

Solutions

Chapter – 1 (Number and Letter Series)

Exercise – 1(a)

Solutions for questions 1 to 39:

1. The given numbers are consecutive natural numbers in decreasing order starting with 225. Hence, the missing number is 223. Choice (B)
2. The given numbers are consecutive prime numbers in increasing order starting with 17. Hence, the next number in the series is 41. Choice (E)
3. The given numbers are squares of consecutive natural numbers in decreasing order starting with 15, i.e., the numbers 225, 196, 169, _____, 100, 81 can be written as 15^2 , 14^2 , 13^2 , _____, 11^2 , 10^2 , 9^2 . Hence, the missing number is 12^2 , i.e., 144. Choice (B)
4. The given numbers are consecutive composite numbers. Hence, the next composite number in the series is 21. Choice (C)
5. The given numbers are cubes of consecutive natural numbers, in increasing order starting with 4, i.e., $4^3 = 64$. 64, 125, 216, 343, _____ $\Rightarrow 4^3, 5^3, 6^3, 7^3, 8^3$. Hence, 512 is the next number in the series. Choice (D)
6. The given numbers are alternate prime numbers in decreasing order, starting with 97. Hence, the next number in the series is 47. Choice (C)
7. 54^{+12} , 66^{+16} , 82^{+20} , 102^{+24} , 126, _____. The difference is increasing by 4, starting with 12. So, the next difference is $24 + 4 = 28$. Hence, the next number is $126 + 28 = 154$. Choice (C)
8. 56^{+37} , 93^{+31} , 124, _____, 176^{+19} , 195. The differences are consecutive prime numbers in decreasing order starting with 37. Hence, the next number in the series is $124 + 29 = 153$. Choice (B)
9. 7^{+4} , 11^{+9} , 20^{+16} , 36^{+25} , 61 _____, 146. The differences are squares of consecutive natural numbers, in increasing order starting with 2, i.e., $2^2 = 4$. Hence, the next number in the series is $61 + 36 = 97$. Choice (C)
10. 75^{+216} , 291^{+125} , 416^{+64} , 480^{+27} , 507, _____. The differences are cubes of consecutive natural numbers in decreasing order. Hence, the next number in the series is $507 + (2)^3 = 515$. Choice (A)
11. 1027^{+4} , 1031^{+6} , 1037^{+8} , 1045^{+9} , 1054, _____. The differences are consecutive composite numbers in increasing order. Hence, the next number in the series is $1054 + 10 = 1064$. Choice (C)
12. 8^{+2} , 16^{+3} , 48^{+2} , 96^{+3} , 288^{+2} , 576, _____. The numbers in the series are alternately being multiplied by two and three. Hence, the next number in the series is $576 \times 3 = 1728$. Choice (E)
13. 75075^{+3} , 25025^{+5} , 5005^{+7} , 715^{+11} , _____, 5. The numbers are being divided by consecutive prime numbers. Hence, the next number in the series is $715 \div 11 = 65$. Choice (D)
14. $12^{+0.5}$, 6^{+1} , $6^{+1.5}$, 9^{+2} , $18^{+2.5}$, 45^{+3} , _____. The next number in the series is $45 \times 3 = 135$. Choice (A)
15. 5^{+1} , 5^{+2} , 10^{+3} , 30^{+4} , 120^{+5} , 600, _____. The next number in the series is $600 \times 6 = 3600$. Choice (D)
16. 125^{+3} , 375^{+2} , 377^{+3} , 1131^{+2} , 1133, _____. The numbers are being alternately multiplied by three and two is added. Hence, the next number in the series is $1133 \times 3 = 3399$. Choice (A)
17. 12^{+2-3} , 21^{+2-3} , 39^{+2-3} , 75^{+2-3} , 147, _____. The next number in the series is $147^{+2-3} = 291$. Choice (B)
18. 12^{+3-1} , 35^{+3+1} , 106^{+3-1} , 317^{+3+1} , 952, _____. The next number in the series is $952 \times 3 - 1 = 2855$. Choice (B)
19. 5^{+2+3} , 13^{+3+2} , 41^{+2+3} , 85^{+3+2} , 257^{+2+3} , _____. The next number in the series is $257 \times 2 + 3 = 517$. Choice (E)
20. 13^{+3+0} , 39^{+3+1} , 118^{+3+2} , 356^{+3+3} , 1071^{+3+4} , 3217^{+3+4} , _____. The next number in the series is $3217 \times 3 + 4 = 9656$. Choice (A)
21. 2^{+2} , 4^{+3} , 7^{+5} , 35^{+7} , 42^{+11} , 462. The numbers are alternately multiplied by and added to consecutive prime numbers in increasing order. Hence, the next number in the series is $462 + 13 = 475$. Choice (D)
22. 440, 360, 288, 224, _____. $\Rightarrow 21^2 - 1$, $19^2 - 1$, $17^2 - 1$, $15^2 - 1$, _____. The given numbers can be expressed in the form of $n^2 - 1$ of consecutive odd numbers starting with $21^2 - 1$. Hence, the next number in the series is $13^2 - 1 = 168$. Choice (C)
23. 132, 182, 306, 380, 552, 870, _____. $\Rightarrow 11^2 + 11$, $13^2 + 13$, $17^2 + 17$, $19^2 + 19$, $23^2 + 23$, $29^2 + 29$, _____. The given numbers are in $n^2 + n$ form of consecutive prime numbers in increasing order, starting with 11. Hence, the next number in the series is $31^2 + 31 = 992$. Choice (C)
24. 2, 10, 30, 68, 130, _____. $\Rightarrow 1^3 + 1$, $2^3 + 2$, $3^3 + 3$, $4^3 + 4$, $5^3 + 5$, _____. The given numbers can be expressed in $n^3 + n$ form of consecutive natural numbers starting with 1. Hence, the next number in the series is $6^3 + 6 = 222$. Choice (B)
25. 95, 126.5, 138, 175.5, 189, 232.5, _____. $\Rightarrow 10^2 - \frac{10}{2}$, $11^2 + \frac{11}{2}$, $12^2 - \frac{12}{2}$, $13^2 + \frac{13}{2}$, $14^2 - \frac{14}{2}$, $15^2 + \frac{15}{2}$, _____. The next number in the series is $16^2 - \frac{16}{2} = 248$. Choice (D)
26. 6, 24, 60, 120, 210, _____. $\Rightarrow 2^3 - 2$, $3^3 - 3$, $4^3 - 4$, $5^3 - 5$, $6^3 - 6$, _____. The next number in the series is $7^3 - 7 = 336$. Choice (E)
27. 29, 29, 27, 23, 25, 19, 23, 17, _____. The given series is an alternate series. The numbers in the alternate positions starting with 29 in the first position form a series of consecutive odd numbers in decreasing order. i.e. 29, 27, 25, 23, 21. The remaining numbers form a series of prime numbers in decreasing order starting with 29 i.e. 29, 23, 19, 17, 13. Hence, the next two numbers in the series are 21 and 13 respectively. Choice (C)
28. 24, 625, 26, 729, 28, 841, _____. $\Rightarrow 24$, 25^2 , 26, 27^2 , 28, 29^2 , _____. The next number in the series is 30. Choice (A)

29. $\frac{50}{500}, \frac{40}{1200}, \frac{30}{1500}, \frac{20}{1400}, \dots$
 $\Rightarrow \frac{1}{10}, \frac{1}{30}, \frac{1}{50}, \frac{1}{70}, \dots$

The next fraction should be equivalent to $\frac{1}{90}$.

And the numerator must be 10 i.e. $\frac{10}{900}$. Choice (C)

30. 5, 12, 13, 7, 14, 17, 9, 16, 19, 11, 18, 23, ____, ____, ____.
 The given series is a mixture of three different series. Every third number starting with 5 form a series of consecutive odd numbers in increasing order.
 Every third number starting with 12 form a series of consecutive even numbers. Similarly, every third number starting with 13 form a series of consecutive prime numbers. 5, 7, 9, 11, 13 (odd number series)
 12, 14, 16, 18, 20 (even numbers series)
 13, 17, 19, 23, 29 (prime numbers series)
 Hence, the next numbers in the series are 13, 20 and 29. Choice (D)

31. $6 + \sqrt{216}, 7 + \sqrt{343}, 8 + \sqrt{512}, 9 + \sqrt{729}, \dots$
 $\Rightarrow 6 + \sqrt{6^3}, 7 + \sqrt{7^3}, 8 + \sqrt{8^3}, 9 + \sqrt{9^3}, \dots$
 The next surd in the series is $10 + \sqrt{10^3}$
 $= 10 + \sqrt{1000}$. Choice (B)

32. (14, 272), (17, 182), ____, (23, 56), (26, 20)
 The given series is a mixed series.
 $14^2 + 3, 17^2 + 3, 20^2 + 3, 23^2 + 3, 26^2 + 3$
 272, 182, ____, 56, 20
 $\Rightarrow 16^2 + 16, 13^2 + 13, 10^2 + 10, 7^2 + 7, 4^2 + 4$.
 The missing pair is (20, 110). Choice (C)

33. 1, 8, 27, 16, 125, 36, 343, 64, ____
 $\Rightarrow 1^2, 2^3, 3^3, 4^2, 5^3, 6^2, 7^3, 8^2, \dots$
 The given series consists of cubes of prime numbers and squares of non-prime numbers. Hence, the next two numbers in the series are $9^2 = 81$, and $10^2 = 100$.
 Choice (D)

34. 11, 28, 327, 464, ____
 $\Rightarrow 11^3, 22^3, 33^3, 44^3, \dots$
 The next number in the series is $55^3 = 166375$. Choice (C)

35. 37, 31, 29, 23, 19, 17, 13, 11, ____
 The given number are pairs of prime numbers in decreasing order starting with 37. The next number in the series is 7. Choice (E)

36. In the given series set of three numbers form a group as follows.
 $2 + 4 = 6 / 4 + 6 = 10 / 6 + 8 = 14 / 8 + 10 = 18 / \dots$
 The first two numbers in each group are a pair of consecutive even numbers. Hence, $10 + 12 = 22$ is the next group. Choice (E)

37. $\begin{array}{c|c|c|c} 2 & 6 & 3 & 5, 35, 7 \\ \hline \uparrow & \uparrow & \uparrow & \\ \hline \end{array} \quad \begin{array}{c|c|c|c} 11 & 143 & 13 & \\ \hline \uparrow & \uparrow & \uparrow & \\ \hline \end{array} \quad \dots$

The first and the third numbers in the given groups are consecutive prime numbers and the number at the middle is the product of the prime numbers in that group. Hence, 17, 323 and 19 are next three numbers in the series. Choice (B)

38. The given series is a Fibonacci series
 $5 + 12 = 17,$
 $12 + 17 = 29,$
 $17 + 29 = 46,$
 $29 + 46 = 75,$
 $75 + 121 = 196.$ Choice (B)

39. The given series consists of Pythagoras triplets.
 $6, 8, 10 / 8, 15, 17 / 12, 16, 20.$
 $6^2 + 8^2 = 10^2, 8^2 + 15^2 = 17^2, 12^2 + 16^2 = 20^2.$
 Choice (C)

Solutions for questions 40 to 45:

40. The actual series can be written as follows.
 $1 \times 2^2, 2 \times 4^2, 8 \times 6^2, 384 \times 10^2, 3840$
 $\therefore 3456$ is the wrong term in the series. Choice (D)

41. Here the actual series can be represented as,
 $6 \times 3, 18 \times 3, 21 \times 3, 63 \times 3, 66 \times 3, 198 \times 3, 201$
 $\therefore 60$ is the wrong term in the series. Choice (C)

42. Here the actual series can be represented as follows,
 $5 \times 2^{-2}, 8 \times 2^{-2}, 14 \times 2^{-2}, 26 \times 2^{-2}, 50 \times 2^{-2}, 98 \times 2^{-2}, 194$
 $\therefore 15$ is the wrong term in the series. Choice (A)

43. Here the actual series can be represented as follows
 $10 \times 1^{-2}, 8 \times 2^{-3}, 13 \times 3^{-4}, 35 \times 4^{-5}, 135 \times 5^{-6}, 669 \times 6^{-7}, 4007$
 $\therefore 670$ is the wrong term in the series. Choice (B)

44. The actual series can be represent as,
 $7^{+1^3}, 8^{+2^3}, 16^{+3^3}, 43^{+4^3}, 107^{+5^3}, 232^{+6^3}, 448$
 $\therefore 20$ is the wrong term in the series. Choice (E)

45. Here the actual series can be written as follows

2,	12,	36	80,	150,	252,
\downarrow	\downarrow	\downarrow	\downarrow	\downarrow	\downarrow
$1^2 + 1^3$	$2^2 + 2^3$	$3^2 + 3^3$	$4^2 + 4^3$	$5^2 + 5^3$	$6^2 + 6^3$
392					
\downarrow					
$7^2 + 7^3$					

 $\therefore 6$ is the wrong term in the series. Choice (B)

Solutions for questions 46 to 51:

46. The actual series is as follows.
 $1 \times 4, 4 \times 4, 16 \times 4, 64 \times 4, 256 \times 4, 1024 \times 4, 4096 \times 4, 16384 \times 4$
 Hence the wrong numbers are 15 and 250, where 260 has greater difference. Choice (D)

47. The actual series can be represented as follows.
 $1 \times 1 + 1, 2 \times 2 + 2, 6 \times 3 + 3, 21 \times 4 + 4, 88 \times 5 + 5, 445 \times 6 + 6,$
 $2676 \times 7 + 7, 18739$
 \therefore The wrong numbers are 7 and 2673, where 2673 has greater difference. Choice (E)

48. The actual series can be represented as follows.
 $1^3 + 1, 2^3 + 2, 3^3 + 3, 4^3 + 4, 5^3 + 5, 6^3 + 6, 7^3 + 7, 8^3 + 8$
 The wrong numbers are 65 and 349, where 65 has greater difference. Choice (D)

49. The original series can be represented as follows.
 $15120^{-2}, 7560^{-3}, 2520^{-4}, 630^{-5}, 126^{-6}, 21^{-7}, 3$
 Here the wrong number are 2525 and 20, where 2525 has greater difference. Choice (B)

50. The actual series can be written as
 $1^{+2^2}, 5^{+3^2}, 14^{+4^2}, 30^{+5^2}, 55^{+6^2}, 91^{+7^2}, 140^{+8^2}, 204$
 \therefore The wrong numbers are 15 and 95, where 95 has greater difference. Choice (E)

51. The actual series can be represented as,
 $2^{+1 \times 2}, 3^{+2 \times 3}, 24^{+3 \times 4}, 108^{+4 \times 5}, 560^{+5 \times 6}, 3390^{+6 \times 7}, 23772$
 Here, the wrong numbers are 107 and 3386, where 3386 has greater difference. Choice (E)

Solutions for questions 52 to 56:

52. The given numbers are consecutive prime numbers in increasing order starting with 2. Hence, the new series is:
 13, 17, 19, 23, 29, 31
 (a) (b) (c) (d) (e)
 The value of (d) is 29. Choice (C)

53. The given series can be represented as
 $7^{+2}, 9^{+2}, 18^{+3}, 21^{+3}, 63^{+4}, 67^{+4}, 268$,
 The fifth term of the next series given, i.e., 39
 \therefore The series is
 (a) (b) (c) (d) 39 (e)
 $3^{+2}, 5^{+2}, 10^{+3}, 13^{+3}, 39^{+4}, 43$
 \therefore The value of (b) is 5. Choice (C)

54. Here the series can be written as follows

$$\begin{array}{ccccccc} 0 & 6 & 24 & 60 & 120 & 210 \\ \uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \uparrow \\ 1^3 - 1 & 2^3 - 2 & 3^3 - 3 & 4^3 - 4 & 5^3 - 5 & 6^3 - 6 \end{array}$$

 As the first term in the next series is 210, i.e., $(6^3 - 6)$, the third term (b) must be, $(8^3 - 8)$, i.e., 504. Choice (D)

55. The given series can be written as
 $1 \times 2^{+1}, 3 \times 3^{+2}, 11 \times 4^{+3}, 47 \times 5^{+4}, 239 \times 6^{+5}, 1439$,
 In the same way
 (a) (b) (c) (d) (e)
 $2 \times 2^{+1}, 5 \times 3^{+2}, 17 \times 4^{+3}, 71 \times 5^{+4}, 359 \times 6^{+5}, 2159$
 \therefore The value of (a) is 2. Choice (B)

56. The given series can be represented as

$$\begin{array}{ccccccc} 2 & 5 & 28 & 17 & 126 & 37 \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ 1^3 + 1 & 2^2 + 1 & 3^3 + 1 & 4^2 + 1 & 5^3 + 1 & 6^2 + 1 \end{array}$$

 The first term of the next series is 37, i.e., $(6^2 + 1)$.
 Hence, (d) must be $(10^2 + 1)$ i.e., 101. Choice (C)

Solutions for questions 57 to 61:

57. The given series can be represented as follows.
 $7^{+3}, 10^{+5}, 15^{+7}, 22^{+11}, 33^{+13}, 46$
 (consecutive prime numbers are added)
 \therefore 48 is the wrong term in the series.
 \therefore The new series will be
 $48^{+3}, 51^{+5}, 56^{+7}, 63^{+11}, 74$
 \therefore 74 is the fifth term in the new series. Choice (E)
58. The series can be represented as follows.
 $7^{+3 \times 2}, 20^{+2 \times 3}, 66^{+3 \times 2}, 138^{+2 \times 3}, 420^{+3 \times 2}, 846$
 \therefore The wrong term is 21.
 \therefore The new series will be
 $21^{+3 \times 2}, 48^{+2 \times 3}, 150^{+3 \times 2}, 306^{+2 \times 3}, 924$
 \therefore 924 will be the fifth term in the new series. Choice (C)
59. The series can be represented as follows.
 $5^{+1}, 6^{+2}, 12^{+3}, 15^{+4}, 60^{+5}, 65$
 \therefore The wrong term is 7.
 New series will be $7^{+1}, 8^{+2}, 16^{+3}, 19$
 \therefore 19 is the fourth term in the new series. Choice (A)
60. The series can be written as follows.
 $15^{+2}, 30^{+2}, 32^{+3}, 96^{+3}, 99^{+2}, 198^{+2}, 200^{+3}, 600$
 \therefore 39 is the wrong number.
 \therefore The new series will be $39^{+2}, 78^{+2}, 80$ Choice (E)
61. The series can be represented as follows.
 $7^{+2}, 9^{+4}, 13^{+8}, 21^{+16}, 37^{+32}, 69^{+64}, 133$
 \therefore The wrong term is 40.
 \therefore The new series will be
 $40^{+2}, 42^{+4}, 46^{+8}, 54^{+16}, 70$,
 \therefore 70 is the fifth term in the new series. Choice (C)

Solutions for questions 62 to 65:

62. In the first row
 14 196 23
 Here 196 is a perfect square and 14 is even.
 \therefore According to rule (iii)
 it will be $(196 - 14) = 182$, which is an even number.
 23 is an odd number.
 According to rule (ii)
 $182 + 23 = 205 = x$, is an odd number.

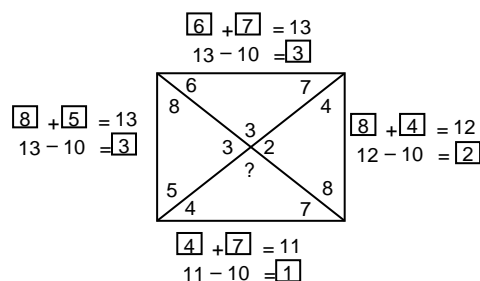
In the second row
 10 205 152
 10 is an even number.
 \therefore According to rule (ii), $(10 + 205) = 215$ which is odd.
 152 is even.
 Hence, the resultant of the second row is $(215 - 152) = 63$.
 Choice (C)

63. The first row is
 65 5 9.
 The resultant of first two numbers = $65 \div 5 = 13$ (odd)
 Resultant of the new number and the last number
 $= 13 \times 9 = 117$
 The second row
 109 24 5
 Resultant of the first two number = $(109 - 24) = 85$ (odd)
 \therefore Resultant of the new number and the third number
 $= 85 \div 5 = 17$.
 \therefore The difference between the resultants.
 $= 117 - 17 = 100$. Choice (D)
64. In the first row,
 The resultant of the first two numbers = $79 - 64 = 15$
 The resultant of the resultant of the first two numbers and the last number = $15 \times 21 = 315 = m$
 In the second row,
 Resultant of the first two numbers = $315 \div 7 = 45$.
 Now the resultant of the resultant of the first two numbers and the last number = $45 - 28 = 17$. Choice (E)

65. 1st row 143 11 8
 The resultant of the first two numbers = $143 \div 11 = 13$
 The resultant of the resultant of first two numbers and the last number = $13 - 8 = 5$
 The resultant of the first two numbers of the second row
 $= 36 - 12 = 24$
 The resultant of the resultant of first two numbers and the last number = $24 + 3 = 27$.
 \therefore The sum of the resultants of the two rows = $27 + 5 = 32$.
 Choice (C)

Solutions for questions 66 to 71:

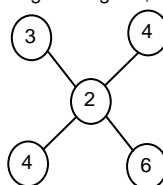
66. The given logic is,



\therefore The missing number is 1. Choice (A)

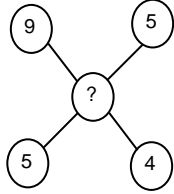
67. The given logic is,
 $6 + 4 = 10$
 $10 + 4 = 14$
 $14 + 4 = 18$
 $18 + 4 = 22$
 \therefore The missing number is 22. Choice (A)

68. The given logic is,



$$\Rightarrow (3 \times 6) - (4 \times 4) = 2$$

Similarly,



$$\Rightarrow (9 \times 4) - (5 \times 5) = 11$$

\therefore The missing number is 11.

Choice (E)

69. The given logic is,
For letters, the pair represents the opposite letters and the series is,
 $A^{+2}, C^{+2}, E^{+2}, G$
 \therefore GT is the missing letter pair.
And for numbers,
 $15 \times 2 = 30 \Rightarrow 30 + 1 = 31$
 $31 \times 2 = 62 \Rightarrow 62 + 1 = 63$
 $\Rightarrow 63 \times 2 = 126 \Rightarrow 126 + 1 = 127$
 \therefore GT, 127 is the missing pair. Choice (C)
70. The given logic is,
For letters, the series is,
 C^{+2}, E^{+3}, H
 L^{+2}, E^{+3}, Q
 U^{+2}, W^{+3}, Z
Similarly
 D^{+2}, F^{+3}, I
 \therefore D is the missing letter.
For numbers,
 $6 \times 1 + 1 = 7$
 $7 \times 2 + 2 = 16$
 $16 \times 3 + 3 = 51$
 $51 \times 4 + 4 = 208$
 $208 \times 5 + 5 = 1045$
 \therefore 1045, D is the missing pair. Choice (C)
71. The given logic is,
The multiplication of the place value of the letters gives the below number.
 \Rightarrow place value of S is 19 and B is 2.
 $\Rightarrow 19 \times 2 = 38$.
 \therefore S, 38 is the missing pair. Choice (B)

Solutions for questions 72 to 75:

72. The given logic is as follows.
The product of the place values of the letters in the first position is multiplied by 4. i.e. r
 $= 18, q = 17 \Rightarrow (18 \times 17) \times 4 = 1224$.
By the same logic, the missing term $= (6 \times 5) \times 4 = 120$.
Choice (B)
73. The given logic is as follows.
First row: $((l - h) \times (d - a) \times (i - c)) \times \text{number of letters given on either side of the number}$
 $= (4 \times 3 \times 6) \times 6 = 432$.
By the same logic, the missing term is:
 $(w - s) \times (o - k) \times (e - b) \times 6$
 $= (4 \times 4 \times 3) \times 6 = 288$. Choice (E)
74. The given logic is as follows.
 $f + a + b = 9, c + a + d = 8$
 $9^3 + 8^2 = 793$
Similarly, 'and' will replace the question mark.
i.e. $m + a + n = 28, a + n + d = 19$
 $28^3 + 19^2 = 22313$. Choice (A)
75. The given logic is as follows.
 $p + e + t = 41, c + a + t = 24$
 $41^2 \times 24^2 = 968256$
Similarly, 'the' will replace the question mark place.
i.e., $a + n + d = 19, t + h + e = 33$
 $19^2 \times 33^2 = 393129$. Choice (C)

Exercise – 1(b)

Solutions for questions 1 to 38:

- $A \times 2, B \times 2, D \times 2, H \times 2, \dots \times 2, F$
 $A = 1$ and $1 \times 2 = 2$ and the 2nd letter is B.
 $B = 2$ and $2 \times 2 = 4$ and the 4th letter is D.
Similarly, $H = 8$ and $8 \times 2 = 16$ and the 16th letter P is the missing letter. Choice (A)
- E, A, ____, O, I.
The given series consists of vowels in decreasing order, starting with E. Hence, the missing letter is U. Choice (B)
- D, F, G, H, J, K, L, M, N, ____
The given series consists of consonants in increasing order, starting with D. The next consonant in the series is P. Choice (C)
- $E^{+5}, J^{+5}, O^{+5}, T^{+5}, Y^{+5}, \dots$
The next letter in the series is $Y + 5 = D$. Choice (A)
- $G^{+3}, J^{+4}, N^{+3}, Q^{+4}, U^{+3}, \dots$
The next letter in the series is $U + 3 = X$. Choice (B)
- $R^{-7}, K^{-5}, F^{-3}, C, \dots$
The values that are subtracted are consecutive prime numbers in decreasing order. Hence, the next letter in the series is $C - 2 = A$. Choice (D)
- BY, CX, EV, GT, KP, ____
The given series is a mixed series. The letters B, C, E, G and K are the letters in prime value positions. Hence, the next letter is M. The second letter in each group form an opposite pair of the first letter in that group. Hence, the next pair in the series is MN. Choice (B)
- The first letters in all the groups are consecutive vowels starting with A. The second letters in all the groups are consecutive vowels starting with I. Hence, the missing pair is OA. Choice (D)
- The first letters in all the pairs, i.e., A, B, C and D, form a series of consecutive letters. Similarly, the second letters P, Q, R and S form another pair of consecutive letters. Hence, the next pair in the series is ET. Choice (A)
- The given series is a mixed series.
Pattern for the first letter:
 $Q^{+1}, R^{+2}, T^{+3}, W^{+4}, A^{+5}, F$
Pattern for the second letter:
 $N^{+2}, P^{+3}, S^{+4}, W^{+5}, B^{+6}, H$
Hence, the missing pair is AB. Choice (C)
- The given series is a mixed series
Pattern for the first letter:
 $E^{+4}, J^{+6}, O^{+4}, S^{+6}, Y^{+4}, C$
Pattern for the second letter:
 $A^{+4}, E^{+6}, K^{+4}, O^{+6}, U^{+4}, Y$
Hence, the next pair in the series is CY. Choice (E)
- The given series is a mixed series.
Pattern for the first letter:
 $K^{+1}, L^{+1}, M^{+1}, N^{+1}, Q$
Pattern for the second letter:
 $P^{-1}, O^{-1}, N^{-1}, M^{-1}, L$
Pattern for the third letter:
 $D^{+1}, E^{+1}, F^{+1}, G^{+1}, H$
Hence, the next group in the series is OLH. Choice (B)
- The given series is a mixed series.
Pattern for the first letter:
Consecutive consonants starting with B.
Next letter in that series is H
Pattern for the second letter:
Consecutive vowels starting with E. The next letter in that series is E.
Pattern for the third letter:
Consecutive consonants starting with V.
Hence, the next group in the series is HEV. Choice (A)

14. The given series is a mixed series.
Pattern for the first letter :
 $G^{+2}, I^{+3}, L^{+4}, P^{+5}, U^{+6}, A$
Pattern for the second letter :
 $K^{+5}, P^{+4}, T^{+3}, W^{+2}, Y^{+1}, Z$
Pattern for the third letter :
 $F^{-3}, C^{-4}, Y^{-5}, T^{-6}, N^{-7}, G$
Hence, the required group is AZG. Choice (D)
15. The alternate groups are in mixed series.
QLR, RNU, SPX are in one series.
The Pattern for the first letter :
 $Q^{+1}, R^{+1}, S^{+1}, I$
The Pattern for the second letter :
 $L^{+2}, N^{+2}, P^{+2}, R$
The Pattern for the third letter :
 $R^{+3}, U^{+3}, X^{+3}, A$
Hence, the next group in the series is TRA. Choice (E)
16. The given series is a mixed series.
Pattern for the first letter :
 $P^{+3}, S^{+5}, X^{+3}, A^{+5}, F^{+3}, I$
Pattern for the second letter :
 $K^{+5}, P^{+3}, S^{+5}, X^{+3}, A^{+5}, F$
Pattern for the third letter :
 $C^{+3}, F^{+5}, K^{+3}, N^{+5}, S^{+3}, V$
Hence, the missing group is FAS. Choice (C)
17. The given series is a mixed series.
Pattern for the first letter :
 $G^{-4}, C^{-4}, Y^{-4}, U^{-4}, Q$
Pattern for the second letter :
 $T^{+5}, Y^{+5}, D^{+5}, I^{+5}, N$
Pattern for the third letter :
 $B^{-6}, V^{-6}, P^{-6}, J^{-6}, D$
Hence, the missing group is UIJ. Choice (B)
18. The given series is a mixed series.
Pattern for the first letter :
 $J^{+5}, O^{+6}, U^{+7}, B^{+8}, J$
Pattern for the second letter :
 $T^{+5}, Y^{+4}, C^{+3}, F^{+2}, H$
Pattern for the third letter :
 $U^{+5}, Z^{+6}, F^{+7}, M^{+8}, U$
Hence, the missing group is OYZ. Choice (A)
19. This question can be solved easily if the relation between the letters within the group is observed. In this series the first letter in all the groups form a series of consecutive letters. Hence, the first letter in the next group is E. The other letters in each group are related as follows.
 $A^{+2} B^{+2} D^{+2} H$
 $B^{+2} D^{+2} H^{+2} P$
 $C^{+2} F^{+2} L^{+2} X$
 $D^{+2} H^{+2} P^{+2} F$
Hence, the next group is obtained as follows.
 $E^{+2}, J^{+2}, T^{+2}, N$. Choice (C)
20. The given series is a mixed series.
Pattern for the first letter :
 $K^{-4}, G^{-4}, C^{-4}, Y^{-4}, U$
Pattern for the second letter :
 $J^{-3}, G^{-3}, D^{-3}, A^{-3}, X$
Pattern for the third letter :
 $A^{-4}, W^{-4}, S^{-4}, O^{-4}, K$
Pattern for the fourth letter :
 $M^{-3}, J^{-3}, G^{-3}, D^{-3}, A$
Hence, the missing group is CDSG. Choice (D)
21. The given series is a mixed series.
Pattern for the first letter :
 $T^{-2}, R^{-3}, O^{-5}, J^{-7}, C$
Pattern for the second letter :
 $C^{-2}, A^{-3}, X^{-5}, S^{-7}, L$
Pattern for the third letter :
 $F^{-2}, D^{-3}, A^{-5}, V^{-7}, Q$
Pattern for the fourth letter :
 $K^{-2}, I^{-3}, F^{-5}, A^{-7}, T$
Hence, the next group in the series is CLOT. Choice (D)
22. The given series is a mixed series.
Pattern for the first letter :
 $F^{+1}, G^{-2}, E^{+3}, H^{-4}, D$
Pattern for the second letter :
 $T^{-2}, R^{+3}, U^{-4}, Q^{+5}, V$
Pattern for the third letter :
 $J^{+3}, M^{-4}, I^{+5}, N^{-6}, H$
Pattern for the fourth letter :
 $M^{-4}, I^{+5}, N^{-6}, H^{-7}, O$
Pattern for the fifth letter :
 $P^{+5}, U^{-6}, O^{+7}, V^{-8}, N$
Hence, the missing group is HQNHV. Choice (B)
23. In this series alternate groups form different series.
i.e., ATNHG, CVPJL, EXRLK and GZTNM are in one series and DKCMB, GNFPE and JQISH are in the second series.
First Series :
Pattern for the first letter :
 $A^{+2}, C^{+2}, E^{+2}, G$
Pattern for the second letter :
 $T^{+2}, V^{+2}, X^{+2}, Z$
Pattern for the third letter :
 $N^{+2}, P^{+2}, R^{+2}, T$
Pattern for the fourth letter :
 $H^{+2}, J^{+2}, L^{+2}, N$
Pattern for the fifth letter :
 $G^{+2}, I^{+2}, K^{+2}, M$
Second series :
Pattern for the first letter :
 $D^{+3}, G^{+3}, J^{+3}, M$
Pattern for the second letter :
 $K^{+3}, N^{+3}, Q^{+3}, I$
Pattern for the third letter :
 $C^{+3}, F^{+3}, I^{+3}, L$
Pattern for the fourth letter :
 $M^{+3}, P^{+3}, S^{+3}, V$
Pattern for the fifth letter :
 $B^{+3}, E^{+3}, H^{+3}, K$
Hence, the next group in the series is MTLVK. Choice (A)
24. The letters with odd position values are taken in alternate groups. i.e., ACEGI, KMOQS, UWYAC Similarly the letters with even position values are taken in the other groups. i.e., DBFHJ, LNPRT, VXZBD. Choice (C)
25. In the given series each group is related to its previous group and the letters within the group are related to each other as follows.
 $K^{+1} L^{+2} N^{+3} Q^{+4}, U^{+1} V^{+2} X^{+3} A^{+4},$
 $E^{+1} F^{+2} H^{+3} K^{+4}, O^{+1} P^{+2} R^{+3} U^{+4},$
 $Y^{+1} Z^{+2} B^{+3} E$
Hence, YZBE is the next group in the series. Choice (C)
26. The consecutive letters in the English alphabet are taken in pairs and each letter has its place value written next to it.
1 A B 2
3 C D 4
5 E F 6
7 G H 8
9 I J 10
Hence, 9IJ10 is the next group in the series. Choice (A)
27. $A 1^2, B 2^2, C 3^2, D 4^2, E 5^2$
Hence, D16 is the next group in the series. Choice (C)
28. 1 B 1, 2 D 2, 3 F 3, 4 H 4, 5 J 5
 $(1+1) (2+2) (3+3) (4+4) (5+5)$
In each group the letter at the middle has the place value, which is sum of the numbers in that group. Hence, 5 J 5 is the next group in the series. Choice (D)
29. The letters are consecutive letters with the prime number as the position value and the digits on either of the letter together indicate the place value of the letter.
 $2W3 \Rightarrow W = 23$
 $1S9 \Rightarrow S = 19$
 $1Q7 \Rightarrow Q = 17$
 $1K1 \Rightarrow K = 11$
Missing term is 1M3. Choice (B)

30. $\begin{matrix} (1+2) & (3-2) & (4+5) \\ A\ 3\ B, & C\ 1\ B, & D\ 9\ E, \\ 1\ 2 & 3\ 2 & 4\ 5 \\ (5-4) & (6+7) \\ E\ 1\ D, & F\ 13\ G \\ 5\ 4 & 6\ 7 \end{matrix}$
Choice (E)
31. $\frac{B(2)}{2^3}, \frac{D(4)}{4^3}, \frac{F(6)}{6^3}, \frac{H(8)}{8^3}, \frac{J(10)}{10^3}$
 $\frac{+2}{+2} \quad \frac{+2}{+2} \quad \frac{+2}{+2} \quad \frac{+2}{+2}$
Hence, $\frac{H}{512}$ is the missing term in the series.
Choice (C)
32. $\begin{matrix} 23 & 17 & 20 & 7 \\ W & 6 & Q, & T\ 1B\ G, \\ (17-23) & (20-7) \\ 11 & 4 & 16 & 7 \\ K & 7 & D, & P\ 9\ G, \end{matrix}$
 $\begin{matrix} (11-4) & (16-7) \end{matrix}$
The difference of the place values of the letters in each group is taken between them. Similar pattern is followed by N13 A.
Choice (C)
33. $\begin{matrix} 14 & 1 & 16 & 2 & 18 & 3 & 22 & 5 \\ N & 15 & A, & P & 18 & B, & R & 21 & C & V & 27 & E \\ (14+1) & (16+2) & (18+3) & (22+5) \end{matrix}$
Pattern for the first letters:
 $N^{+2}, P^{+2}, R^{+2}, T^{+2}, V$
Pattern for the second letters:
 $A^{+1}, B^{+1}, C^{+1}, D^{+1}, E$
Hence, the required group is T 24 D.
Choice (C)
34. $\begin{matrix} B\ C(2+3)^2, & C\ E(3+5)^2, & E\ G(5+7)^2, \\ 2\ 3 & 3\ 5 & 5\ 7 \\ G\ K(7+11)^2, & \end{matrix}$
 $7\ 11$
Pattern for the first and the second letters:
Letters in consecutive prime positions.
Hence, KM $(11+13)^2$ i.e., KM576 is the required group.
Choice (D)
35. $9 \Rightarrow I$ is 9th letter and $9^2 = 81$.
The digits in 81 are written in reverse order on either side of I.
Similar, pattern is followed in other groups.
Pattern for the letters:
 $I^{-1}, H^{-1}, G^{-1}, F^{-1}, E$
E is 5th letter and $5^2 = 25$. Hence, 5 E 2 is the next group in the series.
Choice (A)
36. In each term the numbers are pairs of consecutive prime numbers.
The letter between them has the place value equal to the product of the two numbers on either side of it.
 \therefore The next two prime numbers are 11 and 13 whose product is 143. The 143rd letter is $(26 \times 5 + 13)$ M.
 \therefore 11M13 is the next term.
Choice (E)
37. The numbers written on either side of each letter are squares of consecutive natural numbers.
The letter between the numbers has place value equal to sum of the two numbers.
The next two numbers are 81 and 100, whose sum is 181.
The 181st letter is Y. Hence, 81Y100 is the next term.
Choice (B)
38. The first letters in the given terms are consecutive letters starting with A. Hence, the required first letter is E.
The second letters are consecutive letters starting with C. Hence, the required second letter is G.
The number at the middle is square of the sum of the place values of the letters on either side of it.
The place value of E is 5 and that of G is 7, whose sum is 12.
 \therefore E144G is the required term.
Choice (E)

Solutions for questions 39 to 43:

39. $2\ 9\ 6\ 8\ 1\ 3\ 4\ 8\ 7\ 6\ 5\ 2\ 1\ 3\ 4\ 3\ 6\ 8$
The odd numbers which are preceded and followed by even numbers are 9, 7, 5 and 3.
Choice (A)
40. $5\ 3\ 1\ 9\ 3\ 3\ 2\ 3\ 5\ 7\ 3\ 6\ 9\ 3\ 2\ 4$
The digits which are either preceded by a multiple of 3 or followed by a multiple of 3 are 5, 1, 9, 3, 3, 2, 5, 7, 3, 6, 9, 3 and 2.
Choice (B)
41. $x, k\ 3\ t\ m\ p\ 5\ 2\ a\ 3\ 6\ 4\ q\ j\ h$ the given sequence the characters x, t, 2, 4 and q satisfy the given condition.
Choice (B)
42. $7\ 3\ 2\ 4\ 6\ 8\ 9\ 3\ 5\ 7\ 8\ 4\ 3\ 2\ 1\ 5\ 6\ 3\ 8$
In the given sequence 2 and 3 satisfy the given conditions.
Choice (B)
43. $6\ 5\ 7\ 9\ 11\ 3\ 2\ 3\ 5\ 7\ 8\ 7\ 6\ 2\ 8$
In the given sequence the digits 6, 9 and 3 satisfy the given condition.
Choice (E)

Solutions for questions 44 to 47:

44. (K) $11 + 3$ (right) $- 5$ (left) = 9
The ninth letter is I.
Choice (E)
45. (N) $14 + 5$ (right) $+ 2$ (right) = 21
The 21st letter is U.
Choice (A)
46. (Q) $17 + 4$ (right) $- 2$ (left) = 19
The 19th letter is S.
Choice (E)
47. (J) $10 - 4$ (left) $- 3$ (left) = 3
The third letter is C.
Choice (D)

Solutions for questions 48 to 50:

48. (J) $10 + 3$ (left) $- 5$ (right) = 8
The eighth letter is H.
Choice (D)
49. (E) $5 + 2$ (left) $+ 4$ (left) = 11
The eleventh letter is K.
Choice (C)
50. (L) $12 + 7$ (left) $- 3$ (right) = 16
The 16th letter is P.
Choice (B)

Chapter – 2

(Number and Letter Analogies)

Exercise – 2(a)

Solutions for questions 1 to 50:

1. $196 : 256 :: 324 : \underline{\hspace{2cm}}$
 $(14)^2 : (16)^2 :: (18)^2 : (20)^2$
 $\frac{+2}{+2} \quad \frac{+2}{+2}$
 $(20)^2 = 400$ is the next number.
Choice (B)
2. $441 : 361 :: 729 : \underline{\hspace{2cm}}$
 $(21)^2 : (19)^2 :: (27)^2 : (25)^2$
 $\frac{-2}{+2} \quad \frac{+2}{+2}$
 $(25)^2 = 625$ is the next number.
Choice (C)
3. $121 : 169 :: 361 : \underline{\hspace{2cm}}$
 $(11)^2 : (13)^2 :: (19)^2 : \underline{\hspace{2cm}}$
The given numbers are squares of consecutive prime numbers. Hence, the prime number next to 19 is 23 and $(23)^2 = 529$.
Choice (A)
4. $225 : 400 :: 625 : \underline{\hspace{2cm}}$
 $(15)^2 : (20)^2 :: (25)^2 : (30)^2$
 $\frac{+5}{+5} \quad \frac{+5}{+5}$
 $\therefore (30)^2 = 900$ is the next number.
Choice (D)
5. $324 : 400 :: 576 : \underline{\hspace{2cm}}$
The given numbers are the squares of consecutive composite numbers.
 $(18)^2 : (20)^2 :: (24)^2 : (25)^2$
 $\therefore (25)^2 = 625$ is the required number.
Choice (A)

6. $125 : 216 :: 1331 : \underline{\hspace{2cm}}$
 $(5)^3 : (6)^3 :: (11)^3 : (12)^3$
 $\underbrace{\hspace{1cm}}_{+1} \quad \underbrace{\hspace{1cm}}_{+1}$
 $(12)^3 = 1728$ is the next number. Choice (C)
7. $343 : 729 :: 125 : \underline{\hspace{2cm}}$
 $(7)^3 : (9)^3 :: (5)^3 : (7)^3$
 $\underbrace{\hspace{1cm}}_{+2} \quad \underbrace{\hspace{1cm}}_{+2}$
 $(7)^3 = 343$ is the next number. Choice (B)
8. $125 : 343 :: 343 : \underline{\hspace{2cm}}$
 $(5)^3 : (7)^3 :: (7)^3 : \underline{\hspace{2cm}}$
The given numbers are the cubes of consecutive prime numbers. Hence, the prime number next to 7 is 11 and $(11)^3 = 1331$ is the next number. Choice (B)
9. $27 : 216 :: 64 : \underline{\hspace{2cm}}$
 $(3)^3 : (6)^3 :: (4)^3 : \underline{\hspace{2cm}}$
 $3 \times 2 = 6$ similarly, $4 \times 2 = 8$
 $\therefore (8)^3 = 512$ is the next number. Choice (C)
10. $97 : 89 :: 43 : \underline{\hspace{2cm}}$
Previous prime number to 97 is 89. Similarly for 43 the previous prime is 41. Choice (E)
11. $36 : 343 :: \underline{\hspace{2cm}} : 1331$
 $(6)^2 : (7)^3 :: (10)^2 : (11)^3$
Hence, $10^2 = 100$ is the missing number. Choice (C)
12. $24 : 576 :: 32 : \underline{\hspace{2cm}}$
The given analogy is of the form $n : n^2$.
 $24 : (24)^2 :: 32 : (32)^2$
 $(32)^2 = 1024$ is the next number. Choice (A)
13. $13 : 2197 :: 16 : \underline{\hspace{2cm}}$
The given analogy is of the form $n : n^3$.
 $13 : (13)^3 :: 16 : (16)^3$
 $(16)^3 = 4096$ is the missing number. Choice (C)
14. $81 : 729 :: 144 : \underline{\hspace{2cm}}$
 $(9)^2 : (9)^3 :: (12)^2 : (12)^3$
 $(12)^3 = 1728$ is the next number. Choice (A)
15. $22 : 506 :: 27 : \underline{\hspace{2cm}}$
 $22 : (22)^2 + 22 :: 27 : (27)^2 + 27$
This is of the form $n : n^2 + n$.
 $(27)^2 + 27 = 756$ is the next number. Choice (B)
16. $6 : 222 : 9 : \underline{\hspace{2cm}}$
 $6 : (6)^3 + 6 :: 9 : (9)^3 + 9$
 $(9)^3 + 9 = 738$ is the next number. Choice (A)
17. $5 : 120 : 8 : \underline{\hspace{2cm}}$
 $5 : (5)^3 - 5 :: 8 : (8)^3 - 8$
 $(8)^3 - 8 = 504$ is the next number. Choice (B)
18. $5 : 150 :: 8 : \underline{\hspace{2cm}}$
 $5 : 5^3 + 5^2 :: 8 : 8^3 + 8^2$
This is of the form $n : n^3 + n^2$
 $8^3 + 8^2 = 576$ is the next number. Choice (E)
19. $6 : 180 :: 9 : \underline{\hspace{2cm}}$
 $6 : 6^3 - 6^2 :: 9 : 9^3 - 9^2$
This is of the form $n : n^3 - n^2$.
 $9^3 - 9^2 = 648$. Choice (D)
20. $105 : 150 :: 39 : \underline{\hspace{2cm}}$
 $(10)^2 + \frac{10}{2} : (12)^2 + \frac{12}{2} :: (6)^2 + \frac{6}{2} : (8)^2 + \frac{8}{2}$
 $\underbrace{\hspace{1cm}}_{+2} \quad \underbrace{\hspace{1cm}}_{+2}$
This is of the form $n^2 + \frac{n}{2}$
 $(8)^2 + \frac{8}{2} = 68$ is the next number. Choice (A)
21. $390 : 315 :: \underline{\hspace{2cm}} : 564$
 $(20)^2 - \frac{20}{2} : (18)^2 - \frac{18}{2} :: (26)^2 - \frac{26}{2} : (24)^2 - \frac{24}{2}$
 $\underbrace{\hspace{1cm}}_{+2} \quad \underbrace{\hspace{1cm}}_{+2}$
- This is of the form $n^2 - \frac{n}{2}$.
Hence, $(26)^2 - \frac{26}{2} = 663$ is the missing number. Choice (A)
22. $3864 + 1234 : 5068 :: 4994 + 1234 : \underline{\hspace{2cm}}$
 $4994 + 1234 = 6228$. Choice (A)
23. $1936^{576} : 1360 :: \underline{\hspace{2cm}} : 2142$
 $2142 + 576 = 2718$. Choice (B)
24. $11^{+13} : 24 :: 37 : \underline{\hspace{2cm}}$
Next prime number to 11 is 13. $11 + 13 = 24$.
Next prime to 37 is 41 and $37 + 41 = 78$. Choice (E)
25. $97^{-89} : 8 :: 43 : \underline{\hspace{2cm}}$
Previous prime number to 97 is 89 and $97 - 89 = 8$.
Similarly the previous prime to 43 is 41 and $43 - 41 = 2$. Choice (B)
26. $784^{+28} : 812 :: 1024 : \underline{\hspace{2cm}}$
This is of the form $n^2 : n^2 + n$.
 $\sqrt{784} = 28$ and $784 + 28 = 812$.
Similarly, $\sqrt{1024} = 32$ and $1024 + 32 = 1056$. Choice (B)
27. $256 : 240 :: \underline{\hspace{2cm}} : 90$
 $(16)^2 : (16)^2 - 16 :: (10)^2 : (10)^2 - 10$
This is of the form $n^2 : n^2 - n$.
 $\therefore 10^2 = 100$ is the missing number. Choice (C)
28. $16 : 68 :: 36 : \underline{\hspace{2cm}}$
 $(4)^2 : (4)^3 + 4 :: (6)^2 : (6)^3 + 6$
This is of the form $n^2 : n^3 + n$.
 $\therefore (6)^3 + 6 = 222$ is the next number. Choice (C)
29. $512 : 504 :: 1728 : \underline{\hspace{2cm}}$
 $(8)^3 : 8^3 - 8 :: (12)^3 : (12)^3 - 12$
Hence number. $1728 - 12 = 1716$ is the next number. Choice (B)
30. $4 : 256 :: 5 : \underline{\hspace{2cm}}$
This is of the form $n : (n)^4$
 $(4) : (4)^4 :: (5) : (5)^4$
 $(5)^4 = 625$ is the next number. Choice (A)
31. $4 : 256 :: 5 : \underline{\hspace{2cm}}$
This is of the form $n : n^n$.
 $(4) : (4)^4 :: (5) : (5)^5$
 $\therefore (5)^5 = 3125$ is the next number. Choice (D)
32. $4 : 0.25 :: 5 : \underline{\hspace{2cm}}$
This is of the form $n : \frac{1}{n}$
 $4 : \frac{1}{4} :: 5 : \frac{1}{5}$
 $\therefore \frac{1}{5} = 0.2$ is next number. Choice (C)
33. $2 : 0.25 :: 5 : \underline{\hspace{2cm}}$
 $2 : \frac{1}{(2)^2}$
This is of the form $n : \frac{1}{n^2}$.
Similarly $5 : \frac{1}{5^2} \Rightarrow \frac{1}{25} = 0.04$ Choice (B)
34. $132 \times 5 : 660 :: 726 : \underline{\hspace{2cm}}$
Similarly, $726 \times 5 = 3630$. Choice (C)
35. $7 \times 2 + 4 : 18 :: 12 \times 2 + 4 : \underline{\hspace{2cm}}$
 $12 \times 2 + 4 = 28$. Choice (B)
36. $23 \times 3 - 3 : 66 :: 72 \times 3 - 3 : \underline{\hspace{2cm}}$
 $72 \times 3 - 3 \Rightarrow 216 - 3 = 213$. Choice (D)

37. $143 : 221 :: 437 : \underline{\hspace{2cm}}$
 $11 \times 13 : 13 \times 17 :: 19 \times 23 : \underline{23 \times 29}$
 The given numbers can be written as products of consecutive prime numbers. Hence, $23 \times 29 = 667$ is the next number. Choice (B)
38. Here, the squares and cubes of alternate digits are taken.
 $1234 : 18964 \Rightarrow 1^2 2^3 3^2 4^3$
 Similarly, $4213 : \underline{4^2 2^3 1^2 3^3}$ i.e. 168127. Choice (C)
39. In each number, the number of zeros correspond to the digits given on either side of the zeros.
 Hence, 400004 is the required number. Choice (E)
40. The second number in the first pair is the square of the sum of the digits in the first number.
 $127 : 100 \Rightarrow 127 : (1 + 2 + 7)^3$
 $\therefore 187 : (1 + 8 + 7)^2 = 256$ is the required number. Choice (A)
41. $64 : 100 :: 256 : \underline{\hspace{2cm}}$
 $64 : (6 + 4)^2 :: 256 : (2 + 5 + 6)^2$
 $(13)^2 = 169$ is the next number. Choice (D)
42. $25 : 343 :: 121 : \underline{\hspace{2cm}}$
 $25 : (2 + 5)^3 :: 121 : (1 + 2 + 1)^3$
 $1 + 2 + 1 = 4$ and $(4)^3 = 64$. Choice (C)
43. $3829 : 3851 :: 2987 : \underline{\hspace{2cm}}$
 $3829 + (3 + 8 + 2 + 9) = 3851$
 Similarly $2987 + (2 + 9 + 8 + 7) = 3013$. Choice (A)
44. $121 : 484 :: 235 : \underline{\hspace{2cm}}$
 $121 \times (1 + 2 + 1) = 484$
 Similarly $235 \times (2 + 3 + 5) = 235 \times 10 = 2350$. Choice (D)
45. $47^{+74} : 121 :: 89^{+98} : \underline{\hspace{2cm}}$
 The number is reversed and is added to the number.
 $\therefore 89 + 98 = 187$ is the next number. Choice (E)
46. The given number is squared and is added to itself to give the second number i.e., $n : n^2 + n$
 5 and $(5)^2 = 25$
 $5 + 25 = 30$.
 Similarly for 7
 $7 + (7)^2 = 56$. Choice (C)
47. The second number is the cube of the first number $11^3 = 1331$.
 Similarly 2744 is the cube of 14 . Choice (C)
48. Cubes of consecutive numbers are given in the first pair
 $343 = (7)^3$
 $512 = (8)^3$
 Similarly $1331 = (11)^3$
 Next number to 11 is 12
 So, $(12)^3 = 1728$. Choice (D)
49. The given numbers are 10 and 30 which are as follows.
 $2^3 + 2 = 10$, $3^3 + 3 = 30$, $4^3 + 4 = 68$, $5^3 + 5 = 130$. Choice (C)
50. (Odd number)² and (next odd number)³ are given $25 = (5)^2$ and next odd number to 5 is 7 and $(7)^3 = 343$ i.e., 5^2 and 7^3 .
 Similarly $(9)^2 = 81$ and next odd number to 9 is 11 and $(11)^3 = 1331$. Choice (C)

Exercise – 2(b)

Solutions for questions 1 to 50:

1. $C^{+4} : G :: K^{+4} : \underline{\hspace{2cm}}$
 $K + 4 \Rightarrow 11 + 4 = 15$ and the 15th letter is O. Choice (C)
2. $K : P :: S : \underline{\hspace{2cm}}$
 For K, its opposite letter is P and for S its opposite letter is H. Choice (B)
3. $F^{+13} : S :: L^{+13} : \underline{\hspace{2cm}}$
 $L + 13 \Rightarrow 12 + 13 = 25$ and the 25th letter is Y. Choice (E)

4. $H : P :: S : \underline{\hspace{2cm}}$
 $H = 8$ and $8 \times 2 = 16$ and the 16th letter is P. Similarly, $S = 19$ and $19 \times 2 = 38$ and the 38th letter is L. Choice (A)
5. $DK : GG :: LS : \underline{\hspace{2cm}}$
 Similarly

D	K
+3	-4
G	G

L	S
+3	-4
O	O

 Choice (C)
6. $PS : KH :: MT : \underline{\hspace{2cm}}$
 For P the opposite letter is K and for S the opposite letter is H. Similarly for M and T, the opposite letters are N and G respectively. Choice (B)
7. $EOU : IUA :: AIU : \underline{\hspace{2cm}}$
 For each of the vowels, its next vowel is given. Similarly, for AIU the next vowels are EOA. Choice (C)
8. $HRD : JSF :: XMP : \underline{\hspace{2cm}}$
 For each of these consonants its next consonant is given. Similarly, for XMP their next constants are YNQ. Choice (E)
9. $DATE : ECWI :: CHAIN : \underline{\hspace{2cm}}$
 Similarly

D	A	T	E
+1	+2	+3	+4
E	C	W	I

C	H	A	I	N
+1	+2	+3	+4	+5
D	J	D	M	S

 Choice (A)
10. $MONTH : NMQPM :: PAPER : \underline{\hspace{2cm}}$
 Similarly

M	O	N	T	H
+1	-2	+3	-4	+5
N	M	Q	P	M

P	A	P	E	R
+1	-2	+3	-4	+5
Q	Y	S	A	W

 Choice (D)
11. $TALENT : VDQLYG :: MODERN : \underline{\hspace{2cm}}$

T	A	L	E	N	T
+2	+3	+5	+7	+11	+13
V	D	Q	L	Y	G

 Similarly,

M	O	D	E	R	N
+2	+3	+5	+7	+11	+13
O	R	I	L	C	A

 Choice (C)
12. $PAPER : QZRCU :: \underline{\hspace{2cm}} : \text{NUMBER}$

P	A	P	E	R
+1	-1	+2	-2	+3
Q	Z	R	C	U

 Similarly,

N	U	M	B	E	R
-1	+1	-2	+2	-3	+3
M	V	K	D	B	U

 Choice (D)
13. $NATURE : PEVASI :: ISOMERS : \underline{\hspace{2cm}}$
 In this, for vowels their next vowels and for consonants their next consonants are given.
 Hence, OTUNIST are the required letters. Choice (B)
14. $RISHLE : IVHSOR :: PUBLIC : \underline{\hspace{2cm}}$
 In this, for consonants their opposite letters and for vowels their corresponding letters are given.
 $\therefore KHYOVX$ is the missing term. Choice (B)
15. $AHK : FRZ :: HRB : \underline{\hspace{2cm}}$

A	H	K
+5	+10	+15
F	R	Z

 Similarly,

H	R	B
+5	+10	+15
M	B	Q

 Choice (E)
16. $BRPL : AOKE :: APPLE : \underline{\hspace{2cm}}$
 Similarly,

B	R	P	L
-1	-3	-5	-7
A	O	K	E

A	P	P	L	E
-1	-3	-5	-7	-9
Z	M	K	E	V

 Choice (D)

17. BADF : CEMV :: HRID : _____
 Similarly,

B	A	D	F	H	R	I	D
+1	+4	+9	+16	+1	+4	+9	+16
C	E	M	V	I	V	R	T

 Choice (A)
18. BAD : BBL :: IDFE : _____
 Similarly,

B	A	D	J	D	F	E
$\times 1$	$\times 2$	$\times 3$	$\times 1$	$\times 2$	$\times 3$	$\times 4$
B	B	L	J	H	R	T

 Choice (D)
19. FIELD : LRJXH :: CRICKET : _____

F	A	M	O	U	S
+2	$\times 2$	+2	$\times 2$	+2	$\times 2$
H	B	O	D	W	L

 Similarly,

P	E	C	K	L
+2	$\times 2$	+2	$\times 2$	+2
R	J	E	V	N

 Choice (B)
20. BDEJ : FLOD :: FIAC : _____

B	D	E	J
$\times 3$	$\times 3$	$\times 3$	$\times 3$
F	L	O	D

 Similarly,

F	I	A	C
$\times 3$	$\times 3$	$\times 3$	$\times 3$
R	A	C	I

 Choice (B)
21. TAP : SUZBOQ :: RED : _____
 The letters on either side of each letter were given.

T	A	P
-1 +1	-1 +1	-1 +1
S	U	Z

 Similarly,

R	E	D
-1 +1	-1 +1	-1 +1
Q	S	F

 Choice (C)
22. PSB : NRQUZD :: SET : _____

P	S	B
-2 +2	-2 +2	-2 +2
N	R	Q

 Similarly,

S	E	T
-2 +2	-2 +2	-2 +2
Q	U	V

 Choice (B)
23. MARINE : AIENRM :: DISGUISE : _____
 In this the letters are rearranged as follows.

1	2	3	4	5	6
M	A	R	I	N	E
A	I	E	N	R	M
2	4	6	5	3	1

 Similarly, IGIESUSD is the missing term. Choice (E)
24. DEPRIL : LRPED :: POCKET : _____
 The letters are written in reverse order. DEPRIL, when reversed we get LRPED. Similarly, POCKET when reversed we get TEKCOF. Choice (C)
25. BCE : DIY :: ADFG : _____
 $B = 2$ and $(2)^2 = 4 = D$
 $C = 3$ and $(3)^2 = 9 = I$
 $E = 5$ and $(5)^2 = 25 = Y$
 Similarly, for ADGF we get APJW. Choice (D)
26. 6P1 : 5Y2 :: 6J3 : _____
 P is the 16th letter and 16 is $(Y)^2$
 The value is written in the reverse order.
 Next number to 4 is 5 and $(5)^2 = 25 = Y$.
 The digits is 25 are written in reverse order.
 Similarly, $6^2 = 36 \Rightarrow 6J3$ and $9W4$ is the next term. Choice (C)
27. 3P2 \rightarrow P is 16th letter and $16 \times 2 = 32$
 The digits in 32 are written on either side of P.
 P^{-6} is J. J is 10th letter and $10 \times 2 = 20 \Rightarrow 2J0$
 R is 18th letter and $18 \times 2 = 36 \Rightarrow 3R6$
 R^{-6} is L. L is 12th letter and $12 \times 2 = 24 \Rightarrow 2L4$.
 Choice (D)
28. 2E3 : 4I5 :: 7O8 : _____
 The letters are consecutive vowels and the sum of the numbers on either side of the letter is equal to the place value of the letter and the number are consecutive. Hence, 10U11 is the required term. Choice (E)
29. A 26 \Rightarrow
 A is the first letter and the place value of its opposite pair Z is 26.
 E 22 \Rightarrow
 E is the fifth letter and the place value of its opposite pair V is 22
 A and E are two consecutive vowels.
 I is the ninth letter and the place value of its opposite pair R, is 18.
 The vowel after I is O.
 The place value of the opposite pair of O is L and L is 12. Choice (C)
30. 4X : 622 :: 6P1 : _____
 X is the 24th letter and the digits in the place value are written on either side of it in reverse order.
 X^{+2} is Z. Z is 26th letter.
 $\Rightarrow 6Z2$
 P^{+2} is R and R is the 18th letter
 $\Rightarrow 8R1$. Choice (A)
31. Train runs on tracks, similarly bus runs on road. Choice (E)
32. Earth is a planet and carrot is a vegetable. Choice (A)
33. Wood is raw material for carpenter and Iron is raw material for blacksmith. Choice (D)
34. Pen is used to write and knife is used to cut. Choice (B)
35. The younger one of a pig is piglet and the younger one of dog is puppy. Choice (E)
36. Nut is found inside a shell and seed is found inside a fruit. Choice (C)
37. Day is opposite of night and miser is opposite of spend thrift. Choice (B)
38. Hand has fingers and leg has toes. Choice (C)
39. Kangaroo moves by hopping and snake moves by crawling. Choice (A)
40. The head of state for USA is president and the head of state of Germany is chancellor. Choice (B)
41. A long poem is divided into Stanzas. Similarly, a long Essay is divided into Paragraphs. Choice (A)
42. Sumo is the national game of Japan. Similarly, Archery is the national game of Bhutan. Choice (D)
43. Kangaroo is the national animal of Australia. Similarly, Brown bear is the national animal of Finland. Choice (B)
44. Dinar is the currency of Algeria. Similarly, Lek is the currency of Albania. Choice (A)
45. Blunt is the antonym of Sharp. Similarly, Blindness is the antonym of Sight. Choice (C)
46. Assume is the synonym of Posit. Similarly, Rare is the synonym of Singular. Choice (C)
47. Clown's work place is Circus. Similarly, Lawyer's work place is Court. Choice (E)
48. A group of Crows is called as Murder. Similarly, a group of Deers is called as herd. Choice (B)
49. Graham Bell invented Telephone. Similarly, Galileo Galilei invented Telescope. Choice (A)
50. Afghanistan's capital city is Kabul. Similarly, Bulgaria's capital city is Sofia. Choice (E)

Chapter – 3
(Coding & Decoding)

Exercise – 3(a)

Solutions for questions 1 to 45:

1. Word : PANCREAS
Pattern : Letters in the word are reversed.
Code : SAERCNAP
Similarly, the code for STADIUM is MUIDATS.
Choice (C)
2. Word : CIRCUMSTANCE
Pattern : Alternate letters are written as group.
Code : CRUSACIMTNE
Similarly, the code for HAPPINES is HPIESAPNS.
Choice (D)
3. 1 2 3 4 5 6 7 8 9
Word : H Y P E R B O L A
Code : Y P R O H E B L A
2 3 5 7 1 4 6 8 9
The letters in the prime numbered positions are arranged first followed by the remaining letters.
Similarly, the code for SENTIMENT is ENIESTMNT.
Choice (C)
4. Word : REGISTRATION
Pattern : The word is divided into two equal halves and the letters in each half are reversed.
Code : T S I G E R N O I T A R
Similarly, the code for ACCURATE is UCCAETAR.
Choice (A)
5. 1 2 3 4 5 6 7 8
Word : S A N D W I C H
Code : A D S H C I W N
2 4 1 8 7 6 5 3
The letters in the positions 1, 2, 3, 4, 5, 6, 7 and 8 are rearranged as 2, 4, 1, 8, 7, 6, 5 and 3 to obtain the code.
Similarly, the code for GEOMETRY is EMGYRTEO.
Choice (E)
6. Word : D E C O R A T E
Pattern : Pair of letters reversed.
Code : E D O C A R E T
Similarly, the code for HYGROMETER is YHRGMOTERE.
Choice (B)
7. 1 2 3 4 5 6 7 8
Word : C U S T O M E R
Code : R C E U M S O T
8 1 7 2 6 3 5 4
The letters in the word are rearranged as indicated above.
Similarly, the code for IMMACULATE is EITMAMLAUC.
Choice (B)
8. Word : L I B E R A L
Pattern : +1 +1 +1 +1 +1 +1 +1
Code : M J C F S B M
Similarly, the code for REDUCTION is SFEVDUJPO.
Choice (B)
9. Word : S T R U C T U R E
Pattern : +1 +2 +3 +4 +5 +6 +7 +8 +9
Code : T V U Y H Z B Z N
Similarly, the code for REMEDY is SGPIIE.
Choice (D)
10. Word : M A J E S T Y
Pattern : +1 -1 +1 -1 +1 -1 +1
Code : N Z K D T S Z
The word which is coded as
H K J L Q R F is
-1 +1 -1 +1 -1 +1 -1
G L I M P S E
Choice (D)
11. Word : I M P O R T
Pattern : +2 +3 +5 +7 +11 +13
Code : K P U V C G, similarly

M I S C H I E F
-2 -3 -5 -7 -11 -13 -17 -19
K F N V W V N M
Choice (A)

12. Word : M I N U T E
Pattern : +1 +4 +9 +16 +25 +36
Code : N M W K S O
Similarly, the code for REIGN is SIRWM.
Choice (E)

13. Word : M I R A G E
Pattern : ×2 ×2 ×2 ×2 ×2 ×2
Code : Z R J B N J
Similarly, the code for INTRUDE is RBNJPHJ.
Choice (C)

14. Word : G R O U N D
Pattern : +1 -2 +3 -4 +5 -6
Code : H P R Q S X, similarly
N O U R I S H
-1 +2 -3 +4 -5 +6 -7
M Q R V D Y A
Choice (B)

15. Word : S P L E N D O R
Pattern : +2 ×2 +2 ×2 +2 ×2 +2 ×2
Code : U F N J P H Q J
Similarly, the code for DISASTER is FRUBUNGJ.
Choice (A)

16. Word : S E A R C H
Pattern : The letters in the word are reversed and for these letters their next letters are given as their codes.
H C R A E S
+1 +1 +1 +1 +1 +1
I D S B F T
Similarly, the code for FURNISH is ITJOSVG.
Choice (C)

17. Word : C E R T I F Y
Pattern : The letters in the word are reversed and then their opposite pairs are given as their codes.
Code : B U R G I V X
Similarly, the code for ADJACENT is GMVXZQWZ.
Choice (B)

18. Word : S Y M P H O N Y
Pattern : To each of these letters their opposite letters from the other end of the alphabet is given.
Code : H B N K S L M B
Similarly, the code for PICKLE is KRXPOV.
Choice (E)

19. Word : M Y S T E R Y
Pattern : To each of these letters their corresponding letters from the other half is given.
Code : Z L F G R E L
Similarly, the code for PURSUE is CHEFHR.
Choice (C)

20. Word : B A R R I C A D E
Pattern : The letters are arranged alphabetical order.
Code : A A B C D E I R R
Similarly, the code for INDIVIDUAL is ADDIIILNUV.
Choice (A)

21. Word : M A T E R I A L S
Logic1: -1 -1 -1 -1 +1 +1 +1 +1
L Z S D S J B M T
Logic2: Reverse the order of first four and last four letters separately and leave the middle letter as it is.
Code : D S Z L S T M B J
In the same way we will get the code for REASONING as RZDQPHOJO.
Choice (A)

22. Word : P L A T I N U M
Pattern : In the word the vowels are taken first in the same order as they are in the word followed by consonants.
Code : A I U P L T N M
Similarly, the code for ADVENTURE is AEUEDVNTR.
Choice (D)

23. Word : A D V A N T A G E
Pattern : For vowels their next vowels and for consonants their next consonants are given as codes.
Code : E F W E P V E H I
Similarly, the code for DUPLICATE is FAQMODEVI.
Choice (C)
24. Word : F A N T A S T I C
Logic1: $\begin{matrix} -1 & -1 & -1 & -1 & +1 & +1 & +1 & +1 & +1 \\ E & Z & M & S & B & T & U & J & D \end{matrix}$
Logic2 : Reverse the order of first four and last four letters separately and leave the middle letter as it is.
Code : S M Z E B D J U T
In the same way we will get the code for the word DIRECTION as DQHCDDPJU
Choice (B)
25. For each word, the square the number of letters in it is given as its value.
The word MENTION has seven letters in it and $7^2 (= 49)$ is its code.
NEUROTIC has eight letters in it and $8^2 (= 64)$ is its code.
Similarly, MARVELLOUS has ten letters in it and $10^2 (= 100)$ is its code.
Choice (E)
26. The number of letters in the given word is multiplied with a constant number 10 to get its value.
C A B I N E T has 7 letters and $7 \times 10 = 70$
B E A U T Y has 7 letters and $6 \times 10 = 60$
Similarly, PRODUCTION has 10 letters and $10 \times 10 = 100$.
Choice (B)
27. I M P E N D $\Rightarrow 9 + 13 + 16 + 5 + 14 + 4 = 61$
The sum of the place values of letters in the word is given as its value.
D I S H $\Rightarrow 4 + 9 + 19 + 8 = 40$
Similarly, FRUIT $\Rightarrow 6 + 18 + 21 + 9 + 20 = 74$.
Choice (C)
28. B U G $\Rightarrow 2 + 21 + 7 = 30$ and $30 \times 3 = 90$
In this the sum of the place values is multiplied with the number of letters in the word.
A L M S $\Rightarrow 1 + 12 + 13 + 19 = 45$ and $45 \times 4 = 180$
Similarly,
C A D E T $\Rightarrow 3 + 1 + 4 + 5 + 20 = 33$ and $33 \times 5 = 165$.
Choice (B)
29. I N F E R $\Rightarrow 9 + 14 + 6 + 5 + 18 = 52$
In this the reverse of the sum of the place values of the letters in the word is given as its code.
J E R S E Y $\Rightarrow 10 + 5 + 18 + 19 + 5 + 25 = 82$ and the code is 28
Similarly, C H O I C E $\Rightarrow 3 + 8 + 15 + 9 + 3 + 5 = 43$
 \therefore The code is 34.
Choice (A)
30. F R A M E $\Rightarrow 6 + 18 + 1 + 13 + 5 = 43$ and $43 + 5 = 48$
In this, the sum of the place values is added to the number of letters in the word and given as its value.
H U R D L E $\Rightarrow 8 + 21 + 18 + 4 + 12 + 5 = 68$ and $68 + 6 = 74$
Similarly, FIGMENT $\Rightarrow 6 + 9 + 7 + 13 + 5 + 14 + 20 = 74$ and $74 + 7 = 81$.
Choice (E)
31. Human blood is Red in colour and Red is called Brown in that language.
Choice (E)
32. One cleans the black board with a Duster. In that language Sharpener means Duster.
Choice (B)
33. A Watch indicates time and watch is called Aeroplane in that language.
Choice (E)
34. In this coding, the code for the letters B, D, F, H, J, L, N, P, R, T, V, X and Z is 1.
The code for the letters C, I, O and U is 2.
The code for the letters A, E, G, K, M, Q, S, W and Y is 3.
Hence, the code for ALPHABET is 31113131.
Choice (B)
35. The code for odd letters is 2, i.e., for a, c, e, g, i, k, m, o, l, s, u, w, y - 2
The code for even letters is 1, i.e., for b, d, f, h, j, l, n, o, h, t, v, x, z - 1
The code for SALVATION IS 221121221. Choice (D)
36. The code for prime number letter is 1, i.e., for the letters B, C, E, G, K, M, Q, S and W
The code for the remaining letters is 2.
A, D, F, H, L, J, I, N, O, P, R, T, U, V, X, Y, Z
Hence, the code for LANGUAGE is 22212211.
Choice (C)
37. In this, the code for A, E, I, O and U is 3.
The code for the remaining letters is 4.
The code for DICTIONARY is 4344334344. Choice (A)
38. In this the letter, whose place value is equal to the sum of the digits in the place value of the given letter, is given as its code.
 $M = 13 \Rightarrow 1 + 3 = 4$ and the 4th letter is D.
 $N = 14 \Rightarrow 1 + 4 = 5$ and the 5th letter is E and so on.
Hence, the code for TREASURE is BIEAJCIE.
Choice (B)
39.

Words	Codes
(1) APPLE	28726
(2) LEAVE	76987
(3) LETTER	376347

From (1), P and 2 are repeated. Hence, 2 is code for P.
from (2) and (3), E is 7 and T is 3.
Similarly, the codes for the remaining letters can be determined.
i.e., L is 6, R is 4, A is 8 and V is 9.
The code for TRAVELLER is 348976674. Choice (D)
40. The given logic is, the place values of the letters in the word are written in the reverse order and separated by /.
Similarly the code for DRUNK is 11/14/21/18/4.
Choice (E)
41. The given logic is as follows: the place values of the first letter and the last letter are taken in the first and last positions respectively, the product of place values of the second and the third letter is taken in second position.
Similarly the code for LAND is 12/14/4. Choice (A)
42. The given logic is as follows; in each word sum of the place values of pairs of letters are from left to right written respectively from left to right, separated by /.
Similarly the code for CARE is $(1 + 3) (18 + 5) = 4/23$.
Choice (A)
43. The given logic is as follows:
square root of 64 is 8 (here sqrt is short form of square root).
Similarly from the choices cube root of 216 is 6.
Choice (B)
44. The given logic is as follows:
b is written as $(2)^5 - 7$, a is written as $(1)^5 - 7$ and d is written as $(4)^5 - 7$
Similarly the code for deaf is 1017 3118 -2 7769
Alternate solution:
Considering the values assigned to each letter, we can observe $A < B < D$, similarly we should be find values which are in the form $A < B < C < D < E < F$, which is true only in choice (A).
Choice (A)
45. The given logic is as follows;
Letters in the word are written as $(n)^2 - 16$;
Alternately, we can observe from the codes of L, N and p that the codes for corrective letters have odd difference. This difference series can be observed as odd number. Arithmetic Progression by the difference between P and A. Similarly, the code for form is 20,209,308,153.
Choice (B)

Solutions for questions 46 to 50:

46. The given logic is as follows
 Word: NUMBERS
 Logic: Alphabetical order
 Word: B E M N R S U
 Code: * £ © 4 % # π
 Similarly, the code for BRACELET is 9 { £ £ × % =.
 Choice (A)
47. The given logic is as follows
 Word: G O A T
 Logic: opposite letter
 Word: T L Z G
 Code: = x β 6
 Similarly, the code for HORSE is '# x \$ ☆ 2'. Choice (D)
48. The given logic is as follows
 Word: S Y M B O L
 Logic: +1 -1 +1 +1 +1 -1
 Word: T X N A P K
 Code: = 1 → 4 → 9 → ₹ → + →
 Similarly, the word 'IMAGES' is coded as '5 x * @ @ %'.
 Choice (B)
49. The given logic is as follows
 Word: L O C K E R
 Logic: -6 -5 -4 -3 -2 -1
 Word: F J Y H C Q
 Code: @ 5 } ☆ { 3.
 Similarly, the code for MATRIX is '6 2 ₹ ÷ 6 α'.
 Choice (A)
50. The given logic is as follows
 Word: G L A N C E
 Logic: consonant is replaced by next consonant and vowel is replaced by next vowel
 Word: H M E P D I
 Code: ☆ © £ ₹ 7 \$
 Similarly, the code for 'PLANTS' is '3 © £ ₹ 2 ='.
 Choice (E)

Exercise – 3(b)

Solutions for questions 1 to 5:

The coding is done as follows.

Word: R O U T I N E
 Pattern: ×2 -2 ×2 -2 ×2 -2 ×2
 Code: J M P R R L J

Word: F I D E L I T Y
 Pattern: ×2 -2 ×2 -2 ×2 -2 ×2 -2
 Code: L G H C X G N W

- The code for PREVAIL is FPJTBGX. Choice (B)
- The code of LANGUAGE is XYBEPYNC. Choice (E)
- The code for TOBACCO is NMDYFAD. Choice (D)
- The code for BRANCH is DPBLFF. Choice (C)
- The code for ENVELOPE is JLRCXMFC. Choice (D)

Solutions for questions 6 to 10:

The coding is alone as follows.

I N D U S T R Y
 $C_3 G_2 B_2 C_7 S_1 D_5 F_3 E_5$
 Here I = 9 and $C_3 \Rightarrow C = 3$ and $3 \times 3 = 9 = I$.
 $N = 14$ and $G_2 \Rightarrow G = 7$ and $7 \times 2 = 14 = N$.
 $D = 4$ and $B_2 \Rightarrow B = 2$ and $2 \times 2 = 4 = D$ and so on.

6. The code for S A N S K R I T is $S_1 A_1 G_2 S_1 K_1 C_6 C_3 E_4$.
 Choice (D)

7. The code for B R I G H T is $A_2 F_3 C_3 G_1 D_2 J_2$.
 Choice (C)
8. The code for I N V E N T O R is $C_3 G_2 K_2 E_1 G_2 J_2 C_5 I_2$.
 Choice (C)
9. The code for M O T I V E is $M_1 E_3 J_2 C_3 K_2 E_1$.
 Choice (B)
10. The code for M I N U T E is $M_1 C_3 G_2 G_3 E_4 E_1$.
 Choice (B)

Solutions for questions 11 to 15:

Column – I	Column – II
(1) lit kit bit dit	b r p d
(2) fit git mit kit	t d s v
(3) rit bit git tit	x p v w
(4) nit dit fit rit	r s x j

For the 1st and the 2nd statements, kit and the code d is common. Hence, the code for kit is d.
 For the 2nd and the 3rd statements, git and the code v are common. Hence, the code for git is v.
 For the 3rd and the 4th statements, rit and the code x are common. Hence, the code for rit is x.
 Similarly, the letters and their corresponding codes can be determined.

Word	kit	git	rit	bit	tit	fit	mit	dit	lit	nit
Code	d	v	x	p	w	s	t	r	b	j

- The code for 'lit' is 'b'. Choice (E)
- 'w' is the code for 'tit'. Choice (A)
- The code for 'rit' is 'x'. Choice (D)
- 'j' is code for 'nit'. Choice (C)
- The code for 'kit' is 'd'. Choice (E)

Solutions for questions 16 to 20:

Column I	Column II
(1) PRETEND	4396408
(2) COMMON	615715
(3) HOUSE	4*2&1
(4) SUPPORT	3*21839
(5) DRUM	5*08

In the 1st word, the letter E is repeated and the code 4 is repeated. Hence, the code for E is 4.
 In the 4th word, the letter P is repeated and the code 3 repeated. Hence, the code for P is 3.
 For the 2nd and the 3rd words the letter O and the code 1 are common. Hence the code for O is 1. From the 2nd word, now it can be concluded that the code for M is 5.
 For the 1st and the 2nd words, the letter N and the code 6 are common. Hence, the code for N is 6.
 In the 2nd word, the letter C and the code 7 are left. Hence, the code for C is 7.
 Similarly, the letters and their corresponding codes can be determined.

Letter	E	P	O	M	N	C	U	S	R	H	T	D
Code	4	3	1	5	6	7	*	2	8	&	9	0

- The code for PROTECT is 3819479. Choice (C)
- The code for HORMONE is &185164. Choice (D)
- The code for EMPEROR is 4534818. Choice (B)
- The code for DETHRONE is 049&8164. Choice (B)
- The code for COMPOUND is 71531*60. Choice (A)

Solutions for questions 21 to 25:

Column I	Column II
1. All people are not poet	kak cac hah tat zaz
2. Great people are happy	tat dad faf zaz
3. Krishna is a god	nan gag rar mam
4. Tagore is a great poet	mam kak dad nan lal
5. God make people happy	tat gag faf sas
6. No person is happy	xax pap faf mam

Comparing (4) and (6) 'is' is common in both and the code 'mam' is common, so, 'mam' is the code for 'is'.
Now, comparing (5) and (6) in the same way we get the code for 'happy', i.e., 'faf'.

Comparing (2) and (5) we get the code for 'people', i.e., 'tat'.

From (2) and (4) we get the code for 'great', i.e., 'dad'.

Now in (2) only one word is there, for which the code is unknown, so the remaining code, 'zaz' must be the code for 'are'.

In the same way we will get the codes for the other words also. The codes and the words are written in the following table.

word	great	poet	happy	is	people	are	a	Tagore	God	Krishna	make	No, person	All, not
code	dad	kak	faf	mam	tat	zaz	Nan	Lal	Gag	rar	sas	pap, xax	cac, hah

21. 'lal' is the code for the word 'Tagore'. Choice (C)
22. 'cac' or 'hah' is the code for the word 'not'. Choice (E)
23. Code for "No god is a person" is 'xax mam gag nan pap'. Choice (D)
24. 'lal dad sas' is the code for "Tagore make great". Hence, from the given options choice (D) can be the code for "Tagore make great paintings". Choice (D)
25. Now by comparing the given word and the code with the known codes,
Mahima – yay
not – cac
person – xax
all – hah
no – pap
∴ The code for "Mahima make all people happy" is 'hah yay faf tat sas'. Choice (C)

Solutions for questions 26 to 30:

26. It does not satisfy any of the given conditions. Hence the code is TKUDVF. Choice (D)
27. It satisfies condition (2). Hence the code is VUXPXS. Choice (C)
28. It satisfies condition (3). Hence the code is FKSPBD. Choice (A)
29. It satisfies condition (1). Hence the code is ANGKGP. Choice (B)
30. It satisfies condition (4). Hence the code is BZQZTK. Choice (E)

Solutions for questions 31 to 35:

31. It satisfies condition (3). ∴ The code is YLDHQOY. Choice (D)
32. It satisfies condition (2). ∴ The code is QLGHFOS. Choice (A)
33. It satisfies condition (1). ∴ The code is XGOLKQX. Choice (C)
34. It satisfies condition (2). ∴ The code is BOJHGKL. Choice (D)
35. It satisfies condition (4). ∴ The code is ZOFPHGZ. Choice (B)

Solutions for questions 36 to 40:

36. It does not satisfy any condition. The code will be BFHCEDA. Choice (B)
37. It satisfies condition (4). ∴ The code will be WGJBFEW. Choice (B)
38. It satisfies condition (2). ∴ The code YHBADKY. Choice (E)

39. It satisfies condition (3). ∴ The code is CRKLEFT. Choice (D)
40. It satisfies condition (5). ∴ The code will be AJCTLNR. Choice (A)

Chapter – 4 (Odd Man Out)

Exercise – 4

Solutions for questions 1 to 50:

1. 3, 5, 9 and 7 are odd numbers, but not 4. Choice (B)
2. 37, 47, 67 and 17 are prime numbers but not 27. Choice (A)
3. 16, 36, 64 and 4 are perfect squares but not 28. Choice (B)
4. 41, 43, 47 and 53 are prime numbers, but not 57. Choice (E)
5. $36 = 6^2$, $49 = 7^2$, $64 = 8^2$, $81 = 9^2$ and $100 = 10^2$. 36, 64, 81 and 100 are squares of composite numbers, but not 49. Choice (B)
6. $8 = 2^3$, $27 = 3^3$, $64 = 4^3$, $125 = 5^3$ and $343 = 7^3$. 8, 27, 125 and 343 are cubes of prime numbers but not 64. Choice (C)
7. $343 = 7^3$, $121 = 11^2$, $1331 = 11^3$, $2197 = 13^3$ and $125 = 5^3$. 343, 1331, 125 and 2197 are perfect cubes, but not 121. Choice (B)
8. 48, 75, 84 and 57 are divisible by 3 but not 35. Choice (A)
9. 42624, 37573, 74347 and 93339 are palindromes but not 84284. Choice (C)
10. 27, 36, 72 and 45 are divisible by 9, but not 30. Choice (A)
11. Except 4242, all other numbers are divisible by 11. Choice (C)
12. In each of the fractions, $\frac{2}{22}$, $\frac{1}{1}$, $\frac{3}{333}$ and $\frac{4}{4444}$ the numerator is written in the denominator as many times as its value. This pattern is not followed in $\frac{5}{55}$. Choice (B)
13. $20 = 4^2 + 4$, $42 = 6^2 + 6$, $58 = 7^2 + 9$, $72 = 8^2 + 8$ and $90 = 9^2 + 9$. 20, 42, 72 and 90 can be expressed in $n^2 + n$ form but not 58. Choice (C)
14. $30 = 3^3 + 3$, $630 = 5^4 + 5$, $10 = 2^3 + 2$, $520 = 8^3 + 8$ and $130 = 5^3 + 5$. 30, 10, 130 and 520 can be expressed as $n^3 + n$ but not 630. Choice (B)
15. The sum of the digits in 508, 328, 706 and 148 is 13, but not in 608. Choice (C)

16. Except in 862, in all other numbers sum of first two digits is same as the last digit. Choice (D)
17. $5 \underline{25} \Rightarrow 5 \underline{5^2}$, $3 \underline{9} \Rightarrow 3 \underline{3^2}$, $2 \underline{4} \Rightarrow 2$ and $\underline{2^2}$ and $6 \underline{36} \Rightarrow 6 \underline{6^2}$.
The above pattern is not followed in 426. Choice (D)
18. $1 \underline{1} = 1 \underline{1^3}$, $2 \underline{8} = 2 \underline{2^3}$, $3 \underline{27} = 3 \underline{3^3}$, $4 \underline{16} = 4 \underline{4^2}$ and $\underline{5 \ 125} = 5 \underline{5^3}$
Except 416, other numbers follow similar pattern. Choice (D)
19. Except 132, other numbers are odd numbers. Choice (B)
20. Except 110, other numbers are divisible by 4. Choice (B)
21. A, E, I and O are vowels, while R is a consonant. Choice (B)
22. EV, UF, IR and OL are pairs of opposite letters. AN is not an opposite pair. Choice (A)
23. GT, QD, KX and LY are corresponding pairs, while SH is an opposite pair. Choice (D)
24. In each of the groups ABB, CCCDDDD, BBCCC and DDDDEEEEE, only two letters of the alphabet are used and each letter is written as many times as its place value in the alphabet. This pattern is not followed in the group BCC. Choice (B)
25. In the groups the numerator is the opposite letter and the denominator is the corresponding letter. This pattern is not followed in the group $U \frac{B}{L}$. Choice (D)
26. $K^{+2}M^{+1}N^{-2}L$, $P^{+2}R^{+1}S^{-2}Q$, $V^{+1}W^{+2}Y^{+1}Z$, $J^{+2}L^{+1}M^{-2}K$ and $W^{+2}Y^{+1}Z^{-2}X$. Except VWYZ, all the other groups follow similar pattern. Choice (C)
27. $O^{+2}Q^{-4}M^{+6}S$, $U^{+6}A^{-4}W^{+2}Y$, $N^{+2}P^{-4}L^{+6}R$, $B^{+2}D^{-4}Z^{+6}F$ and $F^{+2}H^{-4}D^{+6}J$. Except UAWY, all other groups follow similar pattern. Choice (B)
28. $Y^{+4}C^{-2}A^{+4}E^{-2}C$, $K^{+4}O^{-2}M^{+4}Q^{-2}O$, $P^{+4}T^{-2}R^{+3}U^{-1}T$, $G^{+4}K^{-2}I^{+4}M^{-2}K$ and $D^{+4}H^{-2}F^{+4}J^{-2}H$. Except PTRUT, all other groups follow similar pattern. Choice (C)
29. The digits on either side of the letter in each of the groups 1P6, 2T0, 1M3 and 1R8 indicate the place value of the letter in the alphabet. This pattern is not followed by 2Y4. Choice (B)
30. In each of the groups B4, D16, E25 and F36 the number is the square of the position value of the letter. This pattern is not followed in I91. Choice (D)
31. Cat, Dog, Tiger and Lion are carnivores, while Elephant is a herbivore. Choice (D)
32. Crocodile, Turtle, Allegator and Frog are amphibians, while Chameleon is a terrestrial animal. Choice (A)
33. Tairuванantapuram, Hyderabad, Bangalore and Bhubaneswar are state capitals, while Calicut is not a state capital. Choice (C)
34. Part, Cart, Dart and Mart are rhyming words, but Trap does not sound similarly. Choice (B)
35. Star, Moon, Comet and Planet are natural celestial bodies, while Rocket is man made. Choice (E)
36. Skin, Eye, Nose and Ear are sensory organs, while Leg is a limb. Choice (C)
37. Boxing, Chess, Wrestling and Squash are individual events, while Baseball is a team event. Choice (A)
38. Walk, Talk, Drink and Lick are verbs, but not Plank. Choice (D)
39. Ganga, Yamuna, Sutlez and Krishna are rivers, while Hirakud is a dam. Choice (B)
40. The letters in the word are jumbled. The words are WHEAT, RICE, JOWAR, CEREALS and BAJRA. WHEAT, RICE, JOWAR and BAJRA are different entities of the class CEREALS. Choice (D)
41. All except Architect are manufacturers. Choice (E)
42. All are two dimensional objects except cube. Choice (E)
43. All are blood relation except Daughter in-law. Choice (A)
44. All are organs of our body which are in pairs except fingers. Choice (C)
45. All except auction are the places where similar items are collected and exhibited. Choice (B)
46. Except mirage, all others are sources of water. Choice (C)
47. Except real, all others are rhyming words. Choice (E)
48. Except Japanese, all others are appropriate usage of citizenship. Choice (B)
49. Except regiment, all others are cadets of army officers. Choice (A)
50. Except Australia: Pound, all others are correct combination of country and its currency. Choice (D)

Chapter – 5 (Clocks)

Exercise – 5

Solutions for questions 1 to 25:

1. The angle covered by the minute hand in 22 minutes is $22 \times 6 = 132^\circ$. Choice (D)
2. The hour hand covers 360° in 12 hours.
 \therefore It covers $\frac{1^\circ}{2}$ in one minute. In quarter of an hour i.e. in 15 minutes the hour hand will move $15 \times \frac{1^\circ}{2} = 7.5^\circ$. Choice (B)
3. The hour hand will move by 6° in 12 minutes. So, minutes hand will move $12 \times 6^\circ = 72^\circ$ in 12 minutes, as the minute hand moves by 6° in one minute. Choice (C)
4. Angle will be $\theta = \left(\frac{11}{2}m - 30h \right)$
 $\left(\frac{11}{2} \times 20 - 30 \times 6 \right) = 40^\circ$. Choice (E)
5. The angle between the hands will be
 $\theta = \left| \frac{11}{2}m - 30h \right|$
here, $h = 3$ and $m = 14$
 $\theta = \frac{11}{2} \times 14 - 30 \times 3$
 $\theta = |77 - 90| = 13^\circ$. Choice (C)

6. Angle between two hands is given by

$$\theta = \left| \frac{11}{2}m - 30h \right|$$

here, $h = 7$ and $m = 25$

$$\therefore \theta = \left| \frac{11}{2} \times 25 - 30 \times 7 \right|$$

$$= \frac{275 - 210}{2} = \frac{145}{2} = 72 \frac{1}{2}^\circ \quad \text{Choice (C)}$$

7. Angle between the two hands is given by

$$\theta = \left| \frac{11}{2}m - 30h \right|, \text{ here } m = 20 \text{ and } h = 11$$

$$\Rightarrow \theta = \left| \frac{11}{2} \times 20 - 30 \times 11 \right| = 220$$

As angle is more than 180° , the angle must be $360^\circ - 220^\circ = 140^\circ$.
Choice (E)

8. When hands coincide with each other the angle between them is 0. Therefore, angle between two hands is given by

$$\theta = 30h - \frac{11}{2}m \quad (\because 30h > \frac{11}{2}m)$$

here, $h = 9$

$$0 = 30 \times 9 - \frac{11}{2}m$$

$$270 \times \frac{2}{11} = m$$

$$\therefore m = 49 \frac{1}{11} \text{ minutes}$$

So, the hands coincide at $49 \frac{1}{11}$ minutes past 9 hours.

Choice (C)

9. When hands of a clock are in opposite direction the angle between them is 180° .

$$\text{Therefore } \theta = \left| \frac{11}{2}m - 30h \right|$$

where $\theta = 180^\circ$ and $h = 4$

$$180 = \frac{11}{2}m - 120$$

$$\frac{11}{2}m = 300$$

$$m = \frac{600}{11} = 54 \frac{6}{11} \text{ minutes}$$

So, at $54 \frac{6}{11}$ minutes past 4 hours, the hands are in opposite direction.
Choice (B)

10. Given $\theta = 20^\circ$ and $h = 2$

$$\theta = \frac{11}{2}m - 30h \text{ or } 30h - \frac{11}{2}m$$

$$20 = \frac{11}{2}m - 30 \times 2$$

$$\frac{11}{2}m = 80$$

$$m = \frac{160}{11} = 14 \frac{6}{11} \text{ minutes (or) } 20 = 30 \times 2 - \frac{11}{2}m$$

$$\frac{11}{2}m = 40$$

$$m = \frac{80}{11} = 7 \frac{3}{11} \text{ minutes}$$

Therefore, the angle between the hands will be 20° at hours $14 \frac{6}{11}$ minutes past 2 and $7 \frac{3}{11}$ minutes past 2.

Choice (D)

11. Given $\theta = 60^\circ$ and $h = 4$

$$\theta = \frac{11}{2}m - 30h \text{ or } \theta = 30h - \frac{11}{2}m$$

$$60 = \frac{11}{2}m - 30 \times 4 \text{ or } 60 = 120 - \frac{11}{2}m$$

$$\frac{11}{2}m = 180 \quad \text{or}$$

$$\frac{11}{2}m = 60 \therefore m = \frac{2 \times 60}{11} = 10 \frac{10}{11} \text{ minutes}$$

$$m = \frac{360}{11} = 32 \frac{8}{11} \text{ minutes.}$$

Hence, the angle between the hands will be 60° at $32 \frac{8}{11}$ min past 4.
Choice (E)

12. In 12 hours the clock will be at 30° with each other for 22 times. So, they will be at 30° with each other for 44 times in a day.
Choice (C)

13. The minute hand overlaps with the hours hand once between 9 and 10, 10 and 11, 1 and 2, 2 and 3, 3 and 4. But between 11 and 1, the overlap happens for only one time, i.e. a total of 6 times.
Choice (B)

14. From 8 a.m. to 6 p.m. i.e., in 10 hours the clock gained 2 minutes.

So, it gains 1 minute in 5 hours.

So it shows correct time at 1 pm on the same day.

Choice (B)

15. The watch which was 6 minutes slow at 9 am on a Tuesday and 3 minutes fast at 12 noon on Wednesday.

\therefore The watch gained 9 minutes in 27 hours.

So, it gains 6 minutes in $\frac{6 \times 27}{9} = 18$ hours.

\therefore It shows correct time after 18 hours i.e. at 3 am on Wednesday.
Choice (C)

16. The watch lost 25 minutes in 50 hours i.e. 6 a.m. on Thursday to 8 a.m. on Saturday. So, it will lose 10 minutes in 20 hours. So it will show correct time at 2'O clock on Friday morning.
Choice (E)

17. The minute hand gains $65 \frac{5}{11} - 60 = 5 \frac{5}{11}$ minutes in one hour.
Choice (A)

18. In a normal clock the minute hand overtakes the hour hand 11 times in 12 hours (i.e. 720 minutes). Hence, it takes $\frac{720}{11} = 65 \frac{5}{11}$ minutes to overtake once. But in the given clock the minute hand overtakes the hour hand in 70 minutes. Minute hand loses $70 - 65 \frac{5}{11}$ i.e. $4 \frac{6}{11}$ in 70 minutes.

So, it loses $\frac{50}{11} \times \frac{24 \times 60}{70}$ minutes in 24 hours.

$$\text{i.e. } \frac{7200}{77} = 93 \frac{39}{77} \text{ minutes.} \quad \text{Choice (A)}$$

19. After 1 hour, the two clocks differ by $3.5 + 2.5 = 6$ minutes. So, after 6 hours the two clocks differ by 36 minutes.
Choice (B)

20. After 5 hours, i.e. at 10:00 p.m. the clock, which loses 2 minutes, will lose 10 minutes and shows 9:50 p.m. So, the other clock will lose $3 \times 5 = 15$ minutes and show 9:45 p.m.
Choice (C)

21. Mirror time = 12 - Actual time = 12 - 10:40 = 1:20.

Choice (D)

22. When time is 3 hours 40 minutes the hour hand will be between 3 and 4 minutes hand will be at 8. So, in the reflection the hour hand will be between 8 and 9 and the minute hand will be at 4. So, the time is 8 hours 20 minutes. or Mirror time = 12 - Actual time = 12 - 3:40 = 8:20.
Choice (E)

23. When the seconds hand move by 360° (i.e. 1 minute) the minute hand moves by 6° . So when the seconds hand moves by 240° , the minute hand moves by $\frac{240 \times 6}{360} = 4^\circ$. Choice (D)
24. At 10:30 the angle between minute hand and hour hand will be $\theta = \left| \frac{11}{2} \times 30 - 30 \times 10 \right|$
when the minute hand points towards south, the hour hand will be to the right of the minute hand which is North-west. Choice (B)
25. The clock strikes for 6 times at 6:00 O'clock. Let the gap between two consecutive strikes be x .
Now, the total gap between 1st strike and 6th strike is $5x$.
Now $5x = 10 \Rightarrow x = 2$
Now, the gap between 1st strike and 12th strike at 12:00 O'clock is $11x$ i.e. 22 seconds. Choice (B)

Chapter – 6 (Calendars)

Exercise – 6

Solutions for questions 1 to 25:

1. 1994 is not a leap year.
 \therefore It has only 1 odd day.
 \therefore 8th Feb 1995 is one day before Wednesday.
Hence, 8th Feb 1994 is a Tuesday. Choice (E)
2. The number of odd days from 17th September 1993 to 30th June 1993
Month : Sep + Aug + Jul + Jun
Odd days : $2 + 3 + 3 + 1 = 2$ odd days.
Hence, 30th June 1993 was two days back to Friday. i.e., Wednesday.
The number of years from 1993 to 1989 is 4 years out of which there is one leap year and 3 non leap years.
 \therefore The number of odd days = $2 \times 1 + 3 = 5$ odd days.
 \therefore Same day i.e., Friday. Choice (C)
3. It is given that 11th August 1985 was Sunday then 13th August 1985 is Tuesday.
1985 is not a leap year, hence it has only one odd day.
So, 13th August 1986 is one day to Tuesday i.e., Wednesday. Choice (E)
4. The number of odd days in 352 days
 $= \frac{352}{7} = 50 + 2$ odd days
Hence, the total number of odd days is 2. Choice (B)
5. Century years which are divisible by 400 are leap years. As 3000, 3100 and 3300 are not divisible by 400, they are not leap years. But, 3200 is a leap year. Choice (C)
6. The total number of years from 2012 to 2016 is four, out of which 2013, 2014 and 2015 are non leap years, hence there is 1 odd day in each of these years, 2012 is a leap year, hence it has 2 odd days.
 \therefore The total number of odd days in these four years is 5. 1st Jan 2016 is five days to Sunday i.e., Friday. Choice (A)
7. The total number of years from 1963 to 1959 is 4 years out of which 1959, 1961 and 1962 are ordinary years. Hence they have 3 odd days and 1960 is leap year which has 2 odd days.
The total number of odd days in these 4 years is 5. Hence 1st April 1959 is 5 days back to Monday i.e., Wednesday.
Now, the number of odd days from 1st April to 1st August in 1959.

Month : Apr + May + Jun + Jul + Aug
Odd days : $1 + 3 + 2 + 3 + 1$
The total number of odd days is 3.
Hence, 1st August 1959 is 3 days to Wednesday i.e. Saturday. Choice (E)

8. 1600 years contain zero odd days.
300 years contain 1 odd day.
93 years = (23 leap + 70 non leap years)
Total number of odd days in 93 years = $(23 \times 2 + 70 \times 1)$
 $= 116$ odd days $\Rightarrow 4$ odd days.
Number of odd days from 1st January to 1st October in 1994
Month : J + F + M + A + M + J + J + A + S + O
Odd days: $3 + 0 + 3 + 2 + 3 + 2 + 3 + 3 + 2 + 1$
 $= 22$ odd days $\Rightarrow 1$ odd day.
The total number of odd days = $1 + 4 + 1 = 6$ odd days
 \therefore 1st October 1994 is Saturday.
Therefore, first Monday is on 3rd October.
So, 3, 10, 17, 24 and 31 are Mondays in October. Choice (D)

9. The number of odd days should be zero to have same calendar.

Years Odd day

2002	–	1
2003	–	1
2004	–	2
2005	–	1
2006	–	1
2007	–	1
2008	–	2
2009	–	1
2010	–	1
2011	–	1
2012	–	2
2013	–	1

After the completion of 2013 we get 14 odd days.
Hence, the number of odd days is zero. So 2013 will have the same calendar as that of 2002. Choice (D)

10. A leap year repeats after 28 years.
Hence, $1984 + 28 = 2012$ will have the same calendar as that of 1984. Choice (C)
11. For a century year to be a leap year, it should be divisible by 400. As 2100 is not divided by 400 it is not a leap year. The next leap year is 2104. Choice (C)
12. To find the number of odd days, we have to find remainder of $541/10$. The remainder is one.
Hence, there is one odd day. Choice (A)
13. 100 years contain 5 odd days.
 \therefore The last day of the first century is Friday.
200 years contain 10 odd days i.e., 3 odd days.
 \therefore The last day of the second century is Wednesday.
300 years contain 15 odd days i.e., 1 odd day.
 \therefore The last day the third century is Monday.
400 years contain 20 odd days and 400th year itself is a leap year. Hence, there is no odd day.
 \therefore The last days is Sunday. The last day of a century cannot be Tuesday, Thursday or Saturday. Choice (D)
14. The total number of odd days up to 25th December, 1995 is obtained as follows
For 1600 years – zero odd days
For 300 years – 1 odd day
In 94 years there are 23 leap years and 71 non leap years.
The total number of odd days in these 94 years is $(23 \times 2 + 71 \times 1) = (46 + 71) = 117$.
 $\Rightarrow 5$ odd days
The number of odd days from 1st Jan to 25th Dec 1995
Month: J + F + M + A + M + J + J + A + S + O + N + D
Odd days: $3 + 0 + 3 + 2 + 3 + 2 + 3 + 3 + 2 + 3 + 2 + 4$
 $= 2$ odd days.
The total number of odd days = $1 + 5 + 2 = 1$ i.e. Monday.
Hence, 25th December 1995 is Monday. Choice (B)

15. 1600 years – 0 odd days
100 years – 5 odd days
75 years = (18L + 57 NL)
= 36 + 57 = 93 odd days \Rightarrow 2 odd days
Now 1st Jan – 24th July 1776
= 205 days \Rightarrow 2 odd days
 \therefore Total number of odd days = 2
 \therefore 23rd July, 1776 was Tuesday. Choice (D)
16. The total number of odd days from 12th March to 23rd September
Month : M + A + M + J + J + A + S
Odd days: 5 + 2 + 3 + 2 + 3 + 3 + 2 = 20 days.
 $\frac{20}{7} = 6$ odd days.
Hence, 23rd September is 6 days to Sunday i.e., Saturday.
So, 23rd September is not a holiday. Choice (B)
17. The number of odd days upto 15th Jan, 1601:
1600 + (1st Jan to 15th Jan 1601)
1600 years have zero odd days and there is one odd day in 15 days.
Hence, 15th Jan 1601 is a Monday. Choice (A)
18. The number of odd days upto 26th Jan 1950.
1600 years = odd days
300 years = 1 odd day
In 49 years there are 12 leap years and 37 non leap years.
Number of odd days in these 49 years is 61.
= 61 odd days \Rightarrow 5 odd days.
Jan 26th = 26 days = 5 odd days
 \therefore Total odd days 11 odd days = 4 odd days
 \therefore Thursday Choice (A)
19. Number of years from 2006 to 2106 is 100 years.
We know that 100 years have 5 odd days. Hence, 23rd April 2106 will be 5 days after Sunday i.e., Friday. Choice (C)
20. 2012 is leap year, so it will have two odd days.
Hence 1st Jan 2013 is two days after Monday i.e., Wednesday.
So, 31st Dec 2012 is a Tuesday. 2023 is a non leap year and have 1 odd day.
So, 1st Jan 2024 is Tuesday. Hence, 31st Dec 2023 is Monday. Choice (B)
21. Number of years from 2006 to 2706 is 700 years.
700 year (400 + 300) have 1 odd day.
Hence, 14th Nov 2706 is one day after Sunday i.e., Monday. Choice (D)
22. The number of odd days from 23rd November to 14th March in that year.
Month : N + O + S + A + J + J + M + A + M
Odd days: 2 + 3 + 2 + 3 + 3 + 2 + 3 + 2 + 3
23 odd days $\Rightarrow \frac{23}{7} = 2$ odd days.
Hence, is two days before Friday i.e., Wednesday. Choice (B)
23. In order to have same calendar between these two months the number of odd days should be zero.
Month : Jan + Feb + Mar + Apr + May + Jun + Jul
Odd days: 3 + 1 + 3 + 2 + 3 + 2
At the completion of June the number of odd days is zero.
Hence, January and July will have the same calendar. Choice (B)
24. A century year which is divisible by 400 is a leap year and a leap year comes for every 4 years.
Hence, 2396 + 4 = 2400 is a leap year. Choice (D)
25. The number of odd days upto 21st April 2006
(200) years + 5 years + (1st Jan 2006 to 21st April 2006)
2000 years have 0 odd days.
In these 5 years there is a leap year and 4 non leap years.

Odd days = $1 \times 2 + 4 \times 1 = 6$ odd days.
The number of odd days from 1st Jan 2006 to 21st Apr 2006.
Month : Jan + Feb + Mar + Apr
Odd days : 3 + 0 + 3 + 0 = 6 days
The total, number of odd days = 6 + 6 = 12
 \Rightarrow 5 odd days.
Hence, 21st April 2006 is Friday. Choice (E)

Chapter – 7 (Symbols and Notations)

Exercise – 7

Solutions for questions 1 to 5:

'+' means '+', 'x' means '×', '-' means '−' and '÷' means '÷'

- The given expression is $9 + 4 - 6 \times 6 \div 8$.
On converting this expression as per the directions, we get the expression $9 \times 4 \div 6 - 6 \div 8$.
We simply this expression using BODMAS rule, where
'B' stands for 'Brackets',
'O' stands for 'of',
'D' stands for 'Division',
'M' stands for 'Multiplication',
'A' stands for 'Addition' and
'S' stands for 'subtraction'.
 $\therefore 9 \times 4 \div 6 - 6 \div 8 = 36 \div 6 - 6 \div 8 = 6 - 6 \div 8 = 8$
Choice (B)
- The given expression is $10 + 10 \times 10 - 10 \div 10$
As per the directions,
it becomes $10 \times 10 - 10 \div 10 + 10$
Using BODMAS rule,
 $10 \times 10 - 10 \div 10 + 10 = 100 - 1 + 10 = 109$.
Choice (A)
- The given expression $16 \times 4 \div 4 + 14 - 2$ becomes
 $16 - 4 + 4 \times 14 \div 2$ as per the given directions.
Using BODMAS rule,
 $16 - 4 + 4 \times 14 \div 2 = 12 + 56 \div 2 = 12 + 28 = 40$.
Choice (C)
- As per the given directions, the given expression
 $16 - 2 + 4 \div 16 - 8 \times 2$ becomes
 $16 \div 2 \times 4 + 16 \div 8 - 2$.
Using BODMAS rule,
 $16 \div 2 \times 4 + 16 \div 8 - 2 = 8 \times 4 + 2 - 2$
 $= 32 + 0 = 32$.
Choice (E)
- $2 \div 4 + 8 - 16 \times 32 \div 64 \times 128 \div 256$ becomes
 $2 + 4 \times 8 \div 16 - 32 \div 64 - 128 \div 256$.
Using BODMAS rule,
 $2 + 4 \times 8 \div 16 - 32 \div 64 - 128 \div 256$
 $= 2 + 32 \div 16 + 32 \div 128$
 $= 2 + 2 + 160 = 164$.
Choice (B)

Solutions for questions 6 to 10:

'+' means '+', 'x' means '×', '-' means '−' and '÷' means '÷'

- The given expression is $5 \times 10 - 15 \div 20 + 25 \div 30$.
According to the given direction, the above expression becomes $5 - 10 + 15 \times 20 \div 25 \times 30$
Using BODMAS rule,
 $5 - 10 + 15 \times 20 \div 25 \times 30 = -5 + 300 \div 25 \times 30$
 $= -5 + 12 \times 30 = 355$.
Choice (C)
- The given expression $(10 - 5) \div 50 \times (25 \times 5) \div 40$ becomes $(10 + 5) \times 50 - (25 - 5) \times 40$.
Using BODMAS rule,
 $(10 + 5) \times 50 - (25 - 5) \times 40 = 15 \times 50 - 20 \times 40$
 $= 750 - 800 = -50$.
Choice (A)

8. The given expression $(10 - 2 \times 3) + (4 - 5 \times 8) \times (2 - 3) \div 2$ becomes $(10 + 2 - 3) \times (4 + 5 - 8) - (2 + 3) \times 2$.
Using BODMAS Rule,
 $(10 + 2 - 3) \times (4 + 5 - 8) - (2 + 3) \times 2 = 9 \times 1 - 5 \times 2$
 $= 9 - 10 = -1$. Choice (C)

9. According to the given conditions, the expression $44 - 11 \div 2 \times 6 \div 6 + 2 - 12$ becomes $44 + 11 \times 2 - 6 \times 6 \div 2 + 12$.
Using BODMAS rule,
 $44 + 11 \times 2 - 6 \times 6 \div 2 + 12 = 44 + 22 - 36 \div 2 + 12$
 $= 66 - 18 + 12 = 60$. Choice (B)

10. The given expression $(13 - 5 \times 8 + 4) \times (5 - 6 + 12 \times 3) \div (4 + 2)$ becomes $(13 + 5 - 8 \div 4) - (5 + 6 \div 12 - 3) \times (4 \div 2)$.
Using BODMAS rule,
 $(13 + 5 - 8 \div 4) - (5 + 6 \div 12 - 3) \times (4 \div 2)$
 $= (18 - 2) - \left(5 + \frac{1}{2} - 3\right) \times 2 = 16 - \frac{5}{2} \times 2 = 11$.
Choice (E)

Solutions for questions 11 to 15:

'\$' stands for '+', '↑' stands for '−', '⊕' stands for '×',
'Δ' stands for '÷', '@' stands for '<', '?' stands for '>' and
'☆' stands for '='.

11. (A) $18 \$ 6 \Delta 3 @ 6 \$ 4 \oplus 3$ becomes
 $18 + 6 \div 3 < 6 + 4 \times 3 \Rightarrow 18 + 2 < 6 + 12$
 $\Rightarrow 20 < 18 \rightarrow \text{false}$.
(B) $18 \$ 6 \Delta 3 \star 6 \oplus 4 \uparrow 3$ becomes
 $18 + 6 \div 3 = 6 \times 4 - 3 \Rightarrow 18 + 2 = 24 - 3$
 $\Rightarrow 20 = 21 \rightarrow \text{false}$.
(C) $18 \Delta 6 \oplus 3 ? 6 \Delta 4 \$ 3$ becomes
 $18 \div 6 \times 3 > 6 \div 4 + 3 \Rightarrow 3 \times 3 > \frac{3}{2} + 3$
 $\Rightarrow 9 > \frac{9}{2} \rightarrow \text{true}$. Choice (C)
12. (A) $4 \uparrow 3 \$ 6 ? 4 \oplus 8 \Delta 4$ becomes
 $4 - 3 + 6 > 4 \times 8 \div 4 \Rightarrow 7 > 8 \rightarrow \text{false}$
(B) $4 \Delta 3 \oplus 6 \star 4 \$ 8 \uparrow 4$ becomes
 $4 \div 3 \times 6 = 4 + 8 - 4 \Rightarrow 8 = 8 \rightarrow \text{true}$.
Choice (B)
13. (A) $2 \oplus 4 \$ 8 \star 8 \oplus 4 \Delta 2$ becomes
 $2 \times 4 + 8 = 8 \times 4 \div 2 \Rightarrow 8 + 8 = 32 \div 2$
 $\Rightarrow 16 = 16 \rightarrow \text{true}$. Choice (A)
14. (A) $7 \oplus 2 \uparrow 13 ? 5 \$ 11 \oplus 7$ becomes
 $7 \times 2 - 13 > 5 + 11 \times 7 \Rightarrow 14 - 13 > 5 + 77$
 $\Rightarrow 1 > 82 \rightarrow \text{false}$
(B) $7 \$ 2 \Delta 13 \star 5 \Delta 11 \oplus 6$ becomes
 $7 + 2 \div 13 = 5 \div 11 \times 6$
 $\Rightarrow 7 + \frac{2}{13} = \frac{30}{11} \rightarrow \text{false}$
(C) $7 \oplus 2 \$ 13 ? 5 \oplus 11 \Delta 7$ becomes
 $7 \times 2 + 13 > 5 \times 11 \div 7$
 $\Rightarrow 14 + 13 > 55 \div 7 \Rightarrow 27 > \frac{55}{7} \rightarrow \text{true}$. Choice (C)
15. (A) $4 \$ 7 \$ 2 \star 6 \oplus 4 \uparrow 11$ becomes
 $4 + 7 + 2 = 6 \times 4 - 11$
 $\Rightarrow 13 = 24 - 11 \Rightarrow 13 = 13 \rightarrow \text{true}$. Choice (A)

Solutions for questions 16 to 20:

$a + b$ means $a > b$, $a - b$ means $a = b$, $a = b$ means $a \geq b$,
 $a \times b$ means $a \leq b$ and $a \div b$ means $a < b$.

16. According to the statement
 $A + B \Rightarrow A > B$
 $B \times C \Rightarrow B \leq C$
 $C \times D \Rightarrow C \leq D$
 $\therefore A > B \leq C \leq D$
Conclusion (I): $A + D \Rightarrow A > D$, which cannot be definitely determined because A could be either greater than, less than or equal to D.
Conclusion (II): $A = C \Rightarrow A \geq C$
which cannot be determined as A can be less than C. Choice (D)

17. According to the statement
 $P \div Q \Rightarrow P < Q$
 $Q - R \Rightarrow Q = R$
 $R + S \Rightarrow R > S$
 $\therefore P < Q = R > S$
Conclusion (I): $P = S \Rightarrow P \geq S$, cannot be definitely determined because P can be less than S.
Conclusion (II): $P \div R \Rightarrow P < R$
As $P < Q$ and $Q = R$
 $P < R$ is true. Choice (B)

18. According to the statement
 $X + Y \Rightarrow X > Y$
 $Y \times Z \Rightarrow Y \leq Z \Rightarrow Z \geq Y$
 $W = Z \Rightarrow W \geq Z \Rightarrow Z \leq W$
 $\therefore W \geq Z \geq Y$ and $X > Y$
Conclusion (I): $Y \times W \Rightarrow Y \leq W$, is true.
Conclusion (II): $X + Z \Rightarrow X > Z$
Which cannot be definitely determined. Choice (A)

19. According to the statement
 $E + F \Rightarrow E < F$
 $F + G \Rightarrow F > G$
 $G - H \Rightarrow G = H$
 $\therefore E < F > G = H$
Conclusion (I): $E + H \Rightarrow E > H$, cannot be definitely determined.
Conclusion (II): $F + H \Rightarrow F > H$, is true. Choice (B)

20. According to the statement
 $M \times N \Rightarrow M \leq N$
 $O = N \Rightarrow O \geq N \Rightarrow N \leq O$
 $O \times P \Rightarrow O \leq P$
 $\therefore M \leq N \leq O \leq P$
Conclusion (I): $M \times P \Rightarrow M \leq P$, is true.
Conclusion (II): $O = M \Rightarrow O \geq M$, is true. Choice (C)

Solutions for questions 21 to 25:

The given information is

$a \text{ } \text{£} \text{ } b$ means $a \leq b$
 $a \text{ } \$ \text{ } b$ means $a \geq b$
 $a \text{ } \uparrow \text{ } b$ means $a < b$
 $a \text{ } \bullet \text{ } b$ means $a > b$
 $a \text{ } \blacktriangle \text{ } b$ means $a = b$

21. The statement is (i) $w \bullet x$ (ii) $x \text{ } \text{£} \text{ } y$ (iii) $y \uparrow z$
i.e., $w > x$, $x \leq y$, $y < z$
 $\Rightarrow w > x$ and $z > y \geq x$
Conclusion I : $w \blacktriangle y \Rightarrow w = y$ cannot be concluded
Hence (I) does not follow.
Conclusion II : $w \uparrow z \Rightarrow w < z$ cannot be concluded
Hence, (II) does not follow. Choice (D)

22. The statement is (i) $a \bullet b$ (ii) $b \blacktriangle c$ (iii) $c \$ d$
i.e., $a > b$, $b = c$ and $c \geq d$
 $\Rightarrow a > b = c \geq d$
Conclusion I : $d \uparrow b \Rightarrow d < b$ or $b > d$ cannot be concluded
Hence, (I) does not follow.
Conclusion II : $b \blacktriangle d \Rightarrow b = d$ cannot be concluded.
Hence, (II) does not follow.
But one of them will always be true. Choice (E)

23. The statement is (i) $m \blacktriangle n$ (ii) $n \in o$ (iii) $o \bullet p$
 i.e., $m = n$, $n \leq o$ and $o > p$
 $\Rightarrow o \geq n = m$ and $o > p$
 Conclusion I : $p \bullet m \Rightarrow p > m$ cannot be concluded
 Hence, I does not follow.
 Conclusion II : $m \in o \Rightarrow m \leq o$ is true.
 Hence, II follows. Choice (B)

24. The statement is (i) $a \$ b$ (ii) $b \bullet c$ (iii) $c \uparrow d$
 i.e., $a \geq b$, $b > c$, $c < d$
 $\Rightarrow a \geq b > c$ and $d > c$ or $c < d$
 Conclusion I : $a \blacktriangle c \Rightarrow a = c$ is false.
 Hence, I does not follow.
 Conclusion II : $b \in d \Rightarrow b \leq d$ cannot be concluded.
 Hence, II does not follow. Choice (D)

25. The statement is (i) $e \in f$, (ii) $f \uparrow g$ (iii) $e \blacktriangle h$
 i.e., $e \leq f$, $f < g$, $e = h$
 $\Rightarrow g > h \geq e = h$
 Conclusion I : $f \$ h \Rightarrow f \geq h$ is true.
 Hence, I follows.
 Conclusion II : $g \bullet e = g > e$ is true.
 Hence, II follows. Choice (C)

Solutions for questions 26 to 30:

The given information is

$p \star q$ means $p > q$
 $p @ q$ means $p < q$
 $p \# q$ means $p \geq q$
 $p \Delta q$ means $p \leq q$
 $p \square q$ means $p = q$

26. The statement is (i) $k \square l$ (ii) $l \Delta m$ (iii) $m @ n$
 i.e., $k = l$, $l \leq m$, $m < n$
 $\Rightarrow k = l \leq m < n$
 Conclusion I : $l @ n \Rightarrow l < n$ is true.
 Hence, I follows.
 Conclusion II : $m \# k \Rightarrow m \geq k$ is true.
 Hence, II follows. Choice (C)

27. The statement is (i) $p \# q$ (ii) $q \star r$ (iii) $r \Delta s$
 From (i) $p \# q \Rightarrow p \geq q$ or $q \leq p$
 From (ii) $q \star r \Rightarrow q > r$
 From (iii) $r \Delta s \Rightarrow r \leq s$ or $s \geq r$
 $\therefore p \geq q > r \leq s$
 Conclusion I : $s \star p \Rightarrow s > p$ cannot be concluded.
 Hence, I does not follow.
 Conclusion II : $q @ s \Rightarrow q < s$ cannot be concluded.
 Hence, II does not follow. Choice (D)

28. The statement is (i) $a \square b$ (ii) $c \Delta d$ (iii) $b \star c$
 i.e., $a = b$, $c \leq d$, $b > c$
 $\Rightarrow a = b > c \leq d$
 Conclusion I : $a \star c \Rightarrow a > c$ is true.
 Hence, I follows.
 Conclusion II : $b \# d \Rightarrow b \geq d$ cannot be concluded.
 Hence, II does not follow. Choice (A)

29. The statement is (i) $s \star r$ (ii) $q \# p$ (iii) $r \Delta p$
 From (i) $s \star r \Rightarrow s > r$
 (ii) $q \# p \Rightarrow q \geq p$ or $p \leq q$
 (iii) $r \Delta p \Rightarrow r \leq p$ or $p \geq r$
 $\therefore q \geq p \geq r < s$
 Conclusion I : $q \# r \Rightarrow q \geq r$ is true
 Hence, I follows.
 Conclusion II : $s \star q \Rightarrow s > q$ cannot be concluded.
 Hence, II does not follow. Choice (A)

30. The statement is (i) $x \square y$ (ii) $y @ z$ (iii) $w \star x$
 i.e., $x \leq y$, $y < z$, $w > x$
 $w > x \leq y < z$
 Conclusion I : $w \star y \Rightarrow w > y$ is true.
 Hence I follows.
 Conclusion II : $x @ z \Rightarrow x < z$ is true.
 Hence II follows. Choice (C)

Solutions for questions 31 to 35:

Given sequence is

M 4 C @ F 71 \$ A EN 9 H > 5 ↓ K ⊙ 3 ? B J ≠ G 8 D 6 IL 2

31. M^{+3} , $@^{+5}$, A^{+7} , \downarrow^{+9} 8. Choice (E)

32. In the above sequence, 4^{+2} $@^{+2}$ 7^{+2} , $\$^{+2}$ E^{+2} 9^{+2} , $>^{+2}$ \downarrow^{+2} \odot^{+2} , $?^{+2}$, J^{+2} G. Choice (B)

33. > and ⊙ are the only symbols which are preceded by an alphabet and followed by a digit. Choice (C)

34. The fifteenth element from the right is ↓.
 The element which is tenth to the right of this element is D. Choice (C)

35. When the elements of the first half of the sequence are written in reverse order, we get the following sequence.
 5 > H 9 N E A \$ 17 F @ C 4 M ↓ K ⊙ 3 ? B J ≠ G 8 D 6 IL 2
 Twentieth element from the left is ?.
 The element which is tenth to the left of '?' is '7'. Choice (B)

Solutions for questions 36 to 40:

The given sequence is

R K 5 9 # B 2 % * E ? A 8 L \$ I 4 S V 7 ! C 6 N @ H 1 3 & D

36. Except BLI, in all others, the three letters are consecutive alphabets in the given sequence. Choice (E)

37. B, C and H are the three letters which are followed by a digit but not immediately preceded by a consonant. Choice (A)

38. The sequence is
 5 # 2, *?8, \$4V _____
 the logic is as follows
 5^{+2} $\#^{+2}$ 2^{+2} , $*^{+2}$ $?^{+2}$ 8^{+2} , $\$^{+2}$ 4^{+2} V^{+2} , $!^{+2}$ 6^{+2} @ Choice (B)

39. The 9th element to the right of the 19th element from the left end is $(9 + 19)^{th} = 28^{th}$ from the left end, that is 3. Choice (B)

40. There is only one letter i.e. E, which is immediately followed and immediately preceded by symbol. Choice (A)

Solutions for questions 41 to 45:

The given sequence is

2 T # K 7 P N 3 R ? 5 Q 1 S A 9 @ 4 E G % 8 J B 6 M ! V 9 Z

41. The 13th element to the left of the 8th element from the right end is 21st from the right end. The element is '?'. Choice (E)

42. Only '9' satisfies the given condition. Choice (B)

43. The sequence in 86V, 2KN, ? 19, _____
 The logic is as follows
 8^{+3} 6^{+3} V^{+3} , 2^{+3} K^{+3} N^{+3} , $?^{+3}$ 1^{+3} 9^{+3} , E^{+3} 8^{+3} 6.
 Hence, E86 is the next term. Choice (C)

44. All the given terms are three successive elements of the sequence, except 4GB. Choice (C)

45. The 4th element to the right of the 23rd element from the right end is $23 - 4 = 19^{th}$ from the right end which is 'Q'. Choice (A)

Solutions for questions 46 to 60:

46. $4 + 5 = 41$ and $10 + 12 = 244$
Both of the above hold good when $a + b \Rightarrow a^2 + b^2$
 $\therefore 6 + 8 = 6^2 + 8^2 = 36 + 64 = 100$. Choice (A)
47. $6 \$ 3 = 9$ and $9 \$ 4 = 17$
Both of these hold good when $a \$ b \Rightarrow a^2 - b^3$
 $\therefore 8 \$ 3 = 64 - 27 = 37$. Choice (B)
48. $5 ? 8 = 27$ and $7 ? 2 = 5$ hold good if '?' represents the following operation.
 $5 \times 8 - (5 + 8) = 40 - 13 = 27 \Rightarrow 5 ? 8$
 $7 \times 2 - (7 + 2) = 14 - 9 = 5 \Rightarrow 7 ? 2$
 $\therefore 11 ? 8 = 11 \times 8 - (11 + 8) = 88 - 19 = 69$. Choice (C)
49. $8 \div 4 = 48$ and $15 \div 6 = 189$ hold good, when '+' represents the following operation.
 $8^2 - 4^2 = 64 - 16 = 48 \Rightarrow 8 \div 4$
 $15^2 - 6^2 = 225 - 36 = 189 \Rightarrow 15 \div 6$
 $\therefore 12 \div 3 = 12^2 - 3^2 = 144 - 9 = 135$. Choice (A)
50. $4 \times 3 = 55$ and $5 \times 9 = 44$ hold good, when '@' represents the following operation.
 $2(3^2 + 4^2) = 2(9 + 16) = 50 \Rightarrow 3 @ 4$
 $2(7^2 + 10^2) = 2(49 + 100) = 298 \Rightarrow 7 @ 10$
 $\therefore 6 @ 9 = 2(6^2 + 9^2) = 2(36 + 81) = 234$. Choice (B)
51. $4 \times 3 = 55$ and $5 \times 9 = 44$ hold good, when 'x' represents the following operation
 $4^3 - 3^2 = 64 - 9 = 55 \Rightarrow 4 \times 3$
 $5^3 - 9^2 = 125 - 81 = 44 \Rightarrow 5 \times 9$
 $\therefore 10 \times 10 = 10^3 - 10^2 = 1000 - 100 = 900$. Choice (A)
52. $2^6 - 2^4 = 64 - 16 = 48 \Rightarrow 2^{6-4}$
 $2^8 - 2^5 = 256 - 32 = 224 \Rightarrow 2^{8-5}$
 $\therefore 2^{10-6} = 2^{10} - 2^6 = 1024 - 64 = 960$. Choice (D)
53. $5 @ 6 \Rightarrow (5 + 6)^3 = 1331$
 $3 @ 4 \Rightarrow (3 + 4)^3 = 343$ and
 $4 @ 5 \Rightarrow (4 + 5)^3 = 729$. Choice (B)
54. $8 \Delta 3 \Rightarrow 8 + 3 = 11$ and $11^2 - 1 = 120$.
 $10 \Delta 6 \Rightarrow 10 + 6 = 16$ and $16^2 - 1 = 255$.
Similarly, $12 \Delta 5 \Rightarrow 12 + 5 = 17$ and $17^2 - 1 = 288$.
Choice (E)
55. $3 \odot 2 \Rightarrow (3)^3 - (2)^2 = 27 - 4 = 23$
 $4 \odot 3 \Rightarrow (4)^4 - (3)^3 = 256 - 27 = 229$
Similarly $5 \odot 4 \Rightarrow (5)^5 - (4)^4 = 3125 - 256 = 2869$.
Choice (A)
56. $3 \Delta 4 = 3 + 4 + 3 \times 4 = 7 + 12 = 19$
 $(3 \Delta 4) \$ 5 = 19 \$ 5 = 19^2 + 5^2$
 $= 361 + 25 = 386$. Choice (A)
57. $1 > 2 = 1^2 + 2^3 = 1 + 8 = 9$
 $(1 > 2) < 3 = 9 < 3 = 9^3 - 3^2$
 $= 729 - 9 = 720$. Choice (B)
58. $2 @ 1 \Rightarrow 2^3 - 1^3 = 8 - 1 = 7$
 $3 > (2 @ 1) = 3 > 7 = 3^3 + 7^3$
 $\Rightarrow 27 + 343 = 370$. Choice (E)
59. $E \downarrow F = (E + F)^2 + (E - F)^2 = 2(E^2 + F^2)$
 $E \uparrow F = (E + F)^2 - (E - F)^2 = 4EF$
 $2 \downarrow 5 = 2(2^2 + 5^2) = 2(4 + 25) = 58$
 $4 \downarrow 3 = 2(4^2 + 3^2) = 2(16 + 9) = 50$

$$\therefore (2 \downarrow 5) \uparrow (4 \downarrow 3) = 58 \uparrow 50$$

$$= 58 \uparrow 50$$

$$\Rightarrow 4 \times 58 \times 50 = 11600$$

Choice (C)

60. $2 ? 3 = (2 + 3)^2 - 2 \times 3 = 25 - 6 = 19$
 $5 ? 3 = 5^2 - 5 \times 3 + 3^2 = 25 - 15 + 9 = 19$.
 $(2 ? 3) \neq (5 ? 3) = 19 \neq 19$
 $= 19^2 - 19 \times 19 + 19^2 = 19^2 = 361$. Choice (B)

Solutions for questions 61 to 65:

- (a) 'A % B ! C' means 'A is added to the product of B and C'.
- (b) 'A @ B * C' means 'the product of B and C is subtracted from A'.
- (c) 'A # B @ C' means 'the product of A and B is divided by C'.
- (d) 'A • B \$ C' means 'C is multiplied by the sum of A and B'.
61. Given, $100 \odot 20 * 3 = a$
The value $a = 100 - (20 \times 3) = 40$
Then $40 \% 40 ! 5 = 40 + 40 \times 5 = 240$. Choice (B)
62. Given, $16 \bullet 14 \$ 4 = q$
The value of $q = (16 + 14) \times 4 = 120$
Then $120 \# 10 @ 12$
 $= \frac{120 \times 10}{12} = 10 \times 10 = 100$. Choice (E)
63. Given, $100 \odot 5 * 16 = t$
 $\therefore t = 100 - (5 \times 16) = 20$
Then $20 \% 4 ! 12 = 20 + 4 \times 12 = 20 + 48 = 68$.
Choice (B)
64. Given, $50 \# 40 @ 200 = p$
 $\Rightarrow p = \frac{50 \times 40}{200} = 10$
Then $16 \% 12 ! 10 = 16 + 12 \times 10 = 16 + 120 = 136$.
Choice (B)
65. Given, $12 \bullet 13 \$ 5 = r$
 $\Rightarrow r = (12 + 13) \times 5 = 125$
 $10 \odot 4 * 125 = 10 - (4 \times 125) = -490$. Choice (C)

Solutions for questions 66 to 70:

Given that

- (a) 'P x Q + R' means 'the product of Q and R is added to P'.
- (b) 'P < Q > R' means 'the sum of P and Q is divided by R'.
- (c) 'P £ Q \$ R' means 'R is subtracted from the product of P and Q'.
- (d) 'P Δ Q □ R' means 'R is multiplied by the difference of P and Q'.

66. Given, $y = 25 = 10 \neq 5$
 $= 25 \times 10 - 5$
 $= 245$
Then $245 \times 15 + 3 = 245 + 15 \times 3 = 290$. Choice (C)
67. Given, $b = 12 < 8 > 16$
 $= 12 + 8 \div 16/4 = 5$
Then $5 \Delta 94 \square 4$
 $= (94 - 5) \times 4$
 $= 89 \times 4 = 356$. Choice (D)
68. Given, $n = 10 \Delta 8 \square 4$
 $= (10 - 8) \times 4 = 8$
Then, $8 = 6 \neq 38$
 $= (8 \times 6) - 38 = 10$. Choice (A)
69. Given, $16 < 8 > 12 = m$
 $\Rightarrow m = \frac{16 + 8}{12} = 8$
Then $8 \times 12 + 2 = 8 + 24 = 32$. Choice (C)

70. Given, $q = 10 \Delta 30 \square 5$
 $= (30 - 10) \times 5 = 100$
 Then $12 < 100 > 16 = \frac{12 + 100}{16} = 28$.

Choice (C)

Solutions for questions 71 to 75:

71. In the given expression the question mark should be replaced with either ' \geq ' or ' $=$ ' in order to make the expressions ' $B > E$ ' and ' $A \geq F$ ' definitely true. Then the expression becomes $A \geq B = C \geq D \geq F > E$ and $A \geq B = C = D \geq F > E$.
 Choice (E)
72. In order to make the given expressions ' $K > F$ ' and ' $I \geq J$ ' true, the elements which are to be placed in place of the question mark are F, G, H, K, J and I. Then the expression becomes $F < G \leq H = K < J \leq I$.
 Choice (C)
73. In order to make the given expressions ' $L > P$ ' and ' $Q < M$ ' true, the symbols which are to be placed in place of question mark are $=$, \geq , $>$, $=$, and \geq . Then the expression becomes $L = M \geq N > O = P \geq Q$.
 Choice (D)
74. In all the given expressions, $R \geq V$ and $S > w$ are false. Therefore none of these are true. ' $R \geq V$ ' and ' $S > W$ ' are false.
 Choice (E)
75. None of the given choices is true.
 Choice (E)

Solutions for questions 76 to 80:

76. Given statement:
 $M \geq R = N < O = P \leq G$
 (A) $N \leq M$, follows
 (B) $R < P$, follows
 (C) $G > R$, Follows
 (D) $O \leq M$, does not follow.
 Choice (D)
77. Given statement:
 $A = B < C \leq D = K \geq E = F$
 (A) $K \geq C$, follows
 (B) $D \geq F$, follows
 (C) $B \leq K$, does not follow
 (D) $D \leq E$, does not follow.
 Choice (E)
78. Given statement:
 $G > R = K = Q \geq N \leq P = B \leq M$
 (A) $Q < G$, follows (B) $R \geq N$, follows
 (C) $N \geq P$, does not follow (D) $P \leq M$, follows
 (E) $N < G$, follows.
 Choice (C)
79. Given statement:
 $X < A = V \leq S = H < N = P$
 (A) $A \leq H$, follows (B) $X < S$, follows
 (C) $A \leq N$, does not follow (D) $H < P$, follows
 (E) $P > S$, follows.
 Choice (C)
80. Given statements:
 $A \geq B = C = D > E$; $P \leq Q = B \leq F < G$
 By combining these two statements we get
 $A \geq B = C = D > E \rightarrow (i)$
 $P \leq Q = B = C = D \rightarrow (ii)$
 $G > F \geq B = C = D > E \rightarrow (iii)$
 $A \geq B \leq F < G \rightarrow (iv)$
 (A) $Q = D$, follows (from (i))
 (B) $F \geq A$, does not follow from (iv)
 (C) $Q \leq A$, follows from (i)
 (D) $P \leq D$, follow from (ii)
 (E) $G > E$, follows from (iii).
 Choice (B)

Chapter – 8 (Direction Sense)

Exercise – 8

Solutions for questions 1 to 37:

1.
 From the figure, the distance OE is to be calculated.
 In triangle ODE, $OE = \sqrt{OD^2 + DE^2}$
 $= \sqrt{(BC - AO)^2 + (AB - CE)^2}$
 $OE = \sqrt{8^2 + 6^2} = 10 \text{ km.}$
 Choice (D)
2.
 He starts at S and reached E. Now we have to find SE.
 In ΔSOE
 $SE = \sqrt{SO^2 + OE^2}$
 $SO = 7 + 5 = 12$
 $OE = 5$
 $SE = \sqrt{12^2 + 5^2} = 13 \text{ km.}$
 Choice (A)
3.
 We have to find AE
 In ΔAOE
 $AE = \sqrt{EO^2 + OA^2}$
 $AO = OB + BA = ED + BA = 6 \text{ km}$
 $EO = BC + CD = 8 \text{ km}$
 $\therefore EA = \sqrt{8^2 + 6^2} = 10 \text{ km.}$
 Choice (B)
4.
 Rahul started at A and reached E.
 We have to find AE.

In $\triangle ABE$

$$AE = \sqrt{AB^2 + BE^2}$$

$$AB = AC - BC = AC - DE$$

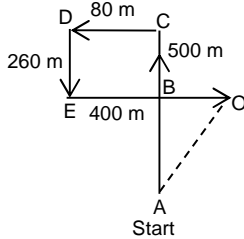
$$AB = 6 - 2 = 4 \text{ km}$$

$$BE = DC = 3 \text{ km}$$

$$\therefore AE = \sqrt{3^2 + 4^2} = 5 \text{ km.}$$

Choice (C)

5.



He started at A and reached O.

Now, we have to find AO.

Now in $\triangle AOB$

$$AO = \sqrt{AB^2 + BO^2}$$

$$AB = AC - BC = AC - DE$$

$$\therefore AB = 500 - 260 = 240 \text{ m}$$

$$BO = EO - EB = EO - DC$$

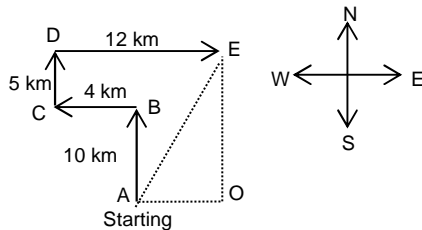
$$BO = 400 - 80 = 320 \text{ m}$$

$$\therefore AO = \sqrt{240^2 + 320^2}$$

$$= \sqrt{160000} = 400 \text{ m.}$$

Choice (A)

6.



AO is the horizontal distance = $DE - CB =$

$$12 - 4 = 8 \text{ km}$$

Vertical distance = $10 + 5 = 15 \text{ km}$

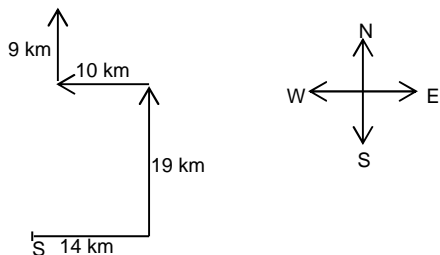
Shortest distance = AE

$$= \sqrt{AO^2 + OE^2} = \sqrt{(8)^2 + (15)^2}$$

$$= \sqrt{64 + 225} = \sqrt{289} = 17 \text{ km.}$$

Choice (D)

7.

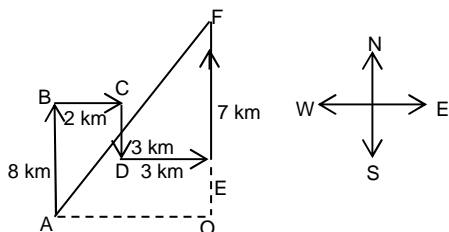


From the diagram the vertical distance traveled

$$= (9 + 19) = 28 \text{ km.}$$

Choice (E)

8.



He starts at A and reaches F. Now, we have to find AF.

In $\triangle AOF$

$$AF = \sqrt{AO^2 + OF^2}$$

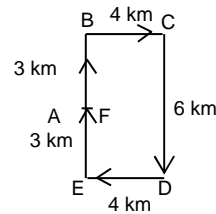
$$AO = BC + DE = 5 \text{ km}$$

$$OF = FE + EO = FE + (AB - CD) = 7 + 5 = 12 \text{ km}$$

$$\therefore AF = \sqrt{12^2 + 5^2} = 13 \text{ km.}$$

Choice (B)

9.

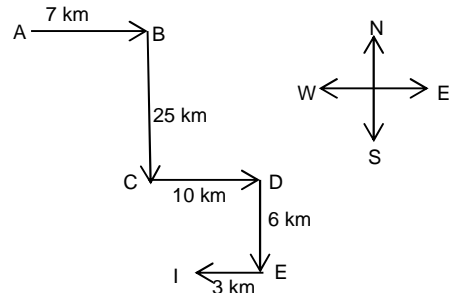


From the diagram, he reaches the same point.

$$\therefore \text{Distance} = 0.$$

Choice (D)

10.

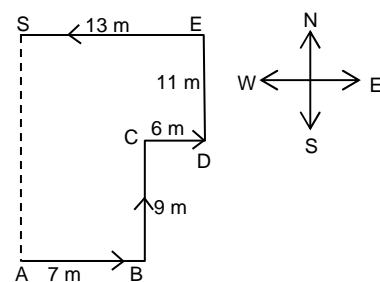


\therefore Total distance in vertical direction = $BC + DE =$

$$= 25 + 6 = 31 \text{ km.}$$

Choice (B)

11.

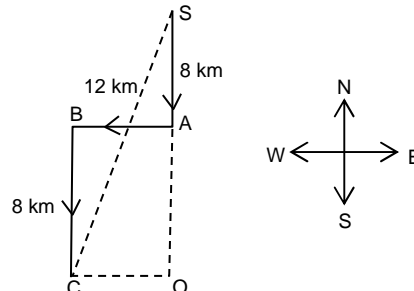


AS is the distance between A and S

$$\therefore \text{The distance AS} = BC + DE = 11 + 9 = 20 \text{ m.}$$

Choice (C)

12.



Shriya starts at S and reaches C.

\therefore The distance covered by Shriya is CS

In $\triangle COS$

$$CS = \sqrt{CO^2 + OS^2}$$

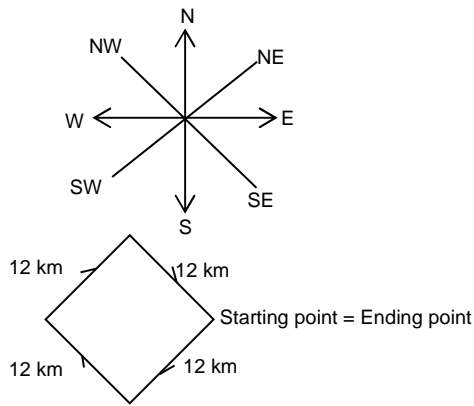
$$CO = BA = 12 \text{ km}$$

$$OS = OA + AS = BC + AS = 18 + 11 = 29 \text{ km}$$

$$\therefore CS = \sqrt{12^2 + 29^2} = \sqrt{905} = 30.08 \text{ km.}$$

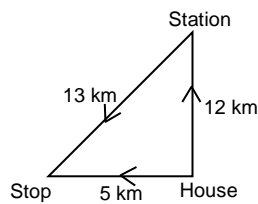
Choice (B)

13.



From the diagram it is clear that, he returned to the starting point.
Choice (E)

14.



The distance between the station and the shop

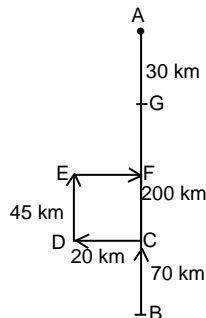
$$= \sqrt{12^2 + 5^2} = 13 \text{ km}$$

Since speeds are equal, they meet at mid point.

\therefore They meet at a distance of 6.5 km from the station.

Choice (D)

15.

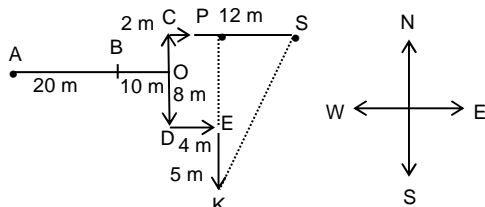


Now P is at position G and Q is at F.

$$GF = AB - (AG + BC + CF) = 200 - (30 + 70 + 45) = 55 \text{ km}$$

Choice (B)

16.



Let ABCS be the path traced by Mr. Bachchan and BDEK the path traced by Kiran.
We have to find KS

$$KS = \sqrt{KP^2 + PS^2}$$

$$KP = KE + EP = KE + DO + OC$$

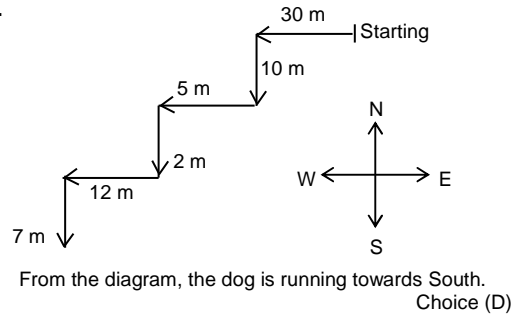
$$= 5 + 8 + 2 = 15 \text{ m}$$

$$PS = CS - CP = CS - DE = 12 - 4 = 8 \text{ m}$$

$$\therefore KS = \sqrt{15^2 + 8^2} = 17 \text{ m.}$$

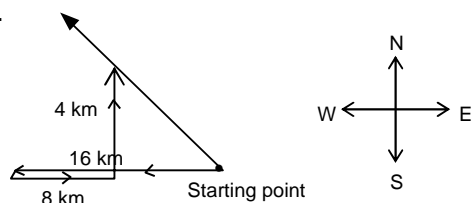
Choice (A)

17.



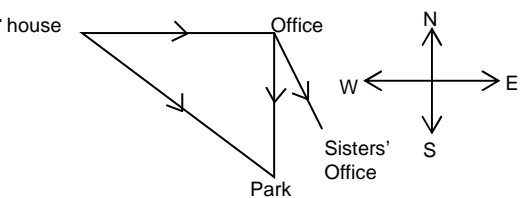
From the diagram, the dog is running towards South.
Choice (D)

18.



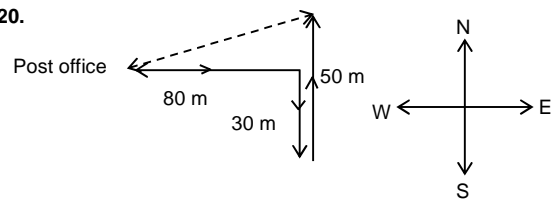
\therefore The direction with respect to the starting point is North-west.
Choice (A)

19.



From figure, it is clear seen that the house is to the North-west of my house.
Choice (C)

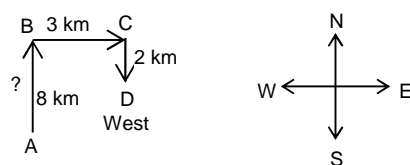
20.



From the figure, the direction is South-west.

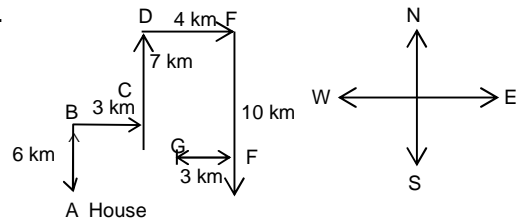
Choice (E)

21.



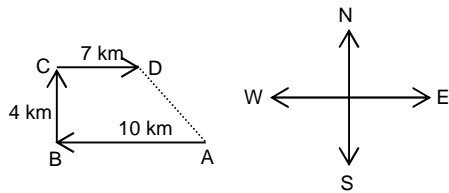
If I started my journey towards North finally I am towards South i.e. opposite to initial direction. If finally I am towards West which implies that I started my journey towards East.
Choice (C)

22.



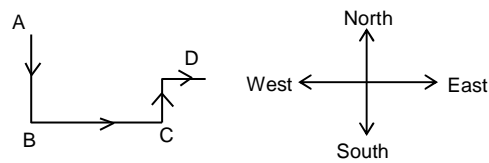
From the diagram the end point G is to the North-east of A.
Choice (C)

23.



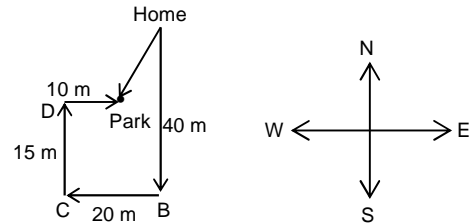
Now, D is to the North-west of A. Choice (D)

24.



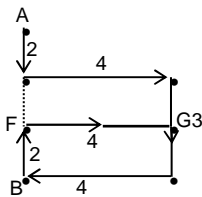
Let A be the initial and D be the final positions of mine. From the diagram I, started my journey towards South. Choice (D)

25.



From the diagram the park is to the South-west of his house. Choice (A)

26. Distance = $\sqrt{(15)^2 + (6)^2}$



Let A and G be his initial and final positions.

The distance AG = $\sqrt{AF^2 + FG^2}$

FG = BC = 4 km

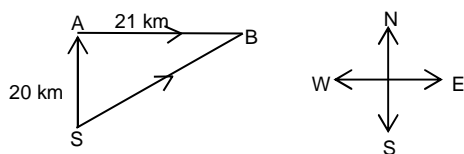
AF = AB + BF = AB + (EB - FE) = AB + (DC - FE) = 2 + (3 - 2) = 3 km.

$\therefore AG = \sqrt{3^2 + 4^2} = 5$ km.

G is towards South-east of A.

Choice (A)

27.



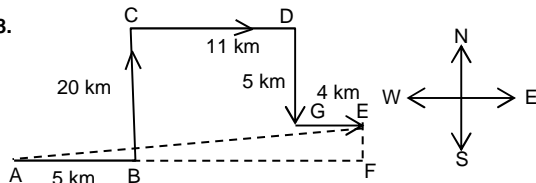
Let S and B be the initial and final positions.

The distance = SB

$= \sqrt{20^2 + 21^2} = \sqrt{400 + 441} = \sqrt{841} = 29$ km

Now, he is in North-east direction with respect to the starting point. Choice (A)

28.



From the diagram, we have to find AE

$AE = \sqrt{AF^2 + FE^2}$

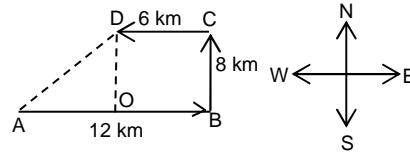
AF = AB + CD + GE = 5 + 11 + 4 = 20 km

EF = (BC - DG) = 20 - 5 = 15 km

AB = $\sqrt{400 + 225} = \sqrt{625} = 25$ km

\therefore The ball is North-east of Harry Potter. Choice (E)

29.



He started at A and reached D. we have to find AD.

$AD = \sqrt{OD^2 + AO^2}$

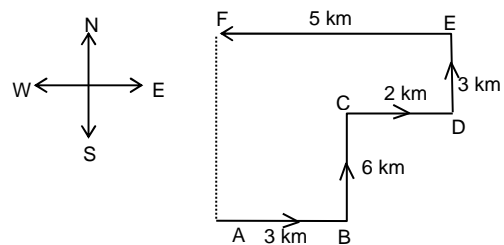
AO = AB - DC = 2 - 6 = 6 km

OD = BC = 8 km

$\therefore AD = \sqrt{64 + 36} = 10$ km

He is North-east of the initial position. Choice (A)

30.



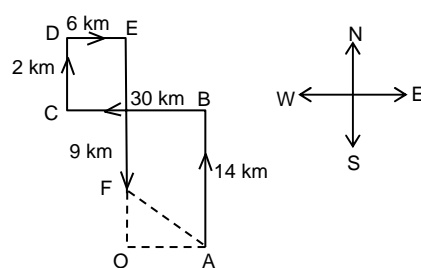
She starts at A and reaches E. We have to find out AE.

AE = BC + DE = 9 km

The horizontal distance traveled = 0

Kalpana is now North to his initial position. Choice (D)

31.



He starts at A and reach F. We have to find AF.

$AF = \sqrt{OF^2 + AO^2}$

OF = (AB + CD - EF) = 14 + 2 - 9 = 7 km

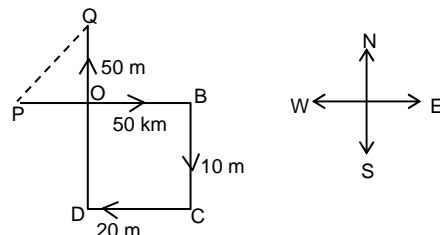
OA = (CB - DE) = 30 - 6 = 24 km

$\therefore AF = \sqrt{49 + 576} = \sqrt{625} = 25$ km

The starting position is South-east of the final position.

Choice (C)

32.



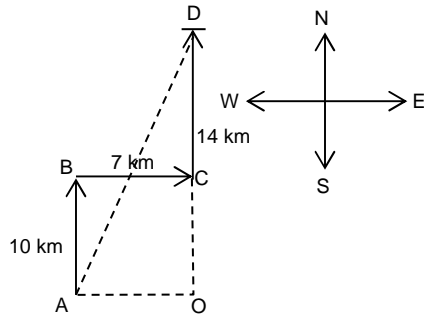
We have to find PQ.

$PQ = \sqrt{QO^2 + OP^2}$

$$\begin{aligned}
 OP &= PB - OB = PB - DC = 50 - 20 = 30 \text{ km} \\
 QO &= QD - OD = QD - BC = 50 - 10 = 40 \text{ km} \\
 \therefore PQ &= \sqrt{1600 + 900} = \sqrt{2500} = 50 \text{ km}.
 \end{aligned}$$

P is towards South-west of Q. Choice (A)

33.

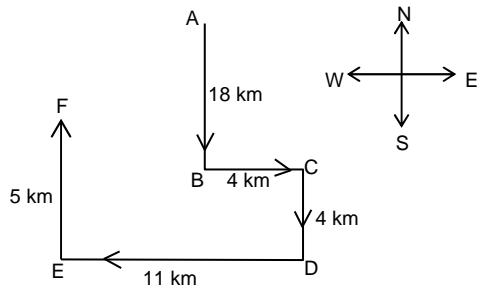


We have to find AD

$$\begin{aligned}
 AD &= \sqrt{OD^2 + AO^2}, \quad AO = BC = 7 \text{ km} \\
 OD &= CD + OC = CD + AB = 10 + 14 = 24 \text{ km} \\
 \therefore \text{Distance} &= \sqrt{7^2 + 24^2} = \sqrt{49 + 576} \\
 &= \sqrt{625} = 25 \text{ km}.
 \end{aligned}$$

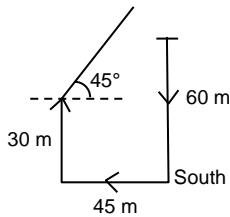
The initial position A is towards South-west of the final position D. Choice (C)

34.



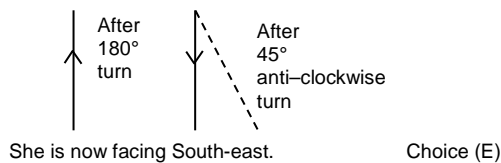
Vertical position = $AB + CD - FE = 18 + 4 - 5 = 17 \text{ km South}$
 Horizontal position = $ED - BC = 11 - 4 = 7 \text{ km West.}$
 Choice (C)

35.



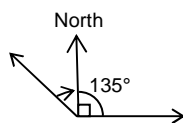
From the diagram, he is traveling towards North-east. Choice (C)

36.



She is now facing South-east. Choice (E)

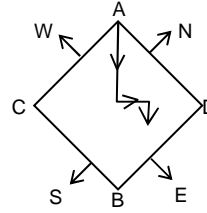
37. 90° clockwise and 135° anticlockwise



\therefore The present direction is North-west. Choice (B)

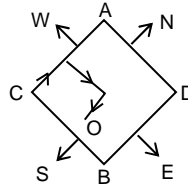
Solutions for questions 38 and 39:

38.



From the above diagram it is clear that Rohan is facing South-east. Choice (B)

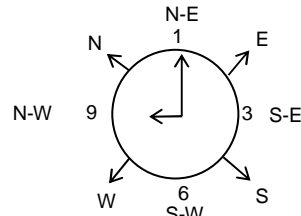
39.



O is the final position of Mr. Vaidya. From the diagram it is clear that Mr. Vaidya is facing South. Choice (B)

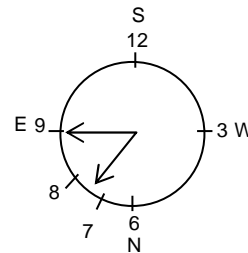
Solutions for question 40 to 50:

40.



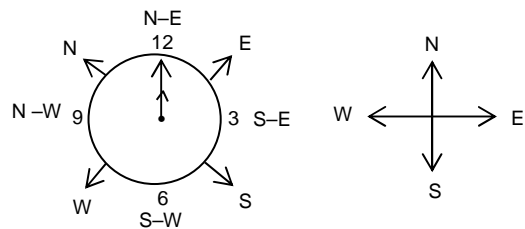
From the above diagram it is clear that, at 3 p.m. the hour hand points towards South-east. Choice (D)

41.



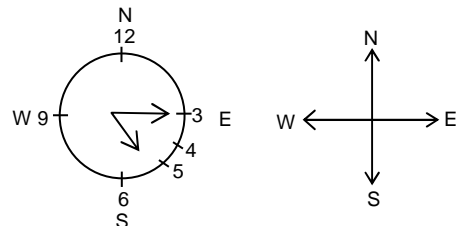
From the diagram, it is clear that at 3 o'clock the hour hand points towards West. Choice (C)

42.



\therefore At 6 pm, the hour hand will be pointing towards South-west. Choice (A)

43.



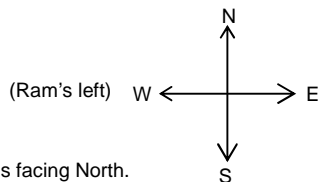
At 6:00, the hour hand will be at 6, which is towards South. Choice (B)

44. Actual Direction Damaged Compass
-
- By comparing the two diagrams it is clear that, the pointer which was showing west is actually directed towards North.
Choice (A)

45. Tree
-
- ∴ To the right of Dileep is east as sun is in the west in the evening.
∴ He is facing North.
Choice (A)

46. Dinesh's shadow is to his left.
∴ He is facing South.
∴ Swetha is facing North.
Choice (B)

47. In the morning, Ram's shadow fell to his left. In the morning shadow casts to the west, which is Ram's left.



- ∴ He is facing North.
∴ Shyam is facing South.
Choice (B)

48. In the morning, the sun will be in the east. Hence, the shadow casts towards west. i.e. Ravi has west to his right.
⇒ Ravi is facing South.
Choice (B)

49. In the evening, the sun will be in the west. Hence, the shadow casts towards east. i.e. Avinash has east to his left.
⇒ Avinash is facing south and Abhinav is facing North.
Choice (A)

50. In the given information it is not given on which side of Prajay is the shadow falling. Hence, the question cannot be answered.
Choice (E)

Chapter – 9 (Blood Relations)

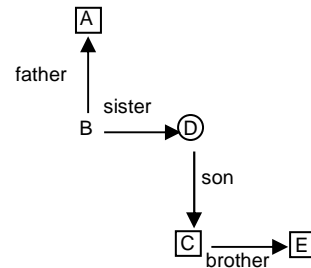
Exercise – 9

Solutions for questions 1 to 20:

Note: For all the diagram \square represent males and \bigcirc represent females.

- My son's sister is my daughter. My daughter's husband is my son-in-law.
Choice (B)
- X's brother's wife's father-in-law is X's brother's father i.e. X's father. X's father's daughter is X's sister.
Choice (C)
- P's mother's mother's son is P's uncle. P's uncle's daughter is P's cousin.
Choice (B)
- My father's mother's only daughter-in-law is my father's wife i.e. my mother. My mother's sister is my aunt.
Choice (A)
- My grandmother's only child is my mother. My Mother's husband is my father. My father's mother is my grandmother.
Choice (B)

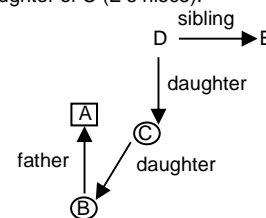
- Ramu's mother-in-law's only daughter is Ramu's wife. Ramu's wife son is Ramu's son.
Choice (C)
- My son's son's mother is my son's wife. My son's wife's daughter is my granddaughter.
Choice (B)
- My father's brother's only sibling is my father. My father's mother is my grandmother.
Choice (E)
- C is the son of D and E is the brother of C means C and E are both son's of D. It is also given that D is the sister of B means E is the nephew of B. But it is not given that B is either male or female. Therefore, B can be either aunt or uncle of E.



Choice (E)

- My mother's sister's son's father is my mother's sister's husband i.e. my mother's brother-in-law. My mother's brother-in-law's mother-in-law is my mother's mother i.e. my grandmother.
Choice (B)
- David's father's only daughter-in-law is David's wife. David's wife's son is David's son. David's son's wife is David's daughter-in-law.
Choice (B)
- Ravi's mother's father's son is Ravi's mother's brother i.e. Ravi's uncle. Ravi's uncle is Ravi's father's brother-in-law.
Choice (C)
- Divya's father's father's only sibling is Divya's father's uncle/aunt. The brother of Divya's father's uncle/aunt is Divya's father's father i.e. Divya's grandfather.
Choice (D)
- He is the father of Rinku's Sister's son means he is Rinku's Sister's husband. He is also Tinku's mother's husband means Tinku's mother is Rinku's sister. Now, Tinku's father is Rinku's brother-in-law. That is Tinku's father is Rinku's mother's son-in-law.
Choice (C)

- A is B's father and B is C's daughter means A is C's husband and B is their daughter. C is D's only daughter and E is D's only sibling means C is E's only niece. B is the daughter of C (E's niece).



Choice (C)

- My father's only brother's wife is my father's sister-in-law. My father's sister-in-law's only daughter is my father's niece. My father's niece's paternal uncle is my father. My father is my mother's husband.
Choice (B)
- My mother's brother's son's mother is my mother's brother's wife i.e. my mother's sister-in-law. My mother's sister-in-law is my maternal aunt's sister-in-law.
Choice (A)

18. Sanjana's brother-in-law is the son of Ramya means Ramya is Sanjana's mother-in-law.
Sanjana's husband is Ramya's son i.e. Sanjana's husband is Ramya's husband's son. Choice (B)
19. My mother's mother's only son-in-law is my father. My father's sister is my aunt. Choice (C)
20. A's mother's son's only sister is B means B is A's sister.
B is the mother of C's daughter means C is B's husband.
C is B's husband and B is A's sister means A is the brother-in-law of C. Choice (B)

Solutions for questions 21 to 25:

21. (D) $P - R + Q$ means P is the sister of R, R is the mother of Q. P is the aunt of Q. Choice (D)
22. (A) $T \times M + S + N$ means T is the father of M and M is the mother of S who is the mother of N. That is S is the daughter of T.
(B) $T \times M + S = N$ means T is the father of M, M is the mother of S and S is the brother of N.
Therefore S is the son of T's daughter. Choice (B)
23. (A) $W \times A - B + Z$ means W is the father of A, A is the sister of B and B is the mother of Z. Therefore W is the grandfather of Z.
(B) $W = A + B - Z$ means W is the brother of A, A is the mother of B and B is the sister of Z. Therefore, W is the uncle of Z. Choice (B)
24. (A) $C \times A \div D - E$ means C is the father of A, A is the son of D and D is the sister of E.
(B) $C + A + D \neq E$ means C is the mother of A. A is the mother of D and D is the daughter of E. Therefore, C is the grand father for D but not E.
(C) $C \div A \neq D = E$ means C is the son of A, A is the daughter of D and D is the brother of E. Here D is the grand father of C.
(D) $C \times A \times D - E$ means C is the father of A, A is the father of D and D is the sister of E. Therefore, C is the grand father of both D and E. Choice (D)
25. (A) $I + B - C \neq D \times L$ means I is the mother of B, B is the sister of C, C is the daughter of D and D is the father of L. Therefore, B, C and L are children of I and D, where I is the mother. Choice (A)

Solutions for questions 26 to 30:

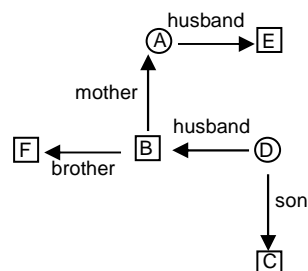
26. $A \Delta B \in C \$ D$ means A is the son of B, B is the mother of C and C is the father of D.
Here A and C are brothers, where C is the father of D.
 \therefore A is the uncle of D. Choice (B)
27. $E @ F \downarrow G \$ H$ means E is the brother of F, F is the wife of G and G is the father of H.
Here, H is the child of F and G and E is the brother of F. Therefore, E is the maternal uncle of H.
But, H can be either niece or nephew of E. Choice (E)
28. $I \$ J \Rightarrow K \Rightarrow L \uparrow M$ means I is the father of J, J is the daughter of K, K is the daughter of L and L is the husband of M.
J is the daughter of I and K and K is the daughter of L and M. Therefore, I is the son-in-law of M. Choice (D)
29. $P \odot Q \Delta R @ S$ means P is the sister of Q, Q is the son of R, R is the brother of S.
Here S is either aunt/uncle of both P and Q.
 $T \downarrow S$ means T is the wife of S i.e. S is the uncle of both P and Q.
P is the niece of S and Q is the nephew of S. Choice (D)

30. $W \Rightarrow \times \Delta Y \in Z$ means W is the daughter of X, X is the son of Y and Y is the mother of Z.
Here, W is the niece of Z but Z can be either aunt or uncle of W. Choice (B)

Solutions for questions 31 to 35:

Given that A is the mother of B and B is the husband of D. Therefore, D is the daughter-in-law of A. Also given that C is the son of D and F is the brother of one of the parents of C. Hence F is the brother of either B or D. But given that D has no siblings, F is the brother of B.

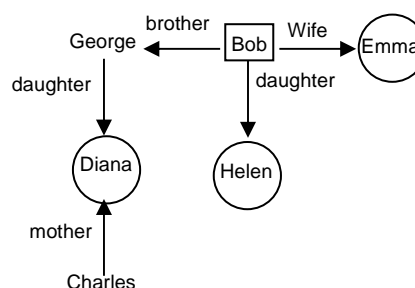
And D is the daughter-in-law of E means E is the husband of A. The given data is represented as follows.



31. C is the grandson of A. Choice (C)
32. F is the brother-in-law of D. Choice (B)
33. E is the father of F. Choice (C)
34. G will be the sister-in-law of B. Choice (B)
35. E, F, B and C are males. Choice (C)

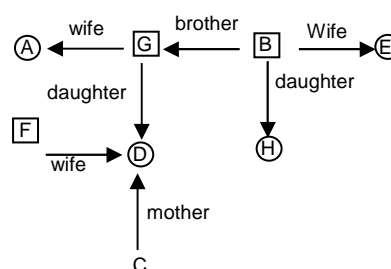
Solutions for questions 36 to 40:

Given that Helen is the daughter of Bob and Bob is the brother of George. Also Diana is the only child of George and is the mother of Charles. Emma is the wife of Bob.



Also given that Amelie is the grandmother of Charles and is the mother-in-law of Floyd.

\therefore Floyd should be the husband of Diana and Amelie should be the wife of George.
(Names are represented by their corresponding first letters)

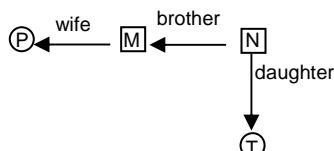


36. George is the uncle of Helen. Choice (A)

37. Helen is the cousin of Diana. Choice (C)
38. Amelie is Diana's mother. Choice (B)
39. Nothing can be said about Floyd's father. Choice (E)
40. Charlie's father is Floyd and George's daughter is Diana. Floyd is the husband of Diana. Choice (C)

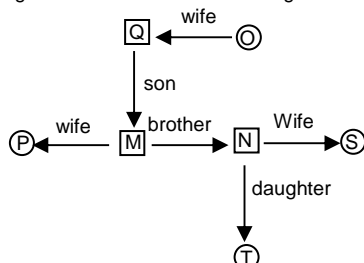
Solutions for questions 41 to 45:

Given M and N are brothers, T is the only niece of M and P is the sister-in-law of N.



(As there are three married couples, it is the only relation possible).

Also given T is the daughter of S, O is the mother-in-law of S and R is the grandson of Q. The relation is given below.

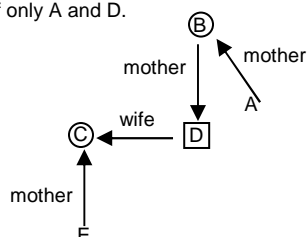


But R can be the son of either M or N.

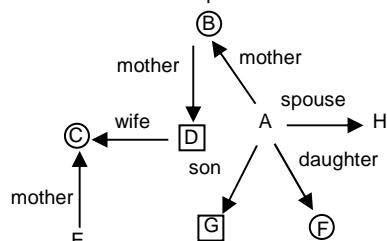
41. R can be either brother or cousin of T. Choice (E)
42. Q is the father-in-law of S. Choice (C)
43. P is the daughter-in-law of O. Choice (C)
44. O is the grandmother of R. Choice (B)
45. O, P, S and T are females and M, N, Q and R are males. Choice (C)

Solutions for questions 46 to 50:

Given, C is the wife of D and E is the only child of C. Also B is the mother of only A and D.



Given G is the son of H and F is the niece of the manager. Therefore H should be the spouse of A. Here B is the widow,



The profession are:

- A – Engineer
H – Doctor
D – Manager
C – Architect
B – Teacher
E – Student
F & G – Not mentioned

46. D is the manager. Choice (B)
47. Father of F can be either A or H. Choice (E)
48. B is the grandmother of G. Choice (C)
49. H is the Doctor. Choice (C)
50. The profession of G cannot be determined from the given data. Choice (E)

Chapter – 10 (Analytical Puzzles)

Exercise – 10(a)

Solution for question 1:

1. There are three speakers after S. So, S is the 2nd speaker. There are three speakers before T. So, T is the 4th speaker. R is neither the 1st nor the 5th. So, R is the 3rd speaker. P speaks after Q, So P is the 5th and Q is the 1st speaker. So, P is the last speaker.

Choice (C)

Solutions for questions 2 and 3:

A is the second tallest person. There is only one person shorter than B. So, B is the fourth tallest person. D is the shortest and second heaviest.

	Weight	Height
1.		
2.	D	A
3.		
4.		B
5.		D

A is shorter than E. So, the third tallest person is C, who is the heaviest person. B is lighter than E and A respectively. So, the final arrangement is as follows.

	Weight	Height
1.	C	E
2.	D	A
3.	E	C
4.	A	B
5.	B	D

2. C is heaviest person. Choice (E)
3. A is the second tallest and the fourth heaviest person. Choice (A)

Solutions for questions 4 to 8:

4. If Sujit entered before Suraj then the number of people will be $15 + 1(\text{Sujit}) + 7 + 1(\text{Suraj}) + 20 = 44$.
If Suraj entered before Sujit then number of people will be $7 + 1(\text{suraj}) + 7 + 1(\text{Sujit}) + 12 = 28$.
So, the number of people in the theater cannot be determined. Choice (E)
5. If Suraj entered before Sujit, then the number of people in the theater will be 28. Choice (A)

6. Between B and E there are two intermediary stations C and D. For traveling from B to C, from C to D and from D to E it takes $3 \times 25 = 75$ minutes. At each of C and B it halts of 5 minutes. Hence, the time taken to reach E after starting at B is 85 minutes. i.e., one hour 25 minutes. Hence, it started at 7:30 at B.
 \Rightarrow It reached B at 7:25. Choice (A)
7. The bus b_1 , which started at P, reached S at 10:40, passing through the intermediary cities Q and R. The time taken to travel from P to S
 $= 3 \times 40 + 2 \times 15 = 150$ minutes
 (journey (stoppage) time)
 $= 2$ hrs 30 minutes.
 Hence, b_1 started at $10:40 - 2:30 = 8:10$ at P.
 b_2 reached Q, starting at U, through the city T, S and R. The time taken by it to reach S $= 4 \times 40 + 3 \times 15 = 205$ minutes
 $= 3$ hr 25 minutes.
 Hence, b_2 started at, $10:35 - 3:25 = 7:10$, at U. Choice (C)
8. b_1 reached S at 10:40, passing through Q and R.
 b_4 reached Q at 10:35, passing through T, S and R. Hence, there is possibility of meeting at R.
 b_1 reaches R at, $(2 \times 40 + 15) + 8:10 = 9:45$
 b_2 reaches R at, $(3 \times 40 + 2 \times 15) + 7:10 = 9:40$
 As they stop for 15 minutes at R, they meet at 9:45 at R. Choice (B)

Solutions for questions 9 and 10:

As Bus number and the order of arrival or departure is not the same. B – 1 has to depart and arrive at 2nd or 3rd positions. Similarly, B – 2 at 1st or 3rd positions and B – 3 at 1st or 2nd positions.

The first bus to leave Mumbai is the third to reach Delhi. So it has to be B – 2. The order of departure and arrival will be as follow.

	Mumbai (departure)	Delhi (arrival)
1.	B2	B3
2.	B3	B1
3.	B1	B2

9. B – 2 is first to leave Mumbai. Choice (B)
10. B – 1 is the second to reach Delhi. Choice (A)

Solutions for questions 11 and 12:

11. From (ii), A_2 , A_3 and A_5 can be scheduled in any of the following sets of positions. 1 – 2 – 3 or 2 – 3 – 4 or 3 – 4 – 5 or 4 – 5 – 6.
 But from (iii), A_3 cannot be in second or the fifth positions. Hence, 2 – 3 – 4 or 3 – 4 – 5 are the possible positions for A_2 , A_3 and A_5 .
 From (i) A_4 should not be the first or the last and A_6 is to leave before A_1 . Hence, the possible order is as follows.
- | | | | |
|---|-------|---|-------|
| 1 | A_6 | 1 | A_6 |
| 2 | A_2 | 2 | A_4 |
| 3 | A_3 | 3 | A_2 |
| 4 | A_5 | 4 | A_3 |
| 5 | A_4 | 5 | A_5 |
| 6 | A_1 | 6 | A_1 |
- Hence, the position of A_4 cannot be determined. Choice (E)
12. If A_1 is to leave immediately after A_5 , then the order will be A_6 , A_4 , A_2 , A_3 , A_5 , and A_1 . Then A_3 will leave in the 4th position. Choice (B)

Solutions for questions 13 and 14:

It is given that German scientist's presentation is the only presentation between the presentations of the Russian and the Indian scientists. The order could be
 Indian / Russian
 German

Russian / Indian

There are three presentations between the presentations of the French and the Japanese scientists. These three must be that of the Indian, the German and the Russian scientists.

\Rightarrow The American scientists is either the first one or the last one. Hence, the following arrangements are possible

1	American	1	French/Japanese
2	French/Japanese	2	Indian/Russian
3	Indian/Russian	3	German
4	German	4	Russian/Indian
5	Russian/Indian	5	Japanese/French
6	Japanese/French	6	American

13. The number of presentations after German scientist's presentation could be 2 or 3. Choice (D)
14. The Russian scientist's presentation is before the American scientist's presentation.
 \Rightarrow American – 6th.
 The Japanese scientist's presentation is immediately after the Indian scientist's presentation.
 \Rightarrow Japanese – 5th, Indian – 4th, Russian – 2nd. Choice (A)

Solutions for questions 15 to 17:

As number of parcels which are loaded and unloaded at different stations are different. The number of parcels loaded or unloaded at a station should be 1 or 2 or 3 or 4.

According to the given conditions the loading and unloading at different station is as follows.

Stations	Loaded parcels	Unloaded parcels
A	101, 104, 105, 107	
B	108	105
C		102, 106, 101
D	103	
E		108

Two of 101, 104, 105, 107 are unloaded at D. They are 104 and 107. As 102 and 106 are unloaded at C. They must have been loaded at B.

So, 109 and 110 should have been loaded at C.

As one parcel is unloaded at B, three are unloaded at C, two at D, four must have been unloaded at E.

So, they are 108, 103, 109 and 110.

The final order of loading and unloading is as follows.

Stations	Loaded parcels	Unloaded parcels
A	101, 104, 105, 107	_____
B	108, 102, 106	105
C	109, 110	102, 106, 101
D	103	104, 107
E	_____	103, 108, 109, 110

15. 2 parcels are loaded at C. Choice (B)
16. 104 and 107 travel through the maximum number of intermediary stations. Choice (D)
17. C – (loading) 109, 110 – (unloading) 101, 102, 106 is true. Choice (C)

Solutions for questions 18 to 20:

From the conditions (i) and (iii), the 1st car to reach R cannot be C₁ or C₂ or C₄. So, it has to be C₃. So, C₃ is the second to start at P, the fourth to reach Q and the first to reach R. The first car to leave P cannot be C₁ or C₂ or C₃. So, it has to be C₄. So, C₄ is the second to reach R and the third to reach Q.

⇒ C₂ is the first to reach Q and C₁ is the second. Thus we get the following arrangement.

	P	Q	R
1	C ₄	C ₂	C ₃
2	C ₃	C ₁	C ₄
3	C ₂ /C ₁	C ₄	C ₁ /C ₂
4	C ₁ /C ₂	C ₃	C ₂ /C ₁

18. C₄ is the first car to leave P. Choice (A)

19. C₁ is the second car to reach Q. Choice (A)

20. The third car to reach R could be C₁ or C₂. Choice (E)

Solutions for questions 21 to 25:

In the following explanation, Fi → Fiat, Ma → Maruti, Ta → Tata, To → Toyota, Me → Mercedes, Fo → Ford and Hy → Hyundai.

From conditions (ii) and (iii), we get the following arrangement.

To — — —

Fi Ma — —

As BMW and Hyundai are parked opposite to each other and at one end (from condition r) and Tata is between BMW and Mercedes (from conditions i) and, we get the following final arrangement.

Fi Me Ta BMW

To Ma Fo Hy

21. BMW and Fiat are parked diagonally opposite to each other. Choice (C)

22. Mercedes is parked opposite to Maruthi. Choice (A)

23. When the positions of Tata and Ford swapped, then Tata is to the immediate left of Hyundai. Choice (E)

24. If the positions of BMW and Fiat are interchanged, then BMW is parked opposite to Toyota. Choice (C)

25. Maruthi is parked opposite to Mercedes. Choice (A)

Solutions for questions 26 and 27:

26. Ben's movie is being screened opposite to Aamir's movie and Ben's and Arnold's movies are not being screened on the screens which are end of the arrangement. Ben's movie is to the immediate left of Jackie's movie.

Ja Ben Ar Tom

Sal Aa Shah Ak

Salman's movie is being screened opposite to Jackie's and Shah Rukh's movie is being screened opposite to Arnold's. Therefore, Akshay's movie is being screened opposite to Tom's movie.

Alternative Solution:

The question is, which movie is being screened opposite to Tom's movie. It is given that Ben's movie is being screened opposite to Aamir's movie, Jackie's movie is being screened opposite to Salman's movie and Shah Rukh's movie is being screened opposite to Arnold's movie. Hence, Akshay's movie is being screened opposite to Tom's movie. Choice (A)

27. Y is to the right of U and exactly in front of V. Therefore,
U Y V

Z is behind W and W and X are at extreme ends. So, W has to be to the right of Y. The final arrangement is as follows.

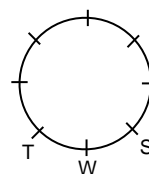
U Y W
X V Z

Therefore, Z and U are at extreme ends is true.

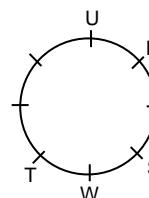
Choice (B)

Solutions for question 28 to 32:

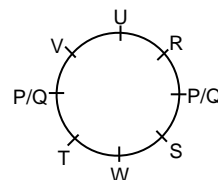
S is to the immediate right of W and W is to the immediate right of T. So, we get the following arrangement.



R and U are opposite to T and W respectively.



V is not sitting next to either R or T and there is no information about P and Q. Hence, we get the following arrangement.



28. V is to the right of U. Choice (B)

29. Either P or Q is two places to the right of W. Choice (E)

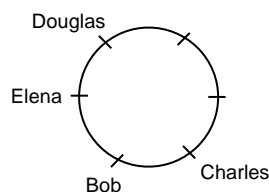
30. V is opposite to T, if R and V interchange their places. Choice (D)

31. If V is to the immediate left of P, then Q is to the immediate left of R. Choice (C)

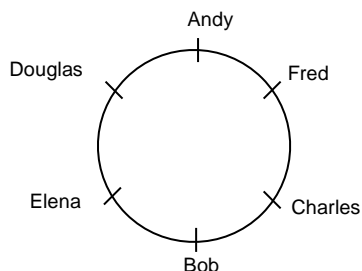
32. V is sitting opposite to S. Choice (A)

Solutions for questions 33 to 37:

As Bob is sitting between Charles and Elena and Douglas is sitting to the left of Elena. We get following arrangement.



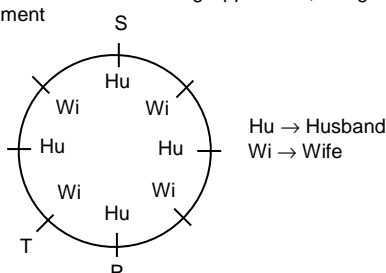
Andy is opposite Bob. Therefore, the final arrangement is as follows.



33. Charles is sitting opposite Douglas. Choice (C)
34. Elena is sitting to the left of Bob. Choice (B)
35. Elena sits to the right of Fred if Elena interchange her place with the person sitting opposite to Bob. Choice (D)
36. Fred will be sitting right of Charles, if each person interchange his/her place with the person sitting opposite them. Choice (D)
37. Douglas and Charles are sitting opposite each other is true. Choice (C)

Solutions for questions 38 to 42:

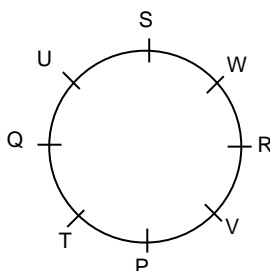
As T sits to the left of P who is sitting opposite S, we get the following arrangement



From the above it is clear that P is T's husband.

⇒ S is W's husband.

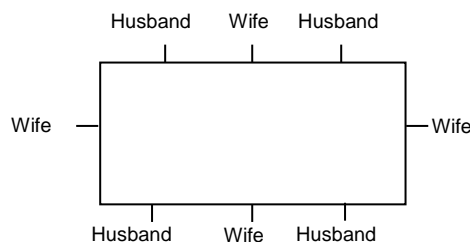
V does not sit next to S. So V has to sit to the right of P. So Q and U will be sitting between S and T. Therefore, the final arrangement is as follows.



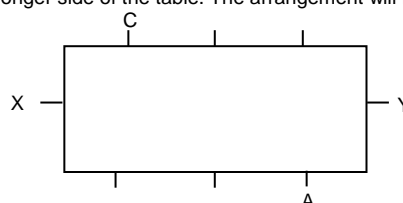
38. Q sits between U and T. Choice (B)
39. S is sitting to the right of W. Choice (A)
40. If P interchanges his place with the person who is sitting opposite to R, then P sits to the right of U. Choice (C)
41. After effecting the changes, T sits between S and R. Choice (A)
42. T sits between P and Q. Choice (E)

Solutions for questions 43 to 47:

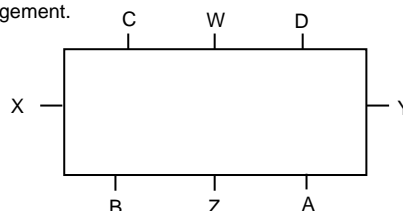
As no two husbands sit adjacent to each other and they sit at the longer side, we get the following arrangement.



X is sitting to the right of C and Y is sitting to the right of A. X and Y are not sitting at the longer sides as W and Z are sitting at the longer side of the table. The arrangement will be,



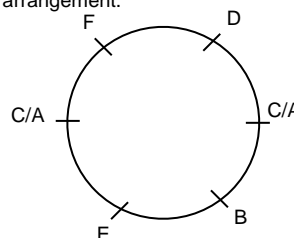
W and Z are sitting at the longer sides but not adjacent to their husbands. i.e. Z is adjacent to A and W is adjacent to C. Since, neither of Z and W is adjacent to her husband. Hence, D is adjacent to W and B is adjacent to Z. Thus we get the following arrangement.



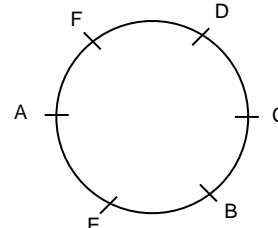
43. X and Y are sitting at the shorter sides of table. Choice (E)
44. D is sitting to the immediate right of Y. Choice (D)
45. D is sitting two places to the right of A. Choice (C)
46. When the places are interchanged as given, A will be sitting to the left of C. Choice (A)
47. A is sitting diagonally opposite to C and B is sitting diagonally opposite to D. Choice (D)

Solutions for questions 48 to 50:

48. B is sitting to the immediate right of E, F is sitting opposite to B and D is sitting opposite to E. Therefore, we get the following arrangement.

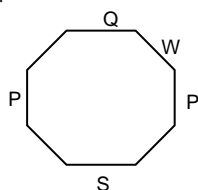


C is not sitting next to F. Therefore, the final arrangement is as follows.

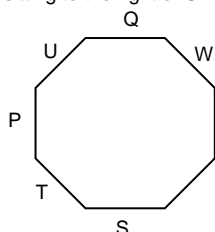


C is sitting to the immediate left of D. Choice (C)

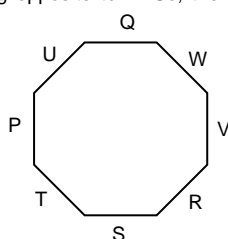
49. S is sitting opposite Q and Q is sitting the right of W.



T is sitting adjacent to S and P. So, T is in between S and P. P is the sitting to the right of U

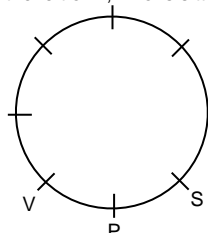


V is sitting opposite to P. So, the final arrangement is as follows.

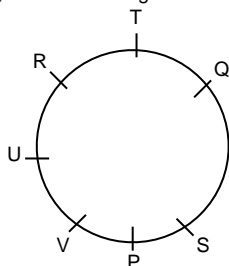


So, R is sitting between V and S is true. Choice (C)

50. V is sitting to the left of P, who is sitting to the left of S.



V is sitting to the right of U. R is sitting between T and V. Therefore, The final arrangement as follows.



T is sitting to the right of Q. Choice (B)

Exercise – 10(b)

Solutions for questions 1 to 5:

From (ii) and (iv), we can say that Veeresh is second from the extreme right and Rajesh is second from the extreme left.

_____ Rajesh _____ _____ Veeresh _____

From (iii) and (v), we can say that, Dinesh, Mahesh and Naresh are to the right of Rajesh

From (i), Ganesh cannot be at the extreme left.

∴ Suresh is at the extreme left.

From (i) and (v) Dinesh must be the third from the extreme right.

∴ Ganesh is the third from the extreme left. (from (i))

From (v), Naresh is at the extreme right.

From (iv), Mahesh is at the middle of the row.

So, the final arrangement is as follows:

Suresh Rajesh Ganesh Mahesh Dinesh Veeresh
Naresh

- Ganesh is third from the left. Choice (B)
- There are two persons between Ganesh and Veeresh. Choice (C)
- Naresh is at the extreme right. Choice (B)
- Suresh is at the extreme left. Choice (E)
- Mahesh is at the middle of the row. Choice (D)

Solutions for questions 6 to 10:

From (i), (iii) and (iv), none of Niranjana, Veeru and Mahendar is from Kolkata.

∴ Sridhar is from Kolkata.

From (ii) (iii) and (v) Sridhar has Reynault.

From (i), Niranjana has McLaren.

Hence Mahendar has Williams.

From (v) Veeru is from Hyderabad and hence Niranjana is from Bangalore.

- Niranjana is from Bangalore. Choice (B)
- Niranjana, who is from Bangalore has McLaren. Choice (A)
- Mahendar has Williams. Choice (C)
- Only choice (C) is true. Choice (C)
- Veeru is from Hyderabad. Choice (B)

Solutions for questions 11 to 15:

From (ii), if a boy got n^{th} rank in one of the two categories (weight and height), then he did not get the $(6 - n)^{\text{th}}$ rank in the other category.

From (iv), Chakri got the fourth rank in weight.

Hence, we can now say that Chakri got neither the second rank nor the fourth rank in height.

From (iii), Eshwar and Anuj got the first and fifth ranks respectively in height.

Hence, Chakri got the third rank in height.

As Chakri is shorter than David, David must have got the second rank in height.

Hence Bharath got the fourth rank in height.

As Anuj is the shortest, he cannot be the lightest.

As Eshwar is heavier than Anuj and Eshwar cannot be the heaviest, Eshwar will be the second heaviest and Anuj is the third lightest.

Hence, the final arrangement is as follows.

Rank Category	1	2	3	4	5
Height	E	D	C	B	A
Weight	B/D	E	A	C	D/B

In the above table, $A \Rightarrow$ Anuj, $B \Rightarrow$ Bharath, $C \Rightarrow$ Chakri, $D \Rightarrow$ David and $E \Rightarrow$ Eshwar

- Bharath's rank in weight is either 1 or 5. Choice (E)
- Anuj is the third heaviest. Choice (D)
- Eshwar and either Bharath or David are heavier than Anuj. Choice (D)

14. The sum of the ranks of Chakri is $3 + 4 = 7$. Choice (C)

15. Bharath is the fourth tallest boy. Choice (A)

Solutions for questions 16 to 20:

Let the costs of red, blue, green, yellow and black be denoted by c (red), c (blue), c (green), c (yellow) and c (black) respectively.

From (i), c (green) $>$ c (yellow) $>$ c (pink)

From (v), the cost of red coloured dress is between the costs of yellow and pink coloured dresses.

From (iv) and above results, we can say that

c (green) $>$ c (yellow) $>$ c (red) $>$ c (pink) $>$ c (blue)

From (iv), we can say that Indu is wearing green coloured dress.

From (iii), Gouri is wearing blue coloured dress.

From (ii), Fathima, Jaya and Harshitha are wearing yellow, red and pink coloured dresses respectively.

16. Harshitha is wearing pink coloured dress. Choice (C)

17. Green coloured dress is the costliest. Choice (A)

18. Harshitha is wearing the second cheapest dress. Choice (C)

19. Jaya is wearing red coloured dress. Choice (B)

20. The cost of Jaya's dress is greater than the costs of pink and blue coloured dresses. Choice (E)

Solutions for questions 21 to 25:

From (iii), the speech on Ethics is not the last.

From (iv) and (v), the fourth speech is on Psychology and the second and fifth speeches are to be given on Ethics and Politics respectively. [Ethics cannot be the last].

From (i), if the first speech is on Humanity, then Dhanu must give the third speech, but this sequence gives no place for Bhanu to speak on Philosophy. Hence the speech on Humanity is the third speech and Dhanu should give the last speech. Bhanu's speech on Philosophy is the first speech to be given.

From (ii) and (iii), Chandu and Ehsaan should give the second and third speech respectively and hence Asha is the fourth speaker.

Finally, the sequence will be

<u>Bhanu</u>	<u>Chandu</u>	<u>Ehsaan</u>	<u>Asha</u>	<u>Dhanu</u>
Philosophy	Ethics	Humanity	Psychology	Politics

21. Ehsaan should give the third speech. Choice (D)

22. Asha must give the speech on Psychology. Choice (A)

23. The last speech is on Politics. Choice (D)

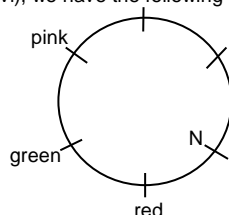
24. Chandu's speech is on Ethics. Choice (A)

25. Speech on Psychology is just after the speech by Ehsaan. Choice (D)

Solutions for questions 26 to 30:

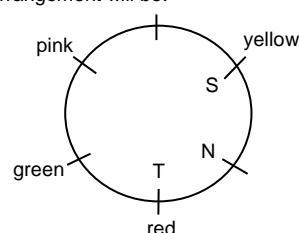
Let each person be denoted by the first letter of his name.

From (ii) and (vi), we have the following arrangement.



From (iii) and above results, we can say that, Sunny is to the immediate right of Nicky.

From (v) and above results, Tinku is to the immediate left of Nicky. The arrangement will be:



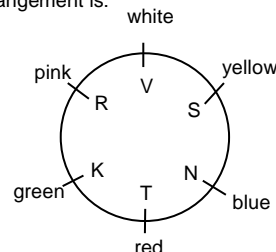
As Sunny is wearing yellow and Tinku is wearing red, from (iv), we can say that only Nicky can wear blue.

Nicky is wearing blue coloured shirt and Rinku is wearing pink coloured shirt.

From (i), as Rinku is to the immediate right of Vicky, Kanna must be to the immediate right of Rinku.

Hence Vicky must wear white coloured shirt.

The final arrangement is:



26. Kanna is wearing green coloured shirt. Choice (E)

27. Rinku is to the immediate right of the person wearing white coloured shirt. Choice (A)

28. Sunny is opposite Kanna. Choice (B)

29. Nicky is opposite the person wearing pink coloured shirt. Choice (D)

30. Kanna is wearing green coloured shirt. Choice (C)

Solutions for questions 31 to 35:

Let each girl be denoted by the first letter of her name.

From (i) at most one of K and S can be selected.

From (iii) and (iv) at least two of N, S, C and V can not be selected.

From (ii), Bhavya can be selected only if Divya is selected.

If Divya is not selected then Bhavya cannot be selected, if so, the team of four is not possible.

Hence, Divya must be selected.

From (v), if S is selected, then K and N can not be selected. (from (i) and (iii)).

The possible teams are:

(1) D, S, B, C

(2) D, S, B, V

If S is not selected, the B must be selected and the possible teams are:

(3) D, B, K, N

(4) D, B, K, C

(5) D, B, K, V

(6) D, B, N, C

(7) D, B, N, V

31. B and D must always be selected. Choice (A)

32. If Vidya is selected, there are only three possible teams (2), (5) and (7). Choice (D)

33. If Kavya is not selected, then the possible teams are (A), (2), (6) and (7). Only choice (D) is not possible. Choice (D)

34. If S is not selected, then the team can be selected in Five ways. Choice (D)

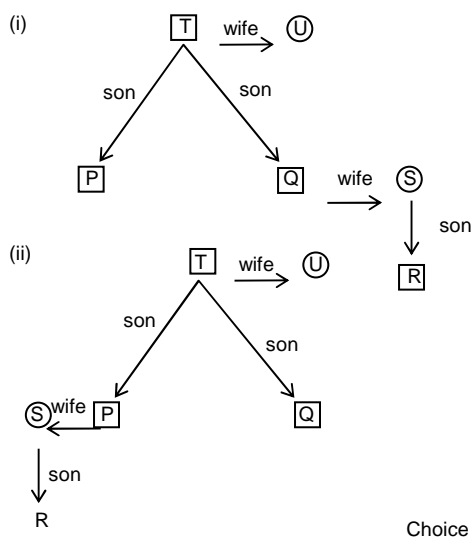
35. If S and V are selected then B and D should be the other two.
Choice (A)

Solutions for questions 36 to 39:

36. Some boys are students and vice versa.
Some boys are vegetarians and vice versa.
Some students are vegetarians and vice versa.
Some boys who are students are vegetarians.
Only choice (A) satisfies this. Choice (A)
37. All widowers are husbands and all husbands are men.
Choice (D) satisfies this. Choice (D)
38. Every multiple of 18 is the multiple of 2 and 3. Some multiples of 2 and 3 are not multiples of 18. Choice (B)
39. Bangles and bracelets may be made of gold or some other metal. All the gold ornaments are not only bangles or bracelets. Choice (C)

Solutions for questions 40 to 50:

40. The sum of the place values of A, B, L and E is $1 + 2 + 12 + 5$ i.e., 20.
The place values of D, I and S are doubled to get H, R and L respectively.
Similarly ENABLE is written as JB 20. Choice (C)
41. If two different persons have at least two children each, then we cannot have two couples and three generations unless the two persons are husband and wife. Hence P and Q are the children of T.
Now R is the son of S and U is the mother-in-law of S.
As there are two couples, the following relationships are the only possibilities:



42. A, D, A, P, U, J
 $1^3, 2^2, 3^3, 4^2, 5^3, 6^2$
The next letter in the series is J. Choice (E)

43. The coding for different letters will be as follows:

A	B	C	D	E	F	G	H	I	J	K	L	M
a	B	1	d	E	2	g	H	3	j	K	4	m

N	O	P	Q	R	S	T	U	V	W	X	Y	Z
N	5	p	Q	6	s	T	7	v	W	8	y	Z

WINTER is written as W3NTE6.

Choice (A)

44. The amount he earns on the first day is equal to that spent on the third day and so on.
The amounts earned on 9th and 10th days = $2^8 + 2^9$
The amount spent on 1st and 2nd days = $0 + \frac{1}{2}$
 \therefore Amount left = $2^8 + 2^9 - \frac{1}{2} = 767.50$ Choice (E)

45. The number of multiples of 4 from 1 to 50 are 12 (i.e. $12 \times 4 = 48$).
The number of factors (but not multiples) of 4 are 2 (i.e. 1 and 2).

The numbers whose sum of digits is 4 are 13, 22 and 31 i.e. 3 numbers (04 and 40 are already counted).
The remaining numbers which have 4 as one of the digits are 14, 34, 41, 42, 43, 45, 46, 47 and 49 i.e. 9 numbers.
Required number of numbers = $12 + 2 + 3 + 9 = 26$.

Choice (C)

46. Let the number of oranges left be x.
 \Rightarrow Number of mangoes left is 3x.
Let the number of fruits sold be y.
 $4x + y = 15 + 25 + 21 + 18 + 30 + 10 = 119$

$$x = \frac{119 - y}{4}$$

Only when $y = 15$, x is an integer and for all other values (i.e., 25, 21, 18, 30 and 10), x is not an integer.

\therefore Basket A is sold.

Choice (D)

47. Let the number of persons be n. The number of chocolates left = 1
Before the nth person came, the chocolates left = $1 \times 2 + 1 = 3$
before the (n - 1)th person : $1 \times 3 \times 2 + 1 = 7$
(n - 2) : $7 \times 2 + 1 = 15$
(n - 3) : $15 \times 2 + 1 = 31$
(n - 4) : $31 \times 2 + 1 = 63$
(n - 5) : $63 \times 2 + 1 = 127$ which is more than 100.
(n - 4)th person is the first person.
 $\Rightarrow n = 5$. Choice (B)

48. Here $E + E = 8$ or $18 \Rightarrow E = 4$ or 9

Case (i)

When $E = 4$, $V + R = 7$ or 17

But $A + A$ must be even

As $A + A = 5$ or 15 , there must be a carry from previous column.

$V + R$ must be 17 (9 and 8 in any order).

Now $A = 2$ or 7

If $A = 2$, $E + H = 6$ or 16

But as $F = 4$, $E + H = 6 \Rightarrow H = 2$

$\Rightarrow A = H$ (contradiction)

If $A = 7$, $E + H = 5$ or 15

As $E = 4$, $E + H = 5 \Rightarrow H = 1$

Now $L + S = 11$

As A, V and R are 7, 8 and 9 (in any order) L and S must be 6 and 5 (in any order)

Case (ii)

When $E = 9$, $V + R = 6$ or 16

Now $A + A$ must be even.

Hence $V + R$ must be 16.

\Rightarrow One among V and R must be 9

But $E = 9$ (contradiction)

$\therefore H = 1$, $E = 4$, $L = 5$ or 6

$S = 5$ or 6 , $A = 7$, $V = 8$ or 9

$R = 8$ or 9

$\therefore 116578$ is represented by one of the following:

(I) H H S L A R

(II) H H L S A R

(III) H H S L A V

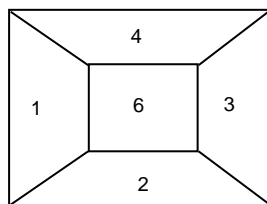
(IV) H H L S A V

Choice (C)

49. The first player strikes off the second column as it has the least values. Now the second player must strike off the first row as it has the highest values. Now if the first player strikes off the third row, the second player strikes off the fourth column. Now the first player strikes off the fourth row and the second player strikes off the third column to leave 6 as the score.
Even if the first player strikes off a row or column other than the third row (in his second turn), the maximum score that he could get is 6.

Choice (D)

50. The cube formed can be represented as follows:



Digit 5 is opposite to 6.

Except the view in choice (C), all others are possible.

Choice (C)

Exercise – 10(c)

Solutions for questions 1 to 5:

Let each person is denoted by the first letter of their respective names.

From (ii) and (iv), we have two cases:

- (I) S _ _ _ R I
(II) R I _ _ _ S

From (iii), if Uday is nth person from the extreme right, then Varun will be nth person from the extreme left.

Consider case (I):

From (i), we get

S N/P M P/N R I

From (v) and above results,

U S P M N R I

From (iv), Varun must sit at the extreme right.

∴ The final arrangement will be:

U S P M N R I V

Consider case (II):

R I _ _ _ S 7
1 2 3 4 5 6

From (i), P/N M N/P

From (v) as U is two places away from P

P has one of U and N two places away to his right and then other two places away to his left.

P can be at none of the positions [as marked above] 3, 4 and 5. Hence P can be at position 6.

The arrangement will be

R I V N M P S U
1 2 3 4 5 6 7 8

But it is violating condition (iii). Hence, Only case (I) is possible i.e.,

U S P M N R I V

- Prakash is the third from the left. Choice (C)
- Ravi is to the immediate right of Naveen. Choice (A)
- If Sunil and Tarun interchange their positions, then Varun will be to the immediate right of Sunil. Choice (D)
- Only Naveen and Ravi are sitting between Madhu and Tarun. Choice (D)
- Varun is at the extreme right. Choice (E)

Solutions for questions 6 to 10:

From (i), we get that, If we arrange the mothers and their children in the ascending order of their ages, then the rank will

be same for the mother and her respective child.

From (v), Asha and Eshwari are the eldest and youngest women in any order.

From (ii), Asha cannot be the youngest, therefore, she is the eldest and Eshwari is the youngest.

From (iv), Teena is the third youngest girl.

From (vi), Bindu's daughter is older than Rani as well as Pavani.

As, Bindu cannot be the third eldest, Bindu is the second eldest woman and Pavani and Rani are the fourth oldest and the youngest girls in any order.

From (ii), Rani is not the youngest.

∴ Rani is the fourth oldest and Pavani is the youngest.

From (iii), Teena is not the daughter of Devi, therefore, she must be the daughter of Chitra and Rani must be the daughter of Devi.

From (iii), Sita's mother is older than Bindu

∴ Sita is the daughter of Asha and Kalyani is the daughter of Bindu.

Mothers and their respective daughters are arranged in the ascending order of their ages in the following table.

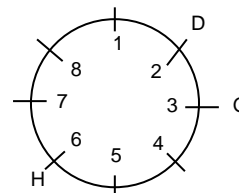
Order of age from eldest to youngest	Mother	Daughter
1	Asha	Sita
2	Bindu	Kalyani
3	Chitra	Teena
4	Devi	Rani
5	Eshwari	Pavani

- Devi is the mother of Rani. Choice (B)
- Sita is the oldest among the children. Choice (C)
- Teena is the daughter of Chitra. Choice (D)
- Three women are elder to Devi. Choice (A)
- Pavani is the daughter of Eshwari. Choice (D)

Solutions for questions 11 to 15:

Let each person be denoted by the first letter of his name.

From (i), we get the following arrangement:



From (iii), as Ankur and Charan are sitting opposite each other, one of them must sit at one of the two positions (4, 5) between Girish and Harish.

From (ii) as Brijesh and Enrique are adjacent to each other, they can not sit at the two position (4, 5) between Girish and Harish. Brijesh and Enrique sit in the adjacent position among 1, 8, 7.

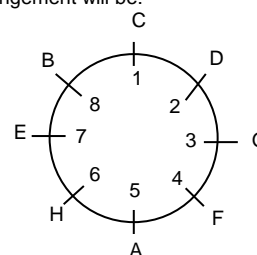
So, Neither Ankur nor Charan can sit at position 8.

∴ Farhaan sits at position 4.

As Charan does not sit adjacent to Farhaan, Ankur sits at position 5 and Charan sits at position 1.

∴ Brijesh and Enrique sit at positions 8 and 7 respectively.

∴ The final arrangement will be:



- Even if Charan and Enrique interchange their positions, they are adjacent to Brijesh. Choice (E)

12. Harish is to the immediate left of Ankur. Choice (B)
13. Brijesh is opposite Farhaan. Choice (A)
14. Charan is to the immediate left of Brijesh. Choice (C)
15. One person is sitting to the left of Farhaan before Harish. Choice (A)

Solutions for questions 16 to 20:

Let each boy be denoted by the first letter of his name.

From (iv), S is in TEAM II.

From (iii), P and R are in the same team.

Case (1):

If P and R are in TEAM II, then exactly one of H, M, V, K and N must be in TEAM II.

From (ii), either N or M must be in TEAM II and the remaining four in TEAM I.

But from (iv), H and M cannot be in the same team.

M must be in TEAM II.

The selection is as follows:

TEAM I	TEAM II
(1) H, V, K, N	S, P, R, M

Case (2):

If P and R in TEAM I, then exactly two of H, M, V, K and N must be in TEAM I.

From (ii), exactly one of M and N must be in TEAM II.

From (i) at least one of H and K must be in TEAM I.

From (v), H and M cannot be in the same team.

We have two possibilities:

TEAM I	TEAM II
(2) P, R, M, K	S, N, V, H
(3) P, R, N, H	S, M, V, K

16. In any of the three possibilities Hafeez and Naresh are in the same team. Choice (D)
17. If Naresh is in team II, possibility (2) prevails. Choice (D)
18. If Manohar is in TEAM II, there are two possibilities [(1) and (3)]. Choice (E)
19. If Naresh is selected in TEAM I, then Manohar and Santosh must be in TEAM II. Choice (D)
20. If Venkat is in TEAM II, [possibilities (2) and (3)], then Pavan and Raju must be in TEAM I. Choice (E)

Solutions for questions 21 to 25:

From (i), (ii) and (iii), as Anil lives in Delhi, he does not work in S - soft.

Also, he does not work in Q - soft and T - soft.

From (v), Bhanu works in P - soft.

∴ Anil works in R - soft.

From (iv) and (v), none of David, Bhanu and Eswar lives in Chennai.

∴ Charan lives in Chennai.

From (iii) and (iv), as Bhanu works in P - soft, he does not live in Bangalore.

∴ David lives in Bangalore and works in S - soft.

Eswar works in Q - soft and Bhanu lives in Mumbai.

The distribution table is as follows.

Anil	-	Delhi	-	R-soft
Charan	-	Chennai	-	T-soft
David	-	Bangalore	-	S-soft
Bhanu	-	Mumbai	-	P-soft
Eswar	-	Hyderabad	-	Q-soft

21. Bhanu lives in Mumbai. Choice (A)
22. David works in S - soft. Choice (C)

23. The person who works in T - soft lives in Chennai. Choice (B)
24. The person who works in P - soft lives in Mumbai. Choice (C)
25. The person who lives in Hyderabad works in Q - soft. Choice (A)

Solutions for questions 26 to 30:

Let the marks scored by Chandu, Durgesh, Harish, Keerthish, Manohar, Naresh and Rakesh be represented by C, D, H, K, M, N and R respectively.

From (i), all scored distinct marks.

From (ii), $C > K > D$

From (iii), $H > M, N > R$

From (iv), Keerthish scored the fourth highest marks.

From (v), $M > C$

From (iii), R is not the least marks scored.

∴ D is the least.

From (ii), (iii) and (v), $H > M > C > K > D$

As K is the fourth highest score and D the lowest score and as $N > R$, N and R must be the fifth and sixth highest scores respectively.

$H > M > C > K > N > R > D$

26. Manohar scored the second highest marks. Choice (B)
27. Rakesh scored the second lowest marks. Choice (B)
28. Only Harish and Manohar scored more marks than Chandu. Choice (E)
29. Only Ravi scored in between the scores of Naresh and Durgesh. Choice (D)
30. Only choice (D) is true. Choice (D)

Solutions for questions 31 to 35:

Let each person be denoted by the first letter of their respective name.

From (ii), we have two possibilities for D.

Suppose D performs on Thursday.

We have

Mon Tue Wed Thu Fri Sat Sun
D

From (vi), we can say that B cannot perform on Wednesday and also on the first day i.e., Monday since, B can perform after E gave his performance.

From (iii), neither A nor B can perform on Sunday and only one person performs between them.

There is only one possibility,

A performs on Wednesday and B performs on Friday

Also from (vi), E has to perform either on Monday or on Tuesday.

From (iv), G and C has to perform on Saturday and Sunday respectively. Hence, F performs on either Monday or Tuesday, which violates condition (v). Hence this case is not possible.

So, D performs on Tuesday.

Mon Tue Wed Thu Fri Sat Sun
D

From (vi) and the above result, B cannot perform on Monday.

From (iv), neither C nor G can perform on Monday.

From (v), F cannot perform on Monday.

Also from (iii) and (vi), A cannot perform on Monday.

∴ E must perform on Monday.

From (iii), as exactly one person performs between A and B, it must be F.

From (iv) and (iii), C and G perform on consecutive days, and as neither A nor B can perform on Sunday, G and C has to perform on Saturday and Sunday respectively.

The final arrangement will be:

Mon Tue Wed Thu Fri Sat Sun
E D A F B G C

31. Girish has to perform on Saturday. Choice (D)
32. Eshwar performs first. Choice (A)
33. Firoz has to perform just after Ajit. Choice (D)
34. Only Ajit and Firoz performed between Danuj and Bhadri. Choice (C)
35. Girish performed second after Firoz. Choice (B)

Solutions for questions 36 to 40:

Let each be denoted by the first letter of her name and the place by the first three letters.

From (i), (iii) (iv) and (v), we have

S Kho A Cal C Ban H Ahm

From (iii) and above results, Vanaja must be from Lucknow. If Vanaja sit at the extreme left of the row, then it violates condition (ii).
∴ Vanaja must sit to the immediate right of Himaja.

The girl from Indore sits at the extreme right of the row. From (ii), Archana must sit second from the extreme left. From (i), Shilpa cannot sit at the extreme right, therefore, she must sit at the extreme left and Prashanthi must sit at the extreme right.

The final arrangement will be:

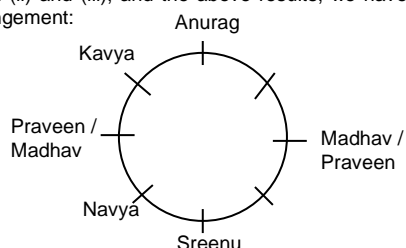
S Kho A Cal C Ban H Ahm V Luc P Ind

36. Prashanti is from Indore. Choice (C)
37. Shilpa is sitting to the immediate left of the person from Calcutta. Choice (B)
38. Vanaja is from Lucknow. Choice (D)
39. Chandrakala is to the immediate right of Archana. Choice (D)
40. There are four girls between Shilpa and Prashanti. Choice (E)

Solutions for questions 41 to 45:

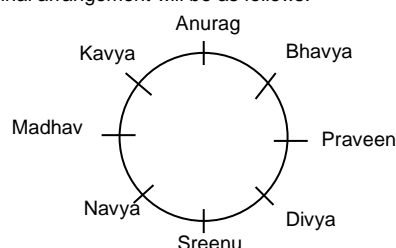
From the given information, boys and girls should be sitting alternately.

From (i) and (iii), we can say that Praveen and Madhav are opposite each other, and Anurag and Sreenu are opposite each other. From (ii) and (iii), and the above results, we have the following arrangement:



From (iii), Bhavya must be to the immediate left of Anurag and Praveen is to the immediate left of Bhavya.

The final arrangement will be as follows:



41. Divya is to the immediate left of Praveen. Choice (A)
42. Madhav is two places away to the left of Sreenu. Choice (B)
43. Praveen is to the immediate right of Divya. Choice (C)
44. Madhav is sitting three places away to the left of Divya. Choice (A)
45. Kavya and Divya are opposite each other. Choice (D)

Solutions for questions 46 to 50:

From (i), (iii) and (iv), and as there are only five boys. Chintu and Dattu are sitting together, and Bittu is two places away from Mittu.

This is possible only when one of Bittu and Mittu is sitting in the middle of the row and the other sitting at any of the extreme ends of the row and Kittu is sitting between Bittu and Mittu.

From (ii) and (vi), we can say that Bittu can not sit at any of the extreme ends of the row.

∴ Bittu is sitting at the middle of the row and Mittu is sitting at one of the extreme ends of the row.

We have two possibilities:

Case (1) Chintu Dattu Bittu Kittu Mittu

Case (2) Mittu Kittu Bittu Chintu Dattu

consider case (1):

From (v), Chintu entered second, from (vi) Kittu and Dattu would have entered third and fourth respectively.

∴ Mittu entered first, which violates condition (iv).

∴ Case (1) is not possible

Consider case (2):

From (v) Mittu entered second.

From (vi), Kittu and Dattu would have entered third and fourth respectively. Hence, Chintu entered first.

46. Chintu entered first. Choice (B)
47. Bittu is sitting at the middle of the row. Choice (B)
48. Mittu is sitting at the extreme left of the row. Choice (A)
49. Mittu entered just before Kittu. Choice (A)
50. Dattu is sitting at the extreme right of the row and he entered fourth. Choice (D)

Exercise – 10(d)

Solutions for questions 1 to 5:

It is given that, R sits second to the left of V, one among them sit at the end. The persons who sit at the ends do not face South. There are three persons between V and W. Hence the possible cases are

(i) R V W
↑ ↑ ↑

(ii) W R V
↑ ↑ ↑

(iii) W V R
↑ ↓ ↑

Given, Q sits third to the right of W who faces South. Hence, case (iii) is eliminated as we cannot place Q. In case (i), Q sits to the immediate right of V. In case (ii) Q sits to the left end and faces North, as the person who sit at the ends do not face South. Given P sits to the immediate left of T, and is adjacent to W. Hence in case (i) T sits second to the right of W and faces South. In case (ii) T sits to the immediate right of Q. Given, only one person sits between P and U, U does not face North. Hence case (i) is eliminated as the persons who sit at the ends do not face South. In case (ii), U sits adjacent to R and W and S sits to the immediate left of V. Given, P and S face different directions as T faces. Hence, P and S face North, as T faces South. Given, R faces opposite direction as S faces. Hence, R faces South.
∴ The final arrangement is as shown below.

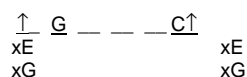
Q T P W U R S V
↑ ↓ ↑ ↓ ↓ ↑ ↑

1. Four persons. Choice (C)

2. T sits third to the right of U. Choice (B)
3. Two persons. Choice (D)
4. Choice (C) is true. Choice (C)
5. Except (P, S), the persons in the remaining pairs face the opposite directions. Choice (E)

Solutions for questions 6 to 10:

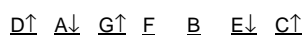
It is given that neither G nor E is sitting at the any end. And G is sitting fourth to the left of C and C is sitting at one of the ends, and the persons who are sitting at the corners are facing north. Hence, we get the following arrangement.



A is adjacent to both G and D, but F is sitting exactly between A and E, then the arrangement will be as follows.



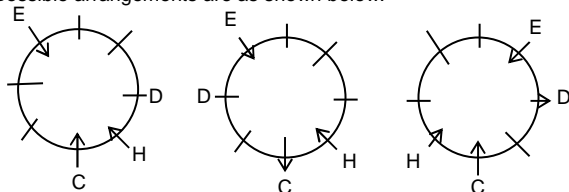
F is to the right of both G and E which means G is facing north and E is facing south. And E and A are facing the same direction. The final arrangement will be as follows.



6. Cannot be determined Choice (E)
7. Three persons are sitting between D and B. Choice (B)
8. If F is facing south then B faces north, then F sits to the immediate left of B. Choice (D)
9. Except GA, in all other options, both the persons are facing the same directions. Choice (B)
10. A is sitting fifth to the left of C. Choice (E)

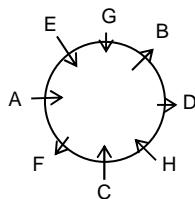
Solutions for questions 11 to 15:

Given C sits three places away from E, who faces H. D sits second to the right of C but not third to the right of E. Hence the possible arrangements are as shown below.



A sits to the immediate right of F, but neither of them is adjacent to D. The neighbours of F face the same direction but opposite to the direction in which F faces. B does not sit adjacent to E, but is to the immediate left of G. Hence we should place A and F adjacent to each other as well as B and G are adjacent to each other. So, we can eliminate case (ii) and (iii). Hence G sits to the immediate left of E and faces the centre. A sits to the immediate right of E and F sits to the immediate left of C. Given B and D, face the same direction, which is opposite to the direction in which E faces. Hence B and D face away from the centre.

∴ The final arrangement is as shown below.

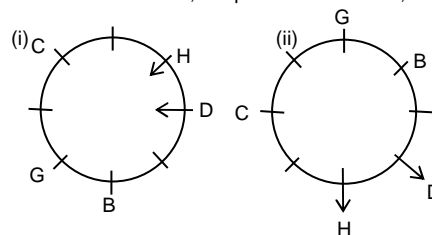


11. G faces C. Choice (E)
12. D sits to the immediate right of H. Choice (A)

13. Three persons face away from the centre. Choice (C)
14. Except (B, C) in the remaining groups, two persons face the same direction. Choice (E)
15. 'C and G face the same direction' is true. Choice (B)

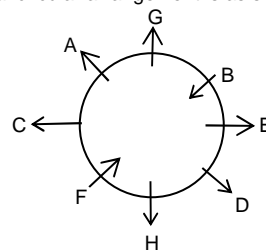
Solutions for questions 16 to 20:

It is given that, B sits three places away from H. C sits second to the right of H and is adjacent to neither B nor D. Hence H faces either the centre or away from the centre. B sits third to the left of H and C sits three places away from B. Given G sits third to the left of D, who faces the same direction as H. B and G are adjacent to each other. Hence, the possible cases are,



Given, F sits second to the left of A. A and D face the same direction. Hence in case (i), A faces the centre as D faces the centre and sits opposite D and F sits to the immediate right of H. In case (ii), A faces away from the centre as D faces away from the centre and F sits to the immediate right of H. Given, no two adjacent persons face the centre. Hence case (i) is eliminated. Given, F faces the centre. C and B face different directions. C faces away from the centre as F faces the centre. Hence B faces the centre and E sits to the immediate left of B and faces away from the centre.

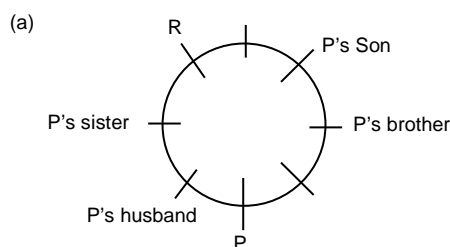
∴ The final circular arrangement is as shown below.



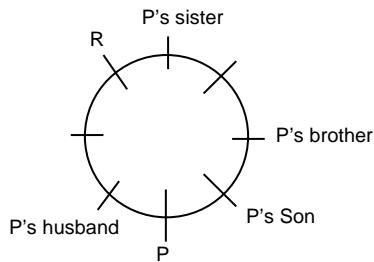
16. A sits third to the left of E. Choice (D)
17. Six persons face away from the centre. Choice (C)
18. Four persons. Choice (A)
19. H sits second to the left of G. Choice (C)
20. Except (E, G) in the remaining pairs the second person sits second to the right of the first person. Choice (D)

Solutions for questions 21 to 25:

From (i), P's husband sits to the immediate left of P. From (ii), we get the following cases:

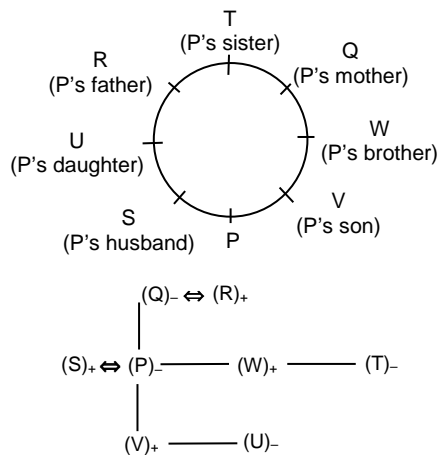


(b)



From (iii), case (a) is eliminated and from (iv), T is P's sister and P's daughter sits second to the left of P.

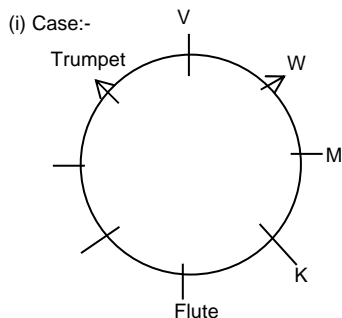
From (v), S is P's husband, R is P's father. Q is P's mother and V is P's son. As W is not a female, W is P's brother. Therefore the final arrangement and the family tree are,



21. Six persons sit between P's husband and P's daughter. Choice (C)
 22. W is P's brother. Choice (A)
 23. R is the husband of Q. Choice (C)

Solutions for questions 31 to 35:

It is given that, the neighbors of V faces away from the center and V sits to the immediate left of W. The one who likes flute sits in the opposite place of V. One of the neighbors of V likes trumpet sits in the opposite place of K. From (3), M and K are neighbors of the one who likes flute. From the above points, we get two possibilities, and they are given in the following diagrams:



From (7), as V faces center and sits to the immediate left of the one who like guitar, the only possibility is that W likes guitar and the one who sits to the immediate right of V likes trumpet.

Hence, case (ii) is eliminated. From (4) and (5), we come to know that K likes sitar and the one who likes Flute is U. X likes Violin and sits second to the right of U, hence U faces away from the center.

As the one who likes veena sits to the immediate right of X, thus X faces the center. As K sits to the immediate left of the person who likes piano, M likes Piano and faces the center. As neither N nor U likes trumpet, L likes trumpet. It is given that only three persons face the center. As X, M and V face the centre, N must

24. P's husband sits second to the left of V. Choice (C)

25. Except W, all others are females. Choice (D)

Solutions for questions 26 to 30:

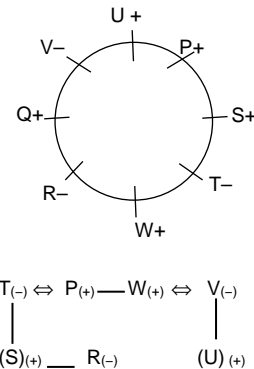
From (i), Q sits third to the right of P.

From (ii), V sits to the immediate left of Q.

From (iii), either V is S's sister or S's sister sits to the immediate right of Q.

From (iv), S's father is P and mother is T, S's sister sits to the immediate right of Q. V is U's mother and U is a male. R is S's sister.

Therefore the final arrangement and the family tree are as shown below:



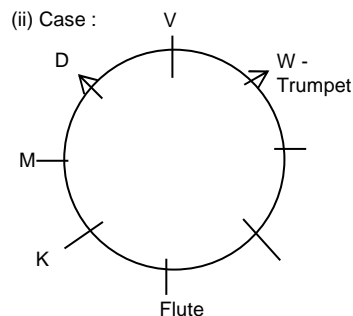
26. U is the nephew of P. Choice (B)

27. P sits to the immediate right of P's son. Choice (C)

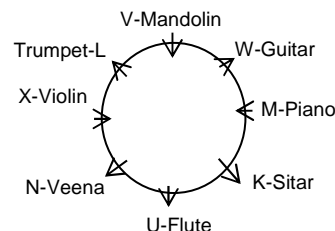
28. If Q is married to U, then Q is the daughter-in-law of W. Choice (D)

29. Five persons. Choice (B)

30. Except Q, all others are males. Choice (D)



be facing away from the center. Hence, the final arrangement is as follows:

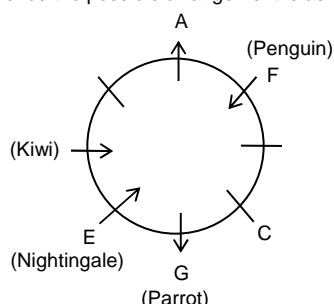


31. X sits to the immediate right of N. Choice (C)

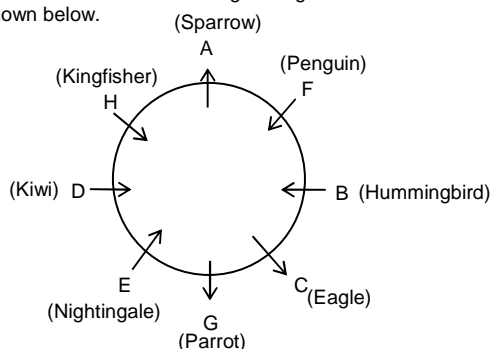
32. L sits second to the left of the one who likes guitar.
Choice (A)
33. M sits opposite the one who likes violin and is definitely true.
Choice (B)
34. Except U-guitar in the remaining options, the given person and the one who plays the given instrument face different directions.
Choice (B)
35. U sits in the opposite place of the one who likes mandolin.
Choice (E)

Solutions for questions 36 to 40:

Given C is sitting to the immediate left of G, who is facing away from the centre. G likes parrot and is sitting second to the right of the person who likes kiwi. C and the person who likes kiwi are not sitting adjacent to each other. Hence C sits third to the right of the person who likes kiwi. Given A does not like kiwi but is sitting to the immediate right of F, who likes penguin, E likes nightingale and is sitting opposite F. A and F are facing different directions. Hence the possible arrangement is as shown below.



Given D is sitting opposite B, who is to the immediate left of the person who likes eagle. B does not like kiwi. Hence C likes eagle and is facing away from the centre. D likes kiwi. B is sitting to the immediate left of F and H is sitting to the immediate left of A. Given the person who likes sparrow is to the immediate left of the person who likes kingfisher. The person who likes the hummingbird is three places away from the person who likes kingfisher. Hence the final seating arrangement and distribution is as shown below.

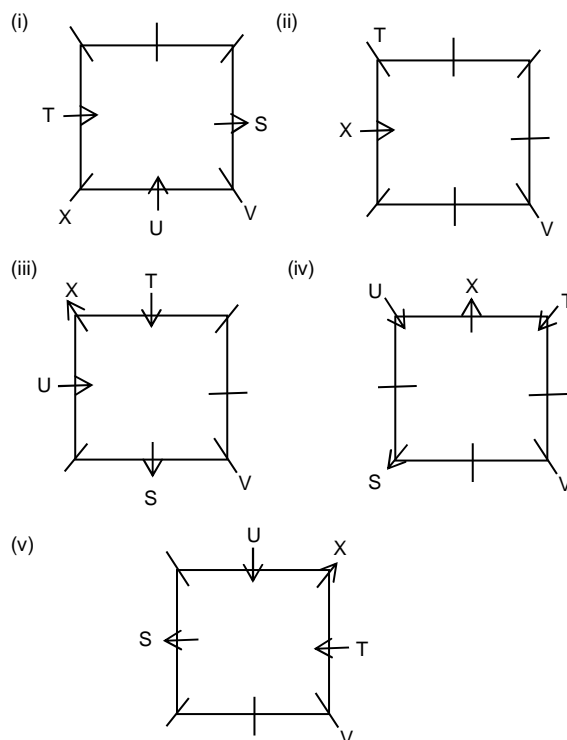


36. B likes the hummingbird.
Choice (A)
37. Five persons.
Choice (E)
38. The person who likes the eagle is facing away from the centre, which is same as the person, who likes the parrot, is facing.
Choice (D)
39. E sits to the immediate right of the person who likes the parrot, similarly A is related to the penguin.
Choice (C)
40. Choice (3) is true.
Choice (C)

Solutions for questions 41 to 45:

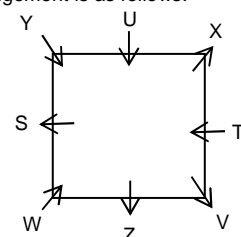
It is given that V sits at the corners, neither X nor W sits adjacent to V. T sits to the immediate right of X, who is facing away from the center. Also given that S sits opposite T, who sits two places away to the right of U. Let us represent the given information in

the following square arrangement.



Also given that W faces the center and opposite to neither U nor V. Y sits opposite V. Since V sits to the immediate left of Z, case (i), (ii), (iii) and (iv) are eliminated.

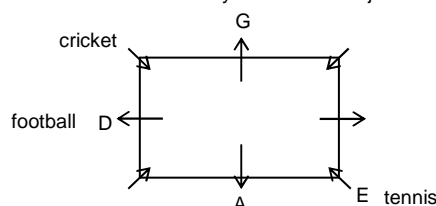
The final arrangement is as follows.



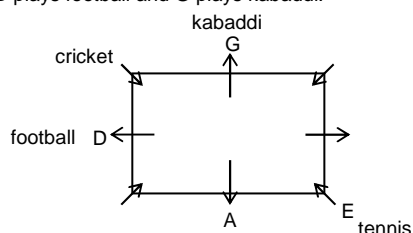
41. X sits opposite W.
Choice (A)
42. S sits third to the right of V.
Choice (B)
43. Four persons sit between U and W.
Choice (D)
44. Z sits opposite Y which is definitely false.
Choice (D)
45. Except UX, in all other pairs the second person sits to the immediate right of first person. But in UX, X sits to the immediate left of U.
Choice (E)

Solutions for questions 46 to 50:

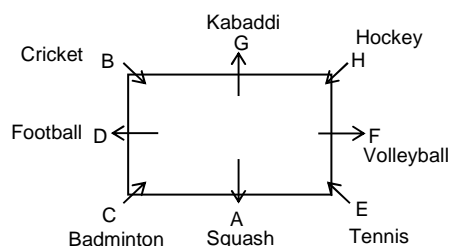
It is given that, E plays tennis or kabaddi but either D or G plays kabaddi. Hence E plays tennis and the cricket player and the tennis player sit opposite each other. A sits second to the left of football player who sits adjacent to neither E nor squash player. A plays neither cricket nor volleyball and not adjacent to cricket player.



Kabaddi and cricket players sit adjacent to each other. D sits second to the right of A. Hence D plays football and G plays kabaddi.



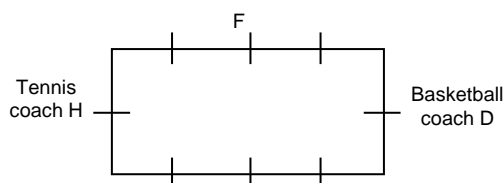
C sits adjacent to squash player. H and volleyball player sit adjacent to each other and H is neither squash player nor badminton player. And B sits second to the right of the hockey player. Hence, the final arrangement is as follows.



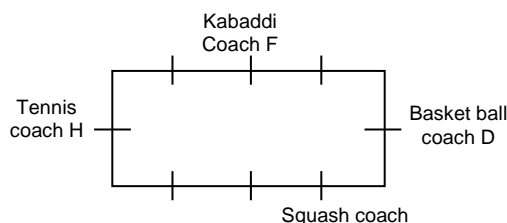
46. B plays cricket. Choice (C)
 47. F plays volley ball. Choice (B)
 48. C sits second to the right of the cricket player. Choice (C)
 49. 'H – hockey' is true. Choice (A)
 50. Both (A) and (C) are true. Choice (D)

Solutions for questions 51 to 55:

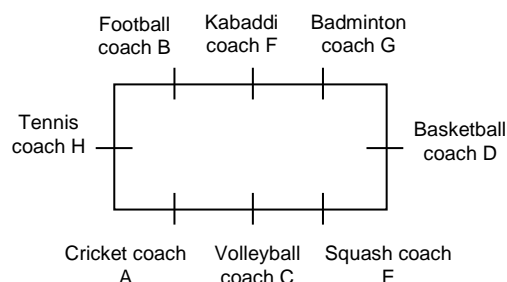
It is given that F sits second to the right of the basketball coach, who sits at one of the shorter sides. H is the tennis coach and sits at one of the longer ends.



C and kabaddi coach sit opposite each other and the squash coach sit adjacent to both C and D but neither C nor kabaddi coach sits adjacent to F.



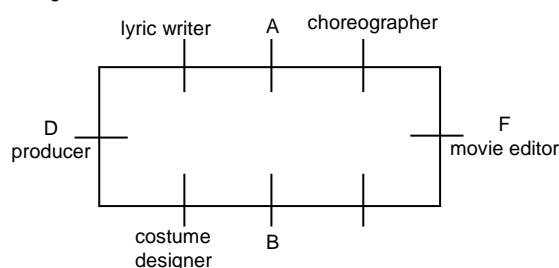
Neither the squash coach nor the cricket coach sits adjacent to F, and A sits to the immediate left of the volleyball coach. And E sits opposite neither A nor the squash coach. Hence E is the squash coach. G is opposite neither the cricket coach nor the football coach. Hence G sits opposite E and is the badminton coach. The final seating arrangement is as follows:



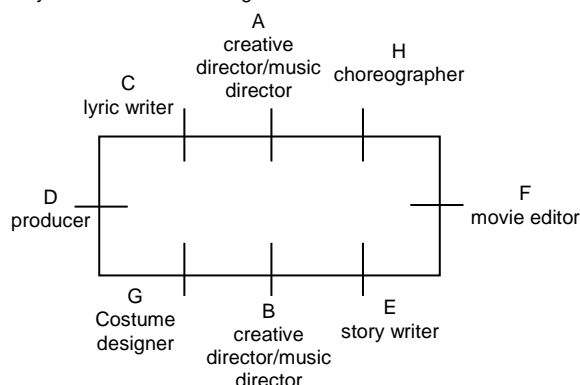
51. G is the badminton coach. Choice (D)
 52. D is the basket ball coach. Choice (A)
 53. The Volleyball coach sits opposite the kabaddi coach. Choice (C)
 54. B – football coach is true. Choice (D)
 55. Except G – tennis, in all other combinations both the persons sit opposite each other. Choice (E)

Solutions for questions 56 to 60:

It is given that D sits opposite to F, movie editor who sits along one of the shorter sides. Which means D and F sit along the shorter sides of the table and they are opposite to each other. The Movie editor. F sits second to the right of B. Hence B sits along one of the longer sides. Producer is a neighbour of both lyric writer and costume designer and they sit along different sides. Hence D will be producer. A sits adjacent to both lyric writer and choreographer. The arrangement is as follows.



But creative director and movie director sit opposite to each other. Hence they will be A and B in any order. H is not a lyric writer. Hence H will be choreographer, sits opposite E who is a story writer. The final arrangement is as follows.



56. E is a story writer. Choice (D)
 57. G is working as costume designer. Choice (A)
 58. C-lyric writer is definitely true. Choice (E)
 59. Except F creative director in all other options one person is opposite to the profession. Choice (E)
 60. Both (A) and (C) are true. Choice (D)

Solutions for questions 61 to 65:

It is given that E takes Finance and plays Football. B takes Marketing. D plays Basketball. H plays Volleyball. A plays neither Volleyball nor Basketball; that means A plays Football. Let us represent these directions in the following.

Persons	Specialization	Games
A		Football
B	Marketing	
C		
D		Basket ball
E	Finance	Football
F		
G		
H		Volleyball

Also given that either D or F takes HR and G takes either HR or Finance. Since either D or F takes HR, G takes Finance.

Since C and H play the same game, C plays Volleyball.

Persons	Specialization	Games
A		Football
B	Marketing	
C		Volleyball
D		Basket ball
E	Finance	Football
F		
G	Finance	
H		Volleyball

It is also given that B and G play the same game. Since only two persons play Football, at most three persons should play one game and take one specialization, B and G play basketball. Also D and H take the same specialization. Since only two persons take Marketing and already two persons have taken Finance, D and H take HR. Since no two persons take the same specialization and play the same game, A cannot take Finance and Marketing, hence A takes HR. Since F does not take Finance he takes Marketing. The final arrangement is

Persons	Specialization	Games
A	HR	Football
B	Marketing	Basketball
C	Finance	Volleyball
D	HR	Basket ball
E	Finance	Football
F	Marketing	Volleyball
G	Finance	Basketball
H	HR	Volleyball

61. F takes Marketing as his specialization. Choice (B)

62. F plays Volleyball. Choice (C)

63. 'B – Finance – Basketball' and 'E – Finance – Volleyball' are definitely false. Therefore, more than one of the above are false. Choice (E)

64. Except C – Volleyball, in the remaining options, the person and their respective specialization is given. Choice (E)

65. C and F play Volleyball. Choice (A)

Solutions for questions 66 to 70:

The given information can be tabulated as shown below.

Person	Village	Tribe
P	\times III \times VI \times V	TAM
Q	VII/IV	
R	\times III \times VI \times V	TAM
S	I	\times TAM
T	VIII	\times XAM
U		
V		CAM
W	\times V	

Given, U, W and Q belong to the same tribe.

Hence, U, W and Q belong to XAM. Since, At least two and at most three persons belong to the same tribe. Hence, S belongs to CAM and T belongs to either CAM or TAM. Given, the persons from XAM are neither from IV nor from II. Hence, Q is from VII. Given, the person from III does not belong to XAM. Hence, V is from III, U is from V and W is from VI. P and R are from II and IV in any order.

\therefore The final distribution is as shown below.

Person	Village	Tribe
P	II/IV	TAM
Q	VII	XAM
R	IV/II	TAM
S	I	CAM
T	VIII	CAM/TAM
U	V	XAM
V	III	CAM
W	VI	XAM

66. Either P or R is from II. Choice (E)

67. V is from III. Choice (B)

68. 'W – VI – XAM' is the correct combination. Choice (D)

69. (U, V, R) belong to different tribes. Choice (E)

70. 'U is from V' is true. Choice (C)

Chapter – 11 (Decision Making)

Exercise – 11

Solutions for questions 1 to 10:

Q.No.	Number	(A) Seven digits	(B) At least 2 prime digits	(C) First & last digits are perfect squares. [F] First & last digits are even	(D) Middle digit even [G] All digits are odd.	(E) Digits are in increasing order from left to right
1	1778459	✓	✓	✓	✓	×
2	4276891	✓	✓	✓	✓	×
3	1367574	✓	✓	✓	×	×
4	9632578	✓	✓	×	✓	×
5	4556662	✓	✓	×	✓	×
6	4368579	✓	✓	✓	✓	×
7	1366789	✓	✓	✓	✓	✓
8	9517531	✓	✓	✓	×	×
9	1573934	✓	✓	✓	×	×
10	964374	×	✓	✓	×	×

1. Satisfies all the basic conditions.
∴ Superior number. Choice (A)
2. Satisfies all the basic conditions.
∴ Superior number. Choice (A)
3. Does not satisfy condition (D) and also its alternate condition.
∴ Garbage number. Choice (E)
4. Does not satisfy condition (C) and also its alternate condition.
∴ Garbage number. Choice (E)
5. Does not satisfy condition (C) but satisfies the alternate condition.
∴ Mutual number. Choice (C)
6. Satisfies all the basic conditions.
∴ Superior number. Choice (A)
7. Satisfies all the basic conditions as well as condition (E).
∴ Impressive number. Choice (B)
8. Does not satisfy the basic condition (D), but satisfies the alternate condition.
∴ Classic number. Choice (D)
9. Does not satisfy the basic condition, (D) and also its alternate condition.
∴ Garbage number. Choice (E)
10. Does not satisfy the basic criteria (A) and (D).
∴ Garbage number. Choice (E)

Solutions for questions 11 to 16:

The four basic conditions from (a) to (d), given in the selection criteria, are as shown in the table below. In case a basic condition is violated, the case is verified for the respective alternate condition given. The alternate conditions are as given below:

(e) If condition (d) is violated, but at least one relative of the candidate is presently staying in A.P. for the last 5 years, then the candidate can be admitted.

(f) If condition (b) or (c) is violated, but not both, and the candidate has a good sports record, then the candidate should be advised to approach the Principal.

(g) If both the conditions (a) and (b) are violated, but the candidate is ready to donate ₹1,00,000 to the college, then the candidate should be advised to approach the Secretary.

Now let us scrutinise the applicants for the basic conditions, as given in the table below (a tick mark "✓" means that the condition is fulfilled, cross mark "X" means that the condition is violated).

Question Number	Name of the candidate	(a) SSC ≥ 80% or CBSE ≥ 70%	(b) Entrance Exam ≥ 60%	(c) Age ≥ 16 years, male candidate	(d) Resident of A.P.	Remarks
11	Jahangir	✓	✓	✓	X	(d) violated
12	Rita	✓	✓	× (female)	✓	(c) violated
13	Prakash	×	✓	✓	✓	(a) violated
14	Ranga	×	×	✓	✓	(a) and (b) violated
15	Ram	×	×	✓	✓	(a) and (b) violated
16	Rahim	×	×	? (age)	?	(c) & (d) unknown, (a) & (b) violated

11. In this case, condition (d) is violated, i.e. Jahangir is not a resident of A.P. Hence, his case is verified for the alternate condition (e). Since, a close relative of Jahangir has been staying in A.P. for the last 10 years (i.e. more than the required 5 years), Jahangir is selected.
Choice (A)
12. In this case, condition (c) is violated, i.e. Rita is a female. Then the alternate condition (f) is applied. As Rita has a good sports record (represented state in basketball), she should approach the Principal.
Choice (C)
13. In this case, condition (a) is violated. As there is no alternate condition given for violating condition (a) alone, admission cannot be granted to Prakash.
Choice (B)
14. In this case, both the conditions (a) and (b) are violated. Then, Ranga's case is verified for the alternate condition (g). As Ranga is ready to pay a donation of ₹1,00,000, he should be advised to approach the Secretary of the school.
Choice (D)
15. In this case, both the conditions (a) & (b) are violated, hence, the alternate condition (g) is applied. As Ram is ready to pay a donation of more than ₹one lakh, he should be advised to approach the Secretary of the school.
Choice (D)
16. In this case both the conditions (a) and (b) are violated in lieu of which the alternate condition (g) is satisfied (i.e. Rahim can pay a donation of ₹1,00,000). But, no information is available to check conditions (c) and (d), hence we cannot take a decision as the data is inadequate.
Choice (E)

Solutions for questions 17 to 22:

The four basic conditions, from (a) to (d), given in this selection criteria, are as shown in the table below.

In case a basic condition is violated, the respective alternate condition is applied in order to take a decision.

The alternate conditions are as given below:

- (e) If condition (a) is violated, and the hero has a success rate of greater than 50% in films, but has a good success rate with the heroine he is going to work with in the film, then take the suggestion of the heroine. OR
If condition (a) is violated, but the hero is successful in the type of films the Producer is making, then take the advice of the Producer.
- (f) If condition (c) is violated, but the hero demands a remuneration of less than ₹50 lakhs, then he can be selected.
- (g) If condition (d) is violated, but the hero can work for at least 15 days in a month, may not be continuous, then the hero can be selected.

Now let us scrutinise all the applicants for the basic conditions (from (a) to (d)) as given in the table below (a tick mark "✓" means that the condition is fulfilled and a cross mark "X" means that the condition is violated):

Question Number	Name of the Hero	(a) Success rate as a hero ≥ 70%	(b) Time spent in the Industry ≥ 5 yrs	(c) Remuneration < ₹10 lakhs	(d) Dates continuous ≥ one week	Remarks
17	Romeo	✓	✓	✓	✓	All conditions are satisfied
18	Chris	×	?	×	?	(b) & (d) unknown and (a) and (c) are not satisfied.
19	Ritesh	×	✓	✓	✓	(a) violated
20	Rajesh	✓	✓	✓	×	(d) violated
21	Hasmukh	×	✓	✓	✓	(a) violated
22	Roopesh	?	✓	✓	?	(a) & (d) unknown

17. In this case, Romeo satisfies all the conditions, hence he is selected as a hero. Choice (A)
18. In this case, condition (a) is not satisfied, as the information given regarding the success rate is not that of his success as a hero. Similarly, (c) is not satisfied, as he charged more than ₹10 lakhs per film. Conditions (b) and (d) cannot be checked, as Chris's experience in Industry and whether he can give dates continuously for at least one week, is not known. Hence, the data is inadequate for taking a decision. Choice (E)
19. In this case, condition (a) is violated, then the alternate condition (e) is tested. As Ritesh has 90% hits in the type of films the producer is making, Producer's advice should be taken. Choice (D)
20. In this case, condition (d) is violated. But as Rajesh can give dates for 18 days in a month, (i.e. more than the required 15 days in a month, as in condition (g)), hence Rajesh is to be selected as the hero. Choice (A)
21. In this case, condition (a) is violated. But as Hasamukh is very successful with the heroine of the film, he fulfils the alternate condition (e). Hence, the suggestion of the heroine should be taken. Choice (C)
22. In this case, both the conditions (a) and (d) cannot be checked, as Roopesh's track record for all the 8 years is unknown, and also his ability to give dates is not mentioned, hence data is insufficient to take a decision. Choice (E)

Solutions for questions 23 to 28:

Question Number	(a) Every student attended all lectures	(b) No body watched the movie earlier	(c) Theatre ≤ 3 kms	(d) Every student agrees	Remarks
23	✓	✓	✓	✓	All conditions are satisfied.
24	×	✓	✓	✓	(a) violated
25	✓	✓	×	✓	(c) violated
26	✓	×	✓	✓	(b) violated
27	✓	×	✓	✓	(b) violated
28	✓	×	✓	✓	(b) violated

23. In this case, as all the conditions are satisfied. Hence, the group will watch the movie. Choice (A)
24. In this case, condition (a) is violated, as three students out of ten have not attended all their lectures. As three is less than half of ten (the total number of students in the group), these three students should attend their lectures and others should proceed to watch the movie, as given in the alternate condition, (e). Choice (E)
25. In this case, the theatre is more than 3 km away, hence condition (c) is violated. But as at least two seniors are accompanying them to watch the movie, the alternate condition (g) is fulfilled. Hence, all of them can go to watch the movie. Choice (A)
26. Here, condition (b) is violated, i.e. 2 out of 10 students have already watched the movie earlier. But as the movie is a hit, and more than half the total number of students (i.e., 8 out of 10) would be watching the movie for the first time, the alternate condition (f) is satisfied. Hence, all of them go to watch the movie. Choice (A)
27. In this case, condition (b) is violated as some students have seen the movie earlier. As the number of these students is less than half of the total number of students in the group, the alternate condition (f) is fulfilled. Hence, all of them go to watch the movie. Choice (A)
28. In this case, condition (b) is violated as some students have seen the movie earlier. As the number of these students is less than half of the total number of students in the group, the alternate condition (f) is fulfilled. Hence, all of them go to watch the movie. Choice (A)

Solutions for questions 29 to 35:

Question Number	(a) Land Cost < 20L	(b) Est. Cost of Const. < 30L	(c) Posh locality	(d) Loan ≥ 20L @ maxm. 18% p.a.	Remarks
29	✓	×	✓	✓	(b) violated
30	✓	✓	✓	?	(d) unknown
31	×	✓	✓	✓	(a) violated
32	×	✓	✓	×	(a) and (d) violated
33	✓	✓	?	?	(c), (d) unknown
34	✓	✓	✓	×	(d) violated
35	✓	✓	×	✓	(c) violated

29. In this case, condition (b) is violated, as the estimated cost of construction is more than ₹30 lakhs. As there are flats available in that locality on the ground floor, the respective alternate condition (f) is fulfilled. Choice (A)
30. In this case, the loan amount is not specified, which is required to check condition (d). Hence, data is inadequate to take a decision. Choice (C)
31. In this case, the cost of the land is more than ₹20 lakhs, hence condition (a) is violated. As there is no alternate condition for the same, the house cannot be constructed. Choice (E)
32. In this case, the land cost is ₹20 lakhs, whereas according to condition (a) the cost of land should be less than ₹20 lakhs. Hence, condition (a) is violated. As there is no alternate condition for the same, the house cannot be constructed. Choice (E)
33. As no information is available to check conditions (c) and (d), the data is inadequate to take any decision. Choice (C)
34. Here, condition (d) is violated, as the loan available is less than the stipulated ₹20 lakhs. But the alternate condition (e) is satisfied as the loan available is ₹15,00,000, i.e. more than the stipulated ₹12 lakhs and the interest rate is 10%, i.e. less than the stipulated 12%. Hence, the matter is to be discussed with the family members. Choice (D)
35. In this case, condition (c) is violated as the land is not located in a posh locality. However, as all the basic amenities are available nearby, the alternate condition (g) is satisfied. Hence, the matter should be discussed with the family members. Choice (D)

Solutions for questions 36 to 40:

Q.No.	City	(i) Population > 20 [a] less than 10% of population has annual income < 1.5lpa	(ii) income of atleast 50% population is ≥ 2lpa [b] sales of refrigerators in previous year > 5000.	(iii) well connected with major cities of the world	(iv) Average temperature during summer > 20°C	Course of action
36	Kolkata	✓	✓	✓	✓	Launch model no.518JTX 486ZMQ 446ZMQ
37	Nagpur	✓	× [✓]	✓	✓	Launch of 446ZMQ
38	Bhopal	× [?]	✓	✓	✓	Data inadequate
39	Delhi	✓	?	✓	✓	Data inadequate
40	Lucknow	× [✓]	✓	✓	✓	

36. Satisfies all the basic conditions.
∴ All the 3 models will be launched. Choice (A)
37. Does not satisfy the basic condition (ii) but satisfies the alternate condition.
∴ Launches only 446ZMQ. Choice (C)
38. No clear information about the alternate condition of (i).
So data is inadequate. Choice (E)
39. No clear information about condition (ii). Choice (E)
40. Does not satisfy condition (i) but satisfies the alternate condition.
∴ Launches models numbered 486ZMQ and 446ZMQ.
Choice (B)
- Step II : 56 38 14 12 92 39 114 43
Step III : 12 38 14 56 92 39 114 43
Step IV : 92 38 14 56 12 39 114 43
Step V : 39 38 14 56 12 92 114 43
Step VI : 114 38 14 56 12 92 39 43
Step VII : 43 38 14 56 12 92 39 114
Step VII is the final output. Choice (D)
2. In each step, only one element is rearranged. Hence, the total number of steps we require to get the final output is $(n - 1)$, where 'n' is the total number of elements in the input. In this input, the total number of elements = 7. Hence, we require $(7 - 1) = 6$ steps to get the final output. Choice (A)
3. In the output the numbers given in the input are rearranged by shifting each number by one position to the right cyclically. Hence, to get the input from the output the converse logic has to be applied, i.e., the numbers should be shifted to their left by one place. Hence, the input is 94 32 51 87 13 7 23 58. Choice (D)
4. It is given that the first eight prime numbers are taken in ascending order as the input. Hence, the input and the output will be as follows.
Input : 2 3 5 7 11 13 17 19
Step I : 3 2 5 7 11 13 17 19
Step II : 5 2 3 7 11 13 17 19
Step III : 7 2 3 5 11 13 17 19
Step IV : 11 2 3 5 7 13 17 19
Choice (C)

Chapter – 12 (Input and Output)

Exercise – 12

Solutions for questions 1 to 5:

The numbers given in the input are shifted one position to their right cyclically in the output. In step I, the first number in the input has interchanged its position with the second number. In step II, the third number has interchanged its position with the first number. In step III, the fourth number has interchanged its position with the first number. This is followed in the steps further, till all the numbers are arranged by shifting by one place to the right cyclically.

1. Input : 38 14 56 12 92 39 114 43
Step I : 14 38 56 12 92 39 114 43

5. The given input is
 Input : 256 159 386 125 81 64 121
 Step I : 159 256 386 125 81 64 121
 Step II : 386 256 159 125 81 64 121
 Step III : 125 256 159 386 81 64 121
 Step IV : 81 256 149 386 125 64 121
 Step V : 64 256 159 386 125 81 121
 Step VI : 121 256 159 386 125 81 64
 Hence, the last but one step is step V. Choice (E)

Solutions for questions 6 to 10:

As we observe the output, we know that the words in the given input are arranged in the increasing order of the number of letters. When the words of equal number of letters occur, then words are arranged in the order as they appear in the dictionary. In each step, one word is being rearranged. Among words with equal number of letters, the word that appears first in the dictionary is arranged first and so on. The input is "adopted action to a stamp drafted general operation". In the given input, the word with minimum number of letters is 'a', hence it occupies the first position in the first step and the remaining words follow the same sequence as in the input. The second position is occupied by the word 'to', as it contains the next highest number of letters. Similarly the other words are also arranged.

6. The final output is reached as shown below:
 Input : post followed after government fallen nomination the of
 Step I : of post followed after government fallen nomination the
 Step II : of the post followed after government fallen nomination
 Step III : of the post after followed government fallen nomination
 Step IV : of the post after fallen followed government nomination
 Hence, step IV is the final output for the given input. Choice (C)

7. For the given input, the output is obtained as shown below:
 Input : prime has the who suspect center attack forces
 Step I : has prime the who suspect center attack forces
 Step II : has the prime who suspect center attack forces
 Step III : has the who prime suspect center attack forces
 Step IV : has the who prime attack suspect center forces
 Step V : has the who prime attack center suspect forces
 Step VI : has the who prime attack center forces suspect
 Hence, step VI is the last step for the final output. Choice (C)

8. The Step IV is reached as shown below:
 Input : sites related found pottery global tourism declare complex
 Step I : found sites related pottery global tourism declare complex
 Step II : found sites global related pottery tourism declare complex
 Step III : found sites global complex related pottery tourism declare
 Step IV : found sites global complex declare related pottery tourism
 Choice (E)

9. By back tracking, we cannot determine the arrangement of words in the previous step and neither can we find which words have been actually rearranged and which were initially in their correct positions. Choice (E)

10. The required arrangement of words can be obtained as shown below:
 Input : we do at is exact fund your life
 Step I : at we do is exact fund your life
 Step II : at do we is exact fund your life
 Step III : at do is we exact fund your life
 Step IV : at do is we fund exact your life
 Step V : at do is we fund life exact your
 Hence, step V has the required arrangement. Choice (D)

Solutions for questions 11 to 15:

As we observe the output through every step, we know that the words are arranged in the same order as they are in the dictionary and the numbers are arranged in the decreasing order of their value. Every word is followed by a number. In step I, among the given words in the input, "global" comes first in the dictionary. Hence, it occupies the first position. The largest number in the input is 356. Hence, 356 occupies the second position in step I and 356 interchanges its position with the word in the second position. In step II, the next word which comes in the dictionary is "higher". Hence, it occupies the third place and interchanges with the word/number in that position. In the next step, the second highest number occupies the fourth place. Similarly, the other words and the numbers are arranged.

11. The given input is
 Input : enough 59 87 subscribed 137 176 issues offered
 Step I : enough 176 87 subscribed 137 59 issues offered
 Step II : enough 176 issues subscribed 137 59 87 offered
 Step III : enough 176 issues 137 subscribed 59 87 offered
 Step IV : enough 176 issues 137 offered 59 87 subscribed
 Step V : enough 176 issues 137 offered 87 59 subscribed
 Step VI : enough 176 issues 137 offered 87 subscribed 59
 Step VI is the last step. Choice (D)

12. The given input is
 Input : actions 59 crunch price 137 every sales 347 236
 Step I : actions 347 crunch price 137 every sales 59 236
 Step II : actions 347 crunch 236 137 every sales 59 price
 Step III : actions 347 crunch 236 every 137 sales 59 price
 Step IV : actions 347 crunch 236 every 137 price 59 sales
 Hence, step IV is the last step. Choice (E)

13. In these type of questions we cannot determine the input from the output, i.e. working out in reverse is not possible, because the initial position of numbers and the words cannot be determined. Choice (E)

14. The given input is
 Input : project product director 376 543 726 indica 834
 Step I : director product project 376 543 726 indica 834
 Step II : director 834 project 376 543 726 indica product
 Step III : director 834 indica 376 543 726 project product
 Step IV : director 834 indica 726 543 376 project product
 Hence, step IV has the given arrangement of words. Choice (C)

15. The given input is
 Input : sat 726 rat 534 mat 684 gate 436 bite
 Step I : bite 726 rat 534 mat 684 gate 436 sat
 Step II : bite 726 gate 534 mat 684 rat 436 sat
 Step III : bite 726 gate 684 mat 534 rat 436 sat
 Hence, step III is the last step. Choice (D)

Solutions for questions 16 to 20:

The words given in the input are arranged in the alphabetical order in the output. Let us now analyse the input and the steps through which the output is determined. The given input is "taking decision three clear expects happen next public". In the given input, the word "clear" comes first in the dictionary, hence it occupies the first position and the remaining words follow the same order as they are in the input. In the second step, the second position is occupied by the word "decision". Similarly, the other words are also rearranged.

16. The last step for the given input is as shown below:
 Input : products retail growth share little option board base
 Step I: base products retail growth share little option board
 Step II: base board products retail growth share little option
 Step III: base board growth products retail share little option
 Step IV: base board growth little products retail share option
 Step V: base board growth little option products retail share
 Step V is the final output. Choice (B)

17. The last step for the given input is obtained as shown below:
 Input : chosen efforts count painful difficult ended total orders
 Step I : chosen count efforts painful difficult ended total orders
 Step II : chosen count difficult efforts painful ended total orders
 Step III : chosen count difficult efforts ended painful total orders
 Step IV : chosen count difficult efforts ended orders painful total
 Step IV is the final output. Choice (A)

18. Step III for the given input is obtained as shown below:
 Input : that there this provide many flows now years
 Step I : flows that there this provide many now years
 Step II : flows many that there this provide now years
 Step III : flows many now that there this provide years
 Choice (D)

19. In these type of questions, we cannot find the input from the output. It is not possible to know the initial position of the words in the input. Choice (E)

20. Step III is obtained from step II of an input, as shown below:
 Step II : biggest bound company sounds revenue need grow with
 Step III : biggest bound company grow sounds revenue need with
 Step IV : biggest bound company grow need sounds revenue with
 Choice (C)

Solutions for question 21 to 25:

The logic is as follows.

Input : 15 17 35 7 23 11

- Step I : +1 -2 +3 -4 +5 -6
 16 15 38 3 28 5
 Step II : Sort in ascending order
 3 5 15 16 28 38
 Step III : $\times 3$ $\times 3$ $\times 3$ $\times 3$ $\times 3$ $\times 3$
 9 15 45 48 84 114
 Step IV : Sum of the digits
 9 6 9 12 12 6
 Step V : Arrange in ascending order
 6 6 9 9 12 12

21. Input : 6 11 15 20 24 33
 Step I : 7 9 18 16 29 27
 Step II : 7 9 16 18 27 29
 Step III : 21 27 48 54 81 87
 Step IV : 3 9 12 9 9 15
 Step V : 3 9 9 9 12 15

Choice (E)

22. As sorting is done from step II, we cannot find step I.

Choice (E)

23. Input : 9 18 36 54 27 45
 Step I : 10 16 39 50 32 39
 Step II : 10 16 32 39 39 50
 Step III : 30 48 96 117 117 150
 Step IV : 3 12 15 9 9 6

Choice (C)

24. Input : 11 7 18 26 22 32
 Step I : 12 5 21 22 27 26
 Step II : 5 12 21 22 26 27
 Step III : 15 36 63 66 78 81
 Step IV : 6 9 9 12 15 9

Choice (D)

25. Step I : 18 21 8 17 50 26
 Step II : 8 17 18 21 26 50
 Step III : 24 51 54 63 78 150
 Step IV : 6 6 9 9 15 6
 Step V : 6 6 6 9 9 15
 Choice (E)

Solutions for questions 26 to 30:

- Input: Let us number the given words as follows:
 Input: solution feasible practical category statement
 1 2 3 4 5
 condition problem view
 6 7 8

In each step, the swapping is done in the following manner.

- Input: 1 2 3 4 5 6 7 8
 Step I: 8 2 3 4 5 6 7 1
 Step II: 8 6 3 4 5 2 7 1
 Step III: 8 6 4 3 5 2 7 1
 Step IV: 8 6 4 2 5 3 7 1
 Step V: 8 6 4 2 1 3 7 5
 Step VI: 8 6 4 2 1 3 5 7


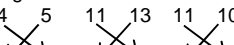
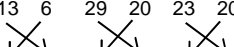
26. The last step for the given input will be "such that the and law ignorance have action". Choice (A)

27. Given that
 Step IV: number the will output be step input final
 Step III: number the will step be output input final
 Step II: number the step will be output input final
 Choice (E)

28. Input: poor many so are left this world there
 Step I: there many so are left this world poor
 Step II: there this so are left many world poor
 Step III: there this are so left many world poor
 Step IV: there this are many left so world poor
 Choice (B)

29. Input : Italy Cuba France Japan Germany
USA China India
Step I: India Cuba France Japan Germany USA China
Italy
Step II: India USA France Japan Germany Cuba China
Italy
Step III: India USA Japan France Germany Cuba China
Italy
Choice (B)
30. The input for the given output will be "Indore Delhi Mumbai
Goa Patna Varanasi Bhopal Pune".
Choice (D)

Solutions for questions 31 to 35:

- Input : 32 13 49 74 19 56
Logic : 
Step I : 13 32 74 49 56 19
Logic : digits are add in each number
Step II : 4 5 11 13 11 10
Logic : 
Step III : 5 4 13 11 10 11
Logic : $\times 2$ $\times 2$ $\times 2$ $\times 2$ $\times 2$ $\times 2$
Step IV : 10 8 26 22 20 22
Logic : $+3$ -2 $+3$ -2 $+3$ -2
Step V : 13 6 29 20 23 20
Logic : 
Step VI : 6 13 20 29 20 23
31. Input : 97 65 85 17 27 28
Step I : 65 97 17 85 28 27
Step II : 11 16 8 13 10 9
Step III : 16 11 13 8 9 10
Step IV : 32 22 26 16 18 20
Step V : 35 20 29 14 21 18
Step VI : 20 35 14 29 18 21
Step VI is the output.
Choice (A)
32. Input : 66 22 51 43 79 68
Step I : 22 66 43 51 68 79
Step II : 4 12 7 6 14 16
Step III : 12 4 6 7 16 14
Step IV : 24 8 12 14 32 28
Choice (A)
33. Step V : 41 58 63 38 89 82
-3 +2 -3 +2 -3 +2
Step IV : 38 60 60 40 86 84
Step III : 19 30 30 20 43 42
Step II : 30 19 20 30 42 43
Now step I cannot be determined.
Choice (E)
34. Input : 69 72 83 74 52 47
Step I : 72 69 74 83 47 52
Step II : 9 15 11 11 11 7
Step III : 15 9 11 11 7 11
Step IV : 30 18 22 22 14 22
Step V : 33 16 25 20 17 20
Step V is the given step. Hence 5 steps are required.
Choice (B)
35. Given,
Input: 19 32 17 14 28 56
Step I: 32 19 14 17 56 28
Step II: 5 10 5 8 11 10
Step III: 10 5 8 5 10 11
 \therefore 8 is the third number from the left in step III.
Choice (D)

Solutions for questions 36 to 40:

By observing the given data, we can understand that the numbers are arranged in the ascending order and words are arranged in the reverse alphabetical order.

In I step, the highest number is taken to the left end, simultaneously the last word in the alphabetical order is taken at the right end.

In II step, the second highest number is shifted the front end, and the second last word in the alphabetical order is taken at the rear end.

The above said process is continued in the remaining steps, through a step by step process. In each step both word and number arrangement take place simultaneously.

Input: situation 91 is 78 tense 14 32 but 63 under 81 control
Step I: 91 situation is 78 tense 14 32 but 63 81 control under
Step II: 81 91 situation is 78 14 32 but 63 control under tense
Step III: 78 81 91 is 14 32 but 63 control under tense situation
Step IV: 63 78 81 91 14 32 but control under tense situation is
Step V: 32 63 78 81 91 14 but under tense situation is control
Step VI: 14 32 63 78 81 91 under tense situation is control but

36. From the above, step III is
"78 81 91 is 14 32 but 63 control under tense situation".
Choice (B)
37. "91" is at 8th position from the right in step V.
Step V: 32 63 78 81 91 14 but under tense situation is control.
Choice (C)
38. There will be no such step.
Choice (A)
39. 6 steps are required to reach the final output.
Choice (D)
40. From the above, the given output is step IV. Choice (B)

Solutions for questions 41 to 45:

The given logic is as follows; Input to step I: difference between the arrival and departure timings.

- step I to step II: each number is multiplied by 2.
step II to step III: the digits in the number are reversed
step III to step IV: numbers are increased by +1,+2+3,+4 and +5 starting from left end.
step IV to V: sum of the digits of each number
step V to step VI: numbers are arranged in ascending order.
step VI to step VII: based on the positions of the numbers in step V ,their corresponding input is taken as output.

41. input:

arrival time: 9:05	arrival time: 9:23	arrival time: 9:46	arrival time: 10:00	arrival time: 10:13
departure time: 9:16	departure time: 9:30	departure time: 9:59	departure time: 10:14	departure time: 10:19

Step I: 11 7 13 14 6
step II: 22 14 26 28 12
step III: 22 41 62 82 21
step IV: 23 43 65 86 26
step V: 5 7 11 14 8
step VI: 5 7 8 11 14

output:

Arrival time: 9:05	Arrival time: 9:23	Arrival time: 10:13	Arrival time: 9:46	Arrival time: 10:00
Departure time: 9:16	Departure time: 9:30	Departure time: 10:19	Departure time: 9:59	Departure time: 10:14

Choice (D)

42. Back tracing is not possible in the given case.
Hence cannot be determined.
Choice (E)
43. step IV: 46
step III: 42
step II: 24
step I: 12
input: from the given choices the input can be

Arrival time 08:32
Departure time 08:44

Choice (C)

44. step I: 14 6 9 11 13
 step II: 28 12 18 22 26
 step III: 82 21 81 22 62
 step IV: 83 23 84 26 67
 Choice (B)
45. step III: 82
 logic: interchange the digits
 step II: 28
 logic: divided by 2
 step I: 14
 Choice (A)

Solutions for questions 46 to 50:

The given logic is as follows

From input to step I: sum of the place values of letters in each word as per the English alphabet.

Step I to step II: The numbers are increased by 2,3,5,7 and 11 respectively.

Step II to step III: Sum of the digits

Step III to step IV: square of each number in step III is taken

Step IV to V: Five is subtracted from each number

Step V to step VI: The numbers are arranged in ascending order

Step VI to step VII: respective word of each number is taken as output.

46. Input: KINDLY ARRANGE ITEMS TO OUR
 Step I: 75 64 66 35 54
 Step II: 77 67 71 42 65
 Step III: 14 13 8 6 11
 Choice C is the correct step. Choice (C)

47. Input: WHICH HELPS IN THE PROBLEM
 Step I: 51 60 23 33 81
 Step II: 53 63 28 40 92
 Step III: 8 9 10 4 11
 Step IV: 64 81 100 16 121
 Step V: 59 76 95 11 116
 Step VI: 11 59 76 95 116
 Step VII: THE WHICH HELPS IN PROBLEM.
 The word 'IN' would be the fourth from the left end.
 Choice (D)

48. As the rearrangement process is done between step VI and step IV, the required element position cannot be determined.
 Choice (E)

49. Choice (A): IMAGE
 Step I: 35
 Step II: 40
 Step III: 4
 Choice (C): MOCK
 Step I: 42
 Step II: 47
 Step III: 11
 The corresponding input can be MOCK. Choice (C)

50.

Input	ROSE	JASMINE	LILLY	MARIGOLD	LOTUS
Step I:	57	71	70	79	69
Step II:	59	74	75	86	80
Step III:	14	11	12	14	8
Step VI:	196	121	144	196	64
Step V:	191	116	139	191	59
Step VI:	59	116	139	191	191
Step VII:	LOTUS	JASMINE	LILLY	MARIGOLD	ROSE

Choice (D)

Solutions for questions 51 to 55:

The given logic as follows

Input step I: The difference between the balls played and the runs scored is taken in respective positions

Step I to step II: Each number is multiplied by 1, 2, 3 and so on

Step II to step III: Each number in step II is increased by +1, +2, +3 and so on

Step III to step IV: The digits in each number is interchanged

Step IV to step V: sum of the digit of each number is taken

Step V to step VI: The number in step V are arranged in ascending order

Step VI to output: Respective position of each number is the output.

i.e. in step VI, the second number from the left end is 9, in the previous step 9 is third from the left end. In the previous step it is sum of the digits of the number 63. Also we can observe from input to step IV the numbers are not rearranged.

Hence in the rearrangement process

107
118

Is arranged second from the left end in the output.

51. Input:

No of balls played	54	40	13	68	94	76
No of runs scored	27	43	31	56	77	61
Step I:	27	03	18	12	17	15
Step II:	27	06	54	48	85	90
Step III:	28	08	57	52	90	96
Step VI:	82	80	75	25	09	69
Step V:	10	8	12	7	09	15
Step VI:	7	8	9	10	12	15

Output:

No of balls played	68	40	94	54	13	76
No of runs scored	56	43	77	27	31	61

Choice (C)

52. Back tracing is not possible. Choice (E)

53. We have seen that numbers in step VI are in ascending order from left to right. Only choice (A) has numbers in this manner. Hence only choice (A) can be correct.

Step I:	13	12	14	18	22	24
Step II:	13	24	42	72	110	144
Step III:	14	26	45	76	115	150
Step IV:	41	62	54	67	511	051
Step V:	5	8	9	13	7	6
Step VI:	5	6	7	8	9	13.

Choice (A)

54. Step IV: 54
 Step III: 45
 Step II: 42
 Step I: 14
 Input: must have difference of 14 between runs scored and balls played. Choice (A)

55. Input:

No of balls played	118	65	27	5	27	92
No of runs scored	133	51	44	11	43	101

Step I:	15	14	17	06	16	09
Step II:	15	28	51	24	80	54
Step III:	16	30	54	28	85	60.

Choice (A)

Solutions for questions 56 to 60:

The given logic is as follows

Input to step I: Number of vowels x number of consonants.

Step I to II: Multiplied by 2, 3, 5 and so on (prime numbers)

Step II to III: Increased by 2, 4, 6 and so on (even numbers)

Step III to IV: In each number digits are written in reverse order.

Step IV to V: First position and second position, third position and fourth position, fifth position and sixth position number are interchanged.

Step V to VI: Descending order

Step VI to VII: Respective words as per rearrangement are taken

Input	CUCUMBER	LETTUCE	VEGETABLE	RADISH	TOMATO	BRINJAL
Step I:	15	12	20	8	9	10
Step II:	30	36	100	56	99	130
Step III:	32	40	106	64	109	142
Step VI:	23	04	601	46	901	241
Step V:	04	23	46	601	241	901
Step VI:	901	601	241	46	23	04
Step VII:	TOMATO	VEGETABLE	BRINJAL	RADISH	CUCUMBER	LETTUCE

56. '601' is fourth from the right end in step IV.
Alternate solution:
From the choices given in questions below, we can see that only 106 or 601 can be the answer. If 106 is the answer, first element in step IV is 32 \Rightarrow first number in step III is 23, \Rightarrow first number in step II is 19, which is not possible. Hence 601 has to be the answer. Choice (B)
57. The output is 'TOMATO VEGETABLE BRINJAL RADISH CUCUMBER LETTUCE'. Choice (A)
58. Choice (B) is step IV.
Alternate solution from the choices given in questions above, we can see that fourth element can only be 601 or 106. It cannot be 106 because, it gives a prime number element in step II which is not possible. Hence only choice (B) can be correct. Choice (B)
59. Step V is the given output.
Alternative solution
From the above alternate solution, the seven numbers are from step V. Choice (A)
60. Two words are between TOMATO and RADISH. Choice (B)

Solutions for questions 61 to 65:

By observing the given input and the last step it is understood that the words are shifted inward according to reverse alphabetical order. Simultaneously, the numbers are shifted inward in the ascending order.

The steps for the given input will be as follows:

Input: one 46 two 38 three 83 four five 89 96
Step I: two one 46 three 83 four five 89 96 38
Step II: three two one 83 four five 89 96 38 46
Step III: one three two four five 89 96 38 46 83
Step IV: four one three two five 96 38 46 83 89
Step V: five four one three two 38 46 83 89 96.

Step V is the last step of the rearrangement.

61. Fifth element from the right in step III is 89. Choice (B)
62. There is no such step. Choice (E)
63. By comparing the above output Choice (D) is step V of the rearrangement. Choice (D)
64. Seventh element from the left in step IV is 38. Choice (C)
65. By comparing the above output Choice (A) is step II of above rearrangement. Choice (A)

Solutions for questions 66 to 70:

By observing the given input and output, we can say the words are arranged in the alphabetical order by adding 's' in front of each word in the first half and the numbers are arranged in ascending order by adding '2' to each number in the second half. From input to Step I, the word which comes first in the alphabetical order is shifted to the end of the first half after adding 's' in the front of it and the largest number is shifted to the starting of the second half by adding 2 to each number. The above process is continued until the desired output is obtained.

Input: late 96 now 32 tick 9 unsuit 15 tag 54 mall 97
Step I: 96 now 32 tick 9 slate 99 unsuit 15 tag 54 mall
Step II: now 32 tick 9 slate small 98 99 unsuit 15 tag 54
Step III: 32 tick 9 slate small snow 56 98 99 unsuit 15 tag
Step IV: tick 9 slate small snow stag 34 56 98 99 unsuit 15
Step V: 9 slate small snow stag stick 17 34 56 98 99 unsuit
Step VI: slate small snow stag stick sunsuit 11 17 34 56 98 99

66. Six steps are required to get the output. Choice (A)
67. In step V, 'stick' is sixth from the left. Choice (D)
68. In step III, there are three elements between 'small' and '99'. Choice (C)
69. Every word is coded with number at the corresponding position from right end. Therefore 'stag' is related to '34'. Choice (E)
70. We get the given output in step III. Choice (C)

Solutions for questions 71 to 75:

By observing the given input and output, we can say that in the first half the numbers arranged and words are arranged in the reverse alphabetical order. From one step to the next step, two operations are taking place. From input to step I, the largest number is shifted to the left end and the word which comes first in the reverse alphabetical order is shifted to the right end. From step I to step II, the smallest number is shifted to the left end and the word which comes second in the reverse alphabetical order is shifted to the right end. From step II to step III, the second largest number is shifted to the left end and the word which comes third in the reverse alphabetical order is shifted to the right end and so on. This process is continued until we get the desired output.

Input: fake 78 beat trick 30 26 card dart 46 64 hair 73
Step I: 78 fake beat 30 26 card dart 46 64 hair 73 trick
Step II: 26 78 fake beat 30 card dart 46 64 73 trick hair
Step III: 73 26 78 beat 30 card dart 46 64 trick hair fake
Step IV: 30 73 26 78 beat card 46 64 trick hair fake dart
Step V: 64 30 73 26 78 beat 46 trick hair fake dart card
Step VI: 46 64 30 73 26 78 trick hair fake dart card beat
 \therefore Step VI is the last step of the given input.

71. '26 78 fake beat 30 card dart 46 64 73 trick hair' is step II. Choice (B)
72. 'card' is at the sixth position from the left in step IV. Choice (B)
73. Step V is the given output. Choice (D)
74. Third from the right. Choice (D)
75. There are six elements between 'beat' and 'hair' in step III. Choice (E)

Solutions for questions 76 to 80:

By observing the given input and output, we can say that the place value of the first letter of each word is increased by '1' and the number is decreased by '1'. From one step to the next step, two operations take place. From input to step I, the words and the numbers are arranged in descending order whereas number comes from the left and the word comes from the right. From step I to step II, the next number comes in the second place and the next word comes next to the previous word and so on. This process is continued until we get the desired output.

Input: month 25 march 44 may april jun 31 63 july 56 99
Step I: 98 25 march 44 may april june 31 63 july 56 nonth
Step II: 98 62 25 march 44 april june 31 july 56 nonth nay
Step III: 98 62 55 25 44 april june 31 july nonth nay narch

Step IV: 98 62 55 43 25 april 31 july north nay narch kune
 Step V: 98 62 55 43 30 25 april north nay narch kune kuly
 Step VI: 98 62 55 43 30 24 north nay narch kune kuly bpril

76. "98 62 55 25 44 april june 31 july north nay narch" is step-III.
 Choice (C)
77. "98 62 55 43 30 25 april north nay narch kune kuly" is the second last step.
 Choice (C)
78. Since 55 is two places away to the right of 98, "north" is two places away to the right of "30".
 Choice (C)
79. "98 62 25 44 31 56" is the correct order of numbers in step II.
 Choice (A)
80. Three elements are there between '55' and '31' in step IV.
 Choice (B)

Chapter – 13 (Non - Verbal Reasoning)

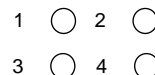
Exercise – 13(a)

Solutions for questions 1 to 15:

1. Element in the first frame are in the following positions.
 1 – 2 – 3
 4 – 5 – 6
 7 – 8 – 9
 These elements are shifted as follows:
 7 – 8 – 9
 3 – 2 – 1
 4 – 6 – 5
 This pattern is followed in further figures.
 Choice (D) follows this pattern for the next frame.
 Choice (D)
2. The inner most element change as square and triangle alternately. In each of the next three steps, one circle moves into triangle and from next step onwards they started moving out of the triangle. This pattern is continued by the fifth answer figure.
 Choice (E)
3. Let each pair of symbols in every frame be numbered as given below:
- | |
|---|
| 1 |
| 2 |
| 3 |
- In the first step, the symbols in 1 and 2 get inverted.
 In the next step, the symbols in 2 and 3 get inverted.
 In the next step, the symbols in 1 and 3 get inverted.
 In the next step, the symbols in 1 and 2 get inverted.
 So, the symbols in 2 and 3 are to be inverted.
 Choice (E)
4. There are four squares in each figure. In the first step the bottom most square moves to the next corner of the previous square in anticlockwise direction and the same pattern is followed by the remaining also.
 Answer figure (C) is the next figure.
 Choice (C)
5. For each of the first three steps, one circle is changed to a square and the dot is attached to the next circle. Once all the circles are converted as squares, the reverse process starts. This process is continued by the second answer figure.
 Choice (B)
6. If the 1st and the 5th figures of the question series are same, then the answer should be similar to the 2nd figure frame of the question series.
 Choice (E)
7. The figure is rotating in clockwise direction by 90° and the shaded portion is changing in one oval in a step and in two ovals in the next step.
 The pattern is continued in answer figure (D).
 Choice (D)

8. The number of dots at the middle are 3, 4 and 5 in consecutive frames. Then again similar pattern repeats. The square is shifting by 2 sides and one side alternately in counter clockwise direction. The circle is shifting by one side and two sides alternately in counter clockwise direction. This pattern is continued by the fourth answer figure.
 Choice (D)

9. Let us assign numbers to each circle in the first figure

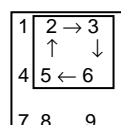


In the 1st step mirror images of circle 1 and 4 appear and water image of circles 2 and 3 appear.

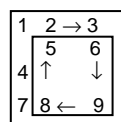
In the 2nd step all circles shifts to the position of the next circle to their left in clockwise direction. These two steps are repeated alternately.

Figure (D) follows the series.
 Choice (D)

10. The elements are shifting in the following pattern, as.



in the first step,

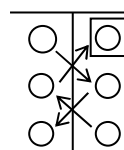


in the second step and so on

Answer figure (D) follows the same pattern.

Choice (D)

11. The figure is rotating by 45° in clockwise direction. In each step one more head than in the previous step is changing its direction.
 The same relation is observed in the Answer fig (B).
 Choice (B)
12. The circle at the middle rotates by 180° and the line which is attached to the circle also rotates by 180°. The petal which is attached to the circle rotates by 45° more than its previous rotation in anticlockwise direction where the shaded part in the petal shifts to the next part in clockwise direction.
 Answer figure (E) follows the same pattern. Choice (E)
13. The elements at the periphery change their direction. In the first step one element (i.e., second one from the left of the top row) changed its direction. In the next step the two elements in the top row changed their direction. In the next step three elements appearing in the clockwise direction and so on.
 The two elements in the centre change their direction in each alternate step.
 The pattern is continued in the answer figure (E).
 Choice (E)
14. If we analyse pair-wise then the top and the bottom elements interchange, the left vertical element and the central horizontal element remain the same in every two figure frames.
 Choice (C)
15. The entire figure is rotating by 45° in counter clockwise direction and 90° clockwise direction alternately. The elements are shifting into the position of another element as described below and a new element is added every time.



A new element appears in the place of this element

This pattern is continued by the fifth answer figure.

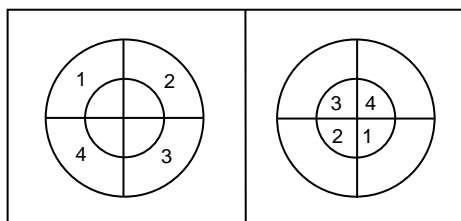
Choice (E)

Solutions for questions 16 to 20:

16. In the figure,
4 circles \rightarrow 2 circles \rightarrow 1 circle \rightarrow
 $\frac{1}{2}$ circle \rightarrow $\frac{1}{4}$ circle. Choice (A)
17. In each figure one extra line is getting added so answer is (C). Choice (C)
18. The complete figure is rotating by 90° in clockwise direction. Choice (C)
19. The triangle is reversed and the inner lines are perpendicular to each side, so answer is (B). Choice (B)
20. % symbols are redundant.
The positions of a, b and c are changing in such a way that a is shifted by in anti clockwise direction by half a side. C is shifted by one side in clockwise direction.
b is shifted by $\frac{1}{2}$ side in clockwise.
is shifting by $\frac{1}{2}$ side in clockwise. Choice (A)

Solutions for questions 21 to 25:

21. In the first pair, the elements are numbered as 1, 2, 3 and 4. Then the shift of the elements from the first figure of the first pair to the second figure of the first pair is as follows.



The same pattern will followed if the question mark is replaced by (A). Choice (A)

22. Let the elements in the first figure of the first pair be numbered as

1	2
3	
4	5

They are rearranged in the second figure of the first pair as

5	3
	1
2	4

The same pattern is observed in the second pair, if we substitute in (C) of the answer figures in place of the question mark. Choice (C)

23. The attached symbols got rotated 45° in anticlock wise direction to move to the next position and the short lines which are on the long lines got shifted to the other long line in clockwise direction. This pattern is observed in the second pair, if we substitute (B) of the answer figures in place of the question mark. Choice (B)
24. In the first pair, from first figure to second figure, the number of sides of each of the three elements in the first figure of the first pair got decreased by one. This pattern is observed in the second pair, if we substitute (D) in the answer figures in place of the question mark. Choice (D)

25. Let the elements be arranged as follows:

1	2
4	3

The changes from (i) to (ii) are :

All the shaded elements are unshaded and all the unshaded elements are shaded. Further, 1 and 4 remained same but 2 and 3 interchanged their places.

Choice (D)

Solutions for questions 26 to 30:

26. In the question pair the mirror image of first figure rotated by 45° in anticlockwise direction. Figure (C) follows the similar pattern. Choice (C)
27. In the question pair, positions of the two right elements are interchanging and rest of the three elements shift in clockwise direction to their next places. Figure (E) follows the similar pattern. Choice (E)
28. In the question pair, an arrow rotates by 45° in the clockwise direction, whereas the corner elements shift to their next position, in the clock wise direction. Figure (A), follows the similar pattern. Choice (A)
29. In the first pair all the corner arrows are reversed and one arrow is reversed in the centre. Figure (D) follows the similar pattern. Choice (D)
30. In the first pair, top two elements interchange. Elements at the centre and bottom shift to the next places in the clockwise direction, whereas one is deleted. Figure (C) follows the similar pattern. Choice (C)

Solutions for questions 31 to 35:

31. Every element is rotating by 90° in clockwise direction but the element 'Q' in pair (B) is rotating in anticlockwise direction. Choice (B)
32. The element is rotated by 135° in clockwise direction and it's water image is taken. But figure (E), does not follow the above pattern. Choice (E)
33. In every pair, the number of elements of shape '+' increase by 1, the number of 'I' decrease by 1 and that of '•' increase by 3. But figure (A), does not follow the above pattern. Choice (A)
34. Number the elements as 1, 2 and 3, in clockwise direction. The first element shifts by one position in anti-clockwise direction and then it reverses. The second element shifts to the other end of the line and changes the direction. The third element shifts by two positions in clockwise directions. But figure (A), does not follow the above pattern. Choice (A)
35. In every pair the lines in figure (I) are rotated by 180° and a head is added to the line without head and a line is added so that it makes an angle of 45° with the line to which head is added in clockwise direction. But in figure (B) it is in anti clockwise direction. Choice (B)

Solutions for questions 36 to 40:

36. In all the given figures except in figure (D), the arrow is pointing at the base but whereas in figure (D), it is not at the base. Choice (D)

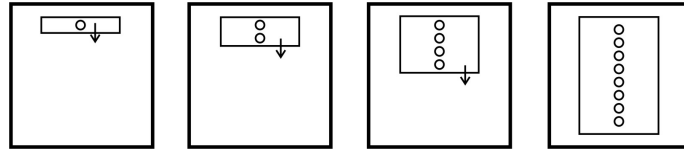
37. In each figure, the two arrows belong to two different lines but in figure (A), both the arrows are on one line.
Choice (A)
38. In each figure three curves are bent in one direction and one is in opposite direction but in figure (C), all the curves are bent in the same direction.
Choice (C)

39. In all the figures, except in figure (B), the arrows along the sides are not consecutive but in figure (B) the arrows are to the consecutive sides.
Choice (B)
40. In each figure the two curves are in opposite sides of two intersecting arrows but in figure (C) it is different.
Choice (C)

Exercise – 13(b)

Solutions for questions 1 to 13:

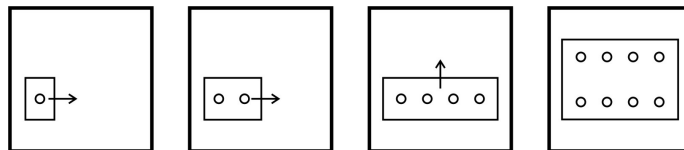
1. When the paper is unfolded, then the pattern is as shown below.



Hence, the answer figure is (D).

Choice (D)

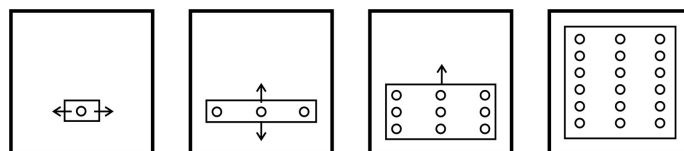
2. When the paper is unfolded, then the pattern is as shown below.



Hence, the answer figure is (A).

Choice (A)

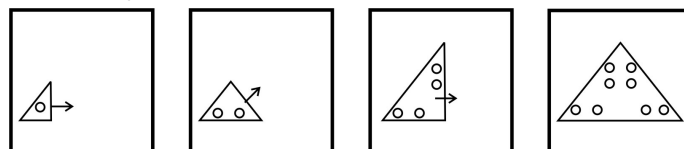
3. When the paper is unfolded, then the pattern is as shown below.



Hence, the answer figure is (B).

Choice (B)

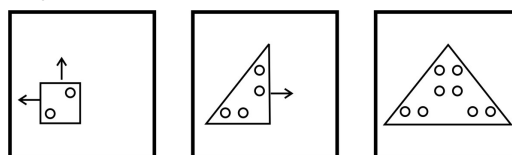
4. When the paper is unfolded, then the pattern is as shown below.



Hence, the answer figure is (C).

Choice (E)

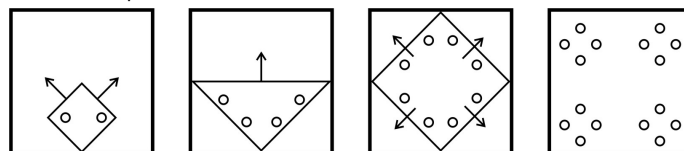
5. When the paper is unfolded, then the pattern is as shown below.



Hence, the answer figure is (B).

Choice (B)

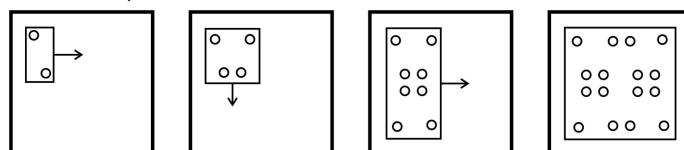
6. When the paper is unfolded, then the pattern is as shown below.



Hence, the answer figure is (D).

Choice (D)

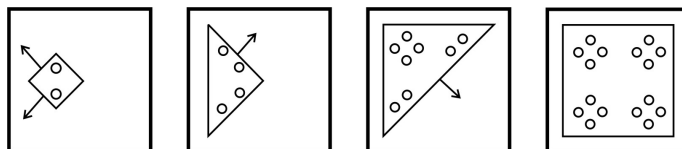
7. When the paper is unfolded, then the pattern is as shown below.



Hence, the answer figure is (B).

Choice (B)

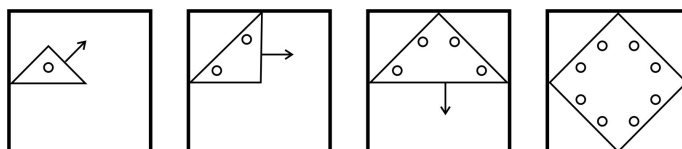
8. When the paper is unfolded, then the pattern is as shown below.



Hence, the answer figure is (A).

Choice (A)

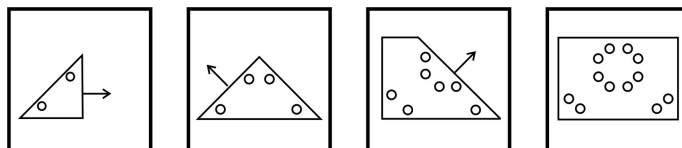
9. When the paper is unfolded, then the pattern is as shown below.



Hence, the answer figure is (B).

Choice (B)

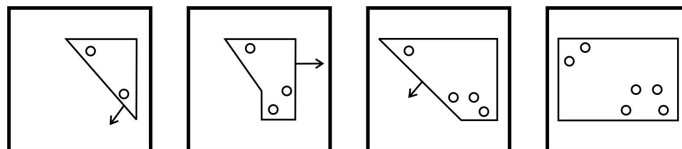
10. When the paper is unfolded, then the pattern is as shown below.



Hence, the answer figure is (A).

Choice (E)

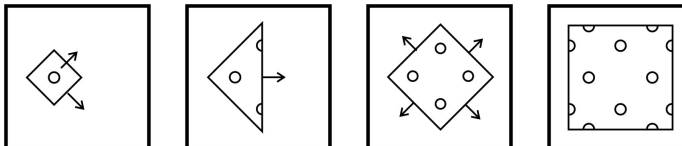
11. When the paper is unfolded, then the pattern is as shown below.



Hence, the answer figure is (D).

Choice (D)

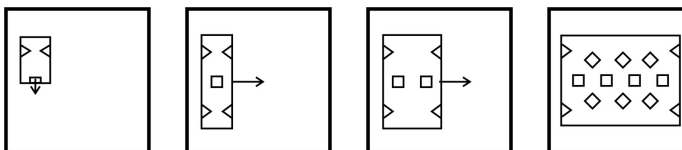
12. When the paper is unfolded, then the pattern is as shown below.



Hence, the answer figure is (D)

Choice (D)

13. When the paper is unfolded, then the pattern is as shown below.



Hence, the answer figure is (B).

Choice (B)

Solutions for questions 14 to 25:

14. Figure (D), will complete the question figure. Choice (D)
15. Figure (C), will complete the question figure. Choice (C)
16. Figure (C), will complete the question figure. Choice (E)
17. Figure (C), will complete the question figure. Choice (C)
18. Figure (C), will complete the question figure. Choice (C)
19. Figure (C), will complete the question figure. Choice (C)
20. Figure (A), will complete the question figure. Choice (A)
21. Figure (C), will complete the question figure. Choice (C)

22. Figure (D), will complete the question figure. Choice (D)

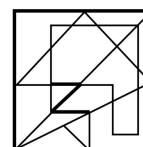
23. Figure (A), will complete the question figure. Choice (A)

24. Figure (D), will complete the question figure. Choice (D)

25. Figure (B), will complete the question figure. Choice (B)

Solutions for questions 26 to 30:

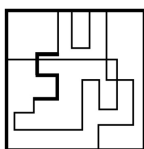
- 26.



Hence, the question figure is embedded in figure (B).

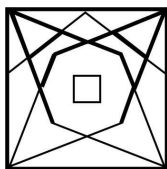
Choice (B)

27.



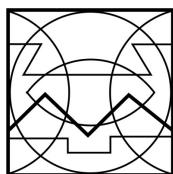
Hence, the question figure is embedded in figure (B).
Choice (B)

28.



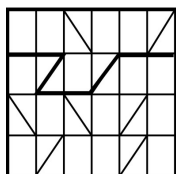
Hence, the question figure is embedded in figure (D).
Choice (D)

29.



Hence, the answer figure (C) is embedded in the question figure.
Choice (C)

30.



Hence, the answer figure (B) is embedded in the question figure.
Choice (B)

Solutions for questions 31 to 35:

30. Choice (A) is the mirror image of the given figure.
Choice (A)
32. Choice (C) is the mirror image of the given figure.
Choice (C)
33. Choice (D) is the mirror image of the given figure.
Choice (E)
34. Choice (D) is the mirror image of the given figure.
Choice (D)
35. Choice (B) is the mirror image of the given figure.
Choice (B)

Solutions for questions 36 to 40:

36. It is clear that the lower half of the sheet is folded on the upper half and figure (C) is the correct figure formed after the folding.
Choice (C)
37. When folded as shown by the arrow, the resultant figure is shown by figure (C).
Choice (C)
38. When folded as shown by the arrow, the resultant figure is shown by figure (D).
Choice (D)
39. The sheet of paper will appear like answer figure (D), when it is folded.
Choice (D)
40. The sheet of paper will appear like answer figure (C) when it is folded.
Choice (E)

Chapter – 14

(Strong and Weak Arguments, Courses of Action)

Exercise – 14

Solutions for questions 1 to 5:

1. Argument I explains a valid reason to go against such marriages because it is wrong to encourage anything that jeopardises the health of a person. Hence, (I) is a strong argument.
Argument II is not a valid argument because a custom being followed since a long time does not necessarily make it good. Only I is strong.
Choice (A)
2. Argument I : The basic purpose of conducting classes is to help students. Hence, Argument I is a strong argument as it conveys this idea.
Argument II : If the institute conducts classes with the intention of making profits, then this is a valid point to be considered. Hence, argument II is also strong. Choice (E)
3. Just because some poor people are improving economically, we cannot conclude that there are good politicians. Any reason could be ascribed to such an improvement. Argument II is very vague and is not giving any reasons for the argument that it proposes. Hence, neither of the arguments is strong.
Choice (D)
4. Sanctuary for endangered animals becomes necessary when it improves and betters the living conditions of the world. But at the same time, if an economy is not able to provide basic necessities to its people, then it cannot think of constructing sanctuaries. Therefore, the decision is based on both the factors viz. requirement and fund supply. Hence, both I and II are strong arguments. Choice (E)
5. Anything which hinders the learning process in a child must be controlled and, if possible, be prohibited. The aim of a teacher should be to make a child learn. According to argument I, beating causes hindrance to learning process of a child thus defeating the ultimate goal. If also supports its argument by referring to the findings of psychologists. Hence, I is a strong argument. Argument II states that a child will be spoiled if it is not caned. Caning is an extreme measure, there are also other softer methods to rectify a child. Moreover, the argument is not substantiated by any facts. Hence, II is not a strong argument. Choice (A)

Solutions for questions 6 to 10:

6. The correct answer is C. To weaken an argument, we should show the assumption in the argument to be false. The assumption in the given argument is that there is no other cause for the near extinction of the cobra. If we prove this wrong, it weakens the argument. Choice (C), by showing an alternative cause, does this. Others are either irrelevant or out of scope.
Choice (C)
7. The correct answer is (D). The conclusion of the argument is that because the public loved and approved a certain formula, Bollywood repeats it for sure success. The assumption is there is no other cause / reason. If we show one, we weaken it. Choice (D) gives us an alternative cause: the not so creative writers don't have any ideas at all. If they had, they would write new stories. Choice (A) strengthens the argument by asserting the same conclusion. Choices (B) and (C) are irrelevant.
Choice (D)
8. The correct answer is (C). The manufacturer decides to use cheaper material without changing the cost of his books and hopes for the same profit. His assumption is, people will not mind the cheaper quality. The cheap material shall result in the same is shown to be true in (C). [To strengthen an argument, we should show the assumption to be true]. The other choices are irrelevant or out of scope.
Choice (C)

9. The correct answer is (A). The argument assumes that there is no other difference which may neutralize or negate the 10% tariff difference in favour of China. If we show this to be true (or if we show yet another difference in favour of China), we strengthen the argument. This is exactly what choice (A) does. Choice (B) weakens the argument. Choice (C) and (D) are irrelevant. Choice (A)
10. The correct answer is choice (C). The assumption is that there is no other explanation for the 'increased' quantity of junk food sold in Rampur. However, choice (C) gives us one. If the scientists are true, then some of these 'lakhs' of devotees must be buying junk food in Rampur on their visit and this may be the actual reason for the increase in junk food consumption. Choice (A) strengthens the argument. Choices (B) and (D) are irrelevant. Choice (C)

Solutions for questions 11 to 15:

11. The reasons for children falling sick could be that either the road side food is cooked in unhygienic conditions or the food is not good for health or both.
If food is cooked in unhygienic conditions, then I follows.
If the kind of food is not good for health, then II follows.
But both can also be the reasons for children falling sick.
Hence, both I and II follow. Choice (E)
12. Both I and II help in reducing emission of harmful gases.
Hence, both I and II follow. Choice (E)
13. We do not know the reason for the addiction, so neither I nor II is a proper course of action. Choice (D)
14. The course of action I can solve the problem but it would affect the free flow of traffic. So, I is not a proper course of action. Course of action II provides easy crossing without disrupting the traffic. So, II is a proper course of action. Choice (B)
15. Course of action I is a time taking process. Hence, I is not a proper course of action.
Since the deaths are occurring due to epidemics, II is a proper course of action. Choice (B)

Solutions for questions 16 to 20:

16. Here the problem is malaria and we know that the cause of malaria is mosquito. As we know that mosquitoes can be controlled by pesticides. So, I is a proper course of action. Course of action II is not practically possible because that will cause a burden on the government. Hence it does not follow. Course of action III is feasible and also not very costly, hence it is a proper course of action. Choice (A)
17. Here the course of action I is a negative course of action. Course of action II can reduce rigging, as it says "they should be made to cast their votes". Hence it follows. Course of action III can reduce rigging. As some authority should scrutinise the polling centers so that polling is conducted without rigging. Choice (A)
18. Course of action I is based on the assumption that the students are not attending the class due to lack of individual attention, hence I does not follow. For the similar reason course of action II is not a proper course of action. II is not a proper course of action. Course of action III force the student to attend the class without solving the problem of not attending the classes. Hence III, does not follow. Choice (E)
19. Here the problem is a multiparty system which is causing instability.
Course of action I is talking about bi-party system and hence this can solve the problem.
Holding election for multiple number of times is not possible. Hence II does not follow.

Course of action III does not solve the problem the problem may re-occur again in future. Choice (D)

20. Here the problem is loud noise made by loud speakers and tape records. Hence, neither of the courses of actions I and III follow.
Course of action II is a possible course of action, as this will help to reduce the loud noise to a permissible limit. Choice (B)

Chapter – 15

(Cause and Effect and Assertions and Reasons)

Exercise – 15

Solutions for questions 1 to 5:

1. The given events are not related events as the place where Mr. X was killed and the place where it was raining heavily may or may not be the same. Choice (E)
2. Event (I) and (II) are related events and chronologically (II) occurs before (I). Only because of finishing 11th among 12 countries in the Hockey World cup, Hockey has become India's shame.
∴ It is the immediate and principle cause. Choice (A)
3. Events (I) and (II) are related events and chronologically (II) occurs before (I) and because of as they are planning to increase capacity, they have to make a plan to sell their products also so they open new offices for marketing those products. But opening an office in a particular city, requires other events such as market survey etc.
∴ It is not the immediate and principle cause. Choice (C)
4. Event (I) and (II) are related. Chronologically (I) occurs before (II). Ragging of junior students can be the immediate and principle cause for the suspension of the senior students. Choice (B)
5. Here both the events are related events and chronologically (II) occurs before (I). But the excellent performance of the bowler is not the immediate and principle cause for the Indian victory. There may be other players (Batsman and fielders) who also need to play well for the Indian victory. Choice (C)

Solutions for questions 6 to 10:

6. As the opposition parties are against to the naval exercise they staged a protest against the government. Hence, (II) is the cause and (I) is its effect. Choice (B)
7. It is known that earthquake leads to Tsunami. Hence, 'I' is the cause and 'II' is its effect. Choice (A)
8. The disease has no relation with people of Madras. Hence, (I) and (II) are effects of independent causes. Choice (D)
9. When pieces of ice which are several cubic kilometers in size break they will cause earthquakes. So, (I) is the cause and (II) is its effect. Choice (A)
10. As the Indian Cricket League formed in opposition to BCCI and was the first to launch the premier league, its competitor BCCI also announced their premier league. So, 'II' is the cause and 'I' is its effect. Choice (B)

Solutions for questions 11 to 15:

11. "Indifferent" means having no opinion. That is, these people are neither against nor advocating reservations. Neither R1 nor RII is explaining the reasons as to why these people are indifferent. Choice (D)

12. RI and/or RII must be a cause to effect the "Assertion". This means that if RI or RII is accomplished, the act given in the "Assertion" will be carried out. Let us examine RI and RII from this view-point.
RI : Having enough money does not become a cause for spending on such prizes. Hence, RI cannot be a valid reason.
RII : If the authors are to be encouraged, they must be given awards or prizes for appreciable works. This is a valid reason. Choice (B)
13. The objective of having better or improved relations is not always to seek support. Neither RI nor RII is a possible reason. Choice (D)
14. RI is not explaining the reasons behind the increasing number of deaths. RII can be a valid reason and under the circumstances given by RII (the law is weak), the law-breakers may behave adamantly. Choice (B)
15. RI : Just because people watch TV, they need not buy goods by tele-shopping. RI is not a possible reason.
RII : If people cannot go to market for any reasons, they would look for an alternative and tele-shopping provides an alternative. RII is a possible reason. Choice (B)

Solutions for questions 16 to 20:

16. Both (A) and (R) are true.
Also, (R) is the correct explanation of A .
Hence, Choice (A). Choice (A)
17. (A) is true and (R) is false as silver, a metal, conducts electricity.
Hence, Choice (C). Choice (C)
18. (A) is false as fusion is not used for power generation.
(R) we do have to control nuclear reaction to generate power.
Hence, (A) is false but (R) is true
Hence, Choice (D). Choice (D)
19. (A) is true, (R) is also true.
(R) is the correct explanation for (A).
Hence, Choice (A). Choice (A)
20. Hindi is the most spoken language in India. Hence the assertion is false but the reason is true. Choice (D)