 12!/(3!x3!x4!x2!) 4) 126 5) None of these

7. In how many ways can a set of chess pieces consisting of a king, a queen, two identical rooks, two identical knights and two identical bishops be placed on the first row of a chessboard?
 1) 8! 2) 88 **3) 5040** 4) 4280 5) None of these

8. A father has 2 apples and 3 pears. Each weekday (Monday through Friday) he gives one of the fruits to his daughter. In how many ways can this be done?
 1) 120 **2) 10** 3) 24 4) 12 5) None of these

9. How many different words can be formed using the letters of the word 'EDUCATION' such that
 - (i) the word always starts with the letter 'D'?
 1) 9! **2) 8!** 3) $2 \times 8!$ 4) $8!/2$ 5) None of these

 - (ii) the word always ends with a vowel?
 1) $5! \times 8!$ 2) $8! \times 3!$ **3) 5 x 8!** 4) $9!$ 5) None of these

 - (iii) the word always begins with the letter 'A' and ends with a consonant?
 1) $7! \times 7! \times 4!$ **3) 4 x 7!** 4) $8! \times 4$ 5) None of these

 - (iv) all the consonants are always together
 1) $6! \times 4$ 2) $6! \times 3$ 2) $8! \times 4!$ **4) 6! x 4!** 5) None of these

 - (v) the letters D, A, O and N are always together
 1) $6! \times 4$ 2) $6! \times 3$ 2) $8! \times 4!$ **4) 6! x 4!** 5) None of these



- (vi) No two consonants are together
 1) $6! \times 6P4$ 2) $6! 3) 5! \times 6P4$ 4) $6! \times 2! 5)$ None of these
- (vii) the letters A and T are never together
 1) $7! \times 8P4$ 2) $7! 3) 2 \times 7! 4) 7! \times 8P2$ 5) None of these

10. In how many ways can the letters of the word PLUMBER such that all the vowels are always together?

- 1) $6! \times 2!$ 2) $7! 3) 5! \times 2! 4) 6! 5)$ None of these



Space for Notes

3.3 Probability

Probability : A mathematically measure of uncertainty is known as probability.

Random Experiment : An experiment in which all possible outcomes are known and exact outcome can be not be predicted, is called a random experiment.

Eg. Rolling an unbiased dice has all six outcomes (1, 2, 3, 4, 5, 6) known but exact outcome can be predicted.

Outcome : The result of a random experiment is called an outcome.

Sample Space : The set of all possible outcomes of a random experiment is known as sample space.

eg . The sample space in throwing of a dice is the set (1, 2, 3, 4, 5, 6)

Trial : The performance of a random experiment is called a trial.

eg. The tossing of a coin is called trial

Event : An event is a set of experimental outcomes, or in other words it is a subset of sample space.

eg. On tossing of a dice, let A denotes the event of even number appers on top A : { 2, 4, 6 }

Mutually Exclusive Events : Two or more events are said to be mutually exclusive if the



occurrence of any one excludes the happening of other in the same experiment.

eg. On tossing of a coin if head occur, then it prevents happening of tail, in the same single experiment.

Exhaustive Events : All possible outcomes of an event are known as exhaustive events.

eg. In a throw of single dice the exhaustive events are six { 1, 2, 3, 4, 5, 6 }

Equally Likely Event : Two or more events are said to be equally likely if the chances of their happening are equal.

eg. In throwing of an unbiased coin, result of Head and Tail is equally likely.

Playing Cards :

(1) Total number of cards are 52.

(2) There are 13 cards of each suit named Diamond, Hearts, Clubs and Spades

(3) Out of which Hearts and diamonds are red cards.

(4) Spades and Clubs are black cards

(5) There are four face cards each in number four Ace, King, Queen and Jack

Black Suit (26)		Red Suit (26)	
Spade (13)	Club (13)	Diamond (13)	Heart (13)

(6) Each Spade, Club, Diamond, Heart has 9 digit cards 2, 3, 4, 5, 6, 7, 8, 9 and 10

(7) There are 4 Honour cards each Spade, Club, Diamond, Heart contains 4 numbers of Honour cards Ace, King, Queen and Jack

Probability of Occurrence of an Event :

If S be the sample space and let E be the event then :

$$\text{If } E \subseteq S, \text{ then } P(E) = \frac{n(E)}{n(S)}$$

(a) $P(S) = 1$

(b) $P(\emptyset) = 0$

(c) $0 \leq P(E) \leq 1$

(d) For any events A and B

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

Ex. In a throw of a coin find the probability of getting a tail.



Solution : In this case sample space, $S = \{ H, T \}$, Event $E = \{ T \}$

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{1}{2}$$

Ex. An unbiased die is tossed. Find the probability of getting a multiple of 2.

Solution : Here Sample space $S = \{ 1, 2, 3, 4, 5, 6 \}$, Event $E = \{ 2, 4, 6 \}$ multiple of 2

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{3}{6} = \frac{1}{2}$$

Ex. An unbiased die is tossed. Find the probability of getting a number less than or equal to 4.

Solution : Here Sample space $S = \{ 1, 2, 3, 4, 5, 6 \}$, Event $E = \{ 1, 2, 3, 4 \}$ number less than or equal to 4.

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{4}{6} = \frac{2}{3}$$

Ex. Two coins are tossed. What is the probability of getting

(a) At most one head ?

Solution : $n(S) = \{ (HH), (HT), (TH), (TT) \} = 4$

$n(E) = \{ HT, TH, TT \} = 3$ at most one head

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{3}{4}$$

(b) At most two heads ?

Solution : $n(S) = \{ (HH), (HT), (TH), (TT) \} = 4$

$n(E) = \{ (HH), (HT), (TH), (TT) \} = 4$

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{4}{4} = 1$$

Ex. What is the chance that a leap year selected randomly will have 53 sundays ?

Solution : A leap year has 366 days, out of which there are 52 weeks and 2 more days.

2 more days can be (Sunday, Monday) (Monday, Tuesday) (Tuesday, Wednesday) (Wednesday, Thursday) (Thursday, Friday) (Friday, Saturday) (Saturday, Sunday) = $n(S) = 7$



So, (Sunday, Monday) and (Saturday, Sunday) = $n(E) = 2$, therefore chances that a leap year selected randomly will have 53 sundays:

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{2}{7}$$

Ex. What is the chance that a normal year selected randomly will have 53 sundays ?

Solution : A normal year has 365 days, out of which there are 52 weeks and 1 more day

So, extra day can be Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday

So, $n(S) = 7$, $n(E) = 1$

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{1}{7}$$

Ex. When two dice are thrown, what is the probability that

(a) Sum of numbers appeared is less than equal to 4

Solution : $E = \{(1,1) (1,2) (1,3) (2,1) (2,2) (3,1)\}$

$n(E) = 6$ and $n(S) = 36$

$$\therefore \text{Required probability} = \frac{n(E)}{n(S)} = \frac{6}{36} = \frac{1}{6}$$

(b) Sum of numbers is a multiple of 4

Solution : $E = \{(1,3) (2,2) (2,6) (3,1) (3,5) (4,4) (5,3) (6,2) (6,6)\}$

$n(E) = 9$, $n(S) = 36$

$$\therefore \text{Required probability} = \frac{n(E)}{n(S)} = \frac{9}{36} = \frac{1}{4}$$

(c) Numbers appeared are equal

Solution : $E = \{(1,1) (2,2) (3,3) (4,4) (5,5) (6,6)\}$

$n(E) = 6$, $n(S) = 36$

$$\therefore \text{Required probability} = \frac{n(E)}{n(S)} = \frac{6}{36} = \frac{1}{6}$$



Ex. A card is drawn at random from a pack of 52 cards, What is the probability that it is

(a) A card of Red Suit ?

Solution : There are 26 cards of Red Suit

$$n(S) = {}^{52}C_1, \quad n(E) = {}^{26}C_1,$$

$$\therefore \text{Required Probability} = \frac{{}^{26}C_1}{{}^{52}C_1} = \frac{26}{52} = \frac{1}{2}$$

(b) An honour card of Black suit ?

Solution : There are 16 honour cards out of which 8 are of Black suit and 8 are of Red Suit. So $n(E) = 8$, $n(S) = 52$

$$\therefore \text{Required Probability} = \frac{{}^8C_1}{{}^{52}C_1} = \frac{8}{52} = \frac{2}{13}$$

(c) A card is drawn and its number is multiple of 2

Solution : $E = 4(2)'s + 4(4)'s + 4(6)'s + 4(8)'s + 4(10)'s$

So, $n(E) = 20$, $n(S) = 52$

$$\therefore \text{Required Probability} = \frac{{}^{20}C_1}{{}^{52}C_1} = \frac{20}{52} = \frac{5}{13}$$

(d) A king or a queen ?

Solution : There are 4 kings and 4 Queens in 52 cards

$$P(\text{a king or a queen}) = \frac{4}{52} + \frac{4}{52} = \frac{1}{13}$$

(e) A king of black suit ?

Solution : There are 2 kings in black suit (King of Spade and King of Club)

$$\therefore \text{Required Probability} = \frac{{}^2C_1}{{}^{52}C_1} = \frac{2}{52} = \frac{1}{26}$$

Ex. A bag contains 4 red, 3 yellow and 5 green balls. 3 balls are drawn randomly. What is the probability that balls drawn contain

(a) Balls of different colors ?

Solution : Total numbers of balls = 12



$$n(S) = {}^{12}C_3 = \frac{12 \times 11 \times 10}{3 \times 2} = 220$$

$$n(E) = {}^4C_1 \times {}^3C_1 \times {}^5C_1 = 4 \times 3 \times 5 = 60$$

$$P(E) = \frac{n(E)}{n(S)} = \frac{60}{220} = \frac{3}{11}$$

(b) Exactly two Red Balls ?

Solution : Here only three balls are to be drawn out of which condition is of Exactly two Red balls,

2 Red balls can be selected in 4C_2 ways

Remaning $12 - 4 = 8$ balls other than red selected in 8C_1 ways

$$P(E) = \frac{n(E)}{n(S)} = \frac{{}^4C_2 \times {}^8C_1}{{}^{12}C_3} = \frac{48}{220} = \frac{12}{55}$$

(c) No Red balls ?

Solution : Now three balls can be selected from 3 Y + 5 G balls

$$P(E) = \frac{n(E)}{n(S)} = \frac{{}^8C_3}{{}^{12}C_3} = \frac{56}{220} = \frac{14}{55}$$

Ex. A bag contains 4 Red balls and 5 Green balls. Two balls are drawn at random. Find the probability that they are of the same colour ?

Solution : Let S be the sample space and E be the event, so

$$\therefore n(S) = {}^9C_2 = 36$$

$n(E) = (\text{Number of ways of drawing 2 balls of Red}) \text{ OR } (\text{Number of ways of drawing 2 balls of Green})$

$$\therefore n(E) = {}^4C_2 + {}^5C_2 = 6 + 10 = 16$$

$$\therefore \text{Required probability} = \frac{n(E)}{n(S)} = \frac{16}{60} = \frac{4}{15}$$

Ex. A three-digit number is formed with the digits 1, 2, 3, 4, 5 at random. What is probability that number formed is

(a) Divisible by 2



Solution : From the given digits 1, 2, 3, 4, 5 numbers formed is :

$$\therefore n(S) = {}^5P_3 = 60$$

For divisibility with 2, even number or 0 should appear at unit place, here 2, 4 are even numbers and can occupy unit place in 2 ! ways, Rest 2 place can be filled in : 4P_2 ways

$$\therefore n(E) = {}^4P_2 \times 2 = 12 \times 2 = 24$$

$$\therefore \text{Required probability} = \frac{n(E)}{n(S)} = \frac{24}{60} = \frac{2}{5}$$

Ex. Not divisible by 2 ?

Solution : $P(\text{Not divisible by 2}) = 1 - P(\text{Divisible by 2})$

$$P(\text{Not divisible by 2}) = 1 - \frac{2}{5} = \frac{3}{5}$$

Ex. Divisible by 5 ?

Solution : A number ends with 5, 0 then the number will be divisible by 5
Here only 5 is present, end place will be fixed by 5 so,

$$n(E) = {}^4P_2 (\text{rest 4 numbers selection}) \times 1, n(S) = {}^5P_3$$

$$\text{Required probability} = \frac{n(E)}{n(S)} = \frac{{}^4P_2}{{}^5P_3} = \frac{1}{5}$$

Ex. The letters of the word CASTIGATION is arranged in different ways randomly. What is the chance that vowels occupy the even places ?

Solution : Vowels are A I A I O,

C A S T I G A T I O N
(O)(E)(O)(E)(O)(E)(O)(E)(O)

So there are 5 even places in which five vowels can be arranged and in rest of 6 places 6 constants can be arranged as follows :

$$n(E) = \frac{{}^5P_5}{2! \times 2! (\text{A, I are 2 times})} \times \frac{{}^6P_6}{2! (\text{T is 2 times})} = 21600$$

$$n(S) = \frac{11!}{2! \times 2! \times 2! (\text{A, I, T are 2 times})} = 4989600$$



$$\text{Required probability} = \frac{21600}{4989600} = 0.043$$

Addition Rule :

(1) If A and B are any two events then the probability of the occurrence of either A or B is given by :

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

(2) If A and B are two mutually exclusive events then the probability of occurrence of either A or B is given by :

$$P(A \cup B) = P(A) + P(B)$$

(3) If A, B and C are any three events then the probability of occurrence of either A or B or C is given by :

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(B \cap C) - P(A \cap C) + P(A \cap B \cap C)$$

(4) If A₁, A₂, A₃A_n are n mutually exclusive and exhaustive events then the probability of occurrence of at least one of them is given by :

$$P(A_1 \cup A_2 \cup A_3 \cup \dots \cup A_n) = P(A_1) + P(A_2) + P(A_3) + \dots + P(A_n)$$

Multiplication rule :

If A and B are two independent events then the probability of occurrence of A and B is given by :

$$P(A \cap B) = P(A)P(B)$$

Conditional Probability :

Conditional probability of occurrence of an event A given that the event B has already occurred is denoted by P (A / B). Here A and B are dependent events.

If A and B are dependent events, then the probability of occurrence of A and B is given by :

$$P(A \cap B) = P(A)P\left(\frac{B}{A}\right) = P(B)P\left(\frac{A}{B}\right)$$

Now we can write as : probability of occurrence of an event A given that the event B has already



occurred

$$P\left(\frac{A}{B}\right) = \frac{P(A \cap B)}{P(B)}$$

Probability of occurrence of an event B given that the event A has already occurred :

$$P\left(\frac{B}{A}\right) = \frac{P(A \cap B)}{P(A)}$$

Ex. A number is selected at random from the numbers 1 to 30. What is the probability that it is divisible by either 3 or 7 ?

Solution : Let A be event of selecting a number divisible by 3. B be the event of selecting a number divisible by 7.

$$n(S) = {}^{30}C_1 = 30$$

$$A = \{ 3, 6, 9, 12, 15, 18, 21, 24, 27, 30 \}, \text{ so } n(A)=10$$

$$B = \{ 7, 14, 21, 28 \}, n(B)= 4$$

$$A \cap B = \{ 21 \}, \quad \text{So } n(A \cap B) = 1$$

Since A and B are not mutually exclusive So :

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A \cup B) = \frac{10}{30} + \frac{4}{30} - \frac{1}{30} = \frac{1}{3}$$

Therefore the probability that a number is divisible by 3 or 7 is 13 / 30

Ex. In the above problem what is the probability that the number selected is divisible by 5 or 13 ?

Solution : Let A be event of selecting a number divisible by 5. B be the event of selecting a number divisible by 13

$$n(S) = {}^{30}C_1 = 30$$

$$A = \{ 5, 10, 15, 20, 25, 30 \}, n(A) = 6$$

$$B = \{ 13, 26 \}, n(B) = 2$$

Here $(A \cap B) = \emptyset$, So A and B are mutually exclusive

$$P(A \cup B) = P(A) + P(B)$$



$$P(A \cup B) = \frac{6}{30} + \frac{2}{30} = \frac{4}{15}$$

So, probability that a number is divisible by 5 or 13 is 4 / 15

Ex. The odds favouring the event of a person hitting a target are 3 to 5. The odds against the event of another person hitting the target are 3 to 2. If each of them fire once at the target, find the probability that both of them hit the target.

Solution : Let A be the event of first person hitting the target,

$$P(A) = \frac{3}{3+5} = \frac{3}{8} \text{ (odds in favour)}$$

Let B be the event of Second person hitting a target.

$$P(B) = \frac{2}{3+2} = \frac{2}{5} \text{ (odds against)}$$

Since both events are independent and both will hit the target so,

$$P(A \cap B) = P(A)P(B) = \frac{3}{8} \times \frac{2}{5} = \frac{3}{20}$$

Ex. In the above example find the probability that at least one one of them hit the target.

Solution : For At least one one of them hit the target.

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A \cup B) = \frac{3}{8} + \frac{2}{5} - \frac{3}{20} = \frac{15+16-6}{40} = \frac{5}{8}$$

Ex. The probabilities that drivers A, B and C will drive home safely after consuming liquor are 2 / 5 , 3 / 7 and 3 / 4, respectively. What is the probability that they will drive home safely after consuming liquor ?

Solution : Let A be the event of driver A drive safely after consuming liquor.

Let B be the event of driver B drive safely after consuming liquor.

Let C be the event of driver C drive safely after consuming liquor.

$$P(A) = \frac{2}{5}, \quad P(B) = \frac{3}{7}, \quad P(C) = \frac{3}{4}$$

The events A, B and C are independent . Therefore,



$$P(A \cap B \cap C) = P(A)P(B)P(C) = \frac{2}{5} \times \frac{3}{7} \times \frac{3}{4} = \frac{9}{70}$$

Therefore, The probability that all the drivers will drive home safely after consuming liquor is 9 / 10

Ex. The probabilities that A and B will tell the truth are 2 / 3 and 4 / 5 respectively . What is the probability that they agree with each other ?

Solution : Let A be the event of A will tell truth. B be the event of B tell truth

$$P(A) = \frac{2}{3}, \quad P(A^c) = 1 - P(A) = \frac{1}{3}$$

$$P(B) = \frac{4}{5}, \quad P(B^c) = 1 - P(B) = \frac{1}{5}$$

When both agree then they say true or they say false together, that is

$$A \cap B \text{ or } A^c \cap B^c$$

Also these events will be mutually exclusive :

$$P(A \cap B) + P(A^c \cap B^c) = P(A)P(B)P(C) = \frac{2}{3} \times \frac{4}{5} + \frac{1}{3} \times \frac{1}{5} = \frac{3}{5}$$

Ex. In the above problem find out the probability that both contradict each other ?

Solution : They will contradict if A tells truth and B tells lies or B tells truth and A tells lies, So

$$(A \cap B^c) \text{ or } (A^c \cap B)$$

Since these events are mutually exclusively

$$P(A \cap B^c) + P(A^c \cap B) = P(A) \times P(B^c) + P(A^c) \times P(B)$$

$$\therefore \text{Required probability} = \frac{2}{3} \times \frac{1}{5} + \frac{1}{3} \times \frac{4}{5} = \frac{2}{5}$$



Exercise



1.A bag contains 4 white, 5 red and 6 blue balls. Three balls are drawn at random from the bag. The probability that all of them are red, is:

- Option 1 : 1/22 Option 2 : 3/22 **Option 3 : 2/91** Option 4 : 2/77

2.A box contains 20 electric bulbs, out of which 4 are defective. Two bulbs are chosen at random from this box. The probability that at least one of these is defective, is:

- Option 1 : 4/19 **Option 2 : 7/19** Option 3 : 12/19 Option 4 : 21/95

3.In a class, 30% of the students offered English, 20% offered Hindi and 10% offered both. If a student is selected at random, what is the probability that he has offered English or Hindi ?

- Option 1 : 2/5** Option 2 : 3/4 Option 3 : 3/5 Option 4 : 3/10

4.A box contains 6 red balls, 7 green balls and 5 blue balls. Each ball is of a different size. The probability that the red ball being selected is the smallest red ball, is

- Option 1 : 1/18 Option 2 : 1/3 **Option 3 : 1/6** Option 4 : 2/3

5.If A and B are 2 independent events and $P(A)=0.5$ and $P(B) = 0.4$, find $P(A \cap B)$:

- Option 1 : 0.5** Option 2 : 0.4 Option 3 : 0.88 Option 4 : None of these

6.A 5-digit number is formed by the digits 1,2,3,4 and 5 without repetition. What is the probability that the number formed is a multiple of 4?

- Option 1 : 1/4 **Option 2 : 1/5** Option 3 : 2/5 Option 4 : 1/120
Option 5 : 4

7.In a single throw of dice, what is the probability to get a number greater or equal to 4?

- Option 1 : 1/3 Option 2 : 2/3 **Option 3 : 1/2** Option 4 : None of these

8.A bag contains 5 oranges, 4 bananas and 3 apples. Rohit wants to eat a banana or an apple. He draws a fruit from the bag randomly. What is the probability that he will get a fruit of his choice?

- Option 1 : 3.5/12 **Option 2 : 7/12** Option 3 : 5/12 Option 4 : None of these

9.There are two boxes A and B. Box A has three red and four blue balls. Box B has five red and two blue balls. Anya draws a ball from each bag randomly. What is the probability that both balls are red?

- Option 1 : 4/7 Option 2 : 8/49 Option 3 : 7/8 **Option 4 : 15/49**

10.Ravi has a bag full of 10 Nestle and 5 Cadbury chocolates. He draws two chocolates. What is the probability that he got at least one Nestle chocolate?

- Option 1 : 2/3 Option 2 : 3/7 Option 3 : 2/21 **Option 4 : None of these-**



11.The probability of having at least one tail in 5 throws of a coin is

- Option 1 : 1/32 **Option 2 : 31/32** Option 3 : 1/5 Option 4 : None of these

12.A bag contains 5 yellow and 4 brown pencils. If two pencils are drawn, what is the probability that the pencils are of the same colour?

- Option 1 : 5/108 Option 2 : 1/6 Option 3 : 5/18 **Option 4 : 4/9**

13.A single letter is drawn at random from the word, "ASPIRATION", the probability that it is a vowel is?

- Option 1 : 1/2** Option 2 : 1/3 Option 3 : 3/5 Option 4 : 2/5

14.The probability that a man can hit a target is 3/4. He tries 5 times. The probability that he will hit the target at least three times is:

- Option 1 : 291/364 Option 2 : 371/464 Option 3 : 471/502 **Option 4 : 459/512**

15.An unbiased dice is rolled 3 times. The probability that the value on the dice is not more than 4 in any of the 3 rolls is:

- Option 1 : 8/27** Option 2 : 1/27 Option 3 : 26/27 Option 4 : 2/3

16.Probability of occurrence of event A is 0.5 and that of event B is 0.2. The probability of occurrence of both A and B is 0.1. What is the probability that none of A and B occur?

- Option 1 : 0.3 **Option 2 : 0.4** Option 3 : 0.7 Option 4 : None of these

17.An unbiased coin is tossed 5 times. If tail appears on first four tosses, then probability of tail appearing on the fifth toss is:

- Option 1 : 1/2** Option 2 : 1 Option 3 : 0 Option 4 : 4/5

18.X and Y are two independent events. The probability that X and Y occur is 1/12, and the probability that neither occur is 1/2, the probability of occurrence of X can be:

- Option 1 : 1/3** Option 2 : 1/5 Option 3 : 1/2 Option 4 : 1/10

19.An unbiased coin is tossed n times. If the probability of getting 4 tails equals the probability of getting 7 tails, then the probability of getting two tails is:

- Option 1 : 55/2048** Option 2 : 3/4096 Option 3 : 1/1024 Option 4 : None of these

20.Sudhanshu and Pankaj stand in a circle with 10 other persons. If the arrangement of the person is at random, then the probability that there are exactly 3 persons between Sudhanshu and Pankaj is?

- Option 1 : 9/11 **Option 2 : 2/11** Option 3 : 1/11 Option 4 : None of these



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List of Content

- Deductive Reasoning
 - Coding deductive logic
 - Directional sense, Blood relations
 - Selection decision tables
 - Puzzles
- Inductive reasoning
 - Coding pattern and Number series pattern recognition
 - Analogy and Classification pattern recognition
- Abductive Reasoning
 - Logical word sequence
 - Data sufficiency

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4. Deductive Reasoning

Logical Deduction:

The phenomenon of deriving a conclusion from a single proposition or a set of given propositions, is known as **logical deduction**. The given propositions are also referred to as the**premises**.

Two Inferential Processes of Deduction :

I. Immediate Deductive Inference :

Here, conclusion is deduced from one of the given propositions, by any of the three ways -conversion, obversion and contraposition.

1. Conversion: The Conversion proceeds with interchanging the subject term and the predicate term i.e. the subject term of the premise becomes the predicate term of the conclusion and the predicate term of the premise becomes the subject of the conclusion. The given proposition is called convertend, whereas the conclusion drawn from it is called its converse.

Table of Valid Conversions

Convertend	Converse
A: All S is P Ex. All pins are tops.	I: Some P is S Some tops are pins.
E: No S is P. Ex. No fish is whale.	E: No P is S. No whale is fish.
I: Some S is P. Ex. Some boys are poets.	I: Some P is S. Some poets are boys.
O: Some S is not P.	No valid conversion

Note that in a conversion, the quality remains the same and the quantity may change.

2. Obversion: In obversion, we change the quality of the proposition and replace the predicate term by its complement.

Table of Valid Obversions

Obvertend	Obverse
A: All birds are mammals.	E: No birds are non-mammals.



E: No poets are singers.	A: All poets are non-singers.
I: Some nurses are doctors.	O: Some nurses are not non-doctors.
O: some politicians are not statesmen.	I: Some politicians are non-statesmen.

3. Contraposition: To obtain the contrapositive of a statement, we first replace the subject and predicate terms in the proposition and then exchange both these terms with their complements.

Table of Valid Contrapositions

Proposition	Contrapositive
A: All birds are mammals.	A: All non-mammals are non-birds.
I: Some birds are mammals.	I: Some non-mammals are non-birds.

Note: The valid converse, obverse or contrapositive of a given proposition always logically follows from the proposition.

II. Mediate Deductive Inference (SYLLOGISM): First introduced by Aristotle, a Syllogism is a deductive argument in which conclusion has to be drawn from two propositions referred to as the premises.

Example:

1. All lotus are flowers.
2. All flowers are beautiful.
3. All lotus are beautiful.

Clearly, the propositions 1 and 2 are the premises and the proposition 3, which follows from the first two propositions, is called the conclusion.

Term : In Logic, a **term** is a word or a combination of words, which by itself can be used as a subject or predicate of a proposition.

Syllogism is concerned with three terms :

1. Major Term : It is the predicate of the conclusion and is denoted by P (first letter of 'Predicate').

2. Minor Term: It is the subject of the conclusion and is denoted by S (first letter of 'Subject').



3. Middle Term: It is the term common to both the premises and is denoted by M (first letter of 'Middle').

Example:

Premises:

1. All dogs are animals.
2. All tigers are dogs.

Conclusion :

All tigers are animals.

Here 'animals' is the predicate of the conclusion and so,,it is the major term. P.

'Tigers' is the subject of the conclusion and so, it is the minor term, S.

'Dogs' is the term common to both the premises and so, it is the middle term, M.

Major And Minor Premises : Of the two premises, the major premise is that in which the middle term is the subject and the minor premise is that in which the middle term is the predicate.

RULES FOR DERIVING CONCLUSION FROM TWO GIVEN PREMISES:

1. The conclusion does not contain the middle term.

Example.

Statements :

1. All men are girls.
2. Some girls are students.

Conclusions :

1. All girls are men.
2. Some girls are not students.

Since both the conclusions 1 and 2 contain the middle term 'girls', so neither of them can follow.

2. No term can be distributed in the conclusion unless it is distributed in the premises.



Example.

Statements :

1. Some dogs are goats.
2. All goats are cows.

Conclusions :

1. All cows are goats.
2. Some dogs are cows.

Statement 1 is an I-type proposition which distributes neither the subject nor the predicate.

Statement 2 is an A type proposition which distributes the subject i.e. 'goats' only.

Conclusion 1 is an A-type proposition which distributes the subject 'cow' only Since the term 'cows' is distributed in conclusion 1 without being distributed in the premises, so conclusion 1 cannot follow.



3. The middle term (M) should be distributed at least once in the premises. Otherwise, the conclusion cannot follow.

For the middle term to be distributed in a premise.

- (i) M must be the subject if premise is an A proposition.
- (ii) M must be subject or predicate if premise is an E proposition.
- (iii) M must be predicate if premise is an O proposition.

Note that in an I proposition, which distributes neither the subject nor the predicate, the middle term cannot be distributed.

Example.

Statements :

1. All fans are watches.
2. Some watches are black.

Conclusions :

1. All watches are fans.



2. Some fans are black.

In the premises, the middle term is 'watches'. Clearly, it is not distributed in the first premise which is an A proposition as it does not form its subject. Also, it is not distributed in the second premise which is an I proposition. Since the middle term is not distributed even once in the premises, so no conclusion follows.

4. No conclusion follows

(a) if both the premises are particular

Example.

Statements :

1. Some books are pens.
2. Some pens are erasers.

Conclusions:

1. All books are erasers.
2. Some erasers are books.

Since both the premises are particular, so no definite conclusion follows.

(b) if both the premises are negative.

Example.

Statements :

1. No flower is mango.
2. No mango is cherry.

Conclusions :

1. No flower is cherry.
2. Some cherries are mangoes. Since both the premises are negative, neither conclusion follows.

(c) if the major premise is particular and the minor premise is negative.

Example.

**Statements:**

1. Some dogs are bulls.
2. No tigers are dogs.

Conclusions:

1. No dogs are tigers.
2. Some bulls are tigers.

Here, the first premise containing the middle term 'dogs' as the subject is the major premise and the second premise containing the middle term 'dogs' as the predicate is the minor premise. Since the major premise is particular and the minor premise is negative, so no conclusion follows.

**5. If the middle term is distributed twice, the conclusion cannot be universal.****Example.****Statements :**

1. All fans are chairs.
2. No tables are fans.

Conclusions:

1. No tables are chairs.
2. Some tables are chairs.

Here, the first premise is an A proposition and so, the middle term 'fans' forming the subject is distributed. The second premise is an E proposition and so, the middle term 'fans' forming the predicate is distributed. Since the middle term is distributed twice, so the conclusion cannot be universal.

6. If one premise is negative, the conclusion must be negative.**Example.****Statements:**

1. All grasses are trees.



2. No tree is shrub.

Conclusions:

1. No grasses are shrubs.
2. Some shrubs are grasses.

Since one premise is negative, the conclusion must be negative. So, conclusion 2 cannot follow.



7. If one premise is particular, the conclusion must be particular.

Example.

Statements:

1. Some boys are thieves.
2. All thieves are dacoits.

Conclusions :

1. Some boys are dacoits.
2. All dacoits are boys.

Since one premise is particular, the conclusion must be particular. So, conclusion 2 cannot follow.



8. If both the premises are affirmative, the conclusion must be affirmative.

Example.

Statements :

1. All women are mothers.
2. All mothers are sisters.

Conclusions :

1. All women are sisters.
2. Some women are not sisters.



Since both the premises are affirmative, the conclusion must be affirmative. So, conclusion 2 cannot follow.

9. If both the premises are universal, the conclusion must be universal.

Complementary pair:

A pair of contradictory statements i.e. a pair of statements such that if one is true, the other is false and when no definite conclusion can be drawn, either of them is bound to follow, is called a complementary pair. E and I-type propositions together form a complementary pair and usually either of them follows, in a case where we cannot arrive at a definite conclusion, using the rules of syllogism.

Let us study the various possible cases and draw all possible inferences in each case, along with verification through Venn diagrams.

Case 1: All men are boys. All boys are students.

Immediate Deductive Inferences:

The converse of first premise i.e. 'Some boys are men' and the converse of second premise i.e. 'Some students are boys' both hold.

Mediate Deductive Inferences:

Since both the premises are universal and affirmative, the conclusion must be universal affirmative. Also, the conclusion should not contain the middle term. So, it follows that 'All men are students'. The converse of this conclusion i.e. 'Some students are men' also holds.

Venn diagram	Inferences
	<ol style="list-style-type: none"> 1. Some boys are men. 2. Some students are boys. 3. All men are students. 4. Some students are men.

Case 2: All birds are animals. All fishes are animals.

Immediate Deductive Inferences:

The converse of first premise i.e. 'Some animals are birds' and the converse of second premise i.e. 'Some animals are fishes' both hold.

Mediate Deductive Inferences:



Both, being A-type propositions, distribute subject only. Thus, the middle term 'animals' is not distributed even once in the premises. So, no definite conclusion follows.

Venn diagram	Inferences
	<ol style="list-style-type: none"> 1. Some animals are birds. 2. Some animals are fishes. 3. Either 'No bird is fish' or 'Some birds are fishes' as E and I-type propositions form a complementary pair

Case 3: All puppets are dolls. Some dolls are rattles.

Immediate Deductive Inferences:

The converse of the first premise i.e. 'Some dolls are puppets' and the converse of the second premise i.e. 'Some rattles are dolls', both hold.

Mediate Deductive Inferences:

First premise, being an A-type proposition, distributes the subject only while the second premise, being an I-type proposition, distributes neither subject nor predicate. Since the middle term 'dolls' is not distributed even once in the premises, so no definite conclusion can be drawn.

Venn diagram	Inferences
	<ol style="list-style-type: none"> 1. Some dolls are puppets. 2. Some rattles are dolls. 3. Either 'No puppet is rattle' or 'Some puppets are rattles' as E and I-type propositions form a complementary type.



Case 4: Some writers are players. All players are musicians.

Immediate Deductive Inferences :

The converse of the first premise i.e. 'Some players are writers' and the converse of the second premise i.e. 'Some musicians are players', both hold.

Mediate Deductive Inferences:

Since one premise is particular, the conclusion must be particular and should not contain the middle term. So, it follows that 'Some writers are musicians'. The converse of this conclusion i.e. 'Some musicians are writers' also holds.

Venn diagram	Inferences
<p>Musicians</p> <p>Writers</p> <p>Players</p>	<ol style="list-style-type: none"> 1. Some players are writers. 2. Some musicians are players. 3. Some writers are musicians. 4. Some musicians are writers.

Case 5: All boxes are toys. Some boxes are clips.

Immediate Deductive Inferences :

The converse of the first premise i.e. 'Some toys are boxes' and the converse of the second premise i.e. 'Some clips are boxes', both hold.

Mediate Deductive Inferences:

Since one premise is particular, the conclusion must be particular and should not contain the middle term. So, it follows that 'Some toys are clips'. The converse of this conclusion i.e. 'Some clips are toys' also holds.

Venn diagram	Inferences
<p>Toys</p> <p>Boxes</p> <p>clips</p>	<ol style="list-style-type: none"> 1. Some toys are boxes. 2. Some clips are boxes. 3. Some toys are clips. 4. Some clips are toys.

Case 6: All buses are vans. Some cycles are vans.

Immediate Deductive Inferences:

The converse of the first premise i.e. 'Some vans are buses' and the converse of the second premise i.e. 'Some vans are cycles', both hold.



Mediate Deductive Inferences:

First premise, being an A-type proposition, distributes subject only and the second premise, being an I-type proposition, distributes neither subject nor predicate. So, the middle term 'vans' is not distributed even once in the premises. Hence, no definite conclusion can be drawn.

Venn diagram	Inferences
 or 	<p>1. Some vans are buses. 2. Some vans are cycles. 3. Either 'No bus is cycle' or 'Some buses are cycles' follows.</p>

Case 7: Some radios are cameras. Some cameras are statues.

Immediate Deductive Inferences:

The converse of the first premise i.e. 'Some cameras are radios' and the converse of the second premise i.e. 'Some statues are cameras', both hold.

Mediate Deductive Inferences :

Since both premises are particular, no definite conclusion follows.



Venn diagram	Inferences
 or 	<ol style="list-style-type: none"> 1. Some cameras are radios. 2. Some statues are cameras. 3. Either 'Some radios are statues' or 'No radio is statue' follows; as I and E-type propositions form a complementary pair.

Case 8: All cakes are candies. No candy is pastry.

Immediate Deductive Inferences:

The converse of the first premise i.e. 'Some candies are cakes' and the converse of the second premise i.e. 'No pastry is candy', both hold.

Mediate Deductive Inferences:

Since both premises are universal, the conclusion must be universal. Since one premise is negative, the conclusion must be negative. So, it follows that 'No cake is pastry'. The converse of this conclusion i.e. 'No pastry is cake' also holds.

Venn diagram	Inferences
	<ol style="list-style-type: none"> 1. Some candies are cakes. 2. No pastry is candy. 3. No cakes is pastry. 4. No pastry is cake.

Case 9: No coin is ring. All rings are bangles.

Immediate Deductive Inferences :

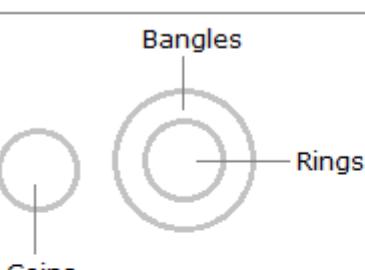
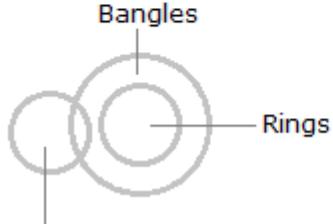
The converse of the first premise i.e. 'No ring is coin' and the converse of the second premise i.e.'Some bangles are rings', both hold.

Mediate Deductive Inferences:



First premise, being an E-type proposition, distributes both the subject and the predicate.

Second premise, being an A-type proposition, distributes the subject. Thus, the middle term 'ring' is distributed twice in the premises. So, the conclusion cannot be universal. Also, since one premise is negative, the conclusion must be negative. Thus, the conclusion must be particular negative i.e. O-type. So, it follows that 'some bangles are not coins'.

Venn diagram	Inferences
 or 	<ol style="list-style-type: none"> 1. No ring is coin. 2. Some bangles are rings. 3. Some bangles are not coins. 4. Either 'Some coins are bangles' or 'No coin is bangle' follows as E and I-type proposition form a complementary pair.

Case 10: Some lamps are candles. No candle is bulb.

Immediate Deductive Inferences :

The converse of the first premise i.e. 'Some candles are lamps' and the converse of the second premise i.e. 'No bulb is candle', both hold.

Mediate Deductive Inferences:

Since one premise is particular and the other negative, the conclusion must be particular negative i.e. O-type, So, it follows that 'Some lamps are not bulbs'.



Venn diagram	Inferences
 or 	<ol style="list-style-type: none"> 1. Some candles are lamps. 2. No bulb is candle. 3. Some lamps are not bulbs. 4. Either 'Some lamps are bulbs' or 'No lamp is a bulb' follows E and I-type propositions form a complementary pair

Important Points To Remember:

While deriving logical conclusions, always remember that the following conclusions hold :

1. The converse of each of the given premises;
2. The conclusion that directly follows from the given premises in accordance with the rules of syllogism;
3. The converse of the derived conclusions.



Exercise

Ques 1 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements

P: All good athletes want to win.

Q: All good athletes eat well.

Conclusions

I. All those who eat well are good athletes.

II. All those who want to win, eat well.

Option 1 : Option 2 : Option 3 : Neither I Option 4 : Both I and

Only Only nor II follows II follow.

conclusion I conclusion II
follows. follows.



Ques 2 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements

P: Some mobiles are cameras.

Q: Some cameras are calculators.

Conclusions

I. All calculators are mobiles.

II. All cameras are mobiles.

Option 1 : Only conclusion I follows.	Option 2 : Only conclusion II follows.	Option 3 : Neither I nor II follows.	Option 4 : Both I and II follow.
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Ques 3 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements

P: Some children are adults.

Q: Some adults are not old

Conclusions

I. Some children are not old.

II. Some children are old.

Option 1 : Only conclusion I follows.	Option 2 : Only conclusion II follows.	Option 3 : Neither I nor II follows.	Option 4 : Both I and II follows.
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Ques 4 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements

P: Some bags are hot.

Q: All hots are cakes.

Conclusions

I. All cakes are bags.

II. Some bags are cakes.

Option 1 : Only conclusion I follows.	Option 2 : Only conclusion II follows.	Option 3 : Neither I nor II follows.	Option 4 : Both I and II follow.
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Ques 5 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements

P: All doctors are surgeons.

Q: Some chemists are doctors

Conclusions

I. Some chemists are surgeons.

II. All surgeons are chemists.

<u>Option 1 :</u>	Option 2 :	Option 3 : neither I	Option 4 : both I and II follow.
<u>only</u>	<u>only</u>	<u>nor II follows</u>	
<u>conclusion I</u>	<u>conclusion II</u>		
<u>follows.</u>	<u>follows.</u>		

Ques 6 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements

(a) No vest is shirt.

(b) All shirts are jackets.

Conclusions

I. All vests are jackets.

II. No vest is a jacket.

III. Some jackets are shirts.

IV. All jackets are shirts.

<u>Option 1 :</u>	Option 2 :	<u>Option 3 : Only III</u>	Option 4 : Only III	Option 5 :
<u>Only I follows</u>	<u>Only II</u>	<u>follows</u>	<u>and IV follow.</u>	<u>None follows.</u>

Ques 7 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements

(a) Some officers are honest.

(b) Reddy is an officer.

Conclusions

I. Some officers are dishonest.

II. Reddy is honest.

III. Reddy is dishonest.

IV. Officer are usually honest.

<u>Option 1 :</u>	Option 2 :	Option 3 : Only II	Option 4 : None	Option 5 : All
<u>Only I follows</u>	<u>Only I and II</u>	<u>follows</u>	<u>follows</u>	<u>follow</u>



Ques 8 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements

- (a) All parks are roads
- (b) Some roads are mall.

Conclusions

- I. All malls are roads.
- II. All malls are parks.
- III. Some parks are malls.
- IV. No park is a mall.

Option 1 : Only I follows	Option 2 : Only II follows	Option 3 : Only III follows	Option 4 : Either I or IV follows	Option 5 : None follows.
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Ques 9 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements

- (a) No beach is island.
- (b) All islands are reefs.

Conclusions

- I. All beaches are reefs.
- II. No beach is a reef.
- III. Some reefs are islands.
- IV. All reefs are islands.

Option 1 : Only I follows	Option 2 : Only II follows	Option 3 : Either I or II follows	Option 4 : Only III and IV follow.	Option 5 : Neither I, II nor IV follows.
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Ques 10 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements

- (a) All shares are debentures.
- (b) No debenture is an equity.

Conclusions

- I. No equity is a share.
- II. Some debentures are shares.
- III. No share is an equity.

Option 1 : Only I follows	Option 2 : Only II follows	Option 3 : All follow	Option 4 : Only III follows.
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Ques 11 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements

- (a) All cities are towns.
- (b) Some cities are villages.

Conclusions

- I. All villages are towns.
- II. No village is a town.
- III. Some villages are towns.

<u>Option 1 :</u>	<u>Option 2 :</u>	<u>Option 3 : Only II follows</u>	<u>Option 4 : None of these follows</u>
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Ques 12 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements

Some ship are boats. All boats are submarines. Some submarines are yatches.

Conclusions

- I. Some yatches are boats.
- II. Some submarines are boats.
- III. Some submarines are ships.
- IV. Some yatches are ships.

<u>Option 1 : All follow</u>	<u>Option 2 : Only II and III follows</u>	<u>Option 3 : Only III follows</u>	<u>Option 4 : Only either III or IV follows.</u>	<u>Option 5 : None of these</u>
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Ques 13 : Given signs signify something and on that basis, assume the given statements to be true and find which of the two conclusions I and II is/are definitely true.

P + Q means P is greater than Q

P * Q means P is greater than or equal than Q

P = Q means P is equal to Q

P / Q means P is less than Q

P - Q means P is less than or equal to Q

Statements

X/Y, W * Z, Z + Y

Conclusions

- I. W + Y
- II. X/Z

<u>Option 1 : Only</u>	<u>Option 2 : Only</u>	<u>Option 3 : Neither conclusion I nor II is true</u>	<u>Option 4 : Both conclusion I and II are true</u>
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conclusion I is conclusion II
true is true

Ques 14 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

Some marbles are pens.

Some pens are dogs.

Some dogs are doors.

Conclusions:

I. Some doors are pens.

II. Some dogs are marbles.

III. Some marbles are doors.

Option 1 : All follow.	Option 2 : Only II follows.	Option 3 : Only I follows.	Option 4 : Only III follows.	Option 5 : <u>None follows</u>
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Ques 15 : In the question the symbols @, #, %, \$ and H are used with the following meaning :

'P \$ Q' means 'P is smaller than Q'

'P @ Q' means P is neither greater than nor equal to Q'

'P H Q' means 'P is neither smaller than nor equal to Q'

'P % Q' means 'P is not greater than Q'

'P # Q' means 'P is neither greater than nor smaller than Q'

Now assume the given statements to be true and find which out of the two conclusions I and II is/are definitely true.

Statements:

J % N, K @ N, T \$ K

Conclusions:

I. T H J

II. J @ K

Option 1 : Only conclusion I is true	Option 2 : Only conclusion II is true	Option 3 : Either conclusion I or II is true	Option 4 : <u>Neither conclusion I nor II is true</u>	Option 5 : Both conclusions I and II are true
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Ques 16 : In the question certain symbols are used with the following meaning:

'P @ Q' means 'P is not greater than Q'.

"P # Q means 'P is neither smaller than nor equal to Q'

"P % Q' means 'P is not smaller than Q'

'P \$ Q' means "P is neither greater than nor equal to Q"

'P^Q' means 'P is neither greater than nor smaller than Q'



Now assume the given statements to be true and find which out of the two conclusions I and II is/are definitely true.

Statements:

I % R, C ^ I, C % E

Conclusions:

I. C % R

II. R @ E

<u>Option 1 :</u>	Option 2 :	Option 3 : Either conclusion I or II is true	Option 4 : Neither conclusion I nor II is true	Option 5 : Both conclusions I and II are true
<u>Only true</u>	<u>Only is true</u>			

Ques 17 : In the question the symbols @, % , \$, # and * are used with the following meaning:

'P \$ Q' means 'P is neither smaller than nor equal to Q'.

'P @ Q' means 'P is not greater than Q'

'P * Q' means 'P is neither greater than nor smaller than Q'

'P % Q' means "P is neither greater than nor equal to Q'

'P # Q' means 'P is not smaller than Q'.

Now assuming the given statements to be true, find which of the conclusions I, II, III and IV is/are definitely true.

Statements:

J \$ M, N @ R, R % M

Conclusions:

I. N % J

II. N % M

III. J \$ R

IV. N * R

<u>Option 1 :</u>	Option 2 :	Option 3 : Only II and III are true	Option 4 : Only II and IV are true	Option 5 : None of these
<u>Only I, II, and III are true</u>	<u>Only I and II are true</u>			

Ques 18 : In the question symbols *, @, %, \$ and # are used with the following meaning :

'P \$ Q' means 'P is not greater than Q'

'P * Q' means 'P is neither smaller than nor greater than Q'

'P # Q' means "P is neither greater than nor equal to Q'

'P % Q' means 'P is not smaller than Q'.

'P @ Q' means 'P is neither smaller than nor equal to Q'.

Now assuming the statements to be true, find which of the two conclusions I and II is/are definitely true.

Statements:

W @ M, J # M, M * Y

Conclusions:

**I. Y * W****II. Y @ J**

Option 1 :	<u>Option 2 :</u>	Option 3 : Either conclusion I or II is true	Option 4 : Neither conclusion I nor II is true	Option 5 : Both conclusions I and II are true
Only conclusion I is true	<u>Only conclusion II is true</u>			

Ques 19 : In the question symbols *, @, %, \$ and # are used with the following meaning :

'P \$ Q' means 'P is not greater than Q'

'P * Q' means 'P is neither smaller than nor greater than Q'

'P # Q' means "P is neither greater than nor equal to Q"

'P % Q' means 'P is not smaller than Q'.

'P @ Q' means 'P is neither smaller than nor equal to Q'.

Now assuming the statements to be true, find which of the two conclusions I and II is/are definitely true.

Statements

D % H, K * H, H \$ R

Conclusions

I. K \$ R

II. D % K

Option 1 :	<u>Option 2 :</u>	Option 3 : Either conclusion I or II is true	Option 4 : Neither conclusion I nor II is true	Option 5 : Both conclusions I and II are true
Only conclusion I is true	<u>Only conclusion II is true</u>			

Ques 20 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

Some rabbits are deers.

No deer is a lion.

All elephants are lions.

Conclusions:

I. No rabbit is lion.

II. No elephant is deer.

III. Some elephants are rabbits.

Option 1 : All follow	<u>Option 2 :</u> <u>Only II follows</u>	Option 3 : Either I or II follow	Option 4 : Only II and III follows	Option 5 : None of these
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Ques 21 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

All files are folders.

All folders are boxes.

All boxes are drawers.

Conclusions:

I. All folders are drawers.

II. All boxes are files.

III. All files are drawers.

IV. All drawers are folders.

Option 1 : <u>Option 2 :</u>	Option 3 : Only II and Option 4 : All follows	Option 5 : None of these
Only I and II follow.	<u>Only I and III follow.</u>	

Ques 22 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

All ducks are pigeons.

All pigeons are crows.

Conclusions:

I. Some crows are ducks.

II. Some crows are pigeons.

Option 1 : Only conclusion I follows.	Option 2 : Only conclusion II follows.	Option 3 : Either I or II follows.	Option 4 : Neither I nor II follows.	Option 5 : Both I and II follow.
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Ques 23 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

Some metals are minerals.

All minerals are solids.

Conclusions:

I. All solids are made up of metals and minerals.

II. Some minerals are metals.

Option 1 : Only conclusion I follows.	Option 2 : Only conclusion II follows.	Option 3 : Either I or II follows.	Option 4 : Neither I nor II follows.	Option 5 : Both I and II follow.
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Ques 24 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

Some boys are trees. Some trees are jungles.

Some jungles are fruits.

Conclusions:

I. Some fruits are trees.

II. Some trees are boys.

III. Some jungles are boys.

Option 1 : None follows	Option 2 : Only I follows	Option 3 : Only III follows	<u>Option 4 : Only II follows</u>	Option 5 : All follow
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Ques 25 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

Some pens are books. All schools are books.

Some colleges are schools.

Conclusions:

I. Some colleges are pens.

II. Some pens are schools.

III. Some colleges are books.

Option 1 : All follows	Option 2 : Only I and II follows	Option 3 : Only II and III follow	Option 4 : Only I and III follows	<u>Option 5 : None of these</u>
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Ques 26 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

Some buses are houses. All houses are taxis.

All rickshaws are taxis.

Conclusions:

I. Some rickshaws are houses.

II. Some taxis are houses.

III. Some taxis are buses.

Option 1 : None follows	Option 2 : Only I follows	Option 3 : Only II follows	<u>Option 4 : Only II and III follow</u>	Option 5 : All follow
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Ques 27 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

All oceans are rivers. Some springs are rivers.



All wells are springs.

Conclusions:

- I. Some springs are oceans.
- II. Some wells are rivers.
- III. Some rivers are oceans.
- IV. No well is river.

Option 1 :	Option 2 :	Option 3 : Only either	Option 4 : None	Option 5 : All
<u>Only either II</u>	<u>Only either II</u>	I or III and IV follow.	follows	follow
<u>or IV and III</u>	<u>or IV and I</u>			
<u>follow.</u>	<u>follow.</u>			

Ques 28 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

Some disciplines are preachers. All preachers are saints. Some saints are not disciples.

Conclusions:

- I. Some saints are disciples.
- II. All disciples are saints.
- III. All preachers are disciples.
- IV. No Saint is disciples.

Option 1 : No	Option 2 :	Option 3 : Only I and	Option 4 : Only II	Option 5 : All
follows	<u>Only I follows</u>	III follow	and III follow	follow

Ques 29 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

Some buses are rivers.

All rivers are mountains.

Some roads are mountains.

Conclusions:

- I. Some mountains are buses.
- II. Some roads are buses.
- III. Some roads are rivers.
- IV. Some mountains are roads.

Option 1 : All	Option 2 :	Option 3 : Only III	Option 4 : Only I and	Option 5 :
follow	Only II, III	and IV follows	IV follows	None of
		and IV follow		these

Ques 30 : In the question, the symbols @, &, *, \$ and # are used with the following meaning:

A # B means A is not greater than B.

A \$ B means A is neither smaller nor equal to B.



A ? B means A is neither smaller nor greater than B

A * B means A is neither greater nor equal to B.

A @ B means A is not smaller than B.

Now assume the given statements to be true and find which out of the two conclusions I and II is/are definitely true.

Statements:

K # T, D \$ F, T * F

Conclusions:

I. K * D

II. D \$ T

Option 1 :	Option 2 :	Option 3 : Either conclusion I or II is true	Option 4 : Neither conclusion I nor II is true	Option 5 : Both conclusions I and II are true
Only conclusion I is true	Only conclusion II is true			

Ques 31 : In the question certain symbols are used with the following meaning:

'P ^ Q' means 'P is greater than Q'.

"P * Q means 'P is equal to Q'

"P # Q' means 'P is either smaller than or equal to Q'

'P \$ Q' means 'P is not smaller than Q'

'P @ Q' means 'P is either greater than or equal to Q'

Now assume the given statements to be true and find which of the two conclusions I and II is/are definitely true.

Statements:

A * B, C # B, A ^ F, B @ C

Conclusions:

I. C ^ F

II. F ^ B

Option 1 :	Option 2 :	Option 3 : Either conclusion I or II is true	Option 4 : Neither conclusion I nor II is true	Option 5 : Both conclusions I and II are true
Only conclusion I is true	Only conclusion II is true			

Ques 32 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

No paper is pen.

No pen is pencil.

All erasers are papers.

Conclusions:

I. Some papers are erasers.

II. No pencil are eraser.

III. No pen is eraser.

IV. ALL papers are erasers.



Option 1 : All follows	Option 2 : Only I and II follows	Option 3 : Only I, II and III follows	Option 4 : Only II and III follows	Option 5 : <u>None of these</u>
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Ques 33 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

Some rings are phones.

Some phones are computers.

Some computers are stations.

Conclusions:

I. Some stations are rings.

II. Some phones are stations.

III. Some computers are rings.

IV. All rings are stations.

Option 1 : <u>None follows</u>	Option 2 : Only I and II follow	Option 3 : Only I, II and III follow	Option 4 : Only II and III follow	Option 5 : All follow
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Ques 34 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

All rings are birds.

Some birds are cages.

All cages are kites.

Conclusions:

I. All kites are cages.

II. Some kites are rings.

III. Some birds are kites.

Option 1 : Only I follows	Option 2 : Only II follows	Option 3 : Only III follows	Option 4 : Only I and II follow	Option 5 : None of these
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Ques 35 : The question contains some statements followed by some conclusions. Decide which of the given conclusions logically follow from the given statements, disregarding commonly known facts.

Statements:

Some dogs are bags.

No bag is lion.

All rooms are lions.

Conclusions:

I. Some rooms are bags.



II. Some dogs are lions.

III. Some rooms are dogs.

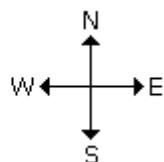
Option 1 : All follows Option 2 : Only I follows Option 3 : Only II follows

Option 4 : Only III follows

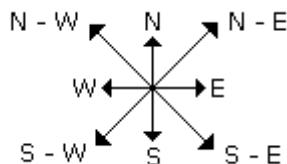
Option 5 :
None of
these follows

4.2 Directional sense

There are four main directions - **East, West, North and South** as shown below:



There are four cardinal directions - **North-East (N-E), North-West (N-W), South-East (S-E), and South-West (S-W)** as shown below:



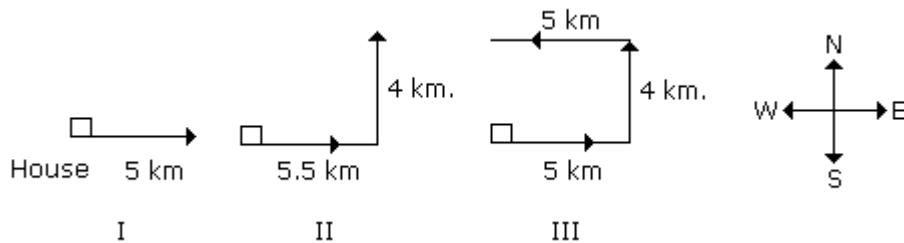
- At the time of sunrise if a man stands facing the east, his shadow will be towards west.
- At the time of sunset the shadow of an object is always in the east.
- If a man stands facing the North, at the time of sunrise his shadow will be towards his left and at the time of sunset it will be towards his right.
- At 12:00 noon, the rays of the sun are vertically downward hence there will be no shadow.

Main types of questions are given below:

Type 1:

Siva starting from his house, goes 5 km in the East, then he turns to his left and goes 4 km. Finally he turns to his left and goes 5 km. Now how far is he from his house and in what direction?

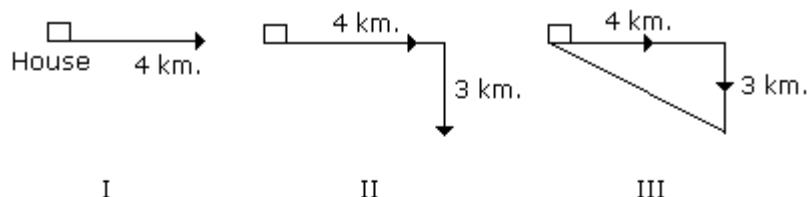
Solution:



From third position it is clear he is 4 km from his house and is in North direction.

**Type 2:**

Suresh starting from his house, goes 4 km in the East, then he turns to his right and goes 3 km. What minimum distance will be covered by him to come back to his house?

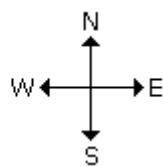
Solution:

$$\begin{aligned}
 \text{Minimum distance} &= \sqrt{(4)^2 + (3)^2} \\
 &= \sqrt{16 + 9} \\
 &= \sqrt{25} \\
 &= 5 \text{ km.}
 \end{aligned}$$

Type 3:

One morning after sunrise Juhi while going to school met Lalli at Boring road crossing. Lalli's shadow was exactly to the right of Juhi. If they were face to face, which direction was Juhi facing?

Solution: In the morning sunrises in the east.



So in morning the shadow falls towards the west.

Now Lalli's shadow falls to the right of the Juhi. Hence Juhi is facing South.

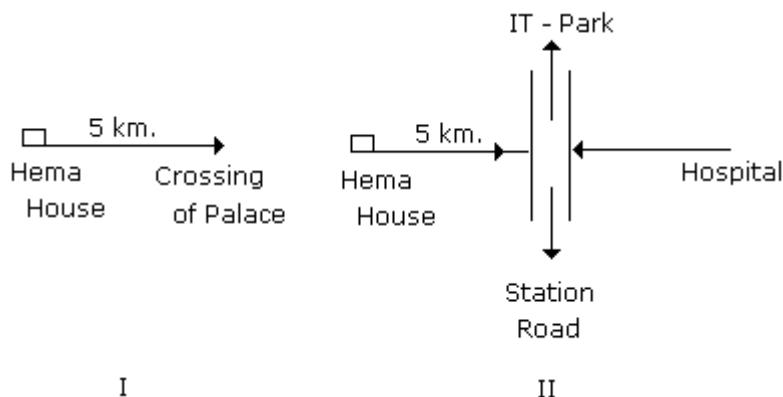
Type 4:

Hema starting from her house walked 5 km to reach the crossing of Palace. In which direction she was going, a road opposite to this direction goes to Hospital. The road to the right goes to station.



If the road which goes to station is just opposite to the road which IT-Park, then in which direction to Hema is the road which goes to IT-Park?

Solution:



From II it is clear that the road which goes to IT-Park is left to Hema.

4.3 Blood relations

The questions which are asked in this section depend upon **Relation**. You should have a sound knowledge of the blood relation in order to solve the questions.

To remember easily the relations may be divided into two sides as given below:

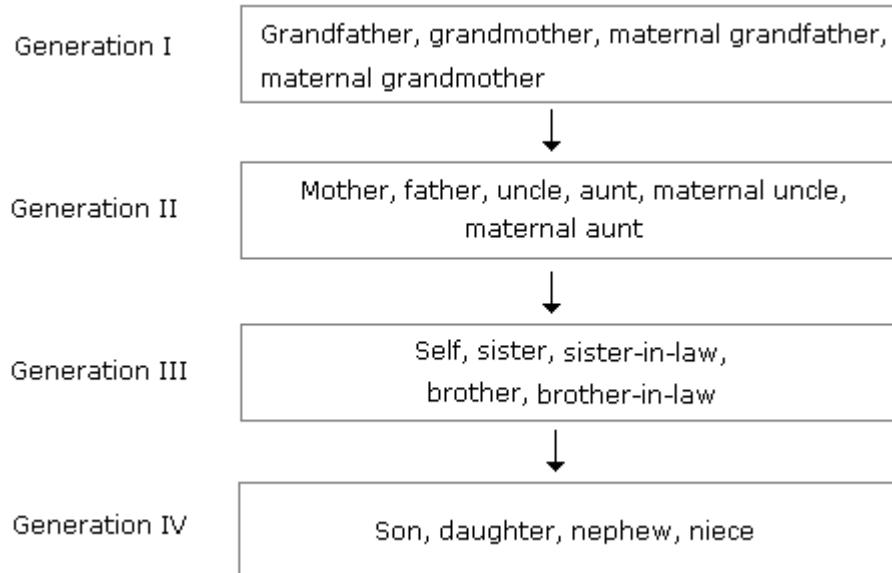
1. Relations of Paternal side:

1. Father's father → Grandfather
2. Father's mother → Grandmother
3. Father's brother → Uncle
4. Father's sister → Aunt
5. Children of uncle → Cousin
6. Wife of uncle → Aunt
7. Children of aunt → Cousin
8. Husband of aunt → Uncle

2. Relations of Maternal side:

1. Mother's father → Maternal grandfather
2. Mother's mother → Maternal grandmother
3. Mother's brother Maternal uncle
4. Mother's sister → Aunt
5. Children of maternal uncle → Cousin
6. Wife of maternal uncle → Maternal aunt

Relations from one generation to next:



Differenct types of questions with explanation:

Type 1:

If A + B means A is the mother of B; A x B means A is the father of B; A \$ B means A is the brother of B and A @ B means A is the sister of B then which of the following means P is the son of Q?

- (A) Q + R @ P @ N (B) Q + R * P @ N
 (C) Q x R \$ P @ N (D) Q x R \$ P \$ N

Solution: (D)

Q x R = Q is the mother of R [-Q, ±R]

R \$ P = R is the brother of P [+R, ±P]

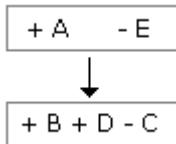
P \$ N = P is the brother of N [+P, ±N]

Therefore P is the son of Q.

Type 2:

A has 3 children. B is the brother of C and C is the sister of D, E who is the wife of A is the mother of D. There is only one daughter of the husband of E. what is the relation between D and B?

Solution: With the chart



Therefore, D is a boy because there is only one daughter of E.

Hence, B is the brother of D.

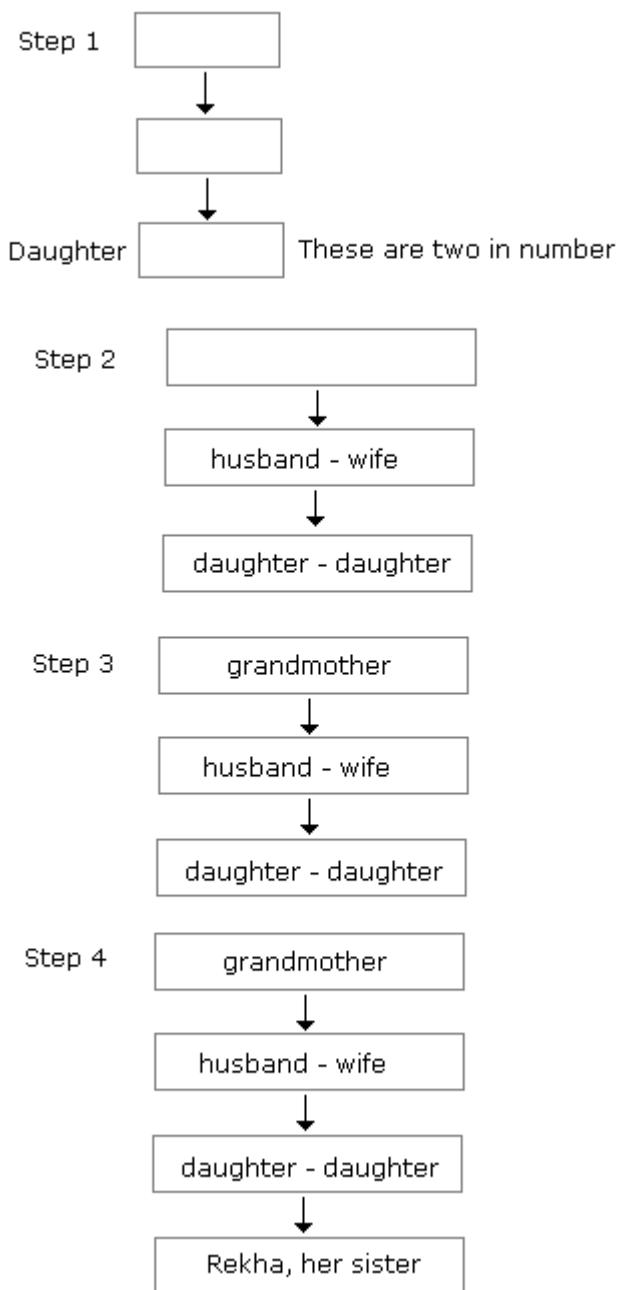
Type 3:

Pointing to a photograph, Rekha says to Lalli, "The girl in the photo is the second daughter of the wife of only son of the grandmother of my younger sister." How this girl of photograph is related to Rekha?

Solution:

First Method - By Generating Charts:

Fresherline.



Second method:

1. Grandmother of younger sister of Rekha → Grandmother of Rekha
2. Wife of only son of grandmother → Mother of Rekha
3. Younger daughter of the mother → Younger sister.

Note: While solving the question (+) can be used for male and (-) can be used for female.



Exercise

Ques 36 : Select the right option from the given alternatives

A man starts from a point 'X' and walks 3 km southwards, then he turns left and walks 6 km. In which direction is he from the starting point?

Option 1 : South-West Option 2 : South-East Option 3 : West Option 4 : South

Ques 37 : Select the right option from the given alternatives

Siddharth and Murali go for jogging from the same point. Siddharth goes towards the east covering 4 km. Murali proceeds towards the west for 3 km. Siddharth turns left and covers 4 km and Murali turns to the right to cover 4 km. Now what will be the distance between Siddharth and Murali?

Option 1 : 14 km Option 2 : 6 m Option 3 : 8 km Option 4 : 7 km

Ques 38 : Select the right option from the given alternatives

A, B, C, D and E are sitting on a bench. A is sitting next to B, C is sitting next to D, D is not sitting with E who is on the left end of the bench, C is on the second position from the right. A is on the right of B and E. A and C are sitting together. In which position is A sitting?

Option 1 : Between B and D Option 2 : Between B and C Option 3 : Between E and D Option 4 : Between C and E

Ques 39 : Select the right option from the given alternatives

Rita, Sita, Gita and Mita went to a dance party with Tarun, Arun, Varun and Karun. Rita did not dance with Tarun or Varun, Gita knew only disco dance and Arun and Varun did not know disco. Mita and Vaun are bitter enemies and won't dance with each other. Given a choice, Arun won't dance with Mita.

Karun's partner is Gita. Who was Mita's dance partner?

Option 1 : Tarun Option 2 : Arun Option 3 : Karun Option 4 : Varun

Ques 40 : Select the right option from the given alternatives

Ques 10 : Select the right option from the given alternatives

My friend and I started simultaneously towards each other from two places 100 m apart. After walking 30 m my friend turned left and went 10 m., then he



turned right and went 20 m, then he turned right again and came back on the road on which he had started walking. If we both walked with the same speed, what is the distance between us at that point of time.

Option 1 : 50 m Option 2 : 20 m Option 3 : 30 m Option 4 : 40 m

Ques 41 : Select the right option from the given alternatives

A man travels 3 kms to the west, turns left and goes 3 kms, turns right and goes 1 km, again turns right and goes 3 kms. How far is he from the starting point?

Option 1 : 7 kms Option 2 : 6 kms Option 3 : 5 kms Option 4 : 4 kms

Ques 42 : Select the right option from the given alternatives

A drives 10 km towards east and turns to the right hand and drives 3 km. Then he drives towards west (turning at his right) 3 km. He then turns to his left and drives 2 km. Finally he turns to his right and travels 7 km. How far is he from his starting point and in which direction would he be?

Option 1 : 10 km, Option 2 : 9 km, Option 3 : 8 km, Option 4 : 5 km, Option 5 : 3
East North West South km, South

Ques 43 : Select the right option from the given alternatives

A player X stands 50 yards away from Y in the West. He moves 10 yards straight towards South and then turns eastward going upto 50 yards, while Y also comes down southward and meets X at the same point. How far is Y from his original position?

Option 1 : 50 yards Option 2 : 40 yards Option 3 : 20 yards Option 4 : 10 yards

Ques 44 : Select the right option from the given alternatives

Sandhya walks straight from point A to B which is 2 kms away. She turns left, at 90° and walks 8 kms to point C, where she turns left again at 90° and walks 5 kms to point D. At D she turns left at 90° and walks for 8 kms to point E. What is the distance between A and E?

Option 1 : 2 Option 2 : 3 Option 3 : 5 Option 4 : 8



Ques 45 : Select the right option from the given alternatives

If A # B means A is father of B; A \$ B means A is mother of B, A @ B means A is sister of B, then how is B related to X in X \$ K # A @ B?

Option 1 : Grandson Option 2 : Grand-daughter Option 3 : Nephew Option 4 : Data Inadequate

Ques 46 : Select the right option from the given alternatives

Introducing Sarita, Meena, said, "She is the only daughter of my father's only daughter". How is Meena related to Sarita?

Option 1 : Niece Option 2 : Cousin Option 3 : Aunt Option 4 : None of these

Ques 47 : Select the right option from the given alternatives

Pointing to a girl, Arvind said "She is daughter of the only child of my father," How is Arvind's wife related to that girl?

Option 1 : Daughter Option 2 : Mother Option 3 : Aunt Option 4 : Sister Option 5 : None of these

Ques 48 : Select the right option from the given alternatives

D, the son-in-law of B is the brother-in-law of A who is the brother of C. How is A related to B?

Option 1 : Brother Option 2 : Son Option 3 : Father Option 4 : Data inadequate Option 5 : None of these

Ques 49 : Select the right option from the given alternatives

A man said, "This girl is the wife of the grandson of my mother". How is the man related to the girl?

Option 1 : Grandfather Option 2 : Father Option 3 : Father-in-law Option 4 : Husband Option 5 : None of these

Ques 50 : Select the right option from the given alternatives



Saroj is mother-in-law of Vani who is sister-in-law of Deepak. Rajeesh is father of Ramesh, the only brother of Deepak. How is Saroj related to Deepak?

Option 1 : Mother- in-law Option 2 : Aunt Option 3 : Wife Option 4 : Mother Option 5 : None of these

Ques 51 : Select the right option from the given alternatives

Kalyani is mother-in-law of Veena who is Sister-in-law of Ashok. Dheeraj is father of Sudeep, the only brother of Ashok. How is Kalyani related to Ashok?

Option 1 : Mother- Option 2 : Aunt Option 3 : Wife Option 4 : Cousin Option 5 : None of these

Ques 52 : Select the right option from the given alternatives

Pointing to a lady, the man said, 'The son of her brother is the Brother of my wife'. How is the lady related to the man?

Option 1 : Mother's sister Option 2 : Grandmother Option 3 : Mother-in-law Option 4 : Sister of father-in-law Option 5 : Natural Aunt

Ques 53 : Select the right option from the given alternatives

Mohit said to Neelam, "Your only brother's son is my wife's brother". How is Neelam related to the wife of Mohit?

Question Related to the wife of mother

Option 1 : Aunt Option 2 : Mother- in-law Option 3 : Sister Option 4 : Cannot be determined Option 5 : None of these

Ques 54 : Select the right option from the given alternatives

Pointing to a photograph of a lady, Mr. Ahluwalia said, "She is the wife of my son's only brother." How is the lady related to Mr. Ahluwalia?

Ques 55 : Select the right option from the given alternatives

Introducing Sunita, Ankit said, "She is the wife of my mother's only son." How is Sunita related to Ankit?

Option 1 : Wife Option 2 : Sister Option 3 : Sister-in-law Option 4 : Data Inadequate Option 5 : None of these



Ques 56 : Select the right option from the given alternatives

Pointing to a lady, the man said, "The son of her only brother is the brother of my wife." How is the lady related to the man?

Option 1 : Mother's sister Option 2 : Grandmother Option 3 : Mother- in-law Option 4 : None of these

Ques 57 : Select the right option from the given alternatives

A girl introduced a boy as the son of the daughter of the father of her uncle. The boy is the girl's.

Option 1 : Brother Option 2 : Nephew Option 3 : Uncle Option 4 : Son-in-law

Ques 58 : Select the right option from the given alternatives

A tourist drives 10 km towards East and turns to righthand side and takes a drive of another 3 km. He then drives towards West (turning to his right) another 3 km. He then turns to his left and walks another 2 km. Afterwards, he turns to his right and travels 7 km. How far is he from his starting point and in which direction?

Option 1 : 10 km Option 2 : 9 km Option 3 : 8 km Option 4 : 5 km
East North West South

Ques 59 : Select the right option from the given alternatives

Renuka started walking from her house, she first walked for 3 km towards west, then she turned towards north and moved 4 km in that direction. How far Renuka is from her house?

Option 1 : 3 km Option 2 : 3 km Option 3 : 5 km Option 4 : 5 km
South North West North-West

Ques 60 : Select the right option from the given alternatives

Sunil was facing east. He turns 150° in the clockwise direction and then 145° in the anticlockwise direction. Which direction is he facing now?

Option 1 : East Option 2 : North Option 3 : South-West Option 4 : South-East

Ques 61 : Select the right option from the given alternatives

Gautam was facing North. He walked 40 meters and turned left to cover 20 mts. He again turned left and walked 40 mts. How far is he from his original position?

Option 1 : 20 mt Option 2 : 40 mt Option 3 : 60 mt Option 4 : 80 mt



Ques 62 : Select the right option from the given alternatives

A puppy was trying to find its mother. It was facing east and walked for 10 mt. It turned south then and walked another 10 mt. Then it started walking towards North it walked for 20 mt and turned west. It walked 10 mt. and moved south for 2 mt. In which direction is it from the original position and how far?

Option 1 : 60 m
north-east Option 2 : 10 m
north-east Option 3 : 8 m
north Option 4 : can't
be determined

Ques 63 : Select the right option from the given alternatives

Amar started from point A and walked 10 km East to point B then turned to North and walked 3 km to point C and then turned West and walked 12 km to point D, then again turned South and walked 3 km to point E. In which direction is he from his starting point?

Option 1 : East Option 2 : South Option 3 : West Option 4 : North Option 5 :

Ques 64 : Select the right option from the given alternatives

From a point Shalu starts walking towards North and after walking 20 meters, she turns to her right and walks 10 metres, then she turns right again and walks 20 m. Then, she turns to her left and walks 10 m and finally turns to her left and walks 20 m. In which direction is she with reference to the starting point?

Option 1 : North Option 2 : South Option 3 : North-East Option 4 : East Option 5 : None of these

Ques 65 : Select the right option from the given alternatives

Ram starts walking towards East from a point 'S' and after walking 15 m turns to his left and walks 10 m, again he walks 10 m turning to his left and finally walks 22 m turning to his left and reaches a point 'Q'. How far and in which direction is he from the point 'S'?

Ques 66 : Select the right option from the given alternatives

I walked 20 m towards east from a point 'S' and then turned right and walked another 20 m. Now I turned to my left and walked 10 m and turning to my right I walked another 10 m. Finally I turned to my right and walked 30 m to reach a point 'F'. What is the shortest straight distance between points 'S' and 'F'?



Option 1 : 20 m Option 2 : 25 m Option 3 : 30 m Option 4 : 40 m Option 5 : 50 m

Ques 67 : Select the right option from the given alternatives

Starting from a point 'M', Hari walked 18 metres towards south. He turned to his left and walked 25 metres. He then turned to his left and walked 18 metres. He again turned to his left and walked 35 metres and reached a point 'P'. How far Hari is from the point 'M' and in which direction?

Option 1 : 10 m Option 2 : 10 m Option 3 : 35 m Option 4 : 10 m Option 5 : east west south None of these

Ques 68 : Select the right option from the given alternatives

A tourist drives 10 km towards east and turns to his right hand and drives 3 km. Then he drives towards west (turning to his right) 3 km. He then turns to his left and drives 2 km. Finally he turns to his right and travels 7 km. How far is he from his starting point and in which direction would he be?

Option 1 : 10 km Option 2 : 9 km Option 3 : 8 km Option 4 : 5 km Option 5 : East North West West 5 km South

Ques 69 : Select the right option from the given alternatives

Karan starts walking towards south. After walking 15 metres he turns towards north. After walking 20 metres, he turns towards east and walks 10 metres. He then turns towards south and walks 5 metres. How far is he from his original position and in which direction?

Option 1 : 10 metres East Option 2 : 10 metres South-East Option 3 : 10 metres West Option 4 : 10 metres North-East

Ques 70 : Select the right option from the given alternatives

Bhavika and Sunaina start simultaneously towards each other from two places 100 m apart. After walking 30 m. Bhavika turns left and goes 10m, then she turns right and goes 20 m and then turns right again and comes back to the road on which she had started walking. If both Bhavika and Sunaina walk with the same speed, what is the distance between them at this point of time?

Option 1 : 70 metres Option 2 : 40 metres Option 3 : 10 metres Option 4 : 20 metres

Ques 71 : Select the right option from the given alternatives

A goes on a picnic and meets a woman B who is the sister of A's wife. How is B related to A?



Option 1 : Sister Option 2 : Sister-in-law Option 3 : Brother Option 4 : Brother-in-law Option 5 :

Ques 72 : Select the right option from the given alternatives

How is my mother's sister's brother's wife's child related to me?

Option 1 : Brother Option 2 : Uncle Option 3 : Cousin Option 4 : Nephew

Ques 73 : Select the right option from the given alternatives

How is A's grandfather's only son's only son's mother's mother-in-law's sister-in-law is related to A?

Option 1 : Grandauant Option 2 : Aunt Option 3 : Grandmother Option 4 : Mother

Ques 74 : Select the right option from the given alternatives

A person travels 10 km towards south. He then turns left and travels 2 km and then turns right and travael 4 km and finally travels 2 km towards the east.

What is his position (in horizontal and vertical directions) with reference to the starting point?

<u>Option 1 : 4 km to the east, 14 km to the south</u>	Option 2 : 14 km to the south, 4 km to the east	Option 3 : 18 km to the south, 14 km to the east	Option 4 : 18 km to the south, 8 km to the east	Option 5 : 8 km to the east
--	---	--	---	-----------------------------

Ques 75 : Select the right option from the given alternatives

Smitha moved a distance of 85 m towards south, then turned to right and walked for 15 m. She turned right again and walked 60 m. Finally, she turned right at an angle of 45° and continued walking. In which directions was she moving ultimately ?

Option 1 : South-East	Option 2 : North-West	Option 3 : North	<u>Option 4 : North-East</u>	Option 5 :
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Ques 76 : Select the right option from the given alternatives

A watch shows 8.30. If the minute hand points towards east, in what direction will the hour hand point?

Option 1 : South-West	<u>Option 2 : South-East</u>	Option 3 : West	Option 4 : North-West	Option 5 : North-West
-----------------------	------------------------------	-----------------	-----------------------	-----------------------

Ques 77 : Select the right option from the given alternatives



After walking 6 kms, I turned right and travelled a distance of 2 kms, then turned left and covered a distance of 10 km. In the end I was moving towards the north. Initially, what direction was I moving in?

- Option 1 : North Option 2 : South Option 3 : South-West Option 4 : North-East Option 5 :

Ques 78 : Select the right option from the given alternatives

A person travels 12 km in the southward direction and then travels 5 kms to the right and then travels 15 kms towards the right and finally travels 5 kms towards the east .How far is he from the starting place?

- Option 1 : 28.5 kms Option 2 : 11.5 kms Option 3 : 3kms Option 4 : 5kms

Ques 79 : Select the right option from the given alternatives

A watch shows 4.30 .If the minute hand points to east, in what direction will the hour hand point?

- Option 1 : North-West Option 2 : South-East Option 3 : North-East Option 4 : North

Ques 80 : Select the right option from the given alternatives

Rohan is walking towards west .He takes three turns while walking,all at an (internal) angle of 45 degree towards right, right and left.What direction is he facing now?

- Option 1 : North-East Option 2 : South-East Option 3 : East Option 4 : West

Ques 81 : Select the right option from the given alternatives

Radha is walking towards East.What direction she should not follow if she should walk towards North?

- Option 1 : Right, Right, Left, Right, Right Option 2 : Right, Right, Left, Left, Left Option 3 : Right, Right, Right, Right Option 4 : Right, Left, Right, Left

Ques 82 : Select the right option from the given alternatives

If all directions are changed in the manner that north becomes south and vice-versa, then North-West will be:

- Option 1 : South-East Option 2 : North-East Option 3 : South-West Option 4 : None of these

Ques 83 : Select the right option from the given alternatives



Neha crawls 10 ft, turns right and crawls another 10 ft, then turns left two times and crawls 15 ft each time . If she started crawling in the westward direction , towards which direction is she crawling now?

Option 1 : East Option 2 : South Option 3 : North Option 4 : West

Ques 84 : Select the right option from the given alternatives

What is my father's wife's grandfather's only child's son's daughter to me?

Option 1 : Aunt Option 2 : Niece Option 3 : Real sister Option 4 :
Cousin sister

Ques 85 : Select the right option from the given alternatives

A' is the father of 'B' and 'C' . 'B' is the son of 'A' but 'C' is not the son of 'A'.What is 'C's' relation with 'A' ?

Option 1 : Daughter Option 2 : Son Option 3 : Niece Option 4 :
Nephew

Ques 86 : Select the right option from the given alternatives

Introducing Leela ,Ram said, "Her father is my mother's only son ".How is Leela related to Ram ?

Option 1 : Aunt Option 2 : Daughter Option 3 : Mother Option 4 :
Sister

Ques 87 : Select the right option from the given alternatives

Pointing to a man, a woman said, "He is the only son of my mother's mother".How is the woman related to the man?

Option 1 : Aunt Option 2 : Daughter Option 3 : Niece Option 4 :
Sister

Ques 88 : Select the right option from the given alternatives

If S - T means 'S' is the wife of 'T', S + T means 'S' is the daughter of 'T' and S / T means that 'S' is the son of 'T'.What will M+J/K means`?

Option 1 : K' is the father of 'M' Option 2 : M' is the grand daughter Option 3 : J' is wife of 'K'
and 'M' are brothers



5. Inductive reasoning

5.1 Coding pattern and Number series pattern recognition

In these series, you will be looking at both the letter pattern and the number pattern.
Fill the blank in the middle of the series or end of the series.



Exercise

Ques 1 : The question shows a pair of words in which the first is related to the second in some way. It is followed by a single word which bears a similar relation to one of the given alternatives. Find the correct alternative to complete the analogy.

Pascal:Programming::Oracle: ?

- | | | | |
|------------|------------------|-----------------|--------------------------------|
| Option 1 : | Option 2 : Greek | Option 3 : Java | <u>Option 4 :
Teletext</u> |
| Internet | | | |

Ques 2 : The question shows a pair of words in which the first is related to the second in some way. It is followed by a single word which bears a similar relation to one of the given alternatives. Find the correct alternative to complete the analogy.

Dividend: Shares :: ? : Debenture

- | | | | |
|------------------|-----------------|-------------------|--------------------------------|
| Option 1 : Bonus | Option 2 : Gift | Option 3 : Profit | <u>Option 4 :
Interest</u> |
| Voucher | | | |

Ques 3 : The question shows a pair of words in which the first is related to the second in some way. It is followed by a single word which bears a similar relation to one of the given alternatives. Find the correct alternative to complete the analogy.

Abjure : Adopt :: Forfeit : ?

- | | | | |
|------------------------|-------------------|------------------------------|-----------------------|
| Option 1 :
Squander | Option 2 : Lavish | <u>Option 3 :
Redeem</u> | Option 4 :
Deposit |
|------------------------|-------------------|------------------------------|-----------------------|

Ques 4 : The question shows a pair of words in which the first is related to the second in some way. It is followed by a single word which bears a similar relation to one of the given alternatives. Find the correct alternative to complete the analogy.

Electrical Engineers : Grid :: Cosmologists : ?

- | | | | |
|------------------|--------------------|------------------------------|-------------------------|
| Option 1 : Group | Option 2 : Faculty | <u>Option 3 :
Galaxy</u> | Option 4 :
Syndicate |
|------------------|--------------------|------------------------------|-------------------------|



Ques 5 : The question shows a pair of words which are related to each other in some way.Select that pair that expresses the relationship that is most similar to the given pair.

Monolith : Rock :: ?

Option 1 :	Option 2 : Tor : Lea	Option 3 : Grain	Option 4 :
Continent :		: Sand	Cataract :
Ocean			Waterfall

Ques 6 : The question shows a pair of words which are related to each other in some way.Select that pair that expresses the relationship that is most similar to the given pair.

Abduct : Kidnap :: ?

Option 1 : Pilfer : Steal	Option 2 : Derail : Further	Option 3 : Jump : Enjoy	Option 4 : Clarify : Cuneal
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Ques 7 : A group of three words are given, which are interconnected in some way. Find a similar relationship from the given options.

Conductor : Orchestra : Symphony

Option 1 : Judge : Convict	Option 2 : Player : Opponent	Option 3 : Game	Option 4 :
		Author : Book	Teacher :
Justice		Magazine	Class : Lesson

Ques 8 : The question shows a pair of words in which the first is related to the second in some way.It is followed by a single word which bears a similar relation to one of the given alternatives. Find the correct alternative to complete the analogy.

NDA: BJP :: ? : Congress

Option 1 : UPS	Option 2 : PUA	Option 3 : UPA	Option 4 : NPA
----------------	----------------	----------------	----------------

Ques 9 : The question shows a pair of words in which the first is related to the second in some way.It is followed by a single word which bears a similar relation to one of the given alternatives. Find the correct alternative to complete the analogy.

Confute : Rebut :: Repellent : ?

Option 1 : Pusher	Option 2 : Attractive	Option 3 : <u>Repugnant</u>	Option 4 : Spray
-------------------	-----------------------	-----------------------------	------------------

Ques 10 : The question shows a pair of words which are related to each other in some way.Select that pair that expresses the relationship that is most similar to the given pair.

Polygon : Perimeter :: ?

Option 1 : Triangle	Option 2 : Circle : Angles	Option 3 : Semi-Circle	Option 4 : Square : Area
	<u>Circumference</u>		



Ques 11 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Newton : Gravitation :: ?

Option 1 : Marie	Option 2 : Kalpana	Option 3 : <u>Archimedes</u>	Option 4 : Davies
Curie : Uranium	Rocket	<u>Buoyancy</u>	Safety Lamp

Ques 12 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Income Tax : Direct :: ?

Option 1 : Import	Option 2 : Sale Tax	Option 3 : Export	Option 4 : Subsidy
: Custom Duty	<u>Indirect</u>	Wealth Tax	Wealth

Ques 13 : Read the question statement and select the correct option from the given alternatives.

Sheaf is related to Corn as is related to Books.

Option 1 : Library	Option 2 : Pile	Option 3 : Anthology	Option 4 : Shop
--------------------	-----------------	----------------------	-----------------

Ques 14 : Read the question statement and select the correct option from the given alternatives.

Surplus is related to Sufficient as is related to Need.

Option 1 : Gathering	Option 2 : Demand	Option 3 : Excess	Option 4 : Storage
----------------------	-------------------	-------------------	--------------------

Ques 15 : Read the question statement and select the correct option from the given alternatives.

Humanitarian is to Altruism what Host is to

Option 1 : Hostage	Option 2 : <u>Hospitality</u>	Option 3 : Service	Option 4 : Welcome
--------------------	-------------------------------	--------------------	--------------------

Ques 16 : Read the question statement and select the correct option from the given alternatives.

Umbrella is to Rain what Goggles are to

Option 1 : Light	Option 2 : Glare	Option 3 : Beam	Option 4 : Sun
------------------	------------------	-----------------	----------------



Ques 17 : The question shows three words, which are analogous to one another in some way. Detect the analogy underlying them by choosing the right option.

Website : CD : Book

- | | | | |
|--|--|-----------------------------------|--|
| Option 1 : They are modern storehouses | Option 2 : They guide us in moral values | Option 3 : They can be subscribed | Option 4 : They <u>are sources of specific information</u> |
|--|--|-----------------------------------|--|

Ques 18 : The question shows three words, which are analogous to one another in some way. Detect the analogy underlying them by choosing the right option.

Acceleration : Speed : Velocity

- | | | | | |
|--|--|--|---|------------|
| Option 1 : These denote laws of movement | Option 2 : They are a function of Force x Motion | Option 3 : They <u>are scientific expression of motion</u> | Option 4 : All these are forms of gravitation | Option 5 : |
|--|--|--|---|------------|

Ques 19 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Appeal: Refusal :: ?

- | | | | | |
|---------------------------------|-------------------------------|---------------------------------|-------------------------------|----------------------------------|
| Option 1 : Obesity: Over-eating | Option 2 : Deny : Affirmation | Option 3 : Try : <u>Failure</u> | Option 4 : Struggle : Victory | Option 5 : Examination : Passing |
|---------------------------------|-------------------------------|---------------------------------|-------------------------------|----------------------------------|

Ques 20 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Vandalism: Property :: ?

- | | | | | |
|-------------------------------|--------------------------------|--------------------------------------|----------------------------------|--------------------------------|
| Option 1 : Implication: Crime | Option 2 : Embezzlement: Fraud | Option 3 : <u>Perjury: Testimony</u> | Option 4 : Malpractice: Cheating | Option 5 : Testify: Reputation |
|-------------------------------|--------------------------------|--------------------------------------|----------------------------------|--------------------------------|

Ques 21 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Pain : Misery :: ?

- | | | | | |
|------------------------------|---------------------------------|--|------------------------------------|---------------------------|
| Option 1 : Disease : Poverty | Option 2 : Despair : Loneliness | Option 3 : <u>Ignorance: Confusion</u> | Option 4 : Superstition : Peasants | Option 5 : Ignore : Greet |
|------------------------------|---------------------------------|--|------------------------------------|---------------------------|



Ques 22 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Resting : Fatigue :: ?

- | | | | | |
|-------------------------|-------------------------|------------------------|---------------------|--|
| Option 1 :
Poverty : | Option 2 : Over-eating: | Option 3 :
Gourmet: | Option 4 :
Race: | Option 5 :
<u>Dieting : Over-weight</u> |
| Disease | Obesity | Underweight | Exercise | |
-

Ques 23 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Trilogy : Novel :: ?

- | | | | | |
|---------------------------|----------------------------|-------------------------------|-----------------------------|---------------------------------------|
| Option 1 : Rice :
Husk | Option 2 : Milk :
Cream | Option 3 :
Fabric: Weaving | Option 4 : Gun
Cartridge | Option 5 :
<u>Serial : Episode</u> |
|---------------------------|----------------------------|-------------------------------|-----------------------------|---------------------------------------|
-

Ques 24 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Earth : Grass :: ?

- | | | | |
|-------------------------|--------------------------|----------------------------------|---------------------------|
| Option 1 : Sky:
Star | Option 2 : Tree:
Leaf | Option 3 : Scalp:
<u>Hair</u> | Option 4 :
Pond : Fish |
|-------------------------|--------------------------|----------------------------------|---------------------------|
-

Ques 25 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Grain : Field :: ?

- | | | | |
|----------------------------------|-------------------------------|-------------------------------------|-------------------------------|
| Option 1 : Patient
: Hospital | Option 2 : Children
School | Option 3 : Steel
<u>Workshop</u> | Option 4 :
Movie : Picture |
|----------------------------------|-------------------------------|-------------------------------------|-------------------------------|
-

Ques 26 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Vehicle : Cart :: ?

- | | | |
|-------------------------------|----------------------------------|--|
| Option 1 :
Country : State | Option 2 : Ocean :
<u>Sea</u> | Option 3 : Man : Option 4 :
Child Music : Jazz |
|-------------------------------|----------------------------------|--|
-

Ques 27 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Prodigious : Meagre



Option 1 : Sleep : Option 2 :	Relaxation	Option 3 :	<u>Option 4 :</u>
Handsome :	Beautiful	Regard: Honour	<u>Exhilarated :</u>
			<u>Depressed</u>

Ques 28 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Exercise : Fitness :: ?

Option 1 :	Option 2 :	Option 3 :	Option 4 :
<u>Concern</u> : Care	Intimidation : Fear	Sensitivity: Poetry	Retain : Sustain

Ques 29 : The question shows a pair of words in which the first is related to the second in some way. It is followed by a single word which bears a similar relation to one of the given alternatives. Find the correct alternative to complete the analogy.

Book: Library :: Animal : ?

Option 1 :	Option 2 : Hunter	Option 3 : Wild	<u>Option 4 : Zoo</u>
Domestic			

Ques 30 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Mundane : Spiritual :: ?

Option 1 :	<u>Option 2 : Worldly</u> :	Option 3 :	Option 4 :
Common :	<u>Unworldly</u>	Secular :	Novel: Routine
Ghostly		Clerical	

Ques 32 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Myth : Legendary :: ?

Option 1 :	Option 2 : Epic :	<u>Option 3 : Fable</u>	Option 4 :
Sermon :	Comic	<u>: Didactic</u>	Anecdote :
Lengthy			Witty

Ques 33 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Manager : Office :: ?

Option 1 : Doctor	<u>Option 2 : Curator</u> :	Option 3 : Bank	Option 4 : Fruit
: Patient	<u>Museum</u>	: Account	: Seed



Ques 34 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Refine : Style :: ?

Option 1 : Paint : Wall	Option 2 : Compose : Song	Option 3 : Author : Book	Option 4 : <u>Retouch</u> : <u>Photograph</u>
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Ques 35 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Portfolio : Securities :: ?

Option 1 : Bottle : Capsules	Option 2 : Carpenter : Furniture	Option 3 : <u>Classroom</u> : <u>Students</u>	Option 4 : Bridge : River
------------------------------	----------------------------------	---	---------------------------

Ques 36 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Joke : Laugh :: ?

Option 1 : Human : Relation	Option 2 : Gluttony : Food	Option 3 : Pill : Headache	Option 4 : <u>Cracker</u> : <u>Explosion</u>
-----------------------------	----------------------------	----------------------------	--

Ques 37 : The question shows a pair of words which are related to each other in some way. Select that pair that expresses the relationship that is most similar to the given pair.

Bouquet : Flower :: ?

Option 1 : Chain : <u>Link</u>	Option 2 : Skin : Body	Option 3 : Product : Factory	Option 4 : Page : Book
--------------------------------	------------------------	------------------------------	------------------------

Ques 38 : Find the next number in the series

2, 5, 10, 17, 26, _____

Option 1 : 35	Option 2 : 38	Option 3 : 39	Option 4 : <u>37</u>
---------------	---------------	---------------	----------------------

Ques 39 : Find the next number in the series

135, 246, 357, 468, _____

Option 1 : 578	Option 2 : 577	Option 3 : <u>579</u>	Option 4 : 570
----------------	----------------	-----------------------	----------------



Ques 40 : Find the next number in the series

23, 68, 113, 158, 203, _____

Option 1 : 252

Option 2 : 248

Option 3 : 242

Option 4 : 256

Ques 41 : Find the next number in the series

3, 12, 48, 192, 768, _____

Option 1 : 2868

Option 2 : 2968

Option 3 : 3072

Option 4 : 3176

Ques 42 : Find the next number in the series

256, 64, 128, 32, 64, _____

Option 1 : 128

Option 2 : 16

Option 3 : 32

Option 4 : 256

Ques 43 : Find the next number in the series

4, 24, 48, 72, 96, _____

Option 1 : 121

Option 2 : 120

Option 3 : 144

Option 4 : 132

Ques 44 : Find the next number in the series

2, 6, 30, 210, _____

Option 1 : 1680

Option 2 : 1800

Option 3 : 1890

Option 4 : 2010

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Exercise

Maharajahs in the shopping mall

AT THE end of the 19th century, India's maharajahs discovered a Parisian designer called Louis Vuitton and flooded his small factory with orders for custom-made Rolls-Royce interiors, leather picnic hampers and modish polo-club bags. But after independence, when India's princes lost much of their wealth, the orders dried up. Then in 2002 LVMH, the world's largest luxury-goods group, made a triumphant return to India, opening a boutique in Delhi and another in Mumbai in 2004. Its target was the new breed of maharajah produced by India's liberalised economy: flush, flash, and growing in number. Other purveyors of opulence followed, from Chanel to Bulgari. In recent months a multitude of swanky brands have announced plans to set up shop in India, including Dolce & Gabbana, Hermès, Jimmy Choo and Gucci. And Indian women will soon be invited to spend over \$100 on bras made by La Perla, an Italian lingerie firm. Only a tiny fraction, of course, will do so. But it is India's future prospects that have excited the luxury behemoths. India has fewer than 100,000 dollar millionaires among its one billion-plus population, according to American Express, a financial-services firm. It predicts that this number will grow by 12.8% a year for the next three years. The longer-term ascendance of India's middle class, meanwhile, has been charted by the McKinsey Global Institute, which predicts that average incomes will have tripled by 2025, lifting nearly 300m Indians out of poverty and causing the middle class to grow more than tenfold, to 583m. Demand for all kinds of consumer products is about to surge, in short. And although restrictions on foreign investment prevent retail giants such as Wal-Mart and Tesco from entering India directly, different rules apply to companies that sell their own products under a single brand, as luxury-goods firms tend to. Since January 2006 they have been allowed to take up to 51% in Indian joint ventures. India is also an attractive market for luxury goods because, unlike China, it does not have a flourishing counterfeit industry. Credit is becoming more easily available. And later this year Vogue, a fashion magazine, will launch an Indian edition. Barriers to growth remain, however. High import duties make luxury goods



expensive. Rich Indians tend to travel widely and may simply buy elsewhere. Finding suitable retail space is also proving a headache. So far most designer boutiques are situated in five star hotels. But things are changing. Later this year Emporio, a new luxury-goods mall, will open in a prosperous neighbourhood in the south of Delhi. It is likely to be the first of many. Even so, India could remain a difficult market to crack. Last October the Luxury Marketing Council, an international organisation of 675 luxury-goods firms, opened its India chapter. Its boss, Devyani Raman, described India's luxury-goods market as "a cupboard full of beautiful clothes with a new outfit arriving every day—it could start to look messy without the right care". This, she said, included everything from teaching shop assistants appropriate manners to instilling in the Indian public a proper understanding of the concept of luxury. "How do you educate them", she asked, "about the difference between a designer bag that costs \$400 and a much cheaper leather bag that functions perfectly well?"

Ques 1 : Select the word or phrase which best expresses the meaning of the given word.

VORACIOUS

- Option 1 : Wild Option 2 : Hungry Option 3 : Angry Option 4 : Quick
-

Ques 2 : Select the word or phrase which best expresses the meaning of the given word.

TIMID

- Option 1 : Fast Option 2 : Slow Option 3 : Medium Option 4 : Shy
-

Ques 3 : Select the word or phrase which best expresses the meaning of the given word.

IRONIC

- Option 1 : Inflexible Option 2 : Bitter Option 3 : Good-natured Option 4 : Sarcastic
-

Ques 4 : Select the word or phrase which best expresses the meaning of the given word.

CORRESPONDENCE

- Option 1 : Agreements Option 2 : Contracts Option 3 : Documents Option 4 : Letters
-

Ques 5 : Select the word or phrase which best expresses the meaning of the given word.

DISTANT

- Option 1 : Far Option 2 : Removed Option 3 : Reserved Option 4 : Separate



Ques 6 : Select the word or phrase which best expresses the meaning of the given word.

LAMENT

Option 1 : Complain Option 2 : Comment Option 3 : Condone Option 4 : Console

Ques 7 : Select the word or phrase which best expresses the meaning of the given word.

WRETCHED

Option 1 : Poor Option 2 : Foolish Option 3 : Insane Option 4 : Strained

Ques 8 : Select the word or phrase which best expresses the meaning of the given word.

RESTRAINT

Option 1 : Hindrance Option 2 : Repression Option 3 : Obstacle Option 4 : Restriction

Ques 9 : Select the word or phrase which best expresses the meaning of the given word.

MENDACIOUS

Option 1 : Full of confidence Option 2 : False Option 3 : Encouraging Option 4 : Provocative

Ques 10 : Select the word or phrase which best expresses the meaning of the given word.

ADMONISH

Option 1 : Punish Option 2 : Curse Option 3 : Dismiss Option 4 : Reprimand

Ques 11 : Select the word or phrase which best expresses the meaning of the given word.

CORPULENT

Option 1 : Lean Option 2 : Gaunt Option 3 : Emaciated Option 4 : Obese

Ques 12 : Select the word or phrase which best expresses the meaning of the given word.

GRATIFY

Option 1 : Appreciate Option 2 : Frank Option 3 : Indulge Option 4 : Pacify

Ques 13 : Select the word or phrase which best expresses the meaning of the given word.

RECKLESS

Option 1 : Courageous Option 2 : Rash Option 3 : Bold Option 4 : Daring

Ques 14 : Select the word or phrase which best expresses the meaning of the given word.

VENT



Option 1 : Opening

Option 2 : Stodgy

Option 3 : End

Option 4 : Past
tense of go

Ques 15 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

The claims of students look hollow when they attribute their poor performance to difficulty of examination.

Option 1 : infer

Option 2 : impute

Option 3 : inhere

Option 4 : inundate

Ques 16 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

He is averse to the idea of holding elections now.

Option 1 : convinced

Option 2 : angry

Option 3 : agreeable Option 4 : opposed

Ques 17 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

True religion does not require one to proselytise through guile or force.

Option 1 : translate

Option 2 : hypnotise

Option 3 : attack

Option 4 : convert

Ques 18 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

She corroborated the statement of her brother.

Option 1 : confirmed

Option 2 : disproved

Option 3 :
condemned

Option 4 : seconded

Ques 19 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

The great dancer impressed the appreciative crowd by her nimble movements.

Option 1 : unrhythmic

Option 2 : lively

Option 3 : quickening

Option 4 : clear

Ques 20 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

Swift is known in the world of letters for his misogyny.

Option 1 : hatred for
mankindOption 2 : hatred for
womankindOption 3 : love for the
reasonableOption 4 : love for
womankind

Ques 21 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

A person unrestrained by the rules of morality or tradition is called a licentious person.

Option 1 : libertine

Option 2 : loafer-type

Option 3 : criminal

Option 4 : freelance

Ques 22 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

His style is quite transparent.

Option 1 : verbose

Option 2 : involved

Option 3 : lucid

Option 4 : witty



Ques 23 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

Only those who are gullible take every advertisement seriously.

- Option 1 : fallible Option 2 : enthusiastic Option 3 : unsuspecting Option 4 : unrealistic
-

Ques 24 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

We didn't believe in his statement, but subsequent events proved that he was right.

- Option 1 : later Option 2 : many Option 3 : few Option 4 : earlier
-

Ques 25 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

The angry villagers have lynched two suspected child-lifters already.

- Option 1 : beaten up Option 2 : captured Option 3 : killed Option 4 : mutilated
-

Ques 26 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

He has a propensity for getting into debt.

- Option 1 : natural Option 2 : aptitude Option 3 : characteristic Option 4 : quality
-

Ques 27 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

The agnostic demanded proof before he would accept the statement of the secretary.

- Option 1 : The pessimist Option 2 : The sceptic Option 3 : Sceptic Option 4 : The atheist
about the existence atheist
of god or any ultimate
reality
-

Ques 28 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

The economic cataclysm which followed the industrial revolution brought with it complex problems hitherto unknown.

- Option 1 : Depression Option 2 : Boom Option 3 : Regeneration Option 4 : Sudden Option 5 : Unprecedented
and violent change collapse
-

Ques 29 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

The environment left a deleterious effect on his health.

- Option 1 : Fatiguing Option 2 : Weakening Option 3 : Aesthetic Option 4 : Harmful Option 5 : Health
-

Ques 30 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

By his speech he fermented trouble in the ranks of the army.

- Option 1 : Quietened Option 2 : Channelized Option 3 : Stirred up Option 4 : Contained
 into healthy directions and suppressed these



Ques 31 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

He has got a meretricious style which does not produce a lasting effect.

- | | | | | |
|-----------------------|----------------------|--------------------------|---------------------------|--|
| Option 1 : Capricious | Option 2 : Whimsical | Option 3 :
Flamboyant | Option 4 :
Pretentious | Option 5 : <u>Showily</u>
<u>attractive</u> |
|-----------------------|----------------------|--------------------------|---------------------------|--|

Ques 32 : Select the word or phrase which best expresses the meaning of the word typed in **bold**.

The liberal school of thought trusts in education reform, and the sporadic use of force to remedy the depravity of certain isolated individuals or groups.

- | | | | | |
|--|------------------------------------|--------------------------|--------------------|--|
| Option 1 : Infrequent,
<u>irregular</u> | Option 2 : Persistent,
constant | Option 3 :
Continuous | Option 4 : Sparing | Option 5 : Corrective
and preventive both |
|--|------------------------------------|--------------------------|--------------------|--|

Ques 33 : Select the word or phrase which fits each definition.

A person who readily believes others.

- | | | | | |
|-----------------------|---------------------|-----------------------------|----------------------|---------------------|
| Option 1 : Creditable | Option 2 : Credible | Option 3 : <u>Credulous</u> | Option 4 : Sensitive | Option 5 : Sensible |
|-----------------------|---------------------|-----------------------------|----------------------|---------------------|

Ques 34 : Select the word or phrase which fits each definition.

Flowers and insects or anything lasting only for a day.

- | | | | | |
|-------------------------|-----------------------------|----------------------|-----------------------|-----------------------|
| Option 1 : Transitional | Option 2 : <u>Ephemeral</u> | Option 3 : Transient | Option 4 : Transitory | Option 5 : Monumental |
|-------------------------|-----------------------------|----------------------|-----------------------|-----------------------|

Ques 35 : Select the word or phrase which fits each definition.

Last part of speech.

- | | | | | |
|---------------------|-----------------------|------------------------------|---------------------------|-----------------------|
| Option 1 : Epilogue | Option 2 : Conclusion | Option 3 : <u>Peroration</u> | Option 4 :
Permutation | Option 5 : Percussion |
|---------------------|-----------------------|------------------------------|---------------------------|-----------------------|

Ques 36 : Select the word or phrase which best expresses the meaning of the given word.

OPALESCENT

- | | | | | |
|-----------------------|------------------------|---------------------------|----------------------|-----------------------------------|
| Option 1 : Iridescent | Option 2 : Transparent | Option 3 :
Translucent | Option 4 : Pollutant | Option 5 : Giving off
an odour |
|-----------------------|------------------------|---------------------------|----------------------|-----------------------------------|

Ques 37 : Select the word or phrase which best expresses the meaning of the given word.

PERIPATETIC

- | | | | | |
|---------------------------|----------------------|-------------------|---------------------|--------------------|
| Option 1 : <u>Worldly</u> | Option 2 : Disarming | Option 3 : Moving | Option 4 : Inherent | Option 5 : Seeking |
|---------------------------|----------------------|-------------------|---------------------|--------------------|

Ques 38 : Select the word or phrase which best expresses the meaning of the given word.

TAUTOLOGICAL

- | | | | | |
|--|-----------------------------|--|--------------------------|---------------------|
| Option 1 : Pertaining to charms or magic | Option 2 : Highly sensitive | Option 3 : <u>Needlessly</u>
<u>repetitious</u> | Option 4 : Highly touchy | Option 5 : Fleeting |
|--|-----------------------------|--|--------------------------|---------------------|



Ques 39 : Select the word or phrase which best expresses the meaning of the given word.

AVERT

- Option 1 : entertain Option 2 : transform Option 3 : turn away Option 4 : lead toward Option 5 : displease
-

Ques 40 : Select the word or phrase which best expresses the meaning of the given word.

CITE

- Option 1 : galvanize Option 2 : visualize Option 3 : locate Option 4 : quote Option 5 : signal
-

Ques 41 : Select the word or phrase which best expresses the meaning of the given word.

CORPULENT

- Option 1 : regenerate Option 2 : obese Option 3 : different Option 4 : hungry Option 5 : bloody
-

Ques 42 : Select the word or phrase which best expresses the meaning of the given word.

EMACIATED

- Option 1 : garrulous Option 2 : primeval Option 3 : vigorous Option 4 : disparate Option 5 : thin
-

Ques 43 : Select the word or phrase which best expresses the meaning of the given word.

GARNISH

- Option 1 : paint Option 2 : garner Option 3 : adorn Option 4 : abuse Option 5 : banish
-

Ques 44 : Select the word or phrase which best expresses the meaning of the given word.

INCOLCATE

- Option 1 : exculpate Option 2 : educate Option 3 : exonerate Option 4 : prepare Option 5 : embarrass
-

Ques 45 : Select the word or phrase which best expresses the meaning of the given word.

EGREGIOUS

- Option 1 : pious Option 2 : outrageous Option 3 : anxious Option 4 : sociable Option 5 : gloomy
-

Ques 46 : Select the word or phrase which best expresses the meaning of the given word.

MISDEMEANOUR

- Option 1 : felony Option 2 : misdeed Option 3 : indignity Option 4 : fiat Option 5 : illiteracy
-

Ques 47 : Select the word or phrase which best expresses the meaning of the given word.

MUSTY

- Option 1 : stale Option 2 : necessary Option 3 : indifferent Option 4 : nonchalant Option 5 : vivid
-

Ques 48 : Select the word or phrase which best expresses the meaning of the given word.

**PHLEGMATIC**

Option 1 : calm Option 2 : cryptic Option 3 : practical Option 4 : salivary Option 5 : dishonest

Ques 49 : Select the word or phrase which best expresses the meaning of the given word.

REPRISAL

Option 1 : revaluation Option 2 : assessment Option 3 : loss Option 4 : retaliation Option 5 : nonsense

Ques 50 : Select the word or phrase which best expresses the meaning of the given word.

WAIF

Option 1 : soldier Option 2 : urchin Option 3 : surrender Option 4 : breeze Option 5 : spouse

Ques 51 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

SAGACIOUS (OPPOSITE)

Option 1 : foolish Option 2 : bitter Option 3 : voracious Option 4 : veracious Option 5 : fallacious

Ques 52 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

TRANSIENT (OPPOSITE)

Option 1 : carried Option 2 : close Option 3 : permanent Option 4 : removed Option 5 : certain

Ques 53 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

IGNOBLE (OPPOSITE)

Option 1 : produced by fire Option 2 : worthy Option 3 : given to questioning Option 4 : huge Option 5 : known

Ques 54 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

NEFAIRIOUS (OPPOSITE)

Option 1 : various Option 2 : lacking Option 3 : benign Option 4 : pompous Option 5 : futile

Ques 55 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

CHAFFING (OPPOSITE)

Option 1 : achieving Option 2 : serious Option 3 : capitalistic Option 4 : sneezing Option 5 : expensive

Ques 56 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

COZEN (OPPOSITE)

Option 1 : amuse Option 2 : treat honestly Option 3 : prate Option 4 : shackle Option 5 : vilify

Ques 57 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

DILATORY (OPPOSITE)



Option 1 : narrowing Option 2 : prompt Option 3 : enlarging Option 4 : portentous Option 5 : sour

Ques 58 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

GRISLY (OPPOSITE)

Option 1 : suggestive Option 2 : doubtful Option 3 : untidy Option 4 : pleasant Option 5 : bearish

Ques 59 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

IRREVERENT (OPPOSITE)

Option 1 : related Option 2 : mischievous Option 3 : respective Option 4 : pious Option 5 : violent

Ques 60 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

JAUNTY (OPPOSITE)

Option 1 : youthful Option 2 : ruddy Option 3 : strong Option 4 : unravelled Option 5 : sedate

Ques 61 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

LEVITY (OPPOSITE)

Option 1 : bridge Option 2 : dam Option 3 : praise Option 4 : blame Option 5 : solemnity

Ques 62 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

UNSEEMLY (OPPOSITE)

Option 1 : effortless Option 2 : proper Option 3 : conducive Option 4 : pointed Option 5 : informative

Ques 63 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

AFFABLE (OPPOSITE)

Option 1 : rude Option 2 : ruddy Option 3 : needy Option 4 : useless Option 5 : conscious

Ques 64 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

BLASÉ (OPPOSITE)

Option 1 : fiery Option 2 : clever Option 3 : intriguing Option 4 : slim Option 5 : ardent

Ques 65 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

EQUILIBRIUM (OPPOSITE)

Option 1 : imbalance Option 2 : peace Option 3 : inequity Option 4 : directness Option 5 : urgency

Ques 66 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

EXTROVERT (OPPOSITE)

Option 1 : clown Option 2 : hero Option 3 : ectomorph Option 4 : neurotic Option 5 : introvert



Ques 67 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

PERT (OPPOSITE)

Option 1 : polite Option 2 : perishable Option 3 : moral Option 4 : deliberate Option 5 : stubborn

Ques 68 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

RUDDY (OPPOSITE)

Option 1 : robust Option 2 : witty Option 3 : wan Option 4 : exotic Option 5 : creative

Ques 69 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

MINOR (OPPOSITE)

Option 1 : Big Option 2 : Major Option 3 : Tall Option 4 : Heavy

Ques 70 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

PROVOCATION (OPPOSITE)

Option 1 : Vocation Option 2 : Pacification Option 3 : Peace Option 4 :
Destruction

Ques 71 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

QUIESCENT (OPPOSITE)

Option 1 : Indifferent Option 2 : Troublesome Option 3 : Weak Option 4 :
Unconcerned

Ques 72 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

VICTORIOUS (OPPOSITE)

Option 1 : Defeated Option 2 : Annexed Option 3 : Destroyed Option 4 :
Vanquished

Ques 73 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

NIGGARDLY (OPPOSITE)

Option 1 : Frugal Option 2 : Thrifty Option 3 : Stingy Option 4 : Generous

Ques 74 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

FRUGAL (OPPOSITE)

Option 1 : Copious Option 2 : Extravagant Option 3 : Generous Option 4 :
Ostentatious

Ques 75 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

**SUBSERVIENT (OPPOSITE)**

Option 1 : Aggressive Option 2 : Straightforward Option 3 : Dignified Option 4 : Supercilious

Ques 76 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

VALUABLE (OPPOSITE)

Option 1 : Invaluable Option 2 : Worthless Option 3 : Inferior Option 4 : Lowly

Ques 77 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

IMPASSIVE (OPPOSITE)

Option 1 : Resurgence Option 2 : Breakthrough Option 3 : Continuation Option 4 : Combination

Ques 78 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

Like poverty, affluence can sometimes create its own problems. (OPPOSITE)

Option 1 : indigence Option 2 : opulence Option 3 : sorrow Option 4 : exuberance

Ques 79 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

I abhor the ideas he sometimes expresses. (OPPOSITE)

Option 1 : admire Option 2 : respect Option 3 : applaud Option 4 : appreciate

Ques 80 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

The members thought that the task was feasible. (OPPOSITE)

Option 1 : impractical Option 2 : impossible Option 3 : difficult Option 4 : impracticable

Ques 81 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

They had an insipid conversation. (OPPOSITE)

Option 1 : lively Option 2 : argumentative Option 3 : loud Option 4 : curious

Ques 82 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

Ram displays enthusiasm whenever he is posed with a problem. (OPPOSITE)

Option 1 : eagerness Option 2 : weakness Option 3 : indifference Option 4 : softness

Ques 83 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

The incessant noise of the boring machine made it difficult for us to go to sleep at night. (OPPOSITE)



Option 1 : intermittent Option 2 : harsh Option 3 : soft Option 4 : constant

Ques 84 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

The leader was pragmatic in her approach to the problem facing the country. (OPPOSITE)

Option 1 : indefinite Option 2 : vague Option 3 : idealistic Option 4 : optimistic

Ques 85 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

She used to disparage her neighbour every now and then. (OPPOSITE)

Option 1 : please Option 2 : praise Option 3 : belittle Option 4 : denigrate

Ques 86 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

PROTRACT (OPPOSITE)

Option 1 : retrace Option 2 : distract Option 3 : curtail Option 4 : expose

Ques 87 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

DECADENT (OPPOSITE)

Option 1 : ethical Option 2 : impetuous Option 3 : succinct Option 4 : lewd

Ques 88 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

HAPLESS (OPPOSITE)

Option 1 : cheerful Option 2 : consistent Option 3 : fortunate Option 4 : shapely

Ques 89 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

ORTHODOXY (OPPOSITE)

Option 1 : renown Option 2 : trepidation Option 3 : unconventionality Option 4 : remoteness

Ques 90 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

SUMPTUOUS (OPPOSITE)

Option 1 : open Option 2 : frequent Option 3 : partial Option 4 : restrained

Ques 91 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

DISSOLUTION (OPPOSITE)

Option 1 : retribution Option 2 : compliance Option 3 : futility Option 4 : establishment

Ques 92 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

STILTED (OPPOSITE)



Option 1 : informal Option 2 : verbose Option 3 : secretive Option 4 : senseless

Ques 93 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

DISPARITY (OPPOSITE)

Option 1 : timidity Option 2 : bigotry Option 3 : likeness Option 4 : influence

Ques 94 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

BELLIGERENT (OPPOSITE)

Option 1 : seditious Option 2 : genial Option 3 : corporal Option 4 : wary

Ques 95 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

BENEDICTION (OPPOSITE)

Option 1 : antidote Option 2 : intonation Option 3 : endowment Option 4 : anathema

Ques 96 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

LISTLESS (OPPOSITE)

Option 1 : energetic Option 2 : confined Option 3 : minuscule Option 4 : enlisted

Ques 97 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

FAR-FETCHED (OPPOSITE)

Option 1 : ingenious Option 2 : facile Option 3 : myopic Option 4 : credible

Ques 98 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

GAUNT (OPPOSITE)

Option 1 : emaciated Option 2 : sombre Option 3 : plump Option 4 : piquant

Ques 99 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

PERT (OPPOSITE)

Option 1 : impudent Option 2 : brash Option 3 : savvy Option 4 : polite

Ques 100 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

PRANKISH (OPPOSITE)

Option 1 : whimsical Option 2 : machiavellian Option 3 : impish Option 4 : serious

Ques 101 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

INGENUITY (OPPOSITE)



Option 1 : skillfulness Option 2 : cunning Option 3 : inventive Option 4 : dullness

Ques 102 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

PHILANTHROPIC (OPPOSITE)

Option 1 : uxorious Option 2 : parsimonious Option 3 : carnal Option 4 : chary

Ques 103 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

AUGUST (OPPOSITE)

Option 1 : gloomy Option 2 : inglorious Option 3 : cherubic Option 4 : affable

Ques 104 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

VANITY (OPPOSITE)

Option 1 : pride Option 2 : humility Option 3 : conceit Option 4 : ostentious

Ques 105 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

TANGIBLE (OPPOSITE)

Option 1 : ethereal Option 2 : concrete Option 3 : actual Option 4 : solid

Ques 106 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

EPILOGUE (OPPOSITE)

Option 1 : dialogue Option 2 : prelude Option 3 : post script Option 4 : epigram

Ques 107 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

PERTINENT (OPPOSITE)

Option 1 : irrational Option 2 : irregular Option 3 : insistent Option 4 : irrelevant

Ques 108 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

STATIONARY (OPPOSITE)

Option 1 : active Option 2 : mobile Option 3 : rapid Option 4 : busy

Ques 109 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

STARTLED (OPPOSITE)

Option 1 : amused Option 2 : relaxed Option 3 : endless Option 4 : astonished

Ques 110 : Select the option that is most nearly **OPPOSITE** in meaning to the given word .

PERENNIAL (OPPOSITE)



Option 1 : frequent Option 2 : regular Option 3 : lasting Option 4 : rare

Ques 111 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) At the end of the year/(B) every student who had done adequate work/(C) was automatically promoted./D) No error.

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)

Ques 112 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) One of the members/(B) expressed doubt if/(C) the Minister was an atheist./D) No error.

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)

Ques 113 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) The meeting adjourned abruptly/(B) by the CEO after/(C) about three hours of deliberation./D) No error

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)

Ques 114 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) You will come/(B) to my party tomorrow,/ (C) isn't it ? /D) No error

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)

Ques 115 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) Do the roses in your garden smell/(B) more sweetly/(C) than those in ours?/D) No error

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)

Ques 116 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) I had hoped to have met him yesterday/(B) to discuss the matter with him/(C) but he was not in his house, and so I could not meet him./D) No error.

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)



Ques 117 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) The retiring principal asked his old pupils/ (B) to take the interest in the school/(C) after he has retired./ (D) No error

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)

Ques 118 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) Hemant persisted/(B) to do it/(C) in spite of my advice/(D) No error.

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)

Ques 119 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) With little patience/(B) you will be able to/(C) cross this hurdle./ (D) No error

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)

Ques 120 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) It is true/(B) that God helps those/(C) who helps themselves./ (D) No error.

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)

Ques 121 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) Umesh is/(B) five years/ (C) senior than me./ (D) No error.

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)

Ques 122 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) Can I lend/(B) your pencil/(C) for a minute, please ?/(D) No error.

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)

Ques 123 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) Ganguly is one of the finest batsmen/ (B) that India have produced/ (C) over the decades./ (D) No error

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)



Ques 124 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) She sang/ (B) very well/(C)isn't it?./ (D) No error.

Option 1 : (A) Option 2 : (B) Option 3 : (C.) Option 4 : (D)

Ques 125 : Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation,if any)

(A) The man told to her/ (B) that he had not brought his dog/ (C) out for a walk as he was afraid that it would rain./ (D) No error

Option 1 : (A) Option 2 : (B) Option 3 : (C) Option 4 : (D)

Ques 126 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

To get one's name in the Rowland Ward's book of hunting records was the *hot ambition* of every serious hunter.

Option 1 : extreme Option 2 : burning Option 3 : reluctant Option 4 : No improvement needed

Ques 127 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

Whatever to our other problems, we have no *shortcoming* to cheap labour in India.

Option 1 : default Option 2 : deficit Option 3 : scarcity Option 4 : No improvement needed

Ques 128 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

Neha was *fined* for careless driving.

Option 1 : got fined Option 2 : fined Option 3 : was to be fined Option 4 : No improvement needed

Ques 129 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

You have come here with a view to *insult me*.

Option 1 : to insulting Option 2 : of insulting Option 3 : for me Option 4 : No improvement needed



Ques 130 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

I would have waited for you at the station if I *knew* that you would come.

- | | | | |
|----------------------|------------------------|-----------------------|----------------------------------|
| Option 1 : had known | Option 2 : was knowing | Option 3 : have known | Option 4 : No improvement needed |
|----------------------|------------------------|-----------------------|----------------------------------|

Ques 131 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

Due to these reason we are all in favour of universal compulsory education.

- | | | | |
|---------------------------------|-------------------------------------|-----------------------------|----------------------------------|
| Option 1 : Out of these reasons | Option 2 : For these <u>reasons</u> | Option 3 : By these reasons | Option 4 : No improvement needed |
|---------------------------------|-------------------------------------|-----------------------------|----------------------------------|

Ques 132 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

When it was feared that the serfs might go too far and gain their freedom from serfdom, the Protestant leaders joined the princes *at crushing* them.

- | | | | |
|--------------------------|------------------------|-----------------------------|----------------------------------|
| Option 1 : into crushing | Option 2 : in crushing | Option 3 : without crushing | Option 4 : No improvement needed |
|--------------------------|------------------------|-----------------------------|----------------------------------|

Ques 133 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

The dissidents *hold* a great problem in every political party.

- | | | | |
|------------------|-----------------|-----------------|----------------------------------|
| Option 1 : cause | Option 2 : give | Option 3 : pose | Option 4 : No improvement needed |
|------------------|-----------------|-----------------|----------------------------------|

Ques 134 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

I shall not go *until* I am invited.

- | | | | |
|------------------------------|---------------------------------------|--------------------------------|----------------------------------|
| Option 1 : till I am invited | Option 2 : unless I am <u>invited</u> | Option 3 : if not I am invited | Option 4 : No improvement needed |
|------------------------------|---------------------------------------|--------------------------------|----------------------------------|

Ques 135 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

They are social insects, *living in communities*, regulated by definite laws, each member of society bearing a well-defined and separate part in the work of a colony.



Option 1 : who are living in communities Option 2 : living among a communities Option 3 : who lives with a communities Option 4 : No improvement needed

Ques 136 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

Please remind me of posting these letters to my relatives.

Option 1 : by posting Option 2 : to post Option 3 : for posting Option 4 : No improvement needed

Ques 137 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

The reason why he wrote the letter was because he could not contact him over the phone.

Option 1 : why he wrote the letter was since Option 2 : for which he wrote the letter was Option 3 : why he wrote the letter was because Option 4 : No improvement needed

Ques 138 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

While crossing the highway a five year old child was knocked out by a passing car.

Option 1 : away Option 2 : up Option 3 : down Option 4 : No improvement needed

Ques 139 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

Not a word they spoke to the unfortunate wife about it.

Option 1 : did they speak Option 2 : they will speak Option 3 : they had spoken Option 4 : No improvement needed

Ques 140 : In the question a part of the sentence is *italicised*. Alternatives to the italicised part is given which may improve the construction of the sentence. Select the correct alternative.

The mother has not seen the child for several months and now eagerly looks forward to seeing him.

Option 1 : looks ahead Option 2 : looks for to Option 3 : looks onto Option 4 : No improvement needed

Ques 141 : Select the correct option that fills the blank to make the sentence meaningfully complete.

The ruling party will have to put its own house order.

Option 1 : in Option 2 : on Option 3 : to Option 4 : into



Ques 142 : Select the correct option that fills the blank to make the sentence meaningfully complete.

Once he has signed the agreement, he won't be able to

Option 1 : back up Option 2 : back in Option 3 : back at Option 4 : back out

Ques 143 : Select the correct option that fills the blank to make the sentence meaningfully complete.

In school many of us never realised the importance that grammar would in later life.

Option 1 : figure Option 2 : portrary Option 3 : play Option 4 : exercise

Ques 144 : Select the correct option that fills the blank to make the sentence meaningfully complete.

'Please' and ' Thank you' are the little courtesies by which we keep the of life oiled and running smoothly.

Option 1 : path Option 2 : machine Option 3 : garden Option 4 : river

Ques 145 : Select the correct option that fills the blank to make the sentence meaningfully complete.

He in wearing the oldfashioned coat inspite of his wife's disapproval.

Option 1 : insists Option 2 : persists Option 3 : desists Option 4 : resists

Ques 146 : Select the correct option that fills the blank to make the sentence meaningfully complete.

Monika is quite intelligent but rather

Option 1 : idealistic Option 2 : generous Option 3 : lazy Option 4 : optimistic

Ques 147 : Select the correct option that fills the blank to make the sentence meaningfully complete.

The boy fell the bicycle.

Option 1 : of Option 2 : off Option 3 : from Option 4 : under

Ques 148 : Select the correct option that fills the blank to make the sentence meaningfully complete.

Ravi put the light and slept.

Option 1 : for Option 2 : down Option 3 : in Option 4 : out

Ques 149 : Select the correct option that fills the blank to make the sentence meaningfully complete.

Radha felt very much grateful . . . her boss for the kindness he had shown in granting her leave.

Option 1 : To Option 2 : For Option 3 : Towards Option 4 : With Option 5 : After

Ques 150 : Select the correct option that fills the blank to make the sentence meaningfully complete.

The consequence of his haughtiness was that his services were dispensed . . . by his master.

Option 1 : About Option 2 : From Option 3 : With Option 4 : Round Option 5 : Up



Ques 151 : Select the correct option that fills the blank to make the sentence meaningfully complete.

Rati just chimes the opinion of her husband and seems to have no mind of her own.

Option 1 : From Option 2 : With Option 3 : In with Option 4 : On about Option 5 : Up with

Ques 152 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

Most children remain school the ages of seven and eight.

Option 1 : In/in Option 2 : At/between Option 3 : Inside/of Option 4 : Under/beyond Option 5 : Beyond/under

Ques 153 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

When Shankar remembered his wife long dead he was moved tears.

Option 1 : For Option 2 : With Option 3 : To Option 4 : Through Option 5 : Off

Ques 154 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

The protracted illness has reduced him skeleton.

Option 1 : Till Option 2 : Round Option 3 : Through Option 4 : To Option 5 : From

Ques 155 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

Social psychology studies the behaviour of human groups organised or unorganised.

Option 1 : With Option 2 : Of Option 3 : In Option 4 : About Option 5 : None of these

Ques 156 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

Because she had a reputation for we were surprised and pleased when she greeted us so

Option 1 : insolence Option 2 : insouciance Option 3 : .irately Option 4 : arrogance Option 5 : .cordially .graciousnessdisdainfully querulousness amiably .affably

Ques 157 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

Raghav is not attracted by the life of the , always wandering through the country-side, begging for charity.

Option 1 : proud Option 2 : noble Option 3 : affluent Option 4 : natural Option 5 : peripatetic almsgiver philanthropist . mendicant . philosopher vagabond

Ques 158 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

Legislation was passed to punish brokers who their clients funds.

Option 1 : Devastate Option 2 : Devour Option 3 : Embezzle Option 4 : Defalcate Option 5 : Dawdled



Ques 159 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

Now that he was prosperous and affluent, he gladly contributed funds to assist the . . . and the disabled.

- | | | | | |
|--------------------|---|---------------------|--------------------------|----------------------|
| Option 1 : Begging | <u>Option 2 :</u>
<u>Impecunious</u> | Option 3 : Penitent | Option 4 :
Impervious | Option 5 : Impetuous |
|--------------------|---|---------------------|--------------------------|----------------------|
-

Ques 160 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

To the dismay of the student body, the class president was . . . berated by the principal at a school assembly.

- | | | | | |
|---------------------------------|----------------------|--------------------------|-------------------------|----------------------------|
| <u>Option 1 : ignominiously</u> | Option 2 : privately | Option 3 : magnanimously | Option 4 : fortuitously | Option 5 : inconspicuously |
|---------------------------------|----------------------|--------------------------|-------------------------|----------------------------|
-

Ques 161 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

The result does not . . . my original conception of the master.

- | | | | | |
|-------------------------------|----------------------|----------------------|----------------------------|--------------------------|
| <u>Option 1 : Accord with</u> | Option 2 : Reconcile | Option 3 : Reconcile | Option 4 : Correspond with | Option 5 : Correspond to |
|-------------------------------|----------------------|----------------------|----------------------------|--------------------------|
-

Ques 162 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

Patriotism, like so many other objects of this imperfect world, is a . . . web of good and evil.

- | | | | | |
|------------------------|----------------------|----------------------|----------------------|---------------------------|
| Option 1 : Complicated | Option 2 : Intricate | Option 3 : Entrapped | Option 4 : Entangled | <u>Option 5 : Tangled</u> |
|------------------------|----------------------|----------------------|----------------------|---------------------------|
-

Ques 163 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

The consequences of the growing materialism of the modern age will be . . .

- | | | | | |
|------------------------|----------------------|------------------------------|----------------------|-----------------------|
| Option 1 : Destructive | Option 2 : Revolting | <u>Option 3 : Disastrous</u> | Option 4 : Unfailing | Option 5 : Compounded |
|------------------------|----------------------|------------------------------|----------------------|-----------------------|
-

Ques 164 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

We were amazed that a man who had been heretofore the most . . . of public speakers could, in a single speech, electrify an audience and bring them cheering to their feet.

- | | | | | |
|------------------------|----------------------------|------------------------------|-----------------------|----------------------|
| Option 1 : enthralling | Option 2 :
accomplished | <u>Option 3 : pedestrian</u> | Option 4 : auspicious | Option 5 : masterful |
|------------------------|----------------------------|------------------------------|-----------------------|----------------------|
-

Ques 165 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

New concerns about growing religious tension in northern India were . . . this week after at least fifty people were killed and hundreds were injured or arrested in rioting between Hindus and Muslims.

- | | | | | |
|---------------------|------------------------|-----------------------|----------------------|--------------------------|
| Option 1 : lessened | Option 2 : invalidated | Option 3 : restrained | Option 4 : dispersed | <u>Option 5 : fueled</u> |
|---------------------|------------------------|-----------------------|----------------------|--------------------------|
-

Ques 166 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

In a revolutionary development in technology, several manufacturers now make biodegradable forms of plastic; some plastic six-pack rings, for example, gradually . . . when exposed to sunlight.

- | | | | | |
|-------------------|---------------------|--------------------|----------------------|-----------------------------|
| Option 1 : harden | Option 2 : stagnate | Option 3 : inflate | Option 4 : propagate | <u>Option 5 : decompose</u> |
|-------------------|---------------------|--------------------|----------------------|-----------------------------|
-



Ques 167 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.

Unlike other examples of . . . verse, Milton's Lycidas does more than merely mourn the death of Edward King: it also denounces corruption in the Church in which King was ordained.

Option 1 : satiric Option 2 : elegiac Option 3 : free Option 4 : humorous Option 5 : didactic

In Japanese art, profound emotion is frequently couched in images of nature, observed with conditioned by life in a land of dramatic seasonal change, where perils of earthquake and typhoon make nature's bounty and its processes awesome and beautiful.

Ques 169 : Select the correct option that fills the blank(s) to make the sentence meaningfully complete.
Because it arrives so early in the season, before many other birds, the robin has been called the of spring.

Option 1 : hostage Option 2 : autocrat Option 3 : compass Option 4 : newcomer Option 5 : harbinger

In place of the more general debate about abstract principles of government that most delegates probably expected, the Constitutional Convention put . . . proposals on the table.

Option 1 : theoretical Option 2 : vague Option 3 : concrete Option 4 : tentative Option 5 : redundant

Ques 171 : In the question, there is a sentence of which some parts have been jumbled up. Re-arrange these parts which are labelled P, Q, R and S to produce the correct sentence. Choose the proper sequence.

It is easy to excuse

P: but it is hard

Q: in a boy of fourteen

R: the mischief of early childhood

S: to tolerate even unavoidable faults

Option 1 : RPQS Option 2 : QRSP Option 3 : QRPS Option 4 : RPSQ

Ques 172 : In the question, there is a sentence of which some parts have been jumbled up. Re-arrange these parts which are labelled P, Q, R and S to produce the correct sentence. Choose the proper sequence.

I saw that

P: but seeing my host in this mood

Q: I deemed it proper to take leave

R: as I had frequently done before

S: it had been my intention to pass the night there

Option 1 : QPSR Option 2 : QRPS Option 3 : SPQR Option 4 : SRPQ

Ques 173 : In the question, there is a sentence of which some parts have been jumbled up. Re-arrange these parts which are labelled P, Q, R and S to produce the correct sentence. Choose the proper sequence.

**People****P: at his dispensary****Q: went to him****R: of all professions****S: for medicine and treatment**

Option 1 : QPRS

Option 2 : RPQS

Option 3 : RQSP

Option 4 : QRPS

Ques 174 : In the question, there is a sentence of which some parts have been jumbled up. Re-arrange these parts which are labelled P, Q, R and S to produce the correct sentence. Choose the proper sequence.

He told us that**P: and enjoyed it immensely****Q: in a prose translation****R: he had read Milton****S: which he had borrowed from his teacher**

Option 1 : RSQP

Option 2 : QRPS

Option 3 : RQSP

Option 4 : RQPS

Ques 175 : In the question, there is a sentence of which some parts have been jumbled up. Re-arrange these parts which are labelled P, Q, R and S to produce the correct sentence. Choose the proper sequence.

We have to**P: as we see it****Q: speak the truth****R: there is falsehood and darkness****S: even if all around us**

Option 1 : RQSP

Option 2 : QRPS

Option 3 : RSQP

Option 4 : QPSR

Ques 176 : In the question, there is a sentence of which some parts have been jumbled up. Re-arrange these parts which are labelled P, Q, R and S to produce the correct sentence. Choose the proper sequence.

It was**P: in keeping with my mood****Q: a soft summer evening****R: as I walked sedately****S: in the direction of the new house**

Option 1 : SRPQ

Option 2 : QRPS

Option 3 : QPRS

Option 4 : SQPR

Ques 177 : In the question each passage consists of six sentences. The first and the sixth sentences are given in the beginning. The middle four sentences have been removed and jumbled up. These are labelled P, Q, R and S. Select the proper order for the four sentences.

S₁: Metals are today being replaced by polymers in many applications.**S₆: Many Indian Institutes of Science and Technology run special programmes on polymer science.****P: Above all, they are cheaper and easier to process, making them a viable alternative to metals.****Q: Polymers are essentially long chains of hydrocarbon molecules.****R: Today polymers are as strong as metals.****S: These have replaced the traditional chromium-plated metallic bumpers in cars.**Option 1 : QRSP

Option 2 : RSQP

Option 3 : RQSP

Option 4 : QRPS



Ques 178 : In the question each passage consists of six sentences. The first and the sixth sentences are given in the beginning. The middle four sentences have been removed and jumbled up. These are labelled P, Q, R and S. Select the proper order for the four sentences.

S₁: The cooperative system of doing business is a good way of encouraging ordinary workers to work hard.

S₆: The main object is to maintain the interest of every member of the society and to ensure that the members participate actively in the projects of the society.

P: If the society is to be well run, it is necessary to prevent insincere officials being elected to the committee which is solely responsible for the running of the business.

Q: They get this from experienced and professional workers who are not only familiar with the cooperative system, but also with efficient methods of doing business.

R: To a large extent, many cooperative societies need advice and guidance.

S: The capital necessary to start a business venture is obtained by the workers' contributions.

Option 1 : SQPR

Option 2 : PQSR

Option 3 : SRQP

Option 4 : PSRQ

Ques 179 : In the question each passage consists of six sentences. The first and the sixth sentences are given in the beginning. The middle four sentences have been removed and jumbled up. These are labelled P, Q, R and S. Select the proper order for the four sentences.

S₁: American private lives may seem shallow.

S₆: This would not happen in China, he said.

P: Students would walk away with books they had not paid for.

Q: A Chinese journalist commented on a curious institution: the library.

R: Their public morality, however, impressed visitors.

S: But in general they returned them.

Option 1 : PSQR

Option 2 : QPSR

Option 3 : RQPS

Option 4 : RPSQ

Ques 180 : In the question each passage consists of six sentences. The first and the sixth sentences are given in the beginning. The middle four sentences have been removed and jumbled up. These are labelled P, Q, R and S. Select the proper order for the four sentences.

S₁: On vacation in Tangier, Morocco, my friend and I sat down at a street cafe.

S₆: Finally a man walked over to me and whispered, "Hey buddy this guy's your waiter and he wants your order."

P: At one point, he bent over with a big smile, showing me a single gold tooth and a dingy face.

Q: Soon I felt the presence of someone standing alongside me.

R: But this one wouldn't budge.

S: We had been cautioned about beggars and were told to ignore them.

Option 1 : SQRP

Option 2 : SQPR

Option 3 : QSRP

Option 4 : QSPR

Ques 181 : In the question each passage consists of six sentences. The first and the sixth sentences are given in the beginning. The middle four sentences have been removed and jumbled up. These are labelled P, Q, R and S. Select the proper order for the four sentences.

S₁: Venice is a strange and beautiful city in the north of Italy.

S₆: This is because Venice has no streets.

P: There are about four hundred old stone bridges joining the island of Venice.

Q: In this city there are no motor cars, no horses and no buses.

R: These small islands are near one another.

S: It is not an island but a hundred and seventeen islands.

Option 1 : PQRS

Option 2 : PRQS

Option 3 : SRPQ

Option 4 : PQSR



Ques 182 : In the question each passage consists of six sentences. The first and the sixth sentences are given in the beginning. The middle four sentences have been removed and jumbled up. These are labelled P, Q, R and S. Select the proper order for the four sentences.

S₁: I keep on flapping my big ears all day.

S₆: Am I not a smart, intelligent elephant ?

P: They also fear that I will flap them all away.

Q: But children wonder why I flap them so.

R: I flap them so to make sure they are safely there on either side of my head.

S: But I know what I am doing.

Option 1 : SRQP

Option 2 : QPSR

Option 3 : QPRS

Option 4 : PSRQ

Ques 183 : In the question each passage consists of six sentences. The first and the sixth sentences are given in the beginning. The middle four sentences have been removed and jumbled up. These are labelled P, Q, R and S. Select the proper order for the four sentences.

S₁: Jawaharlal Nehru was born in Allahabad on 14 Nov, 1889.

S₆: He died on 27 May, 1964.

P: Nehru met Mahatma Gandhi in February, 1920.

Q: In 1905 he was sent to London to study at a school called Harrow.

R: He became the first Prime Minister of Independent India on 15 August, 1947.

S: He married Kamla Kaul in 1915.

Option 1 : QRPS

Option 2 : QSPR

Option 3 : RPQS

Option 4 : SQRP

Option 5 : 4

Ques 184 : In the question each passage consists of six sentences. The first and the sixth sentences are given in the beginning. The middle four sentences have been removed and jumbled up. These are labelled P, Q, R and S. Select the proper order for the four sentences.

S₁: Ms. Parasuram started a petrol pump in Madras.

S₆: Thus she has shown the way for many others.

P: A total of twelve girls now work at the pump.

Q: She advertised in newspapers for women staff.

R: They operate in two shifts.

S: The response was good.

Option 1 : PQSR

Option 2 : SQPR

Option 3 : QSPR

Option 4 : PQRS

Ques 185 : In the question each passage consists of six sentences. The first and the sixth sentences are given in the beginning. The middle four sentences have been removed and jumbled up. These are labelled P, Q, R and S. Select the proper order for the four sentences.

S₁: Politeness is not a quality possessed by only one nation or race.

S₆: In any case, we should not mock at others' habits.

P: One may observe that a man of one nation will remove his hat or fold his hands by way of greetings when he meets someone he knows.

Q: A man of another country will not do so.

R: It is a quality to be found among all peoples and nations in every corner of the earth.

S: Obviously, each person follows the custom of his particular country.

Option 1 : RPQS

Option 2 : RPSQ

Option 3 : PRQS

Option 4 : QPRS



Ques 186 : In the question each passage consists of six sentences. The first and the sixth sentences are given in the beginning. The middle four sentences have been removed and jumbled up. These are labelled P, Q, R and S. Select the proper order for the four sentences.

S₁: There is a difference between Gandhiji's concept of secularism and that of Nehru's.

S₆: Instead of doing any good, such secularism can do harm instead of good.

P: Nehru's idea of secularism was equal indifference to all religions and bothering about none of them.

Q: According to Gandhiji, all religions are equally true and each scripture is worthy of respect.

R: Such secularism which means the rejection of all religions is contrary to our culture and tradition.

S: In Gandhiji's view, secularism stands for equal respect for all religions.

Option 1 : SQPR

Option 2 : PSQR

Option 3 : QSPR

Option 4 : PRSQ

Ques 187 : In the question each passage consists of six sentences. The first and the sixth sentences are given in the beginning. The middle four sentences have been removed and jumbled up. These are labelled P, Q, R and S. Select the proper order for the four sentences.

S₁: Once upon a time an ant lived on the bank of a river.

S₆: She was touched.

P: The dove saw the ant struggling in water in a helpless condition.

Q: All its efforts to come up failed.

R: One day it suddenly slipped into the water.

S: A dove lived in a tree on the bank not far from the spot.

Option 1 : RQSP

Option 2 : QRPS

Option 3 : SRPQ

Option 4 : PQRS

Ques 188 : The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Choose the most logical order of sentences from among the four given choices to construct a coherent paragraph.

1. But, we all helped in the first few days.

2. Chandrapur is considered as a rural area.

3. Manohar was transferred to his office recently.

4. Initially he was not getting adjusted to the city life.

5. Before that he was working in Chandrapur branch of our office.

Option 1 : 54312

Option 2 : 43215

Option 3 : 12345

Option 4 : 35241

Ques 189 : The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Choose the most logical order of sentences from among the four given choices to construct a coherent paragraph.

1. A study to this effect suggests that the average white-collar worker demonstrates only about twenty-five per cent listening efficiency.

2. However, for trained and good listeners it is not unusual to use all the three approaches during a setting, thus improving listening efficiency.

3. There are three approaches to listening: listening for comprehension, listening for empathy and listening for evaluation.

4. Although we spend nearly half of each communication interaction listening, we do not listen well.

5. Each approach has a particular emphasis that may help us to receive and process information in different settings.

Option 1 : 15432

Option 2 : 23451

Option 3 : 35241

Option 4 : 43215



Ques 190 : The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Choose the most logical order of sentences from among the four given choices to construct a coherent paragraph.

- 1. Much of the argument that goes on around the alternative solution occurs because people hold different perceptions of the problem.**
- 2. One of the reasons that Japanese Managers are perceived as making superior decisions compared to Western Managers is that they spend a great deal of effort and time determining that the problem is correctly defined.**
- 3. Unfortunately, too often in the West, Managers assume that the initial definition of the situation is correct.**
- 4. Up to half the time in meetings is spent in asking "Is this the real problem?"**

Option 1 : 2431

Option 2 : 2341

Option 3 : 3241

Option 4 : 1342

Ques 191 : Arrange the sentences A, B, C and D to form a logical sequence between sentences 1 to 6

- 1. Take the case of a child raised under slum conditions, whose parents are socially ambitious and envy families with money, but who nevertheless squander the little they have on drink.**
- A. Common sense would expect that he would develop the value of thrift; he would never again endure the grinding poverty he has experienced as a child.
- B. He may simply be unable in later life to mobilize a drive sufficient to overcome these early conditions.
- C. But infact it is not so.
- D. The exact conditions are too complex but when certain conditions are fulfilled, he will thereafter be a spend thrifit.
- 6. This is what has been observed in a number of cases.**

Option 1 : DCBA

Option 2 : ABCD

Option 3 : ACDB

Option 4 : BACD

Ques 192 : Arrange the sentences A, B, C and D to form a logical sequence between sentences 1 to 6

- 1. The three colonial cities - Calcutta, Bombay and Madras were born at around the same time.**
- A. Sadly today it has also become the most virulent symbol of the violent trends in body politic that is tearing apart the society along suicidal lines.
- B. Of the three, Bombay had been most enterprising in industrial and commercial exploration.
- C. Whether it is one caste against other or the most pervasive of all trends - Hindus against Muslims.
- D. It is indeed a metaphor for modern India.
- 6. This is about two tales of a city.**

Option 1 : ABCD

Option 2 : BACD

Option 3 : BDCA

Option 4 : DABC

Ques 193 : Arrange the sentences A, B, C and D to form a logical sequence between sentences 1 to 6

- 1. Indian golfers contemplating a round or two in China would do well to familiarise themselves with the grazing habits of water buffalo.**
- A. However, it is rare that these bulky beasts of burden meander across the manicured greens of China's golf courses.
- B. Chuangshan - located 90 minutes north of Hongkong was constructed to make the most of the area's natural attributes - an undulating valley ringed by blue mountains.
- C. But it is not very rare to find a bamboo hatted worker excitedly directing a moving hazard.
- D. Particularly not so if it is Chuangshan Hotspring Golf Club.
- 6. Chuangshan is unique for more than a highly picturesque phenomenon.**

Option 1 : ABCD

Option 2 : ACDB

Option 3 : ADCB

Option 4 : ADBC



Ques 194 : Arrange the sentences A, B, C and D to form a logical sequence between sentences 1 to 6

1. Hunger lurks unseen in every village and city of our country.

A. What goes unrecognised is that death of starvation is only the most dramatic manifestation of a much more invisible malaise - of pervasive, stubborn, chronic hunger.

B. Yet it surfaces into public consciousness only transiently, in moments when there are troubling media reports of starvation deaths.

C. Among these are entire communities, utterly disenfranchised and asset less.

D. And, that there are millions of forgotten people in India who live routinely at the very edge of survival, with hunger as a way of everyday life.

6. Like the Musahaars, a proud and savagely oppressed Dalit community in Bihar and Uttar Pradesh, who own not even the land on which their tenuous homesteads are built.

Option 1 : CBAD Option 2 : BDAC Option 3 : ADCB Option 4 : BADC

Ques 195 : Select the word or phrase which best expresses the meaning of the given word.

FACILE

Option 1 : Face Option 2 : Fragile Option 3 : Soft Option 4 : Easily done

Ques 196 : Select the word or phrase which best expresses the meaning of the given word.

APPROBATION

Option 1 : Self-confidence Option 2 : Probe Option 3 : Approval Option 4 : Distress

Ques 197 : Select the word or phrase which best expresses the meaning of the given word.

ASPERSION

Option 1 : Discipline Option 2 : To go away Option 3 : Deceit Option 4 : Slander

Ques 198 : Select the word or phrase which best expresses the meaning of the given word.

BOORISH

Option 1 : Beautiful Option 2 : Distasteful Option 3 : Boring Option 4 : Crude

Ques 199 : Select the word or phrase which best expresses the meaning of the given word.

BLITHE

Option 1 : Disturb Option 2 : Carefree Option 3 : Distress Option 4 : Emotive

Ques 200 : Select the word or phrase which best expresses the meaning of the given word.

CREDULITY

Option 1 : Credible Option 2 : Discipline Option 3 : Gullible Option 4 : Weakness

Ques 201 : Select the word or phrase which best expresses the meaning of the given word.

DELUGE



Option 1 : Delude Option 2 : Fancy Option 3 : Flood Option 4 : Illusion

Ques 202 : Select the word or phrase which best expresses the meaning of the given word.

DISCOURSE

Option 1 : Conversation Option 2 : Speech Option 3 : Function Option 4 : Religion

Ques 203 : Select the word or phrase which best expresses the meaning of the given word.

DISPARATE

Option 1 : Discreet Option 2 : Disturb Option 3 : Different Option 4 : Defame

Ques 204 : Select the word or phrase which best expresses the meaning of the given word.

ENTICE

Option 1 : Flee Option 2 : Enter Option 3 : Trap Option 4 : Tempt

Ques 205 : Select the correct answer option based on the passage.

Why did Spencer have a large enthusiastic following in the United States?

Option 1 : Because he Option 2 : Because his Option 3 : Because Option 4 : None of
believed in Darwin's work was perceived to he was a English these
theory of evolution justify capitalism philosopher

Ques 206 : Select the correct answer option based on the passage.

Which of the following will the author agree to?

Option 1 : Mill, Marx and Option 2 : Spencer is Option 3 : Mill, Option 4 : Mill,
Darwin are more more famous than Mill, Darwin, Marx and Darwin, Marx and
famous than Spencer as Marx and Darwin as of Spencer are equally Parsons are very
of today. today. famous famous today today.

Ques 207 : Select the correct answer option based on the passage.

What does Talcott Parson's statement, "Who now reads Spencer?" imply?

Option 1 : No one read Option 2 : He is asking Option 3 : Everyone Option 4 : None of
Spencer in 1937 a question to his should read Spencer these
students.

Ques 208 : Select the correct answer option based on the passage.

What could possibly "laissez-faire" mean as inferred from the context in which it has been used in the passage?

Option 1 : Restricted Option 2 : Not Option 3 : Option 4 :
interfered by the Unprincipled Uncompetitive
government



Ques 209 : Select the correct answer option based on the passage.

According to the author, why was Spencer so popular in the 19th Century?

Option 1 : He supported capitalism Option 2 : He extended Darwin's theory of evolution to a lot of things. Option 3 : He had one broad and simple idea and many specific ideas flowed from it. Option 4 : He was a friend of Parson's.

Ques 210 : Select the correct answer option based on the passage.

What is the author most likely to agree to in the following?

Option 1 : Darwin's idea of evolution preceded that of Spencer Option 2 : Both Darwin and Spencer got the idea of evolution at the same time. Option 3 : Spencer's idea of the evolution at preceded that of Darwin Option 4 : Darwin and Spencer worked on totally different models of evolution

Ques 211 : Select the correct answer option based on the passage.

What must have been the most-likely response/reaction of the New York audience to Spencer's talk in 1882?

Option 1 : Vindication Option 2 : Surprise Option 3 : Happiness Option 4 : Depression

Ques 212 : Select the correct answer option based on the passage.

Which people is the author referring to in the statement: "people who had limited interest in the finches of the Galápagos"?

Option 1 : People who were not interested in the bird finch Option 2 : People who were not interested in finches in particular from Galapagos. Option 3 : People who were not interested in animal species or natural evolution. Option 4 : People who did not have interest in birds.

Ques 213 : Select the correct answer option based on the passage.

What of the following is true about Christensen and Mead?

Option 1 : They are in complete disagreement Option 2 : They are in partial agreement Option 3 : They are in Option 4 : None of complete agreement these

Ques 214 : Select the correct answer option based on the passage.

What best describes the statement: "Build a worse mousetrap and the world will beat a path to your door." ?

Option 1 : Factual Option 2 : Celebratory Option 3 : Satirical Option 4 : Cynical

Ques 215 : Select the correct answer option based on the passage.

Which of the statements is the author of the passage most likely to agree to?



Option 1 : Internet is a successful instance of Christensen's innovation model.
Option 2 : Internet is an instance of Christensen's model of innovation, but unsuccessful.
 Option 3 : Internet is an instance of Mead's type I innovation, but unsuccessful.
 Option 4 : Internet is an successful instance of Mead's type I innovation.

Ques 216 : Select the correct answer option based on the passage.

According to the author, what is the problem companies had with the internet?

Option 1 : It's quality never improved. Option 2 : It helped the consumers.
Option 3 : The companies could not make money with it. Option 4 : It was an instance of Mead's Type II innovation.

Ques 217 : Select the correct answer option based on the passage.

What does the author imply by the phrase thanks mainly to "The Innovator's Dilemma," in the first paragraph?

Option 1 : The author wants to thank Christenson for writing the book.
Option 2 : The author is obliged to Christenson for writing the book.
Option 3 : The author implies that the phrase "Build a worse..." comes from Christenson's book.
 Option 4 : The author is being sarcastic towards Christenson's book.

Ques 218 : Select the correct answer option based on the passage.

Which segment of society are initial users to Christensen's "disruptive technology" and Type One innovation of Mead?

Option 1 : Economically high and low respectively
Option 2 : Economically low and high respectively
 Option 3 : Both economically low
 Option 4 : Both economically high

Ques 219 : Select the correct answer option based on the passage.

What does 'giddy' mean in context of it's usage in the third paragraph of the passage?

Option 1 : Those suffering of vertigo
 Option 2 : Unhealthy
 Option 3 : Light-hearted
Option 4 : Nervous

Ques 220 : Select the correct answer option based on the passage.

What does the statement of Schumpeter imply?

Option 1 : One should make mail coaches instead of rail roads.
 Option 2 : One should make rail roads instead of mail coaches.
Option 3 : Incremental changes cannot lead to an innovation
 Option 4 : Innovations are irreversible changes.

Ques 221 : Select the correct answer option based on the passage.

What is the author of the passage most likely to agree to?



Option 1 : Social networking has benefited corporate sector to a large extent.

Option 2 : Social networking is not useful for corporate sector.

Option 3 : Social networking may benefit the corporate sector to some extent.

Option 4 : None of these

Ques 222 : Select the correct answer option based on the passage.

According to the author, how does social networking help recruitment?

Option 1 : By increasing the reach in a super-linear fashion.

Option 2 : Making available a larger pool of passive candidates.

Option 3 : Since teenagers are also on the network.

Option 4 : None of these

Ques 223 : Select the correct answer option based on the passage.

Which of the following is an appropriate title for the passage?

Option 1 : Social Networking and Business

Option 2 : Social Networks

Option 3 : Ethics of Social Networking in Business

Option 4 : Social Networking: Pros and Cons

Ques 224 : Select the correct answer option based on the passage.

Which of the following statements is Reid Hoffman most likely to agree to?

Option 1 : Social network is only useful for recruiting.

Option 2 : Social networking has other uses apart from recruiting.

Option 3 : Social networking has not impacted business much.

Option 4 : The prime use of social networking is for Hedge funds.

Ques 225 : Select the correct answer option based on the passage.

What meaning of avid could you infer from the passage?

Option 1 : Dormant

Option 2 : Unprincipled

Option 3 : Unwanted

Option 4 : Enthusiastic

Ques 226 : Select the correct answer option based on the passage.

What is the most probable context in which the author is talking about Pizza Hut?

Option 1 : Social networking did not benefit it.

Option 2 : Social networking was a big success for it.

Option 3 : Social networking created problems for it.

Option 4 : None of these

Ques 227 : Select the correct answer option based on the passage.

Why does the author call Lotus Connections a social software platform?

Option 1 : Because it is used for knowledge management.

Option 2 : It has a feature to allow employees to interact

Option 3 : Because IBM developed it.

Option 4 : Because the service team can get in touch with



and cooperate with
each other.

the right engineers
using it.

Ques 228 : Select the correct answer option based on the passage.

What are the hurdles that social networking has to overcome in order to benefit the business world?

- | | | | |
|--------------------------------------|---------------------------------------|--|--------------------------|
| Option 1 : Issue of confidentiality. | Option 2 : Misalignment of interests. | Option 3 : <u>Misalignment of interests and confidentiality.</u> | Option 4 : None of these |
|--------------------------------------|---------------------------------------|--|--------------------------|
-

Ques 229 : Select the correct answer option based on the passage.

What is the author likely to agree to in the following?

- | | | | |
|--|---|--|--------------------------|
| Option 1 : Some cultures suffer corruptions while others do not. | Option 2 : Social factors incline a society towards corruption. | Option 3 : <u>Bribery is not a cultural phenomena.</u> | Option 4 : None of these |
|--|---|--|--------------------------|
-

Ques 230 : Select the correct answer option based on the passage.

Which of the following the author does not identify as linguistic manifestation of corruption?

- | | | | |
|---------------------------------|------------------------------------|---|--|
| Option 1 : Asking for a favour. | Option 2 : Use of double meanings. | Option 3 : Use of quasi-official terminology. | Option 4 : <u>Relate to food item.</u> |
|---------------------------------|------------------------------------|---|--|
-

Ques 231 : Select the correct answer option based on the passage.

What is bribe generally called in China?

- | | | | |
|----------------------|---------------------|-----------------------------|----------------------|
| Option 1 : Hand-over | Option 2 : Refresco | Option 3 : <u>Envelopes</u> | Option 4 : Baksheesh |
|----------------------|---------------------|-----------------------------|----------------------|
-

Ques 232 : Select the correct answer option based on the passage.

In summary what does the passage primarily suggest and provide evidence for?

- | | | | |
|---|--|---|--|
| Option 1 : <u>Corruption is always concealed in some way, both linguistically and in the process.</u> | Option 2 : Corruption exists only in developing economies. | Option 3 : Corruption is an unethical practice. | Option 4 : Corruption slows down GDP growth. |
|---|--|---|--|
-

Ques 233 : Select the correct answer option based on the passage.

What could be the meaning of the word dissimulation, as can be inferred from the context it is used in first line of the passage?

- | | | | |
|----------------------|--------------------|----------------------|-------------------|
| Option 1 : Hypocrisy | Option 2 : Clarity | Option 3 : Frankness | Option 4 : Insult |
|----------------------|--------------------|----------------------|-------------------|
-

Ques 234 : Select the correct answer option based on the passage.



What best represents the author's attitude towards the rich people in the West?

- Option 1 : Appreciative Option 2 : Mildly critical Option 3 : Heavily critical Option 4 : Mildly appreciative
-

Ques 235 : Select the correct answer option based on the passage.

What is the author most likely to agree to?

- | | | | |
|--|---|--|--------------------------|
| Option 1 : People generally do not try to hide money taken as bribe. | Option 2 : People hide money taken as bribe primarily to avoid detection. | Option 3 : People <u>hide money taken as bribe from view even if detection possibility is low.</u> | Option 4 : None of these |
|--|---|--|--------------------------|
-

Ques 236 : Select the correct answer option based on the passage.

What could be the meaning of the word 'obscurantist' as inferred from the passage?

- Option 1 : Clear Option 2 : Unclear Option 3 : Nasty Option 4 : Polite
-

Ques 237 : Select the correct answer option based on the passage.

Why does the author calls 'progress' as peculiar?

- | | | | |
|---|--|---|--------------------------|
| Option 1 : Because Modern is good and traditional is bad. | Option 2 : Because of its unbalanced nature. | Option 3 : Because it differs politically and personally. | Option 4 : None of these |
|---|--|---|--------------------------|
-

Ques 238 : Select the correct answer option based on the passage.

What do you infer from the sentence -'For some of us, life inbut emotionally and intellectually'?

- | | | | |
|--|---|--|---|
| Option 1 : A person has one leg in one truck and meets with an accident. | Option 2 : A person meets with an accident. | Option 3 : The nation is moving in two different directions. | Option 4 : The nation is suffering from many road accidents |
|--|---|--|---|
-

Ques 239 : Select the correct answer option based on the passage.

How does the author feel about 'Globalisation' in India?

- | | | | |
|--------------------|---------------------|-------------------------|-------------------------------|
| Option 1 : Curious | Option 2 : Hopeless | Option 3 : Enthusiastic | Option 4 : <u>Speculative</u> |
|--------------------|---------------------|-------------------------|-------------------------------|
-

Ques 240 : Select the correct answer option based on the passage.

What does the sentence "We greater like the maturing head of a hammerhead shark with eyes looking in diametrically opposite directions.' implies?

- | | | | |
|--|---|---|---|
| Option 1 : Indian people are barbaric in nature. | Option 2 : We are progressing in some areas and regressing in the others. | Option 3 : India has a diverse culture. | Option 4 : Some people are modern while the others are traditional in approach. |
|--|---|---|---|



Ques 241 : Select the correct answer option based on the passage.

What do you infer from the sentence in context of the passage-'India lives in several centuries at the same time.'?

- | | | | |
|---|---|---|---|
| Option 1 : We are progressing in some areas and regressing in the others. | Option 2 : People from different countries are living in India. | Option 3 : India has a diverse culture. | Option 4 : Some people are modern while the others are traditional in approach. |
|---|---|---|---|

Ques 242 : Select the correct answer option based on the passage.

What do you infer from the following lines-'In the lane behind my house, every night I walk past road gangs of emaciated labourers digging a trench to lay fiber-optic cables to speed up our digital revolution. In the bitter winter cold, they work by the light of a few candles.' ?

- | | | | |
|--|------------------------------------|--|---|
| Option 1 : India has a balanced mixture of both traditional and modern people. | Option 2 : Progress is unbalanced. | Option 3 : Digital revolution is very important for our economic growth. | Option 4 : There is shortage of electricity in India. |
|--|------------------------------------|--|---|

Ques 243 : Select the correct answer option based on the passage.

What does the phrase "cultural insult" imply?

- | | | | |
|---|--|---|-------------------------------------|
| Option 1 : People from one culture do not respect people from the other cultures. | Option 2 : Disrespect of British towards Indian Culture. | Option 3 : White people's definition for treatment at hands us. | Option 4 : Ill-treatment of British |
|---|--|---|-------------------------------------|

Ques 244 : Select the correct answer option based on the passage.

Why does the response towards 'Globalisation in India' differs in different parts of India?

- | | | | |
|--|---|---|---|
| Option 1 : Due to different literacy levels. | Option 2 : Due to religious diversity in India. | Option 3 : It will not benefit all sections of the society. | Option 4 : It may not have all the answers to India's current problems. |
|--|---|---|---|

Ques 245 : Select the correct answer option based on the passage.

What is the phrase 'Sacrificing merit' referring to?

- | | | | |
|---------------------------|---|------------------------------------|--------------------------|
| Option 1 : Killing merit. | Option 2 : Selection on basis of merit. | Option 3 : Encouraging reservation | Option 4 : None of these |
|---------------------------|---|------------------------------------|--------------------------|

Ques 246 : Select the correct answer option based on the passage.

What do you mean by the word 'Egalitarian'?



Option 1 : Characterized by belief in the equality of all people. Option 2 : Characterized by belief in the inequality of all people.
 Option 3 : Another word for reservations.
 Option 4 : Growth in the inequality of all people.

Ques 247 : Select the correct answer option based on the passage.

What does the statement- and not to convert it into a fetish of 'political correctness' in the passage imply?

Option 1 : Reservation issue should not be converted into a political propaganda. Option 2 : Reservation issue should not be converted into a political based on caste alone.
 Option 3 : Reservation issue should be left to the ruling government. Option 4 : None of these.

Ques 248 : Select the correct answer option based on the passage.

What is the author most likely to agree with?

Option 1 : Caste-based reservation is the answer to India's problems. Option 2 : Gender-based reservation is the answer to India's problems.
 Option 3 : There is no solution to bridge the gap between privileged and under-privileged.
 Option 4 : None of these.

Ques 249 : Select the correct answer option based on the passage.

What do you mean by the word 'Votaries'?

Option 1 : Advocates Option 2 : Types Option 3 : Demerits Option 4 : People

Ques 250 : Select the correct answer option based on the passage.

What do you infer from the sentence ' The idea of caste-based reservations is justified by the logic of social justice' ?

Option 1 : Caste-based reservation will help in providing opportunities to the socially backward amongst all classes. Option 2 : Caste-based reservation will lead to social equality. Option 3 : Caste-based reservation will help backward classes actualise their potential. Option 4 : All of these.

Ques 251 : Select the correct answer option based on the passage.

Why does caste-bases reservation system needs to be assessed and audited from time to time?

Option 1 : To measure its economic advantage to the Nation. Option 2 : To make sure that it achieves social justice for all. Option 3 : To do a cost analysis. Option 4 : None of these.

Ques 252 : Select the correct answer option based on the passage.

What is the tone of the passage?



Option 1 : Neutral

Option 2 : Biased

Option 3 :
Celebratory

Option 4 : Critical

Ques 253 : Select the correct answer option based on the passage.

From the passage, what can we conclude about the view of the author about Lord Mountbatten?

Option 1 : Appreciative Option 2 : Sarcastic Option 3 : Neutral Option 4 :
Speculative

Ques 254 : Select the correct answer option based on the passage.

What is the author likely to agree to as the reason for the chaos in the sub-continent in 1947?

Option 1 : Because Gandhi was assassinated	<u>Option 2 : Because the British left the sub-continent in haste.</u>	Option 3 : Because the Hindus and Muslims could not live in peace.	Option 4 : Because Lord Mountbatten was watching a movie on 14th August 1947.
--	--	--	---

Ques 255 : Select the correct answer option based on the passage.

What could possibly "grandiloquence" mean as inferred from the context in which it has been used in the passage?

Option 1 : Grand Party Option 2 : Celebrations Option 3 : Lofty speech Option 4 : Destiny

Ques 256 : Select the correct answer option based on the passage.

What is the author primarily talking about in the article?

Option 1 : Mountbatten's association with India.	Option 2 : Nehru's speech	Option 3 : Gandhi's assassination	<u>Option 4 : The aftermath of the partition.</u>
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Ques 257 : Select the correct answer option based on the passage.

In the view of the author, What does the Nehru's phrase "tryst with destiny" symbolise today?

Option 1 : A celebration of Indian Independence	Option 2 : An inspirational quote	Option 3 : A reminder of Gandhi's assassination	<u>Option 4 : A symbol of the ills of the partition</u>
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Ques 258 : Select the correct answer option based on the passage.

The author persists on talking about the " Bob Hope movie" in the article. Why?

Option 1 : Because the movie was a classic of 1947	Option 2 : He thinks it caused the partition of the sub-continent.	<u>Option 3 : He uses it to show the apathy of Mountbatten's the Britishers towards favourite movie.</u>	Option 4 : It was the sub-continent
--	--	--	-------------------------------------

Ques 259 : Select the correct answer option based on the passage.



What does the author imply about the future of the Pakistan?

- | | | | |
|---|---|---------------------------------------|---|
| Option 1 : It becomes a <u>secular country.</u> | Option 2 : It becomes <u>unsecular.</u> | Option 3 : It is <u>unprosperous.</u> | Option 4 : It becomes a <u>rogue state.</u> |
|---|---|---------------------------------------|---|
-

Ques 260 : Select the correct answer option based on the passage.

Why was Gandhi assassinated?

- | | | | |
|---|---|--|--------------------------|
| Option 1 : Because he was favouring the <u>Muslims.</u> | Option 2 : His assassin <u>thought he was partial to the Muslims.</u> | Option 3 : He got killed in the violence <u>after partition.</u> | Option 4 : None of these |
|---|---|--|--------------------------|
-

Ques 261 : Select the correct answer option based on the passage.

Which of these could you infer according to the passage?

- | | | | |
|--|---|---|----------------------------------|
| Option 1 : Wages in the <u>Developing countries</u> | Option 2 : Wages in the <u>Developing countries</u> | Option 3 : Wages in the <u>Developing countries</u> | Option 4 : None of these |
| <u>are less as compared to</u> countries are more as wages in the <u>developed countries</u> | <u>the Developed countries</u> | <u>countries are same as wages in the developed countries</u> | <u>these developed countries</u> |
-

Ques 262 : Select the correct answer option based on the passage.

What does "American jobs" in the last line of the first paragraph of the passage imply?

- | | | | |
|--|--|--|---|
| Option 1 : Jobs provided by American companies | Option 2 : Jobs held <u>(or to be held) by American people</u> | Option 3 : Jobs open to only American citizens | Option 4 : Jobs provided by the American government |
|--|--|--|---|
-

Ques 263 : Select the correct answer option based on the passage.

According to the passage, why India does not have enough skilled labour?

- | | | | |
|--|--|--|---|
| Option 1 : The total amount of young population is low | Option 2 : The total number of colleges are insufficient | Option 3 : Students do not want to study | Option 4 : Maximum universities and colleges do not match global standards. |
|--|--|--|---|
-

Ques 264 : Select the correct answer option based on the passage.

What can you infer as the meaning of 'stifling' from the passage?

- | | | | |
|-----------------------|--------------------|---------------------|-------------------------|
| Option 1 : Democratic | Option 2 : Liberal | Option 3 : Impeding | Option 4 : Undemocratic |
|-----------------------|--------------------|---------------------|-------------------------|
-

Ques 265 : Select the correct answer option based on the passage.

What is an appropriate title to the passage?



Option 1 : Growing Indian Economy	Option 2 : Higher education in India	<u>Option 3 : India's Skill Shortage</u>	Option 4 : Entrepreneurship in India
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Ques 266 : Select the correct answer option based on the passage.

In the third sentence of the third paragraph of the passage, the phrase "closer to community colleges " is used. What does it imply?

Option 1 : Near to community colleges	<u>Option 2 : Like community colleges</u>	Option 3 : Close association to community colleges	Option 4 : None of these
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Ques 267 : Select the correct answer option based on the passage.

According to the passage, what is the paradox of the Indian economy today?

Option 1 : The economic progress is impressive, but the poor (earning one dollar per day) are not benefited.	<u>Option 2 : The economic progress is impressive disallowing the government to take tough decisions.</u>	Option 3 : There is not enough skilled workforce and the government does not realize this.	Option 4 : Government is not ready to invest in new universities.
--	---	--	---

Ques 268 : Select the correct answer option based on the passage.

Why are salaries for skilled workers rising?

Option 1 : Companies are paying hire to lure skilled people to jobs.	Option 2 : American companies are ready to pay higher to skilled workers.	Option 3 : Entrepreneurship is growing in India.	<u>Option 4 : There is not enough skilled workers, while the demand for them is high.</u>
--	---	--	---

Ques 269 : Select the correct answer option based on the passage.

What is the experimental approach being discussed in the first paragraph?

<u>Option 1 : Word of mouth Marketing</u>	Option 2 : Selling of video-game consoles, bottled water and electric toothbrushes	Option 3 : Traditional Advertising	Option 4 : None of these
---	--	------------------------------------	--------------------------

Ques 270 : Select the correct answer option based on the passage.

What is the tone of the passage?

<u>Option 1 : Neutral</u>	Option 2 : Biased	Option 3 : Celebratory	Option 4 : Critical
---------------------------	-------------------	------------------------	---------------------

Ques 271 : Select the correct answer option based on the passage.

What can we infer from Walter Carl's statement?

Option 1 : Amway and Tupperware are	Option 2 : Amway and Tupperware are	<u>Option 3 : Amway and Tupperware are</u>	Option 4 : None of these
-------------------------------------	-------------------------------------	--	--------------------------



products where word of consumers who mouth marketing could appreciated word of be used. mouth marketing.

companies who use word of mouth marketing.

Ques 272 : Select the correct answer option based on the passage.

What is the effect of internet on Word-of-mouth marketing?

Option 1 : It is impeded by the internet.	<u>Option 2 : It is encouraged by the internet.</u>	Option 3 : Internet magnifies the moral issues of this marketing technique.	Option 4 : Internet has made it obsolete.
---	---	---	---

Ques 273 : Select the correct answer option based on the passage.

According to the passage, in what order did different companies use word of mouth marketing?

Option 1 : Nintendo before Sony, Nestle and Philips.	<u>Option 2 : Nintendo after Sony, Nestle and Philips.</u>	Option 3 : Nintendo, Sony, Nestle and Philips: all at the same time.	Option 4 : None of these
--	--	--	--------------------------

Ques 274 : Select the correct answer option based on the passage.

According to Peter Kim, what happened to Microsoft's marketing campaign for Vista?

Option 1 : It succeeded	Option 2 : It succeeded with some hiccups	<u>Option 3 : It failed</u>	Option 4 : None of these
-------------------------	---	-----------------------------	--------------------------

Ques 275 : Select the correct answer option based on the passage.

Where does BzzAgent operate?

Option 1 : USA and India	<u>Option 2 : USA and UK</u>	Option 3 : USA only	Option 4 : None of these
--------------------------	------------------------------	---------------------	--------------------------

Ques 276 : Select the correct answer option based on the passage.

What is the author most likely to agree to in the following?

Option 1 : There is not enough evidence to state that word-of-mouth marketing is useful.	<u>Option 2 : There is enough evidence to state that word-of-mouth marketing is useful.</u>	Option 3 : Evidence shows that word of mouth marketing is a unethical.	Option 4 : Word of mouth marketing is a failed technique.
--	---	--	---

See Passage Above



Ques 277 : Select the correct answer option based on the passage.

Who are the 'new breed of Maharajas' ?

- | | | | |
|--|---|---|--------------------------|
| Option 1 : Maharajas who recovered their wealth in 2004. | Option 2 : The children of the older Maharajas. | Option 3 : The new class of rich people which emerged in India post liberalisation. | Option 4 : None of these |
|--|---|---|--------------------------|
-

Ques 278 : Select the correct answer option based on the passage.

What is the author most likely to agree to as the reason for the inflow of luxury good groups in India?

- | | | | |
|--|---|---|--------------------------|
| Option 1 : The fast growth in Indian economy leading to bright future prospects. | Option 2 : To serve 'the new breed of maharajas'. | Option 3 : To serve the tiny fraction of high income groups in India. | Option 4 : None of these |
|--|---|---|--------------------------|
-

Ques 279 : Select the correct answer option based on the passage.

Why do different rules apply to Wal-Mart and luxury good firms?

- | | | | |
|---|--|--|--|
| Option 1 : India is encouraging luxury goods while it doesn't encourage Wal-Mart. | Option 2 : India is an attractive market for luxury goods. | Option 3 : There are different rules for retail firms and those that sell their own product. | Option 4 : India does not have a flourishing counterfeit industry. |
|---|--|--|--|
-

Ques 280 : Select the correct answer option based on the passage.

What does Devyani Raman's statement imply?

- | | | | |
|--|--|--|--------------------------|
| Option 1 : Beautiful clothes are an important luxury item and should be taken care of. | Option 2 : The luxury goods market is becoming disorganized. | Option 3 : The supply of beautiful clothes is these very high. | Option 4 : None of these |
|--|--|--|--------------------------|
-

Ques 281 : Select the correct answer option based on the passage.

What could be the meaning of the word modish, as can be inferred from the context it is used in first line of the passage?

- | | | | |
|-------------------------|--------------------|----------------|----------------------|
| Option 1 : Unattractive | Option 2 : Stylish | Option 3 : New | Option 4 : Beautiful |
|-------------------------|--------------------|----------------|----------------------|
-

Ques 282 : Select the correct answer option based on the passage.

What is the author most likely to agree to?

- | | | | |
|---|---|--|--------------------------|
| Option 1 : The current number of dollar millionaires in India is very high. | Option 2 : The current number of dollar millionaires in India is low. | Option 3 : The current number of dollar millionaires in India match world average. | Option 4 : None of these |
|---|---|--|--------------------------|
-



Ques 283 : Select the correct answer option based on the passage.

What is a good estimate of the middle class population in India today as inferred from the passage?

Option 1 : 583m Option 2 : 100,000 Option 3 : 58m Option 4 : 300m

Ques 284 : Select the correct answer option based on the passage.

According to the author, which of these is not a problem for the luxury good firms in the Indian market?

Option 1 : High import duty. Option 2 : Difficulty in finding retail space. Option 3 : Restriction on firms to enter Indian markets. Option 4 : All of these

Ques 285 : Select the correct answer option based on the passage.

What could be the meaning of the word panacea in the passage?

Option 1 : Solution Option 2 : Problem Option 3 : Solution to all problems. Option 4 : Sustainable solution

Ques 286 : Select the correct answer option based on the passage.

Why, according to the author, should microfinance be scaled up in India?

Option 1 : The demand for microfinance is high. Option 2 : It is a market-based anti-poverty solution. Option 3 : It is sustainable. Option 4 : Both 1 and 2. Option 5 : 1, 2 and 3.

Ques 287 : Select the correct answer option based on the passage.

Why are saving products not available?

Option 1 : Due to inflexibility of loan products. Option 2 : Due to regulatory restrictions. Option 3 : Since insurance services are not available. Option 4 : Saving products are not available.

Ques 288 : Select the correct answer option based on the passage.

Why does the author talk about the 'entrepreneurial talent of poor' in the concluding paragraph?

<u>Option 1 : Entrepreneurship among poor is encouraged by microfinance.</u>	Option 2 : Entrepreneurship among poor is an alternate to microfinance.	Option 3 : Entrepreneurship among poor is discouraged by microfinance.	Option 4 : None of these
--	---	--	--------------------------

Ques 289 : Select the correct answer option based on the passage.

Which of the following is not a challenge faced by microfinance in India?

<u>Option 1 : Does not help the poorest.</u>	Option 2 : Efficient when economy of scale is achieved.	Option 3 : Non-conducive policy environment.	Option 4 : Structural problems of Indian society.
--	---	--	---

Ques 290 : Select the correct answer option based on the passage.



Which of the following is correct with regard to microfinance?

Option 1 : The supply is Option 2 : The demand Option 3 : The supply Option 4 : None of more than demand. is more than supply. and demand are well balanced. inferred from the passage.

Ques 291 : Select the correct answer option based on the passage.

What is the author's view about interest rates?

Option 1 : The government should set them.	Option 2 : There should be transparency with regard to them.	Option 3 : The market forces should set them.	Option 4 : Both 1 and 2.	<u>Option 5 : Both 2 and 3.</u>
--	--	---	--------------------------	---------------------------------

Ques 292 : Select the correct answer option based on the passage.

Which of the following will the author agree to?

Option 1 : Indian economy growth will solve the problem of poverty.	<u>Option 2 : Indian economy growth is not enough to solve the problem of poverty.</u>	Option 3 : Indian economy growth aggravates the problem of poverty.	Option 4 : None of these
---	--	---	--------------------------

Ques 293 : Select the correct answer option based on the passage.

Which of the following will Dr. George agree to?

Option 1 : The girl child is as safe in the mother's womb as after birth.	Option 2 : The girl child is more safe in the mother's womb in comparison to after birth.	<u>Option 3 : The girl child is more safe after birth as compared to the mother's womb.</u>	Option 4 : None of these
---	---	---	--------------------------

Ques 294 : Select the correct answer option based on the passage.

What is the solution to the problem of female foeticide as envisioned by Dr. Bedi?

Option 1 : Effective use of law.	<u>Option 2 : Mass public outrage.</u>	Option 3 : Comparison with Nithari killing.	Option 4 : Contempt towards doctors.
----------------------------------	--	---	--------------------------------------

Ques 295 : Select the correct answer option based on the passage.

What is the tone of the passage?

<u>Option 1 : Factual</u>	Option 2 : Biased	Option 3 : Aggressive	Option 4 : Sad
---------------------------	-------------------	-----------------------	----------------

Ques 296 : Select the correct answer option based on the passage.

What is Akhila Sivadas's opinion on the PCPNDT act?

Option 1 : The act is inconsistent.	Option 2 : The act needs reform.	Option 3 : The act encourages demand for foeticide.	<u>Option 4 : The act is sound, but needs enforcement.</u>
-------------------------------------	----------------------------------	---	--



Ques 297 : Select the correct answer option based on the passage.

What does the word sanitised imply in the first paragraph of the passage?

Option 1 : Unforgivable Option 2 : Legitimate Option 3 : Free from Option 4 : None of
dirt these

Ques 298 : Select the correct answer option based on the passage.

What is the doctors' explanation for foeticide?

Option 1 : They think it Option 2 : They do it because people demand it. Option 3 : The technology is available and there is no harm using it. Option 4 : None of these

Ques 299 : Select the correct answer option based on the passage.

Which of the two people mentioned in the passage suggest similar solution to the problem?

Option 1 : Dr. Agnihotri Option 2 : Dr. Bedi and Option 3 : Dr. George Option 4 : Dr. and Dr. George Dr. Agnihotri and Dr. Bedi George and Miss Sivadas

Ques 300 : Select the correct answer option based on the passage.

Which "demand" does the author refer to, in paragraph 5?

Option 1 : Demand for principled doctors. Option 2 : Demand for high income jobs for women. Option 3 : Demand for youth icons. Option 4 : Demand for sex determination and abortion.

In the following question select the word which is OPPOSITE in the meaning of the given word.

Q301. INDISCREET

- a. reliable
- b. honest
- c. prudent
- d. stupid

Q302. SOLICITUDE

- a. insouciance
- b. ingenuity
- c. propriety
- d. austerity

Q303. In the sentence there is a bold word or phrase. One of the words or phrases given in the options conveys almost the same meaning as the bold word or phrase in the sentence. Select that option which is nearest in meaning.

It is preposterous on your part to look for a job without first completing your education.



- a. Wise
- b. Imperative
- c. Advisable
- d. Most admirable
- e. Very absurd

In the following question, fill in the blank space.

Q304. The success that he has gained, though striking enough, does not, however, commensurate the efforts made by him.

- a. About
- b. From
- c. With
- d. Beside
- e. Over

Q305. Vinod took his meals after he

- a. Had completed his work
- b. Had been completing his work
- c. Was completing his work
- d. Had been completed his work
- e. Had got completed his work

In the following questions, select the word or phrase that is similar in meaning to the given word.

Q306. Nonchalance

- a. Neutrality
- b. Indifference
- c. All-knowing
- d. Ignorance
- e. Untimeliness

Q307. Conceal

- a. Hide
- b. Seal
- c. Ceiling
- d. Horrifying

Q308. Read the sentence to find out whether there is any grammatical error in it. The error, if any, will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore - the errors of punctuation, if any)

(A) The whole thing moves/ (B) around the concept of building a small dynamic/(C) organisation into a larger one./ (D) No error.

- a. (A)
- b. (B)
- c. (C)



d. (D)

Q309. In the question a part of the sentence is italicised. Alternatives to the italicised part is given which may improve the sentence. Choose the correct alternative. In case no improvement is needed. Option 'D' is the answer.

She gave most of her time to music.

- a. spent
- b. lent
- c. devoted
- d. No improvement

Q310. The given sentences when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Choose the most logical order of sentences from among the four given choices to construct a coherent paragraph.

1. He was so busy with them that he did not get time to eat. 2. Thousands of people came to him and asked different types of questions. 3. No one cared to see that he had his food or rest that night. 4. Swami Vivekanand once stayed in a small village.

- a. 2341
- b. 3214
- c. 4213
- d. 4231

Answer the question based on the given passage

Management is a set of processes that can keep a complicated system of people and technology running smoothly. The most important aspects of management include planning,budgeting, organising, staffing, controlling, and problem-solving. Leadership is a set ofprocesses that creates organisations in the first place or adapts them to significantly changingcircumstances. Leadership defines what the future should look like, aligns people with thatvision, and inspires them to make it happen despite the obstacles. This distinction is absolutely crucial for our purposes here: Successful transformation is 70 to 90 percent leadership and only 10 to 30 percent management. Yet for historical reasons, many organisations today don't have much leadership. And almost everyone thinks about the problem here as one of managing change. For most of this country, as we created thousands

and thousands of large organisations for the first time in human history, we didn't have enough good managers to keep all those bureaucracies



functioning. So many companies and universities developed management programs and hundreds and thousands of people were encouraged to learn management on the job. And they did. But, people were taught little about leadership. To some degree, management was emphasised because it's easier to teach than leadership. But even more so, management was the main item on the twentieth-century agenda because that's what was needed. For every entrepreneur or business builder who was a leader, we needed hundreds of managers to run their ever-growing enterprises. Unfortunately for us today, this emphasis on management has often been institutionalised in corporate cultures that discourage employees from learning how to lead. Ironically, past success is usually the key ingredient in producing this outcome. The syndrome, as I have observed it on many occasions, goes like this: success creates some degree of marked dominance which in turn produces much growth. After a while keeping the ever-larger organisation under control becomes the primary challenge. So attention turns inward and managerial competencies are nurtured. With a strong emphasis on management but not leadership, bureaucracy and an inward focus takeover. But with continuedsuccess, the result mostly of market dominance, the problem often goes unaddressed and an unhealthy arrogance begins to evolve. All of these characteristics then make any transformation effort much more difficult. Arrogant managers can over-evaluate their current performance and competitive position, listen poorly and learn slowly. Inwardly focused employees can have difficulty seeing the very forces that present threats and opportunities. Bureaucratic cultures can smother those who want to respond to shifting conditions. And the lack of leadership leaves no force inside these organisations to break out of the morass.

Q311. Why did companies and universities develop programmes to prepare managers in such a large number?

- a. (A) Companies and universities wanted to generate funds through these programmes
- b. (B) The large number of organisations were created as they needed managers in good



number

- c. (C) Organisations did not want to spend their scarce resources in training managers
- d. (D) Organisations wanted to create communication network through trained managers

Q312. How has the author defined management?

- a. It is the process of adapting organisations to changing circumstances.
- b. It is the system of aligning people with the direction it has taken.
- c. It refers to creating a vision to help direct the change effectively.
- d. Creating better performance through customer orientation.

Q313. What is the historical reason for many organisations not having leadership?

- a. A view that leaders are born, they are not made
- b. Leaders lack managerial skills and organisations need managers
- c. Leaders are weak in carrying out traditional functions of management
- d. Leaders allow too much complacency in organisations

Q314. Which of the following characteristics help organisations in their transformation efforts?

- a. Emphasis on leadership but not management
- b. A strong and dogmatic culture
- c. Bureaucratic and inward looking approach
- d. Failing to acknowledge the value of customers and shareholders

Q315. Which of the following is similar in meaning of the word 'smother' as used in the passage?

- a. Suppress
- b. Encourage
- c. Instigate
- d. Criticise

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List of Content

- Basic Programming
 - Data Types
 - Iteration, Recursion, Decision
 - Procedure, functions and scope
- Data Structures
 - Arrays, Linked Lists, Trees, Graphs
 - Stacks, Queues
 - Hash Tables
 - Heaps
- OOPs
 - Polymorphism
 - Abstraction
 - Encapsulation
- Miscellaneous
 - Sorting

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1. Basic Programming

1.1 Data Type in C

In the C programming language, data types refer to an extensive system used for declaring variables or functions of different types. The type of a variable determines how much space it occupies in storage and how the bit pattern stored is interpreted.

The types in C can be classified as follows:

S.N.	Types and Description
1	Basic Types: They are arithmetic types and consists of the two types: (a) integer types and (b) floating-point types.
2	Enumerated types: They are again arithmetic types and they are used to define variables that can only be assigned certain discrete integer values throughout the program.
3	The type void: The type specifier <i>void</i> indicates that no value is available.
4	Derived types: They include (a) Pointer types, (b) Array types, (c) Structure types, (d) Union types and (e) Function types.

The array types and structure types are referred to collectively as the aggregate types. The type of a function specifies the type of the function's return value. We will see basic types in the following section, whereas, other types will be covered in the upcoming chapters.

Following table gives you details about standard integer types with its storage sizes and value ranges:

Type	Storage size	Value range
char	1 byte	-128 to 127 or 0 to 255
unsigned char	1 byte	0 to 255



signed char	1 byte	-128 to 127
int	2 or 4 bytes	-32,768 to 32,767 or -2,147,483,648 to 2,147,483,647
unsigned int	2 or 4 bytes	0 to 65,535 or 0 to 4,294,967,295
short	2 bytes	-32,768 to 32,767
unsigned short	2 bytes	0 to 65,535
long	4 bytes	-2,147,483,648 to 2,147,483,647
unsigned long	4 bytes	0 to 4,294,967,295

1.2 Iteration, Recursion, Decision

❖ What is Iteration ?

Iteration, in the context of computer programming, is a process wherein a set of instructions or structures are repeated in a sequence a specified number of times or until a condition is met. When the first set of instructions is executed again, it is called an iteration. When a sequence of instructions is executed in a repeated manner, it is called a loop.

Eg. for (int i=0;i<1000;i++)
{
\\Print first name and last name from table
}

❖ What is Recursion ?

Recursion is the process of repeating items in a self-similar way. Same applies in programming languages as well where if a programming allows you to call a function inside the same function that is called recursive call of the function as follows.

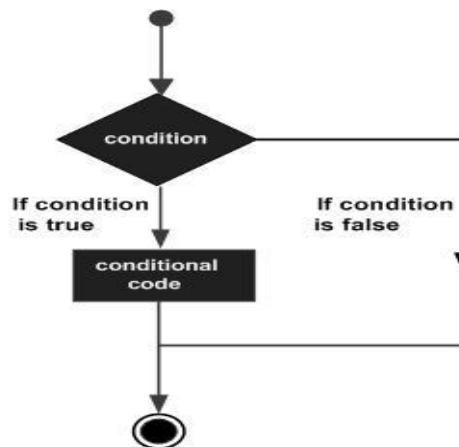
Eg.

```
void recursion()  
{  
    recursion(); /* function calls itself */  
}  
  
int main()  
{  
    recursion();  
}
```



❖ What is Decision ?

Decision making structures require that the programmer specify one or more conditions to be evaluated or tested by the program, along with a statement or statements to be executed if the condition is determined to be true, and optionally, other statements to be executed if the condition is determined to be false.



1.3 Procedure, functions and scope

❖ What is Procedure ?

A procedure is a set of rules to follow which, if they conclude, produce some result. An algorithm is also such a sequence, but an algorithm is guaranteed to terminate whereas a procedure offers no such guarantee.

❖ What is Function ?

In programming, a function is a segment that groups code to perform a specific task.

A C program has at least one function main(). Without main() function, there is technically no C program.

Types of C functions

Basically, there are two types of functions in C on basis of whether it is defined by user or not.

- Library function
- User defined function

Library function

Library functions are the in-built function in C programming system. For example:

main()

- The execution of every C program starts from this main() function.



`printf()`

- `printf()` is used for displaying output in C.

`scanf()`

- `scanf()` is used for taking input in C.

Visit this page to learn more about library functions in C programming language.

User defined function

C allows programmer to define their own function according to their requirement. These types of functions are known as user-defined functions. Suppose, a programmer wants to find factorial of a number and check whether it is prime or not in same program. Then, he/she can create two separate user-defined functions in that program: one for finding factorial and other for checking whether it is prime or not.

How user-defined function works in C Programming?

```
#include <stdio.h>
void function_name(){
.....
.....
}
int main(){
.....
.....
function_name();
.....
.....
}
```

As mentioned earlier, every C program begins from `main()` and program starts executing the codes inside `main()` function. When the control of program reaches to `function_name()` inside `main()` function. The control of program jumps to `void function_name()` and executes the codes inside it. When all the codes inside that user-defined function are executed, control of the program jumps to the statement just after `function_name()` from where it is called. Analyze the figure below for understanding the concept of function in C programming. Visit this page to learn in detail about user-defined functions.

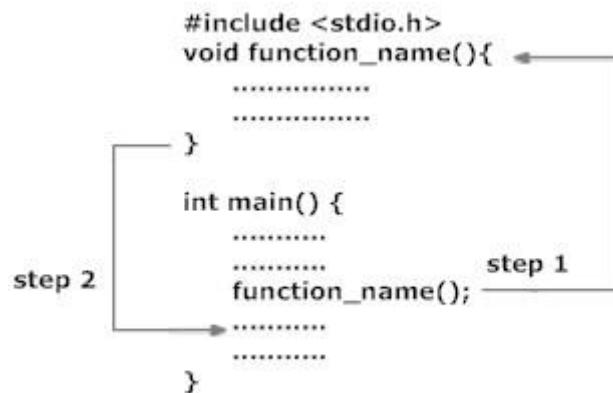


Fig: Working of Functions

Remember, the function name is an identifier and should be unique.

★ C - Scope Rules:

A scope in any programming is a region of the program where a defined variable can have its existence and beyond that variable can not be accessed. There are three places where variables can be declared in C programming language:

1. Inside a function or a block which is called **local** variables,
2. Outside of all functions which is called **global** variables.
3. In the definition of function parameters which is called **formal** parameters.

Let us explain what are **local** and **global** variables and **formal** parameters.

Local Variables

Variables that are declared inside a function or block are called local variables. They can be used only by statements that are inside that function or block of code. Local variables are not known to functions outside their own. Following is the example using local variables. Here all the variables a, b and c are local to main() function.

```

#include <stdio.h>

int main ()
{
    /* local variable declaration */
    int a, b;
    int c;

    /* actual initialization */
    a = 10;
    b = 20;
    c = a + b;

    printf ("value of a = %d, b = %d and c = %d\n", a, b, c);

    return 0;
}
    
```



Global Variables

Global variables are defined outside of a function, usually on top of the program. The global variables will hold their value throughout the lifetime of your program and they can be accessed inside any of the functions defined for the program.

A global variable can be accessed by any function. That is, a global variable is available for use throughout your entire program after its declaration. Following is the example using global and local variables:

```
#include <stdio.h>

/* global variable declaration */
int g;

int main ()
{
    /* local variable declaration */
    int a, b;

    /* actual initialization */
    a = 10;
    b = 20;
    g = a + b;

    printf ("value of a = %d, b = %d and g = %d\n", a, b, g);

    return 0;
}
```

A program can have same name for local and global variables but value of local variable inside a function will take preference. Following is an example:

```
#include <stdio.h>

/* global variable declaration */
int g = 20;

int main ()
{
    /* local variable declaration */
    int g = 10;

    printf ("value of g = %d\n", g);

    return 0;
}
```

When the above code is compiled and executed, it produces the following result:

```
value of g = 10
```

Formal Parameters

Function parameters, formal parameters, are treated as local variables with-in that function and they will take preference over the global variables. Following is an example:



```
#include <stdio.h>

/* global variable declaration */
int a = 20;

int main ()
{
    /* local variable declaration in main function */
    int a = 10;
    int b = 20;
    int c = 0;

    printf ("value of a in main() = %d\n", a);
    c = sum(a, b);
    printf ("value of c in main() = %d\n", c);

    return 0;
}

/* function to add two integers */
int sum(int a, int b)
{
    printf ("value of a in sum() = %d\n", a);
    printf ("value of b in sum() = %d\n", b);

    return a + b;
}
```

When the above code is compiled and executed, it produces the following result:

```
value of a in main() = 10
value of a in sum() = 10
value of b in sum() = 20
value of c in main() = 30
```

Initializing Local and Global Variables

When a local variable is defined, it is not initialized by the system, you must initialize it yourself. Global variables are initialized automatically by the system when you define them as follows:

Data Type	Initial Default Value
int	0
char	'\0'
float	0
double	0
pointer	NULL

It is a good programming practice to initialize variables properly otherwise, your program may produce unexpected results because uninitialized variables will take some garbage value already available at its memory location.



2. Data Structures

2.1 Arrays, Linked Lists, Trees, Graphs

❖ Arrays in C:

In C programming, one of the frequently arising problem is to handle similar types of data. For example: If the user want to store marks of 100 students. This can be done by creating 100 variable individually but, this process is rather tedious and impracticable. These type of problem can be handled in C programming using arrays.

An array is a sequence of data item of homogeneous value(same type).

Arrays are of two types:

1. One-dimensional arrays
2. Multidimensional arrays

Declaration of one-dimensional array

```
data_type array_name[array_size];
```

For example:

```
int age[5];
```

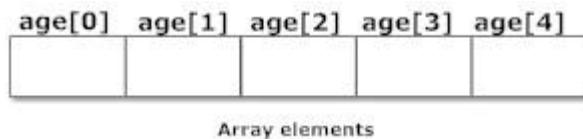
Here, the name of array is *age*. The size of array is 5,i.e., there are 5 items(elements) of array *age*. All element in an array are of the same type (int, in this case).

Array elements

Size of array defines the number of elements in an array. Each element of array can be accessed and used by user according to the need of program.

For example:

```
int age[5];
```



Note that, the first element is numbered 0 and so on.

Here, the size of array *age* is 5 times the size of int because there are 5 elements.



Suppose, the starting address of age[0] is 2120d and the size of int be 4 bytes. Then, the next address (address of a[1]) will be 2124d, address of a[2] will be 2128d and so on.

Initialization of one-dimensional array:

Arrays can be initialized at declaration time in this source code as:

```
int age[5]={2,4,34,3,4};
```

It is not necessary to define the size of arrays during initialization.

```
int age[]={2,4,34,3,4};
```

In this case, the compiler determines the size of array by calculating the number of elements of an array.

age[0]	age[1]	age[2]	age[3]	age[4]
2	4	34	3	4

Initialization of one-dimensional array

Accessing array elements

In C programming, arrays can be accessed and treated like variables in C.

For example:

```
scanf("%d",&age[2]);
/* Statement to insert value in the third element of array age[]. */

scanf("%d",&age[i]);
/* Statement to insert value in (i+1)th element of array age[]. */
/* Because, the first element of array is age[0], second is age[1], ith is age[i-1] and (i+1)th is age[i]. */

printf("%d",age[0]);
/* Statement to print first element of an array. */

printf("%d",age[i]);
/* Statement to print (i+1)th element of an array. */
```

Example of array in C programming

```
/* C program to find the sum marks of n students using arrays */

#include <stdio.h>
int main(){
    int marks[10],i,n,sum=0;
    printf("Enter number of students: ");
    scanf("%d",&n);
    for(i=0;i<n;++i){
```



```

printf("Enter marks of student%d: ",i+1);
scanf("%d",&marks[i]);
sum+=marks[i];
}
printf("Sum= %d",sum);
return 0;
}

```

Output

```

Enter number of students: 3
Enter marks of student1: 12
Enter marks of student2: 31
Enter marks of student3: 2
sum=45

```

Important thing to remember in C arrays

Suppose, you declared the array of 10 students. For example: arr[10]. You can use array members from arr[0] to arr[9]. But, what if you want to use element arr[10], arr[13] etc. Compiler may not show error using these elements but, may cause fatal error during program execution.

Initialization of Multidimensional Arrays

In C, multidimensional arrays can be initialized in different number of ways.

```

int c[2][3]={{{1,3,0}, {-1,5,9}}};
    OR
int c[][3]={{1,3,0}, {-1,5,9}};
    OR
int c[2][3]={1,3,0,-1,5,9};

```

Initialization Of three-dimensional Array

```

double cprogram[3][2][4]={
{{{-0.1, 0.22, 0.3, 4.3}, {2.3, 4.7, -0.9, 2}},
 {{0.9, 3.6, 4.5, 4}, {1.2, 2.4, 0.22, -1}},
 {{8.2, 3.12, 34.2, 0.1}, {2.1, 3.2, 4.3, -2.0}}}
};

```

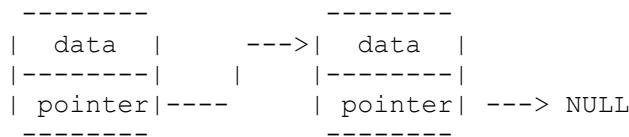
Suppose there is a multidimensional array arr[i][j][k][m]. Then this array can hold $i \times j \times k \times m$ numbers of data.

Similarly, the array of any dimension can be initialized in C programming.



★ Linked List in C:

A linked list is a complex data structure, especially useful in systems or applications programming. A linked list is comprised of a series of nodes, each node containing a data element, and a pointer to the next node, eg,



A structure which contains a data element and a pointer to the next node is created by,

```

struct list {
    int value;
    struct list *next;
};

```

This defines a new data structure called *list* (actually the definition of a node), which contains two members. The first is an integer called *value*. The second is called *next*, which is a pointer to another list structure (or node). Suppose that we declare two structures to be of the same type as *list*, eg,

```
struct list n1, n2;
```

The next pointer of structure *n1* may be set to point to the *n2* structure by

```

/* assign address of first element in n2 to the pointer next of the
n1 structure */
n1.next = &n2;

```

which creates a link between the two structures.

```

/* LLIST.C Program to illustrate linked lists */
#include <stdio.h>
struct list {
    int value;
    struct list *next;
};

main()
{
    struct list n1, n2, n3;
    int i;

    n1.value = 100;
    n2.value = 200;

```



```

n3.value = 300;
n1.next = &n2;
n2.next = &n3;
i = n1.next->value;
printf("%d\n", n2.next->value);
}

```

Not only this, but consider the following

```

n1.next = n2.next      /* deletes n2 */
n2_3.next = n2.next;   /* adds struct n2_3 */
n2.next = &n2_3;

```

In using linked list structures, it is common to assign the value of 0 to the last pointer in the list, to indicate that there are no more nodes in the list, eg,

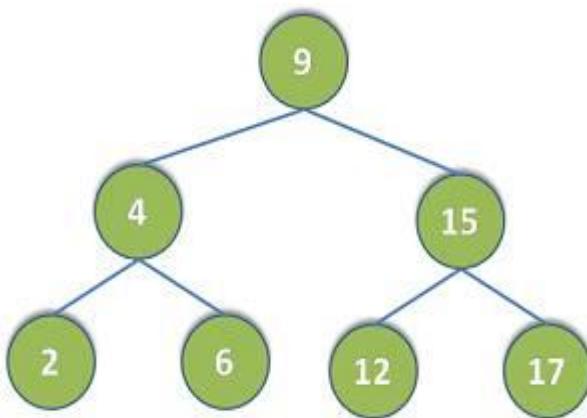
```
n3.next = 0;
```

Tree,Graph:

Binary tree is the data structure to maintain data into memory of program. There exists many data structures, but they are chosen for usage on the basis of time consumed in insert/search/delete operations performed on data structures.

Binary tree is one of the data structures that are efficient in insertion and searching operations.
Binary tree works on O (logN) for insert/search/delete operations.

Binary tree is basically tree in which each node can have two child nodes and each child node can itself be a small binary tree. To understand it, below is the example figure of binary tree.

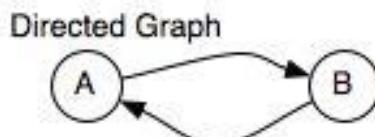
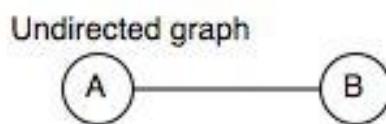


Binary tree works on the rule that child nodes which are lesser than root node keep on the left side and child nodes which are greater than root node keep on the right side. Same rule is followed in child nodes as well that are itself sub-trees. Like in above figure, nodes (2, 4, 6) are on left side of root node (9) and nodes (12, 15, 17) are on right side of root node (9).



★ Graph in C:

A graph is a way of representing connections between places. Mathematically, a graph is a collection of nodes and edges. Nodes are locations that are connected together by the edges of the graph. For instance, if you had two small towns connected by a two-way road, you could represent this as a graph with two nodes, each node representing a town, and one edge, the road, connecting the two towns together. In addition to the undirected graph, in which the edge is a two-way connection, there are directed graphs, in which edges connect only one way. For instance, you could represent the previous example of two cities connected by a road as a directed graph consisting of two nodes and two edges, each edge connecting one of the nodes to the other. In the city example, it may also be convenient to record the distance between the two cities; this can be expressed by adding a 'weight' to an edge, which is a number that usually corresponds to the distance covered by an edge (the distance between two nodes).



★ Stacks, Queues:

The stack is a common data structure for representing things that need to be maintained in a particular order. For instance, when a function calls another function, which in turn calls a third function, it's important that the third function return back to the second function rather than the first.

One way to think about this implementation is to think of functions as being stacked on top of each other; the last one added to the stack is the first one taken off. In this way, the data structure itself enforces the proper order of calls.

Conceptually, a stack is simple: a data structure that allows adding and removing elements in a particular order. Every time an element is added, it goes on the top of the stack; the only element that can be removed is the element that was at the top of



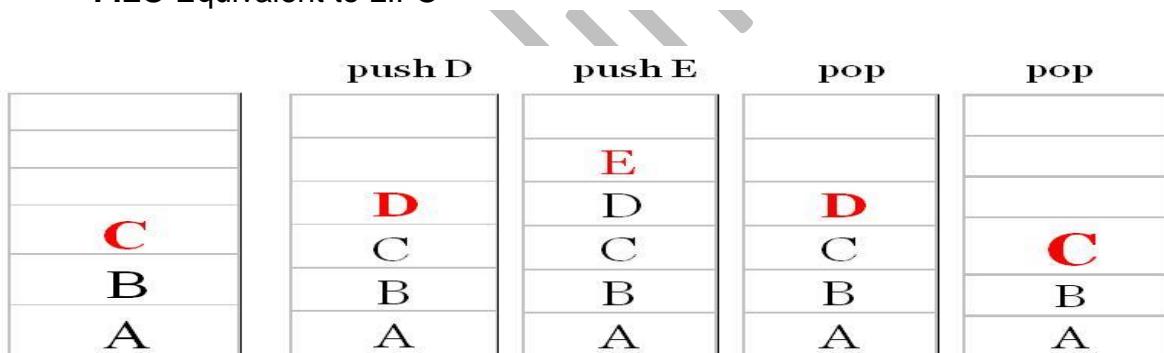
the stack. Consequently, a stack is said to have "first in last out" behavior (or "last in, first out"). The first item added to a stack will be the last item removed from a stack.

So what's the big deal? Where do stacks come into play? As you've already seen, stacks are a useful way to organize our thoughts about how functions are called. In fact, the "call stack" is the term used for the list of functions either executing or waiting for other functions to return.

In a sense, stacks are part of the fundamental language of computer science. When you want to express an idea of the "first in last out" variety, it just makes sense to talk about it using the common terminology. Moreover, such operations show up an awful lot, from theoretical computer science tools such as a push-down automaton to AI, including implementations of depth-first search.

Stacks have some useful terminology associated with them:

- **Push** To add an element to the stack
- **Pop** To remove an element from the stock
- **Peek** To look at elements in the stack without removing them
- **LIFO** Refers to the last in, first out behavior of the stack
- **FILO** Equivalent to LIFO

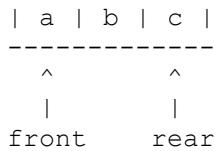


The *queue* is another data structure. A physical analogy for a queue is a line at a bank. When you go to the bank, customers go to the *rear* (end) of the line and customers come off of the line (i.e., are serviced) from the *front* of the line.

Aside: In fact, other English-speaking countries use this term for a line, e.g., they might say "Queue up!" rather than "Get in a line!"

Like a stack, a queue usually holds things of the same type. We usually draw queues horizontally. Here's a queue of characters with 3 elements:

queue



The main property of a queue is that objects go on the *rear* and come off of the *front* of the queue.

Here are the minimal set of operations we'd need for an abstract queue:

- Enter (or Insert)

Places an object at the *rear* of the queue.

- Delete (or Remove)

Removes an object from the *front* of the queue and produces that object.

- IsEmpty

Reports whether the queue is empty or not.

★ Hash Table:

Hash tables are an efficient implementation of a keyed array data structure, a structure sometimes known as an associative array or map. If you're working in C++, you can take advantage of the STL map container for keyed arrays implemented using binary trees, but this article will give you some of the theory behind how a hash table works.

Keyed Arrays vs. Indexed Arrays

One of the biggest drawbacks to a language like C is that there are no keyed arrays. In a normal C array (also called an indexed array), the only way to access an element would be through its index number. To find element 50 of an array named "employees" you have to access it like this:

```
1 employees[50];
```

In a keyed array, however, you would be able to associate each element with a "key," which can be anything from a name to a product model number. So, if you have a keyed array of employee records, you could access the record of employee "John Brown" like this:

```
1 employees["Brown, John"];
```



One basic form of a keyed array is called the hash table. In a hash table, a key is used to find an element instead of an index number. Since the hash table has to be coded using an indexed array, there has to be some way of transforming a key to an index number. That way is called the hashing function.

Hashing Functions

A hashing function can be just about anything. How the hashing function is actually coded depends on the situation, but generally the hashing function should return a value based on a key and the size of the array the hashing table is built on. Also, one important thing that is sometimes overlooked is that a hashing function has to return the same value every time it is given the same key.

Let's say you wanted to organize a list of about 200 addresses by people's last names. A hash table would be ideal for this sort of thing, so that you can access the records with the people's last names as the keys.

First, we have to determine the size of the array we're using. Let's use a 260 element array so that there can be an average of about 10 element spaces per letter of the alphabet.>

Now, we have to make a hashing function. First, let's create a relationship between letters and numbers:

A --> 0
B --> 1
C --> 2
D --> 3
...
and so on until Z --> 25.

The easiest way to organize the hash table would be based on the first letter of the last name.

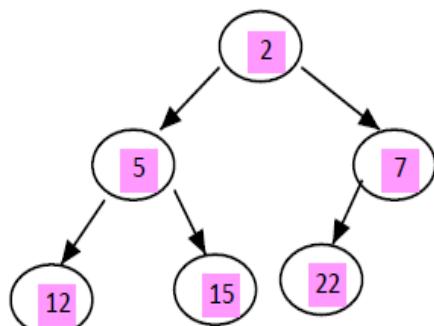
Since we have 260 elements, we can multiply the first letter of the last name by 10. So, when a key like "Smith" is given, the key would be transformed to the index 180 (S is the 19 letter of the alphabet, so S --> 18, and $18 * 10 = 180$).

Since we use a simple function to generate an index number quickly, and we use the fact that the index number can be used to access an element directly, a hash table's access time is quite small. A linked list of keys and elements wouldn't be nearly as fast, since you would have to search through every single key-element pair.



★ Heaps:

The Heap data structure is an array object that can be viewed as a complete and balanced binary tree. Min (Max)-Heap has a property that for every node other than the root, the value of the node is at least (at most) the value of its parent. Thus, the smallest (largest) element in a heap is stored at the root, and the subtrees rooted at a node contain larger (smaller) values than does the node itself.



Heap Size	2	5	7	12	15	22
6	0	1	2	3	4	5

A Min-heap viewed as a binary tree and an array.

Heaps can be used as an array. For any element at array position I , left child is at $(2i)$, right child is at $(2i+1)$ and parent is at $(\text{int})(i / 2)$. Heap size is stored at index 0.

Basic operations of a heap are:

1. Insert – Insert an element.
2. Delete minimum – Delete and return the smallest item in the heap.

Fresherline



3. OOPs

★ Polymorphism

The word **polymorphism** means having many forms. Typically, polymorphism occurs when there is a hierarchy of classes and they are related by inheritance.

C++ polymorphism means that a call to a member function will cause a different function to be executed depending on the type of object that invokes the function.

Consider the following example where a base class has been derived by other two classes:

```
#include <iostream>
using namespace std;

class Shape {
protected:
    int width, height;
public:
    Shape( int a=0, int b=0)
    {
        width = a;
        height = b;
    }
    int area()
    {
        cout << "Parent class area :" << endl;
        return 0;
    }
};
class Rectangle: public Shape{
public:
    Rectangle( int a=0, int b=0):Shape(a, b) { }
    int area ()
    {
        cout << "Rectangle class area :" << endl;
        return (width * height);
    }
};
class Triangle: public Shape{
public:
    Triangle( int a=0, int b=0):Shape(a, b) { }
    int area ()
    {
        cout << "Triangle class area :" << endl;
        return (width * height / 2);
    }
}
```



```

};

// Main function for the program
int main( )
{
    Shape *shape;
    Rectangle rec(10,7);
    Triangle tri(10,5);

    // store the address of Rectangle
    shape = &rec;
    // call rectangle area.
    shape->area();

    // store the address of Triangle
    shape = &tri;
    // call triangle area.
    shape->area();

    return 0;
}

```

★ Abstraction:

Abstraction refers to showing only the essential features of the application and hiding the details. In C++, classes provide methods to the outside world to access & use the data variables, but the variables are hidden from direct access.

★ Encapsulation:

Encapsulation is one of the four fundamental OOP concepts. The other three are inheritance, polymorphism, and abstraction.

Encapsulation is the technique of making the fields in a class private and providing access to the fields via public methods. If a field is declared private, it cannot be accessed by anyone outside the class, thereby hiding the fields within the class. For this reason, encapsulation is also referred to as data hiding.

Encapsulation can be described as a protective barrier that prevents the code and data being randomly accessed by other code defined outside the class. Access to the data and code is tightly controlled by an interface.

The main benefit of encapsulation is the ability to modify our implemented code without breaking the code of others who use our code. With this feature Encapsulation gives maintainability, flexibility and extensibility to our code.



4. Miscellaneous

4.1 Sorting

Sorting

Introduction

Sorting is ordering a list of objects. We can distinguish two types of sorting. If the number of objects is small enough to fit into the main memory, sorting is called *internal sorting*. If the number of objects is so large that some of them reside on external storage during the sort, it is called *external sorting*. In this chapter we consider the following internal sorting algorithms

- Bucket sort
- Bubble sort
- Insertion sort
- Selection sort
- Heapsort
- Mergesort

$O(n)$ algorithms

Bucket Sort

Suppose we need to sort an array of positive integers {3,11,2,9,1,5}. A bucket sort works as follows: create an array of size 11. Then, go through the input array and place integer 3 into a second array at index 3, integer 11 at index 11 and so on. We will end up with a sorted list in the second array.

Suppose we are sorting a large number of local phone numbers, for example, all residential phone numbers in the 412 area code region (about 1 million). We sort the numbers without use of comparisons in the following way. Create a bit array of size 10^7 . It takes about 1Mb. Set all bits to 0. For each phone number turn-on the bit indexed by that phone number. Finally, walk through the array and for each bit 1 record its index, which is a phone number.

We immediately see two drawbacks to this sorting algorithm. Firstly, we must know how to handle duplicates. Secondly, we must know the maximum value in the unsorted array.. Thirdly, we must have enough memory - it may be impossible to declare an array large enough on some systems.

The first problem is solved by using linked lists, attached to each array index. All duplicates for that bucket will be stored in the list. Another possible solution is to



have a counter. As an example let us sort 3, 2, 4, 2, 3, 5. We start with an array of 5 counters set to zero.

0	1	2	3	4	5
0	0	0	0	0	0

Moving through the array we increment counters:

0	1	2	3	4	5
0	0	2	2	1	1

Next, we simply read off the number of each occurrence: 2 2 3 3 4 5.

$O(n^2)$ algorithms

Bubble Sort

The algorithm works by comparing each item in the list with the item next to it, and swapping them if required. In other words, the largest element has bubbled to the top of the array. The algorithm repeats this process until it makes a pass all the way through the list without swapping any items.

```
void bubbleSort(int ar[])
{
    for (int i = (ar.length - 1); i >= 0; i--)
    {
        for (int j = 1; j ≤ i; j++)
        {
            if (ar[j-1] > ar[j])
            {
                int temp = ar[j-1];
                ar[j-1] = ar[j];
                ar[j] = temp;
            }
        }
    }
}
```

Example. Here is one step of the algorithm. The largest element - 7 - is bubbled to the top:

7, 5, 2, 4, 3, 9
 5, 7, 2, 4, 3, 9
 5, 2, 7, 4, 3, 9
 5, 2, 4, 7, 3, 9
 5, 2, 4, 3, 7, 9
 5, 2, 4, 3, 7, 9

The worst-case runtime complexity is $O(n^2)$. See explanation below



```

void bubbleSort(int ar[])
{
    for (int i = (ar.length - 1); i >= 0; i--)
    {
        for (int j = 1; j <= i; j++)
        {
            if (ar[j-1] > ar[j])
            {
                int temp = ar[j-1]; O(1)
                ar[j-1] = ar[j];
                ar[j] = temp;
            }
        }
    }
}


$$\sum_{i=0}^{i=n} O(i) = 1 + 2 + 3 + \dots + (n-1) = O(n^2)$$


```

Selection Sort

The algorithm works by selecting the smallest unsorted item and then swapping it with the item in the next position to be filled.

The selection sort works as follows: you look through the entire array for the smallest element, once you find it you swap it (the smallest element) with the first element of the array. Then you look for the smallest element in the remaining array (an array without the first element) and swap it with the second element. Then you look for the smallest element in the remaining array (an array without first and second elements) and swap it with the third element, and so on. Here is an example,

```

void selectionSort(int[] ar){
    for (int i = 0; i < ar.length-1; i++)
    {
        int min = i;
        for (int j = i+1; j < ar.length; j++)
            if (ar[j] < ar[min]) min = j;
        int temp = ar[i];
        ar[i] = ar[min];
        ar[min] = temp;
    }
}

```

Example.

29, 64, 73, 34, 20,

20, 64, 73, 34, 29,

20, 29, 73, 34, 64

20, 29, 34, 73, 64

20, 29, 34, 64, 73

The worst-case runtime complexity is $O(n^2)$.



Insertion Sort

To sort unordered list of elements, we remove its entries one at a time and then insert each of them into a sorted part (initially empty):

```
void insertionSort(int[] ar)
{
    for (int i=1; i < ar.length; i++)
    {
        int index = ar[i]; int j = i;
        while (j > 0 && ar[j-1] > index)
        {
            ar[j] = ar[j-1];
            j--;
        }
        ar[j] = index;
    }
}
```

Example. We color a sorted part in green, and an unsorted part in black. Here is an insertion sort step by step. We take an element from unsorted part and compare it with elements in sorted part, moving form right to left.

29, 20, 73, 34, 64
29, 20, 73, 34, 64
20, 29, 73, 34, 64
20, 29, 73, 34, 64
20, 29, 34, 73, 64
20, 29, 34, 64, 73

Let us compute the worst-time complexity of the insertion sort. In sorting the most expensive part is a comparison of two elements. Surely that is a dominant factor in the running time. We will calculate the number of comparisons of an array of N elements:

we need 0 comparisons to insert the first element
 we need 1 comparison to insert the second element
 we need 2 comparisons to insert the third element
 ...
 we need (N-1) comparisons (at most) to insert the last element

Totally,

$$1 + 2 + 3 + \dots + (N-1) = O(n^2)$$

The worst-case runtimecomplexity is $O(n^2)$.What is the best-case runtime complexity? $O(n)$. The advantage of insertion sort comparing it to the previous two sorting algorithm is that insertion sort runs in linear time on nearly sorted data.



$O(n \log n)$ algorithms

Mergesort

Merge-sort is based on the divide-and-conquer paradigm. It involves the following three steps:

- Divide the array into two (or more) subarrays
- Sort each subarray (Conquer)
- Merge them into one (in a smart way!)

Example. Consider the following array of numbers

27 10 12 25 34 16 15 31

divide it into two parts

27 10 12 25

34 16 15 31

divide each part into two parts

27 10

12 25

34 16

15 31

divide each part into two parts

27

10

12

25

34

16

15

merge (cleverly-!) parts

10 27

12 25

16 34

15 31

merge parts

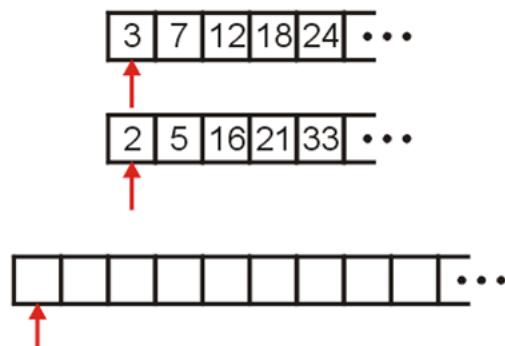
10 12 25 27

15 16 31 34

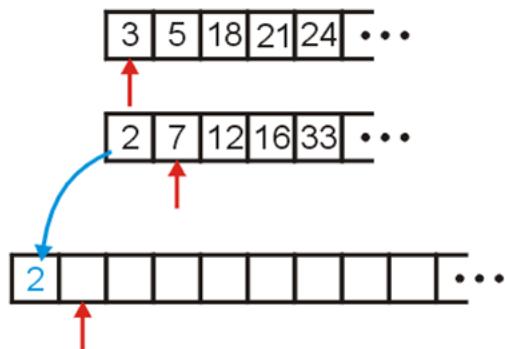
merge parts into one

10 12 15 16 25 27 31 34

How do we merge two sorted subarrays? We define three references at the front of each array.



We keep picking the smallest element and move it to a temporary array, incrementing the corresponding indices.



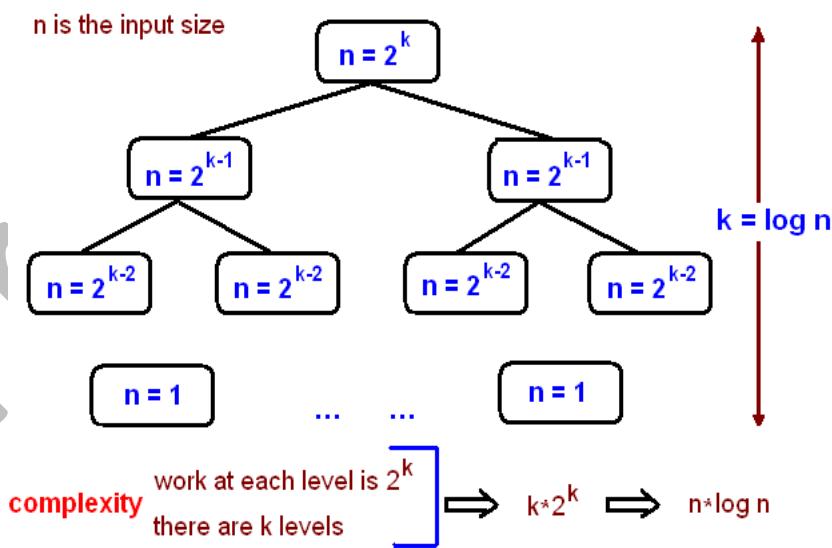
See implementation details in in MergeSort.java.

Complexity of Mergesort

Suppose $T(n)$ is the number of comparisons needed to sort an array of n elements by the MergeSort algorithm. By splitting an array in two parts we reduced a problem to sorting two parts but smaller sizes, namely $n/2$. Each part can be sorted in $T(n/2)$. Finally, on the last step we perform $n-1$ comparisons to merge these two parts in one. All together, we have the following equation

$$T(n) = 2*T(n/2) + n - 1$$

The solution to this equation is beyond the scope of this course. However I will give you a reasoning using a binary tree. We visualize the mergesort dividing process as a tree



Lower bound

ZZZ



Exercise

Ques 1 : Choose the correct answer

There is a new data-type which can take as values natural numbers between (and including) 0 and 25.

How many minimum bits are required to store this data-type?

Option 1 : 4

Option 2 : 5

Option 3 : 1

Option 4 : 3

Ques 2 : Choose the correct answer

A data type is stored as an 6 bit signed integer. Which of the following cannot be represented by this data type?

Option 1 : -12

Option 2 : 0

Option 3 : 32

Option 4 : 18

Ques 3 : Choose the correct answer

A language has 28 different letters in total. Each word in the language is composed of maximum 7 letters.

You want to create a data-type to store a word of this language. You decide to store the word as an array of letters. How many bits will you assign to the data-type to be able to store all kinds of words of the language.

Option 1 : 7

Option 2 : 35

Option 3 : 28

Option 4 : 196

Ques 4 : Choose the correct answer

A 10-bit unsigned integer has the following range:

Option 1 : 0 to 1000

Option 2 : 0 to 1024

Option 3 : 1 to 1025

Option 4 : 0 to 1023

Ques 5 : Choose the correct answer

Rajni wants to create a data-type for the number of books in her book case. Her shelf can accommodate a maximum of 75 books. She allocates 7 bits to the data-type. Later another shelf is added to her book-case. She realizes that she can still use the same data-type for storing the number of books in her book-case. What is the maximum possible capacity of her new added shelf?

Option 1 : 52

Option 2 : 127

Option 3 : 53

Option 4 : 75

Ques 6 : Choose the correct answer

A new language has 15 possible letters, 8 different kinds of punctuation marks and a blank character.

Rahul wants to create two data types, first one which could store the letters of the language and a second one which could store any character in the language. The number of bits required to store these two data-types will respectively be:

Option 1 : 3 and 4

Option 2 : 4 and 3

Option 3 : 4 and 5

Option 4 : 3 and 5

Ques 7 : Choose the correct answer



Parul takes as input two numbers: a and b. a and b can take integer values between 0 and 255. She stores a, b and c as 1-byte data type. She writes the following code statement to process a and b and put the result in c.

$$c = a + 2^*b$$

To her surprise her program gives the right output with some input values of a and b, while gives an erroneous answer for others. For which of the following inputs will it give a wrong answer?

Option 1 : a = 10 b = 200 Option 2 : a = 200 b = 10 Option 3 : a = 50 b = 100 Option 4 : a = 100 b = 50

Ques 8 : Choose the correct answer

Prashant takes as input 2 integer numbers, a and b, whose value can be between 0 and 127. He stores them as 7 bit numbers. He writes the following code to process these numbers to produce a third number c.

$$c = a - b$$

In how many minimum bits should Prashant store c?

Option 1 : 6 bits Option 2 : 7 bits Option 3 : 8 bits Option 4 : 9 bits

Ques 9 : Choose the correct answer

Ankita takes as input 2 integer numbers, a and b, whose value can be between 0 and 31. He stores them as 5 bit numbers. He writes the following code to process these numbers to produce a third number c.

$$c = 2^*(a - b)$$

In how many minimum bits should Ankita store c?

Option 1 : 6 bits Option 2 : 7 bits Option 3 : 8 bits Option 4 : 9 bits

Ques 10 : Choose the correct answer

A character in new programming language is stored in 2 bytes. A string is represented as an array of characters. A word is stored as a string. Each byte in the memory has an address. The word "Mahatma Gandhi" is stored in the memory with starting address 456. The letter 'd' will be at which memory address?

Option 1 : 468 Option 2 : 480 Option 3 : 478 Option 4 : 467

Ques 11 : Choose the correct answer

Stuti is making a questionnaire of True-false questions. She wants to define a data-type which stores the response of the candidate for the question. What is the most-suited data type for this purpose?

Option 1 : integer Option 2 : boolean Option 3 : float Option 4 : character

Ques 12 : Choose the correct answer:

A pseudo-code is used. Assume that when two data-types are processed through an operator, the answer maintains the same data-type as the input data-types. Assume that all data-types have enough range



to accommodate any number. If two different data-types are operated on, the result assumes the more expressive data-type.

What will be the output of the following pseudo-code statements:

integer a = 456, b, c, d =10

b = a/d

c = a - b

print c

Option 1 : 410

Option 2 : 410.4

Option 3 : 411.4

Option 4 : 411

Ques 13 : Choose the correct answer:

A pseudo-code is used. Assume that when two data-types are processed through an operator, the answer maintains the same data-type as the input data-types. Assume that all data-types have enough range to accommodate any number. If two different data-types are operated on, the result assumes the more expressive data-type.

// in pseudo code refers to comment

What will be the output of the following pseudo-code statements:

integer a = 984, b, c, d =10

print remainder(a,d) // remainder when a is divided by d

a = a/d

print remainder(a,d) // remainder when a is divided by d

Option 1 : 48

Option 2 : Error

Option 3 : 84

Option 4 : 44

Ques 14 : Choose the correct answer:

Assume the following precedence (high to low). Operators in the same row have the same precedence:

(.)

* /

+ -

AND

OR

For operators with equal precedence, the precedence is from left-to-right in expression.

What will be the output of the following code statements?

integer a = 50, b = 25, c = 0

print (a > 45 OR b > 50 AND c > 10)

Option 1 : 1

Option 2 : 0

Option 3 : -1

Option 4 : 10

Ques 15 : Choose the correct answer:

Assume the following precedence (high to low). Operators in the same row have the same precedence:

(.)

* /

+ -

AND

OR

For operators with equal precedence, the precedence is from left-to-right in expression.

What will be the output of the following code statements?

integer a = 50, b = 25, c = 5

print a * b / c + c

Option 1 : 120

Option 2 : 125

Option 3 : 255

Option 4 : 250



Ques 16 : Choose the correct answer:

Assume the following precedence (high to low). Operators in the same row have the same precedence:

(.)

* /

+ -

AND

OR

For operators with equal precedence, the precedence is from left-to-right in expression.

What will be the output of the following code statements?

integer a = 10, b = 35, c = 5

print a * b / c - c

Option 1 : 5

Option 2 : 60

Option 3 : Error

Option 4 : 70

Ques 17 : Choose the correct answer:

Assume the following precedence (high to low). Operators in the same row have the same precedence:

(.)

* /

+ -

AND

OR

For operators with equal precedence, the precedence is from left-to-right in expression.

integer a = 10, b = 35, c = 5

Comment about the output of the two statements?

print a * b + c / d

print c / d + a * b

Option 1 : Differ due to left-to-right precedence Option 2 : Differ by 10 Option 3 : Differ by 20 Option 4 : Same

Ques 18 : Choose the correct answer:

Assume the following precedence (high to low). Operators in the same row have the same precedence:

(.)

* /

+ -

AND

OR

For operators with equal precedence, the precedence is from left-to-right in expression.

integer a = 40, b = 35, c = 20, d = 10

Comment about the output of the following two statements:

print a * b / c - d

print a * b / (c - d)

Option 1 : Differ by 80

Option 2 : Same

Option 3 : Differ by 50

Option 4 : Differ by

160



Ques 19 : Choose the correct answer:

Assume the following precedence (high to low). Operators in the same row have the same precedence:

(.)

* /

+ -

AND

OR

For operators with equal precedence, the precedence is from left-to-right in expression.

integer a = 60, b = 35, c = -30

What will be the output of the following two statements:

print (a > 45 OR b > 50 AND c > 10)

print ((a > 45 OR b > 50) AND c > 10)

Option 1 : 0 and 1

Option 2 : 0 and 0

Option 3 : 1 and 1

Option 4 : 1 and 0

Ques 20 : Choose the correct answer:

A pseudo-code is used. Assume that when two data-types are processed through an operator, the answer maintains the same data-type as the input data-types. Assume that all data-types have enough range to accommodate any number. If two different data-types are operated on, the result assumes the more expressive data-type.

// in pseudo code refers to comment

What will be the output of the following pseudo-code statements:

integer a = 984, b=10

//float is a data-type to store real numbers.

float c

c = a / b

print c

Option 1 : 984

Option 2 : 98.4

Option 3 : 98

Option 4 : Error

Ques 21 : Choose the correct answer:

A pseudo-code is used. Assume that when two data-types are processed through an operator, the answer maintains the same data-type as the input data-types. Assume that all data-types have enough range to accommodate any number. If two different data-types are operated on, the result assumes the more expressive data-type.

// in pseudo code refers to comment

What will be the output of the following pseudo-code statements:

integer a = 984

//float is a data-type to store rational numbers.

float b= 10, c

c = a / b

print c

Option 1 : 984

Option 2 : Error

Option 3 : 98.4

Option 4 : 98

Ques 22 : Choose the correct answer

Smriti wants to make a program to print the sum of square of the first 5 whole numbers (0...4). She writes the following program:

integer i = 0 // statement 1

integer sum = 0 // statement 2



```
while ( i < 5 ) // statement 3
{
    sum = i*i // statement 4
    i = i + 1 // statement 5
}
print sum // statement 6
```

Is her program correct? If not, which statement will you modify to correct it?

Option 1 : No error, the program is correct. Option 2 : Statement 1 Option 3 : Statement 4 Option 4 : statement 6

Ques 23 : Choose the correct answer

Shashi wants to make a program to print the sum of the first 10 multiples of 5. She writes the following program, where statement 5 is missing:

```
integer i = 0
integer sum = 0
while ( i <= 50 )
{
    sum = sum + i
-- MISSING STATEMENT 5 --
}
print sum
```

Which of the following will you use for statement 5?

Option 1 : $i = 5$ **Option 2 : $i = 5 * i$** **Option 3 : $i = i + 1$** **Option 4 : $i = i + 5$**

Ques 24 : Choose the correct answer

Shantanu wants to make a program to print the sum of the first 7 multiples of 6. He writes the following program:

```
integer i = 0 // statement 1
integer sum // statement 2
while ( i <= 42 ) // statement 3
{
    sum = sum + i // statement 4
    i = i + 6;
}
print sum // statement 6
```

Does this program have an error? If yes, which one statement will you modify to correct the program?

Option 1 : Statement 1 Option 2 : Statement 2 Option 3 : Statement 3 Option 4 : Statement 4

Ques 25 : Choose the correct answer

Sharmili wants to make a program to print the sum of all perfect cubes, where the value of the cubes go from 0 to 100. She writes the following program:

```
integer i = 0, a // statement 1
```



```
integer sum = 0;
a = ( i * i * i )
while ( i < 100 ) // statement 2
{
    sum = sum + a // statement 3
    i = i + 1
    a = ( i * i * i ) // statement 4
}
print sum
```

Does this program have an error? If yes, which one statement will you modify to correct the program?

Option 1 : Statement 1 Option 2 : Statement 2 Option 3 : Statement 3 Option 4 : Statement 4 Option 5 : No error

Ques 26 : Choose the correct answer

Bhavya wants to make a program to print the sum of all perfect squares, where the value of the squares go from 0 to 50. She writes the following program:

```
integer i = 1, a // statement 1
integer sum = 0
while ( a < 50 ) // statement 2
{
    sum = sum + a // statement 3
    i = i + 1
    a = ( i * i ); // statement 4
}
print sum
```

Does this program have an error? If yes, which one statement will you modify to correct the program?

Option 1 : Statement 1 Option 2 : Statement 2 Option 3 : Statement 3 Option 4 : Statement 4 Option 5 : No error

Ques 27 : Choose the correct answer

Vijay wants to print the following pattern on the screen:

2
24
246
2468

He writes the following program:

```
integer i = 1, j=2 // statement 1
while ( i <= 4 ) // statement 2
{
    j = 2;
    while ( j <= ? ) // Statement 3
    {
        print j
        print blank space
        i = i + 2
    }
}
```



```

}
print end-of-line \takes the cursor to the next line
i = i + 1
}

```

What is the value of ? in statement 3 ::

Option 1 : 8

Option 2 : i

Option 3 : 2*i

Option 4 : 4

Ques 28 : Choose the correct answer

Shravanti writes the following program:

```

integer i = 0, j
while ( i < 2 )
{
    j = 0;
    while ( j <= 3*i )
    {
        print j
        print blank space
        j = j + 3
    }
    print end-of-line \takes the cursor to the next line
    i = i + 1
}

```

What will be the output of the program?

Option 1 : 0

Option 2 : 0 3

0 3

0 3 6

Option 3 : 0

0 3 6

0 3 6 9

Option 4 : 0 3 6

0 3 6 9

0 3 6 9 12

Ques 29 : Choose the correct answer

Vijay wants to print the following pattern on the screen:

1

1 2

1 2 3

He writes the following program:

```

integer i = 1 // statement 1
while ( i <= 3 )
{
    int j // Statement 2
    while ( j <= i ) // Statement 3
    {
        print j
        print blank space
        j = j + 1 // Statement 4
    }
    print end-of-line \takes the cursor to the next line
    i = i + 1
}

```



Will this program function correctly? If not which one statement will you modify to make the program function correctly?

Option 1 : Statement 1

Option 2 : Statement 2

Option 3 : Statement 3

Option 4 : Statement 4

Option 5 :
Program
does not
have error.

Ques 30 : Choose the correct answer

Charu writes the following program:

```
integer i = 1, j, a
while ( i <= 4 )
{
    j = 1;
    a = 0;
    while ( a <= 5*i )
    {
        a = 2^j;
        print a
        print blank space
        j = j + 1
    }
    print end-of-line \takes the cursor to the next line
    i = i + 1
}
```

What will be the output of the program?

Option 1 : 2

2 4

2 4 8

2 4 8 16

Option 2 : 2 4

2 4 8

2 4 8 16

2 4 8 16 32

Option 3 : 2 4

2 4 8

2 4 8

2 4 8 16

Option 4 : 2

2 4

2 4

2 4 8 16

Ques 31 : Choose the correct answer

Himanshu wants to write a program to print the larger of the two inputted number. He writes the following code:

```
int number1, number 2
input number1, number 2
if ("??") // Statement 1
print number1
else
print number2
end if
Fill in the ?? in statement 1.
```

Option 1 :

number1>number2

Option 2 :

number2>number1

Option 3 : number2

equals number1

Option 4 : number1

<= number2

Ques 32 : Choose the correct answer



Shalini wants to program to print the largest number out of three inputted numbers. She writes the following program:

```
int number1, number 2, number3, temp;  
input number1, number2, number3;  
if (number1>number2)  
    temp = number1  
else  
    temp = number2  
end if  
if (??) // Statement 1  
    temp = number3  
end if  
print temp
```

Fill in the ?? in Statement 1

Option 1 : number3 > number2 Option 2 : number3 > temp Option 3 : number3 < temp Option 4 : number3 > number1

Ques 33 : Choose the correct answer

Rohit writes the following program which inputs a number and prints "Double digit" if the number is composed of two digits and "Not a double digit" if it is not.

```
int number;  
if (number>10 AND number < 100)  
    print "Double digit"  
else  
    print "Not a double digit"  
end if
```

Rohit tries the following inputs: 5 and 66. The program works fine. He asks his brother Ravi to try the program. When Ravi enters a number, the program doesn't work correctly. What did Ravi enter?

Option 1 : 8 Option 2 : 100 Option 3 : 99 Option 4 : 10

Ques 34 : Choose the correct answer

Rohan writes the following program which inputs a number and prints "Triple digit" if the number is composed of three digits and "Not triple digit" if it is not.

```
int number;
if (number>99)
    print "Triple digit"
else
    print "Not triple digit"
end if
```

Rohan tries the following inputs: 25 and 566. The program works fine. He asks his brother Ravi to try the program. When Ravi enters a number, the program doesn't work correctly. What did Ravi enter?

Option 1 : 99 **Option 2 : 100** **Option 3 : 0** **Option 4 : 1000**



Ques 35 : Choose the correct answer

Abhinav wants to find the largest number in a given list of 20 numbers. Which of the following is an efficient approach to do this?

Option 1 : Use bubble sort to sort the list in descending order and then print the first number of the series.
 Option 2 : Use selection sort to sort the list in descending order and then print the first number of the series.
Option 3 : Implement one iteration of selection sort for print the first number of the descending order and print the first number in the series.
 Option 4 : None of these

Ques 36 : Choose the correct answer

Lavanya wants to find the smallest number out of 26 inputted numbers. How many minimum comparisons he has to make?

Option 1 : 25 Option 2 : 13 Option 3 : 26 Option 4 : 52

Ques 37 : Choose the correct answer

A company offers commission for selling its products to its salesperson. The commission rate is Rs. 5 per product. However if the salesperson sells more than 200 items, he gets a commission of Rs. 10 on all items he sold after the first 200. Kanu writes a program to calculate the commission for the salesperson:

```
integer numberProducts, commission
input numberProducts

if ( numberProducts > 200 )
-- MISSING STATEMENT --
else
commission = numberProducts * 5
end if
print commission
```

Fill in the missing statement.

Option 1 : commission = Option 2 : commission = Option 3 : commission Option 4 : None of
 (numberProducts - 200) * 10 200 * 5 + (numberProducts = numberProducts * 10 these
- 200) * 10

Ques 38 : Choose the correct answer

Vikram wants to write a program which checks whether the inputted number is divisible by any of the first 6 natural numbers (excluding 1). He writes the following efficient code for it.

```
int number, n = 2, isdivisible=0
input number
while ( n <=6 ) // Statement 1
{
    if ( remainder (number, n) == 0)
        isdivisible = 1
    end
    n = n+1 // Statement 2
}
if (isdivisible equals 1)
```



```

print "It is divisible"
else
    print "It is not divisible"
end

```

Vikram takes the program to Hari. Hari tells Vikram that though the code is correct, it can be made more efficient. Hari modifies a single statement and makes the code more efficient. Which statement does he modify and how?

- | | | | |
|--|--|--|--|
| <u>Option 1 : Statement 1 is changed to:</u> | <u>Option 2 : Statement 1 is changed to:</u> | <u>Option 3 : Statement 1 is changed to:</u> | <u>Option 4 : Statement 2 is changed to:</u> |
| <u>while (n <=6 AND isdivisible=0)</u> | <u>while (n <=6 OR isdivisible=0)</u> | <u>while (isdivisible=0)</u> | <u>n = n + 2</u> |
-

Ques 39 : Choose the correct answer

Rajiv wants to make a program which inputs two numbers: a and b (a>b) and computes the number of terms between a and b (including a and b). What will be code statement to do this:

- | | | | |
|-------------------------|-----------------------------|-------------------------|-----------------------------|
| <u>Option 1 : a - b</u> | <u>Option 2 : a - b + 1</u> | <u>Option 3 : a + b</u> | <u>Option 4 : a - b - 1</u> |
|-------------------------|-----------------------------|-------------------------|-----------------------------|
-

Ques 40 : Choose the correct answer

I have a problem to solve which takes as input a number n. The problem has a property that given the solution for (n-1), I can easily solve the problem for n. Which programming technique will I use to solve such a problem?

- | | | | |
|-----------------------------|-----------------------------------|---|-----------------------------|
| <u>Option 1 : Iteration</u> | <u>Option 2 : Decision-making</u> | <u>Option 3 : Object Oriented Programming</u> | <u>Option 4 : Recursion</u> |
|-----------------------------|-----------------------------------|---|-----------------------------|
-

Ques 41 : Choose the correct answer:

A pseudo-code is used with the following meaning.

"pointer" is a data-type which contains memory address (or pointers)

Statement "a = *b" puts the value at the memory address referenced by b into a.

Statement "a = &b" puts the memory address of b into a.

Statement "*b = a" puts the value a at the memory address referenced by b.

What is the output of the following code statements? The compiler saves the first integer at the memory location 4062. Integer is one byte long.

```

integer a
pointer b
a = 20
b = &a
print *b

```

- | | | | |
|------------------------|------------------------|----------------------|----------------------|
| <u>Option 1 : 4062</u> | <u>Option 2 : 4063</u> | <u>Option 3 : 20</u> | <u>Option 4 : 10</u> |
|------------------------|------------------------|----------------------|----------------------|
-

Ques 42 : Choose the correct answer:

A pseudo-code is used with the following meaning.

"pointer" is a data-type which contains memory address (or pointers)

Statement "a = *b" puts the value at the memory address referenced by b into a.

Statement "a = &b" puts the memory address of b into a.

Statement "*b = a" puts the value a at the memory address referenced by b.



What is the output of the following code statements? The compiler saves the first integer at the memory location 4165 and the rest at consecutive memory spaces in order of declaration. Integer is one byte long.

```
integer a, b
pointer c, d
a = 30
c = &a
b = *c
a = a + 10
print b
```

Option 1 : 30

Option 2 : 4165

Option 3 : 40

Option 4 : 4166

Ques 43 : Choose the correct answer:

A pseudo-code is used with the following meaning.

"pointer" is a data-type which contains memory address (or pointers)

Statement "a = *b" puts the value at the memory address referenced by b into a.

Statement "a = &b" puts the memory address of b into a.

Statement "*b = a" puts the value a at the memory address referenced by b.

What is the output of the following code statements? The compiler saves the first integer at the memory location 4165 and the rest at consecutive memory spaces in order of declaration. Integer is one byte long.

```
integer a
pointer c, d
a = 30
c = &a
d = c
a = a + 10
print *c
```

Option 1 : 30

Option 2 : 4165

Option 3 : 40

Option 4 : 4166

Ques 44 : Choose the correct answer

What is space complexity of a program?

Option 1 : Amount of hard-disk space required to store the program	Option 2 : Amount of hard-disk space required to compile the program	Option 3 : Amount of memory required by the program to run	Option 4 : Amount of memory required for the program to compile
--	--	--	---

Ques 45 : Choose the correct answer

The memory space needed by an algorithm has a fixed part independent of the problem instance solved and a variable part which changes according to the problem instance solved. In general, which of these two is of prime concern to an algorithm designer?

Option 1 : Fixed part	<u>Option 2 : Variable Part</u>	Option 3 : Product of fixed part and variable part	Option 4 : None of these
-----------------------	---------------------------------	--	--------------------------



Ques 46 : Choose the correct answer

While calculating time complexity of an algorithm, the designer concerns himself/herself primarily with the run time and not the compile time. Why?

- | | | | |
|---|---|--|--|
| Option 1 : Run time is always more than compile time. | Option 2 : Compile time is always more than run time. | Option 3 : Compile time is a function of run time. | Option 4 : A program needs to be compiled once but can be run several times. |
|---|---|--|--|
-

Ques 47 : Choose the correct answer

Pankaj and Mythili were both asked to write the code to evaluate the following expression:

$$a - b + c/(a-b) + (a-b)^2$$

Pankaj writes the following code statements (Code A):

```
print (a-b) + c/(a-b) + (a-b)*(a-b)
```

Mythili writes the following code statements (Code B):

```
d = (a-b)
```

```
print d + c/d + d*d
```

If the time taken to load a value in a variable, for addition, multiplication or division between two operands is same, which of the following is true?

- | | | | |
|--|--|--|--|
| Option 1 : Code A uses lesser memory and is slower than Code B | Option 2 : Code A uses lesser memory and is faster than Code B | Option 3 : Code A uses more memory and is faster than Code B | Option 4 : Code A uses more memory and is slower than Code B |
|--|--|--|--|
-

Ques 48 : Choose the correct answer

Vrinda writes an efficient program to sum two square diagonal matrices (matrices with elements only on diagonal). The size of each matrix is nXn. What is the time complexity of Vrinda's algorithm?

- | | | | |
|--------------------------|------------------------|-------------------------------|--------------------------|
| Option 1 : $\theta(n^2)$ | Option 2 : $\theta(n)$ | Option 3 : $\theta(n \log n)$ | Option 4 : None of these |
|--------------------------|------------------------|-------------------------------|--------------------------|
-

Ques 49 : Choose the correct answer

Tarang writes an efficient program to add two upper triangular 10X10 matrices (elements on diagonal retained). How many total additions will his program make?

- | | | | |
|----------------|---------------|---------------|---------------|
| Option 1 : 100 | Option 2 : 55 | Option 3 : 25 | Option 4 : 10 |
|----------------|---------------|---------------|---------------|
-

Ques 50 : Choose the correct answer

Ravi and Rupali are asked to write a program to sum the rows of a 2X2 matrices stored in the array A.

Ravi writes the following code (Code A):

```
for n = 0 to 1
    sumRow1[n] = A[n][1] + A[n][2]
end
```

Rupali writes the following code (Code B):

```
sumRow1[0] = A[0][1] + A[0][2]
sumRow1[1] = A[1][1] + A[1][2]
```

Comment upon these codes (Assume no loop-unrolling done by compiler):



Option 1 : Code A will execute faster than Code B. Option 2 : Code B will execute faster than Code A

Option 3 : Code A is logically incorrect.

Option 4 : Code B is logically incorrect.

Ques 51 : Choose the correct answer

There is an array of size n initialized with 0. Akanksha has to write a code which inserts the value 3^k at position 3^k in the array, where $k=0,1,\dots$ (till possible). Akanksha writes an efficient code to do so. What is the time complexity of her code?

Option 1 : $\Theta(n^2)$

Option 2 : $\Theta(n)$

Option 3 : $\Theta(\log_3(n))$

Option 4 : $\Theta(3^n)$

Ques 52 : Choose the correct answer

There are two matrices A and B of size $n \times n$. The data in both these matrices resides only at positions where both the indices are a perfect square. Rest all positions have 0 as the data. Manuj has available a third matrix initialized with 0's at all positions. He writes an efficient code to put the sum of A and B in C. What is the time complexity of Manuj's program?

Option 1 : $\Theta(n^2)$

Option 2 : $\Theta(n)$

Option 3 : $\Theta(n^{1/2})$

Option 4 : $\Theta(\log(n))$

Ques 53 : Choose the correct answer

Ravi has to add an strictly upper triangular (no elements at diagonal) and a strictly lower triangular square matrix (no elements at diagonal) and put the result in a third matrix. What is the time complexity of Ravi's algorithm? Assume that storing a value in a memory space takes negligible time, while each addition between values takes the dominating amount of time.

Option 1 : $\Theta(n^2)$

Option 2 : $\Theta(n)$

Option 3 : $\Theta(1)$

Option 4 : None of these

Ques 54 : Choose the correct answer

We have two 100×3 (rowsXcolumn) matrices containing mid-term exam marks and end-term exam marks of 100 students. Each row refers to a particular student, while columns refer to marks in English, Social Sciences and Maths. The end-term and mid-term marks of each student in each subject have to be added to get his total score in each subject, to be put in a third matrix (100×3). Parinidhi writes a code (Code A), where the outer loop iterates over the rows, while the inner loop iterates over the columns. Shashi writes a code (Code B), where the outer loop iterates over the columns, while the inner loop iterates over rows. Which of the following is true with regard to their code ignoring any caching or memory storage effects?

Option 1 : Code A is faster than Code B

Option 2 : Code B is faster than Code A

Option 3 : Code A and Code B will run in the same amount of time

Option 4 : The comparison between the speed of the codes cannot be made.

Ques 55 : Choose the correct answer

A code takes the following code steps (equivalently time unit) to execute: $5n^3 + 6n^2 + 1$. Which of the following is not true about the time complexity of the program?

Option 1 : It has a time complexity of $O(n^3)$

Option 2 : It has a time complexity of $O(n^4)$

Option 3 : It has a time complexity of $O(n^2)$

Option 4 : It has a time complexity of $\Theta(n^3)$



Ques 56 : Choose the correct answer

We have two programs. We know that the first has a time complexity $O(n^2)$, while the second has a complexity $\omega(n^2)$. For sufficiently large n, which of the following cannot be true?

- | | | | |
|--|--|---|-------------------------------------|
| Option 1 : Both codes have same complexity | Option 2 : The first code has higher time complexity than the second | Option 3 : The second code has lower time complexity than the first | Option 4 : Both codes are the same. |
|--|--|---|-------------------------------------|

Ques 57 : Choose the correct answer

The time complexity of code A is $\theta(n)$, while for Code B it is $\theta(\log(n))$. Which of the following is true for sufficiently large n?

- | | | | |
|--|--|--|--|
| Option 1 : Both code have the same time complexity | Option 2 : Code A has higher time complexity | Option 3 : Code B has higher time complexity | Option 4 : No comparison can be made between the time complexity of the two codes. |
|--|--|--|--|

Ques 58 : Choose the correct answer

Rajini is given an efficient code for summing two $n \times n$ matrices and putting the result in a third matrix. She is asked to find its time complexity. She realizes that the number of iterations required is more than n. What can she claim with regard to the complexity of the code?

- | | | | |
|-------------------------|---------------------------|------------------------------|------------------------------|
| Option 1 : It is $O(n)$ | Option 2 : It is $O(n^2)$ | Option 3 : It is $\theta(n)$ | Option 4 : It is $\omega(n)$ |
|-------------------------|---------------------------|------------------------------|------------------------------|

Ques 59 : Choose the correct answer

Gautam is given two codes, A and B, to solve a problem, which have complexity $\theta(n)$ and $\theta(n^2)$ respectively. His client wants to solve a problem of size k, which Gautam does not know. Which code will Gautam deliver to the client, so that the execution is faster?

- | | | | |
|-------------------|-------------------|------------------------------------|---|
| Option 1 : Code A | Option 2 : Code B | Option 3 : Gautam cannot determine | Option 4 : Both codes have the same execution time, so deliver any. |
|-------------------|-------------------|------------------------------------|---|

Ques 60 : Choose the correct answer

Surbhi is given two codes, A and B, to solve a problem, which have complexity $O(n^3)$ and $\omega(n^4)$ respectively. Her client wants to solve a problem of size k, which is sufficiently large. Which code will Surbhi deliver to the client, so that the execution is faster?

- | | | | |
|-------------------|-------------------|------------------------------------|---|
| Option 1 : Code A | Option 2 : Code B | Option 3 : Surbhi cannot determine | Option 4 : Both codes have the same execution time, so deliver any. |
|-------------------|-------------------|------------------------------------|---|

Ques 61 : Choose the correct answer



Vibhu is given two codes, A and B, to solve a problem, which have complexity $O(n^4)$ and $\omega(n^3)$ respectively. Her client wants to solve a problem of size k, which is sufficiently large. Which code will Gautam deliver to the client, so that the execution is faster?

Option 1 : Code A

Option 2 : Code B

Option 3 : Vibhu cannot determine

Option 4 : Both codes have the same execution time, so deliver any.

Ques 62 : Choose the correct answer

Pavithra is given two codes, A and B, to solve a problem, which have complexity $\Theta(n^3)$ and $\omega(n^3)$ respectively. Her client wants to solve a problem of size k, which is sufficiently large. Which code should she deliver to the client in the present scenario?

Option 1 : Code A

Option 2 : Code B

Option 3 : Both codes have the same execution time, so deliver any.

Option 4 : None of these

Ques 63 : Choose the correct answer

Code A has to execute $4*n^2 + 64$ program statements, while Code B has to execute $32*n$ program statements for a problem of size n. The time for executing a single program statement is same for all statements. Rajesh was given a problem with a certain size k and he delivered Code A. What could be the possible value of k?

Option 1 : 1000

Option 2 : 5

Option 3 : 10Option 4 : 3

Ques 64 : Choose the correct answer

Saumya writes a code which has a function which calls itself. Which programming concept is Saumya using?

Option 1 : This is bad programming practice and should not be done.

Option 2 : Recursion

Option 3 : Decision Making

Option 4 : Overloading

Ques 65 : Choose the correct answer

Shrishti writes the code for a function that computes the factorial of the inputted number n.

```
function factorial(n)
{
    if(n equals 1)
        return 1
    else
-- MISSING STATEMENT --
    end
}
```

Fill in the missing statement.

Option 1 : return factorial(n- 1)

Option 2 : return n*factorial(n)

Option 3 : return n*(n- 1)

Option 4 : return n*factorial(n-1)



Ques 66 : Choose the correct answer

Tanuj writes the code for a function that takes as input n and calculates the sum of first n natural numbers.

```
Function sum( n )
{
    if(??)
        return 1
    else
        return (n + sum(n-1))
    end
}
```

Fill in ?? in the code.

Option 1 : n equals 1

Option 2 : n equals 2

Option 3 : n >= 1

Option 4 : n > 1

Ques 67 : Choose the correct answer

Saloni writes the code for a function that takes as input n, an even integer and calculates the sum of first n even natural numbers.

```
function sum( n )
{
    if(n equals 2)
        return 2
    else
        return (n + sum(n-2))
    end
}
```

She then calls the function by the statement, sum(30). How many times will the function sum be called to compute this sum.

Option 1 : 1

Option 2 : 30

Option 3 : 15

Option 4 : 16

Ques 68 : Choose the correct answer

Consider the following function

```
function calculate( n )
{
    if(n equals 5)
        return 5
    else
        return (n + calculate(n-5))
    end
}
```

Shishir calls the function by the statement, calculate(20). What value will the function return?

Option 1 : 50

Option 2 : 200

Option 3 : 35

Option 4 : 20



Ques 69 : Choose the correct answer

Ravi is writing a program in C++. C++ uses the 'for' keyword for loops. Due to distraction, Ravi writes 'gor' instead of 'for'. What will this result to?

- | | | | |
|---------------------------------------|---|--|--|
| Option 1 : The code will not compile. | Option 2 : The code will give an error while in execution | Option 3 : The code may work for some inputs and not for others. | Option 4 : It will create no problems. |
|---------------------------------------|---|--|--|

Ques 70 : Choose the correct answer

What does a compiler do?

- | | | | |
|---|---|---|--|
| Option 1 : Converts code from a high level language to a low level language | Option 2 : Necessarily converts the code into assembly language | Option 3 : Converts code from a low level language to a high level language | Option 4 : Necessarily converts the code into machine language |
|---|---|---|--|

Ques 71 : Choose the correct answer

A program is compiled by Tarun on his machine. Whether it will run on a different computer will depend upon:

- | | | | |
|---|---|---|---|
| Option 1 : Operating system on the computer | Option 2 : Hardware configuration of the computer | Option 3 : Both operating system and hardware configuration | Option 4 : The language of the hardware configuration program |
|---|---|---|---|

Ques 72 : Choose the correct answer

Sakshi writes a code in a high-level programming language on a Pentium-III machine, which she wants to execute on a Motorola chip. What of the following will she run on the code?

- | | | | |
|---------------------------|-----------------------|-----------------------------|-------------------|
| Option 1 : An interpreter | Option 2 : A compiler | Option 3 : A cross-compiler | Option 4 : Linker |
|---------------------------|-----------------------|-----------------------------|-------------------|

Ques 73 : Choose the correct answer

Shahaana has a 10,000 line code. She is trying to debug it. She knows there is a logical error in the first 25 lines of the code. Which of the following will be an efficient way of debugging:

- | | | | |
|---|--|--|--------------------------|
| Option 1 : Compile the whole code and step into it line by line | Option 2 : Use an interpreter on the first 25 lines. | Option 3 : Compile the whole code and run it | Option 4 : None of these |
|---|--|--|--------------------------|

Ques 74 : Choose the correct answer

Farhan writes a code to find the factorial of an inputted number. His code gives correct answer for some inputs and incorrect answers for others. What kind of error does his program have?

- | | | | |
|------------------------------|---------------------------|--------------------------|--------------------------|
| Option 1 : Syntactical error | Option 2 : Run-time Error | Option 3 : Logical Error | Option 4 : None of these |
|------------------------------|---------------------------|--------------------------|--------------------------|



Ques 75 : Choose the correct answer

Reshama is debugging a piece of code which takes several iterations of modifying and executing code, while Mohammad has to deliver a product to the customer, which the customer will run multiple times.

Reshama wants her debug cycle to take minimum possible time, while Mohammad wants that his products run time is minimum. What tools should Reshama and Mohammad respectively use on their code?

Option 1 : Compiler,
Interpreter

Option 2 : Interpreter,
Compiler

Option 3 : Compiler,
Compiler

Option 4 :
Interpreter,
Interpreter

Ques 76 : Choose the correct answer

Gautam writes a program to run on a Motorola processor on his Pentium computer. He wants to see how the program will execute on the Motorola processor using his Pentium machine. What tool will he use?

Option 1 : Compiler

Option 2 : Interpreter

Option 3 : Assembler

Option 4 : Simulator

Ques 77 : Choose the correct answer

Consider the following code:

```
function modify(y,z)
{
    y = y + 1;
    z = z + 1;
    return y - z
}

function calculate( )
{
    integer a = 5, b = 10, c

    c = modify(a, b);
    print a
    print space
    print c
}
```

Assume that a and b were passed by value. What will be the output on executing function calculate()?

Option 1 : 11 -5

Option 2 : 10 -5

Option 3 : 6 -5

Option 4 : 5 -5

Ques 78 : Choose the correct answer

Consider the following code:

```
function modify(b,a)
{
    return a - b
}

function calculate( )
{
    integer a = 5, b = 12, c
```



```
c = modify(a, b);
print c
}
```

Assume that a and b were passed by reference. What will be the output of the program on executing function calculate() ?

Option 1 : 7

Option 2 : -7

Option 3 : Error

Option 4 : 8

Ques 79 : Choose the correct answer

Consider the following code:

```
function modify(y,z)
{
    y = y + 1
    z = z + 1
    return y - z
}
```

```
function calculate( )
{
    integer a = 12, b = 20, c

    c = modify(a, b);
    print a
    print space
    print c
}
```

Assume that a and b were passed by reference. What will be the output of the function calculate() ?

Option 1 : 12 -8

Option 2 : 13 -8

Option 3 : 12 8

Option 4 : 13 8

Ques 80 : Choose the correct answer

Afzal writes a piece of code, where a set of three lines occur around 10 times in different parts of the program. What programming concept can he use to shorten his program code length?

Option 1 : Use for loops Option 2 : Use functions Option 3 : Use arrays Option 4 : Use classes

Ques 81 : Choose the correct answer

Geetika writes a piece of code, where a set of eight lines occur around 10 times in different parts of the program (Code A). She passes on the code to Deva. Deva puts the set of eight lines in a function definition and calls them at the 10 points in the program (Code B). Which code will run faster using an interpreter?

Option 1 : Code A

Option 2 : Code B

Option 3 : Code A and Option 4 : None of
Code B will run with these
the same speed



Ques 82 : Choose the correct answer

Consider the following code:

```
function modify(a,b)
{
    integer c, d = 2
    c = a*d + b
    return c
}

function calculate( )
{
    integer a = 5, b = 20, c
    integer d = 10
    c = modify(a, b);
    c = c + d
    print c
}
```

Assume that a and b were passed by value. What will be the output of the function calculate() ?

Option 1 : 80

Option 2 : 40

Option 3 : 32

Option 4 : 72

Ques 83 : Choose the correct answer

Consider the following code:

```
function modify(w,u)
{
    w = w + 2
    u = u - 3
    return (w - u)
}

function calculate( )
{
    integer a = 10, b = 20, c
    c = modify(a, b);
    print a
    print space
    print b
}
```

Assume that a was passed by value and b was passed by reference. What will be the output of the program on executing function calculate() ?

Option 1 : 12 17

Option 2 : 10 17

Option 3 : 12 20

Option 4 : 10 20

Ques 84 : Choose the correct answer

Consider the following function:

```
function run()
{
    integer a = 0 // Statement 1
```



```

while (a < 5)
{
    integer c = 0 // Statement 2
    c = c + 1 // Statement 3
    a = a + 1
}
print c // Statement 4
}

```

At which statement in this program will the compiler detect an error?

Option 1 : Statement 1 Option 2 : Statement 2 Option 3 : Statement 3 Option 4 : Statement 4

Ques 85 : Choose the correct answer

Which one of the following is the lowest level format to which the computer converts a higher language program before execution?

Option 1 : English code Option 2 : Machine Code Option 3 : Assembly Language Option 4 : System Language

Ques 86 : Choose the correct answer

If you want to write a function that swaps the values of two variables, you must pass them by:

Option 1 : Value only Option 2 : Reference only Option 3 : Either A or B Option 4 : Neither A nor B

Ques 87 : Choose the correct answer

Consider the following code:

```

if (condition 1) {
    if (condition 2)
        { // Statement A }
    else
        if (condition 3)
            { // Statement B }
        else
            { // Statement C }
    else
        if (condition 4)
            { // Statement D }
        else
            { // Statement E }
}

```

Which of the following conditions will allow execution of statement C?

Option 1 : condition1 AND condition3	Option 2 : condition1 AND condition4 AND !condition2	Option 3 : NOT(condition2) AND NOT(condition3)	<u>Option 4 : condition1 AND NOT(condition2) AND NOT(condition3)</u>
--------------------------------------	--	--	--



Ques 88 : Choose the correct answer

Consider the following code:

```
if (condition 1) {  
if (condition 2)  
{ // Statement A }  
else  
if (condition 3)  
{ // Statement B}  
else  
{// Statement C }  
else  
if (condition 4)  
{// Statement D}  
else  
{// Statement E}  
}
```

Which of the following conditions will allow execution of statement E?

Option 1 : condition1 AND
condition3

Option 2 : NOT(condition1)
AND condition2 AND
NOT(condition4)

Option 3 :
NOT(condition2) AND
NOT(condition3)

Option 4 : condition1
AND condition4 AND
NOT(condition2)
AND
NOT(condition3)

Ques 89 : Choose the correct answer

Consider the following code:

```
if (condition 1) {  
if (condition 2)  
{ // Statement A }  
else  
if (condition 3)  
{ // Statement B}  
else  
{// Statement C }  
else  
if (condition 4)  
{// Statement D}  
else  
{// Statement E}  
}
```

Which of the following condition will allow execution of statement A?

Option 1 : NOT(condition2)
AND NOT(condition3)

Option 2 : condition1 AND
condition4 AND
NOT(condition2) AND
NOT(condition3)

Option 3 : condition1
AND condition2 AND
condition4

Option 4 :
NOT(condition1)
AND condition2 AND
NOT(condition4)



Ques 90 : Choose the correct answer

What does the following function do?

```
function operation (int a, int b)
{
if (a < b)
{ return operation(b, a) }
else
{ return a }
}
```

Option 1 : Returns the max of (a,b)

Option 2 : Returns the min of (a,b)

Option 3 : Loops forever

Option 4 : Always returns the second parameter

Ques 91 : Choose the correct answer

What does the following function do?

```
function operation (int a, int b)
{
if (a > b)
{ return operation(b, a) }
else
{ return a; }
}
```

Option 1 : Always returns the first parameter

Option 2 : Returns the min of (a,b)

Option 3 : Returns the max of (a,b)

Option 4 : Loops forever

Ques 92 : Choose the correct answer

function g(int n)

```
{
if (n > 0) return 1;
else return -1;
}
```

function f(int a, int b)

```
{
if (a > b) return g(b-a);
if (a < b) return g(a-b);
return 0;
}
```

If f(a,b) is called, what is returned?

Option 1 : Always -1

Option 2 : 1 if a > b, -1 if a < b, 0 otherwise

Option 3 : -1 if a > b, 1 if a < b, 0 otherwise

Option 4 : 0 if a equals b, -1 otherwise



Ques 93 : Choose the correct answer

```
function g(int n)
{
if (n > 0) return 1;
else return -1;
}

function f(int a, int b)
{
if (a > b) return g(a-b);
if (a < b) return g(b-a);
return 0;
}
```

If f(a,b) is called, what is returned?

Option 1 : 1 if a > b, -1 if a < b, 0 otherwise

Option 3 : 0 if a equals b, +1 otherwise Option 4 : -1 if a > b,
1 if a < b, 0 otherwise

Ques 94 : Choose the correct answer

```
function g(int n)
{
if (n > 0) return 1;
else return -1;
}
```

```
function f(int a, int b)
{
if (a > b) return g(a-b);
if (a < b) return g(-b+a);
return 0;
}
```

If f(a,b) is called, what is returned?

Option 1 : Always +1

Option 2 : 1 if a > b, -1 if a < b, 0 otherwise

Option 3 : -1 if a > b, 1 if a < b, 0 otherwise

Option 4 : 0 if a equals b, -1 otherwise

Ques 95 : Choose the correct answer

```
function g(int n)
{
if (n > 0) return 1;
else return -1;
}
```

```
function f(int a, int b)
{
if (a > b) return g(b-a);
if (a < b) return g(-a+b);
return 0;
}
```



If $f(a,b)$ is called, what is returned?

- Option 1 : Always +1 Option 2 : -1 if $a > b$, 1 if $a < b$, 0 otherwise Option 3 : 1 if $a > b$, -1 if $a < b$, 0 otherwise Option 4 : 0 if a equals b , -1 otherwise
-

Ques 96 : Choose the correct answer

Consider the following code:

```
for i= m to n increment 2
{ print "Hello!" }
```

Assuming $m < n$ and exactly one of (m,n) is even, how many times will Hello be printed?

- Option 1 : $(n - m + 1)/2$ Option 2 : $1 + (n - m)/2$ Option 3 : $1 + (n - m)/2$ Option 4 : $(n - m + 1)/2$ if m is even, $(n - m + 1)/2$ if m is odd $(n - m + 1)/2$ if m is odd $(n - m)/2$ if m is odd
-

Ques 97 : Choose the correct answer

Consider the following code:

```
for i= m to n increment 2
{ print "Hello!" }
```

Assuming $m < n$ and (m,n) are either both even or both odd, How many times will Hello be printed?

- Option 1 : $(n - m + 1)/2$ Option 2 : $1 + (n - m)/2$ Option 3 : $1 + (n - m)/2$ Option 4 : $(n - m + 1)/2$ if m is even, $(n - m + 1)/2$ if m is odd $(n - m)/2$ if m is odd
-

Ques 98 : Choose the correct answer

Assuming $n > 2$, What value does the following function compute for odd n ?

```
function f (int n)
```

```
{
```

```
if (n equals 1) { return 1 }
if (n equals 2) { return f(n-1) + n/2 }
return f(n-2) + n;
```

```
}
```

- Option 1 : $1 + 2 + 3 + 4 + \dots + n$ Option 2 : $1 + 3 + 5 + 7 + \dots + n$ Option 3 : $n/2 + (1 + 3 + 5 + 7 + \dots + n)$ Option 4 : $1 + (1 + 3 + 5 + 7 + \dots + n)$
-

Ques 99 : Choose the correct answer

Assuming $n > 2$, What value does the following function compute for even n ?

```
int f (int n)
```

```
{
```

```
if (n equals 1) { return 1 }
if (n equals 2) { return f(n-1) + n/2 }
```



```
return f(n-2) + n
```

```
}
```

Option 1 : $1 + 2 + 3 + 4 + \dots$ Option 2 : $1 + (2 + 4 + 6 + \dots + n)$ Option 3 : $1 + \frac{n}{2} + (4 + 6 + 8 + \dots + n)$ Option 4 : $2 + 4 + 6 + \dots + n$

Ques 100 : Choose the correct answer

The for loop is equivalent to a while loop when

Option 1 : There is no initialization expression

Option 2 : There is no increment expression

Option 3 : A and B combined are true

Option 4 : It is never equivalent

Ques 101 : Choose the correct answer

Consider the statement

```
while (a < 10.0) { a = a*a }
```

Assuming a is positive, for what value of a will this code statement result in an infinite loop?

Option 1 : a < 1.0

Option 2 : $a < \sqrt{10}$

Option 3 : $a > \sqrt{10}$ Option 4 : $a = 0$

Ques 102 : Choose the correct answer

```
int area(double radius)
{
    return PI*radius*radius;
}
```

Which of the following is always true about the function area?

Option 1 : It returns the area of a circle within the limits of double precision.

Option 3 : It returns the area of a circle within the limits of precision of double, or the constant PI, whichever is lower.

Option 4 : None of the above.

Ques 103 : Choose the correct answer

What does this function compute for positive n?

```
function f(int n)
{
    if (n equals 1)
        { return 1 }
    else
        { return f(n-1)/f(n-1) + n }
}
```

Option 1 : $1 + n$

Option 2 : $1 + 2 + 3 + \dots + n$

Option 3 : $1 + n$, if $n > 1$, otherwise

Option 4 : None of the above

Ques 104 : Choose the correct answer



Which of these is not a data type?

Option 1 : integer

Option 2 : character

Option 3 : boolean

Option 4 : array

Ques 105 : Choose the correct answer

The construct "if (condition) then A else B" is for which of the following purposes?

Option 1 : Decision-Making

Option 2 : Iteration

Option 3 : Recursion

Option 4 : Object
Oriented
Programming

Ques 106 : Choose the correct answer

In a sequential programming language, code statements are executed in which order?

Option 1 : All are executed simultaneously

Option 2 : From top to bottom

Option 3 : From bottom to top

Option 4 : None of these

Ques 107 : Choose the correct answer

A for-loop is used for which of the following purposes?

Option 1 : Decision-Making

Option 2 : Iteration

Option 3 : Recursion

Option 4 : None of these

Ques 108 : Choose the correct answer

There are two loops which are nested. This implies which one of the following?

Option 1 : Two loop, one after the other

Option 2 : Two loops, one inside the others

Option 3 : One loop with two different iteration counts

Option 4 : Two loops with the same iteration count

Ques 109 : Choose the correct answer

How will 47 be stored as an unsigned 8-bit binary number?

Option 1 : 10111101

Option 2 : 00101111

Option 3 : 10111000

Option 4 : 00101101

Ques 110 : Choose the correct answer

An integer X is saved as an unsigned 8-bit number, 00001011.What is X?

Option 1 : 22

Option 2 : 11

Option 3 : 10

Option 4 : None of these

Ques 111 : Choose the correct answer

A variable cannot be used...

Option 1 : Before it is declared

Option 2 : After it is declared

Option 3 : In the function it is declared in

Option 4 : Can always be used in



Ques 112 : Choose the correct answer

What is implied by the argument of a function?

- | | | | |
|--------------------------|--|---|----------------------------|
| Option 1 : The variables | Option 2 : The value it passed to it when it is called | Option 3 : The execution code inside it | Option 4 : Its return type |
|--------------------------|--|---|----------------------------|

Ques 113 : Choose the correct answer

Which of the following is true about comments?

- | | | | |
|------------------------------|----------------------------------|---|--|
| Option 1 : They are executed | Option 2 : They are not executed | Option 3 : A good program does not contain them | Option 4 : They increase program execution time. |
|------------------------------|----------------------------------|---|--|

Ques 114 : Choose the correct answer

Neelam wants to share her code with a colleague, who may modify it. Thus she wants to include the date of the program creation, the author and other information with the program. What component should she use?

- | | | | |
|-------------------------|----------------------|---------------------|-----------------------------------|
| Option 1 : Header files | Option 2 : Iteration | Option 3 : Comments | Option 4 : Preprocessor directive |
|-------------------------|----------------------|---------------------|-----------------------------------|

Ques 115 : Choose the correct answer

Shashi writes a program in C++ and passes it on to Pankaj. Pankaj does some indentation in some statements of the code. What will this lead to?

- | | | | |
|-----------------------------|-------------------------------------|---------------------------------|-------------------------------|
| Option 1 : Faster Execution | Option 2 : Lower memory requirement | Option 3 : Correction of errors | Option 4 : Better readability |
|-----------------------------|-------------------------------------|---------------------------------|-------------------------------|

Ques 116 : Choose the correct answer

Zenab and Shashi independently write a program to find the mass of one mole of water, which includes mass of hydrogen and oxygen. Zenab defines the variables:

integer hydrogen, oxygen, water // Code A

while Shashi defines the three quantities as:

integer a, b, c // Code B

Which is a better programming practice and why?

- | | | | |
|--|---|--|--|
| Option 1 : Code B is better because variable names are shorter | Option 2 : Code A is better because the variable names are understandable and non-confusing | Option 3 : Code A will run correctly, while Code B will give an error. | Option 4 : Code B will run correctly, while Code A will give an error. |
|--|---|--|--|

Ques 117 : Choose the correct answer

For solving a problem, which of these is the first step in developing a working program for it?

- | | | | |
|--|---|--|---------------------------|
| Option 1 : Writing the program in the programming language | Option 2 : Writing a step-by-step algorithm to solve the problem. | Option 3 : Compiling the libraries required. | Option 4 : Code debugging |
|--|---|--|---------------------------|



Ques 118 : Choose the correct answer

A robust program has which one of the following features?

- | | | | |
|---|--|---|--------------------------|
| Option 1 : It runs correctly on some inputs | Option 2 : It is robust to hardware damage | Option 3 : It can handle <u>incorrect input data or data types.</u> | Option 4 : None of these |
|---|--|---|--------------------------|

Ques 119 : Choose the correct answer

Tarun wants to write a code to divide two numbers. He wants to warn the user and terminate the program if he or she enters 0 as the divisor. Which programming construct can he use to do this?

- | | | | |
|----------------------|----------------------------|----------------------|--------------------------|
| Option 1 : Iteration | Option 2 : Decision-making | Option 3 : Recursion | Option 4 : None of these |
|----------------------|----------------------------|----------------------|--------------------------|

Ques 120 : Choose the correct answer

To solve a problem, it is broken in to a sequence of smaller sub-problems, till a stage that the sub-problem can be easily solved. What is this design approach called?

- | | | | |
|------------------------------|-------------------------------|-----------------------------------|--------------------------|
| Option 1 : Top-down Approach | Option 2 : Bottom-Up Approach | Option 3 : Procedural Programming | Option 4 : None of these |
|------------------------------|-------------------------------|-----------------------------------|--------------------------|

Ques 121 : Choose the correct answer

The time complexity of linear search algorithm over an array of n elements is

- | | | | |
|--------------------------|-------------------|----------------------------|---------------------|
| Option 1 : $O(\log_2 n)$ | Option 2 : $O(n)$ | Option 3 : $O(n \log_2 n)$ | Option 4 : $O(n^2)$ |
|--------------------------|-------------------|----------------------------|---------------------|

Ques 122 : Choose the correct answer

Rajesh implements queue as a singly-linked linked list. The queue has n elements. The time complexity to ADD a new element to the queue:

- | | | | |
|-------------------|--------------------------|-------------------|----------------------------|
| Option 1 : $O(1)$ | Option 2 : $O(\log_2 n)$ | Option 3 : $O(n)$ | Option 4 : $O(n \log_2 n)$ |
|-------------------|--------------------------|-------------------|----------------------------|

Ques 123 : Choose the correct answer

The time required to insert an element in a stack with linked list implementation is

- | | | | |
|-------------------|--------------------------|-------------------|----------------------------|
| Option 1 : $O(1)$ | Option 2 : $O(\log_2 n)$ | Option 3 : $O(n)$ | Option 4 : $O(n \log_2 n)$ |
|-------------------|--------------------------|-------------------|----------------------------|

Ques 124 : Choose the correct answer

In the following sorting procedures, which one will be the slowest for any given array?

- | | | | |
|-----------------------|----------------------|-----------------------|-------------------------------|
| Option 1 : Quick sort | Option 2 : Heap sort | Option 3 : Merge Sort | Option 4 : <u>Bubble sort</u> |
|-----------------------|----------------------|-----------------------|-------------------------------|

Ques 125 : Choose the correct answer



Pankaj stores n data elements in a hash table. He is able to get the best efficiency achievable by a hash table. What is the time complexity of accessing any element from this hash table?

- Option 1 : O(1) Option 2 : $O(n^2)$ Option 3 : $O(\log n)$ Option 4 : $O(n)$
-

Ques 126 : Choose the correct answer

Every element of a data structure has an address and a key associated with it. A search mechanism deals with two or more values assigned to the same address by using the key. What is this search mechanism?

- Option 1 : Linear Search Option 2 : Binary search Option 3 : Hash Coded Search Option 4 : None of these
-

Ques 127 : Choose the correct answer

The order of magnitude of the worst case performance of a hash coded search (over N elements) is

- Option 1 : N Option 2 : $N \log_2 N$ Option 3 : $\log_2 N$ Option 4 : not dependent upon N
-

Ques 128 : Choose the correct answer

A sorting algorithm traverses through a list, comparing adjacent elements and switching them under certain conditions. What is this sorting algorithm called?

- Option 1 : insertion sort Option 2 : heap sort Option 3 : quick sort Option 4 : bubble sort
-

Ques 129 : Choose the correct answer

A sorting algorithm iteratively traverses through a list to exchange the first element with any element less than it. It then repeats with a new first element. What is this sorting algorithm called?

- Option 1 : insertion sort Option 2 : selection sort Option 3 : heap sort Option 4 : quick sort
-

Ques 130 : Choose the correct answer

A sort which uses the binary tree concept such that any number in the tree is larger than all the numbers in the subtree below it is called

- Option 1 : selection sort Option 2 : insertion sort Option 3 : heap sort Option 4 : quick sort
-

Ques 131 : Choose the correct answer

The average time required to perform a successful sequential search for an element in an array A(1 : n) is given by

- Option 1 : $(n+1)/2$ Option 2 : $\log_2 n$ Option 3 : $n(n+1)/2$ Option 4 : n^2
-

Ques 132 : Choose the correct answer

How many comparisons are needed to sort an array of length 5 if a straight selection sort is used and array is already in the opposite order?

- Option 1 : 1 Option 2 : 10 Option 3 : 50 Option 4 : 20



Ques 133 : Choose the correct answer

Queues serve a major role in

Option 1 : simulation of recursion

Option 2 : simulation of arbitrary linked list

Option 3 : simulation of limited resource allocation

Option 4 : expression evaluation

Ques 134 : Choose the correct answer

The average search time of hashing with linear probing will be less if the load factor

Option 1 : is far less than one

Option 2 : equals one

Option 3 : is far greater than one

Option 4 : none of these

Ques 135 : Choose the correct answer

Number of vertices of odd degree in a graph is

Option 1 : is always even

Option 2 : always odd

Option 3 : either even or odd

Option 4 : always zero

Ques 136 : Choose the correct answer

The algorithm design technique used in the quick sort algorithm is

Option 1 : Dynamic programming

Option 2 : Back tracking

Option 3 : Divide and conquer

Option 4 : Greedy Search

Ques 137 : Choose the correct answer

Linked lists are not suitable for

Option 1 : Insertion sort

Option 2 : Binary search

Option 3 : Queue implementation

Option 4 : None of these

Ques 138 : Choose the correct answer

A connected graph is the one which

Option 1 : Cannot be partitioned without removing an edge

Option 2 : Can be partitioned without removing an edge

Option 3 : does not contain a cycle

Option 4 : Has even number of vertices

Ques 139 : Choose the correct answer

Stack is useful for implementing

Option 1 : radix search

Option 2 : breadth first search

Option 3 : recursion

Option 4 : none of these

Ques 140 : Choose the correct answer

Which of the following is useful in traversing a given graph by breadth first search?



Option 1 : stack

Option 2 : set

Option 3 : list

Option 4 : queue

Ques 141 : Choose the correct answer

Which of the following is useful in implementing quick sort?Option 1 : stack

Option 2 : set

Option 3 : list

Option 4 : queue

Ques 142 : Choose the correct answer

Which of the following abstract data types can be used to represent a many-to-many relation?

Option 1 : Tree

Option 2 : Stack

Option 3 : Graph

Option 4 : Queue

Ques 143 : Choose the correct answer

Two lists, A and B are implemented as singly linked link-lists. The address of the first and last node are stored in variables *firstA* and *lastA* for list A and *firstB* and *lastB* for list B. Given the address of a node is given in the variable *node*, the element stored in the node can be accessed by the statement *node->data* and the address to the next node can be accessed by *node->next*. Pankaj wants to append list B at end of list A. Which of the following statements should he use?

Option 1 : *lastB -> next = firstA* Option 2 : *lastA = firstB* Option 3 : *lastA->next = firstB* Option 4 : *lastB = firstA*

Ques 144 : Choose the correct answer

Which of the following sorting algorithms yield approximately the same worst-case and average-case running time behaviour in O (n log n)?

Option 1 : Bubble sort and Selection sort

Option 2 : Heap sort and Merge sort

Option 3 : Quick sort and Radix sort

Option 4 : Tree sort and Median-of-3 Quick sort

Ques 145 : Choose the correct answer

A complete binary tree with 5 levels has how many nodes? (Root is Level 1)

Option 1 : 15

Option 2 : 25

Option 3 : 63

Option 4 : 31

Ques 146 : Choose the correct answer

The maximum number of nodes on level l of a binary tree is which of the following? (Root is Level 1)Option 1 : 2^{l-1} Option 2 : 3^{l-1} Option 3 : 2^l Option 4 : $2^l - 1$

Ques 147 : Choose the correct answer

Consider an array on which bubble sort is used. The bubble sort would compare the element A[x] to which of the following elements in a single iteration.Option 1 : A [x+1]

Option 2 : A [x+2]

Option 3 : A [x+2x]

Option 4 : All of these.



Ques 148 : Choose the correct answer

In an implementation of a linked list, each node contains data and address. Which of the following could the address field possibly contain?

- Option 1 : Address of next Option 2 : It's own address Option 3 : Address of last node Option 4 : Address of first node
-

Ques 149 : Choose the correct answer

Surbhi wants to implement a particular data structure using a static array. She uses the concept of circular list to implement the data structure, because this allows her to efficiently use all fields of the array. Which data structure is Surbhi implementing?

- Option 1 : a stack Option 2 : a queue Option 3 : Binary Tree Option 4 : None of these
-

Ques 150 : Choose the correct answer

Which of the following is a bad implementation for a queue?

- Option 1 : Circular List Option 2 : Doubly linked list Option 3 : Singly linked List Option 4 : Linear Static Array
-

Ques 151 : Choose the correct answer

Which of the following statements are true about a doubly-linked list?

- Option 1 : it may be either linear or circular Option 2 : it must contain a header node Option 3 : it will occupy same memory space as that of linear linked list, both having same number of nodes Option 4 : None of these
-

Ques 152 : Choose the correct answer

Which of the following data structure may give overflow error, even though the current number of element in it is less than its size ?

- Option 1 : Queue implemented in a linear array Option 2 : Queue implemented in a circularly connected array Option 3 : Stack implemented in a linear array Option 4 : none of these
-

Ques 153 : Choose the correct answer

Number of possible ordered trees with 3 nodes A, B, C is

- Option 1 : 16 Option 2 : 12 Option 3 : 13 Option 4 : 14
-

Ques 154 : Choose the correct answer

The best sorting methods if number of swapping done is the only measure of efficiency is

- Option 1 : Bubble sort Option 2 : Selection sort Option 3 : Insertion sort Option 4 : Quick sort
-

Ques 155 : Choose the correct answer



As part of the maintenance work, you are entrusted with the work of rearranging the library books in a shelf in proper order, at the end of each day. The ideal choice will be

- Option 1 : bubble sort Option 2 : insertion sort Option 3 : selection sort Option 4 : heap sort
-

Ques 156 : Choose the correct answer

A hash table can store a maximum of 10 records. Currently there are records in locations 1, 3, 4, 7, 8, 9, 10. The probability of a new record going into location 2, with a hash function resolving collisions by linear probing is

- Option 1 : 0.6 Option 2 : 0.1 Option 3 : 0.2 Option 4 : 0.5
-

Ques 157 : Choose the correct answer

A full binary tree with n leaves contains

- Option 1 : $2n + 1$ nodes Option 2 : $\log_2 n$ nodes Option 3 : $2n - 1$ nodes Option 4 : $2n$ nodes
-

Ques 158 : Choose the correct answer

An array contains the following elements in order: 7 6 12 30 18. Insertion sort is used to sort the array in ascending order. How many times will an insertion be made?

- Option 1 : 2 Option 2 : 3 Option 3 : 4 Option 4 : 5
-

Ques 159 : Choose the correct answer

An array of 5 numbers has the following entries in order: 7 4 5 10 8. Prashant uses selection sort to sort this array in descending order. What will the array contain after two iterations of selection sort?

- Option 1 : 10 8 7 5 4 Option 2 : 10 8 5 7 4 Option 3 : 8 10 5 7 4 Option 4 : None of these
-

Ques 160 : Choose the correct answer

Srishti writes a program to find an element in the array A[5] with the following elements in order: 8 30 40 45 70. She runs the program to find a number X. X is found in the first iteration of binary search. What is the value of X?

- Option 1 : 40 Option 2 : 8 Option 3 : 70 Option 4 : 30
-

Ques 161 : Choose the correct answer

The array A has n elements. We want to determine the position of X in the array. We know that X is present in the array A and X can be present at any location in the array with equal probability. How many comparisons will be required on average to find the element X using linear search?

- Option 1 : n Option 2 : $(n+1)/2$ Option 3 : 2^n Option 4 : n^2
-

Ques 162 : Choose the correct answer

A is an empty stack. The following operations are done on it.

- PUSH(1)
PUSH(2)



POP

PUSH(5)

PUSH(6)

POP

What will the stack contain after these operations. (Top of the stack is underlined)

Option 1 : 5 6Option 2 : 1 5Option 3 : 5 6Option 4 : 1 5

Ques 163 : Choose the correct answer

A stack is implemented as a linear array A[0...N-1]. Farhan writes the following functions for pushing an element E in to the stack.

```
function PUSH( top, E, N )
{
    if(X)
    {
        top= top+1
        A[top] = E
    }
    else
    {
        print "Overflow"
    }
    return top
}
```

Fill in the condition X

Option 1 : top < N

Option 2 : top

Option 3 : top > 0

Option 4 : top > 1

Ques 164 : Choose the correct answer

A stack is implemented as a linear array A[0...N-1]. Noor writes the following functions for popping an element from the stack.

```
function POP( top, N )
{
    if(X)
    {
        top = top - 1
    }
    else
    {
        print "Underflow"
    }
    return top
}
```

Fill in the condition X

Option 1 : top < N-1

Option 2 : top

Option 3 : top > 1

Option 4 : top >= 0

Ques 165 : Choose the correct answer

Q is an empty queue. The following operations are done on it:

ADD 5



ADD 7

ADD 46

DELETE

ADD 13

DELETE

DELETE

ADD 10

What will be the content of Q after these operations. Front is marked by (F) and Rear is marked by (R).

Option 1 : 10(R) 13(F)

Option 2 : 5(R) 10(F)

Option 3 : 13(R) 10(F)

Option 4 : 10(R) 5(F)

Ques 166 : Choose the correct answer

A queue is implemented as a (singly linked) linked-list for easy addition and deletion of elements. Each node has an element and pointer to another node. Which node will point to empty/no location?

Option 1 : Front

Option 2 : Rear

Option 3 : Both

Option 4 : None of these

Ques 167 : Choose the correct answer

A stack is implemented as a (singly-linked) linked-list, where each node contains data and address of another node. The top node will contain the address of which node?

Option 1 : No node. It will be empty

Option 2 : The node containing the first element pushed into the stack.

Option 3 : The node containing the element which was pushed just before the top element.

Option 4 : None of these

Ques 168 : Choose the correct answer

A queue is implemented by a linear array of size 10 (and not as a circularly connected array). Front and Rear are represented as an index in the array. To add an element, the rear index is incremented and the element is added. To delete an element, the front index is incremented. The following operations are done on an empty queue.

ADD 1; DELETE; ADD 2; ADD 3; ADD 4; DELETE, DELETE

After this set of operations, what is the maximum capacity of the queue?

Option 1 : 6

Option 2 : 7

Option 3 : 10

Option 4 : None of these

Ques 169 : Choose the correct answer

A queue is implemented as a (singly linked) linked-list. Each node has an element and pointer to another node. Rear and Front contain the addresses of the rear and front node respectively. If the condition (rear isequal front) is true and neither is NULL, what do we infer about the linked list?

Option 1 : It has no elements

Option 2 : It has one element

Option 3 : There is an error

Option 4 : None of these

Good Luck!