

Date: 17/11/2019



Test Booklet Code

**K-10**  
KARNATAKA

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# Answers & Solutions

for

## NTSE (Stage-I) 2019-20

### INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you open the question booklet.

1. Use blue/black ballpoint pen only. There is no negative marking.
2. Part I : MAT : 1 - 100 questions  
Part II : SAT : 1 - 100 questions
3. This test booklet contains 200 questions of one mark each. All the questions are compulsory.
4. Answer each question by darkening the one correct alternative among the four choices on the OMR SHEET with blue/black ballpoint pen.

Example:

Q. No.	Alternatives
Correct way : 1	① ② ● ④
Q. No.	Alternatives
Wrong way : 1	⊗ ⊖ ⊙ ④

Student must darkening the right oval only after ensuring correct answer on OMR Sheet.

5. Students are not allowed to scratch / alter / change out an answer once marked on OMR Sheet, by using white fluid / eraser / blade / tearing / wearing or in any other form.
6. Separate sheet has been provided for rough work in this test booklet.
7. Please handover the OMR Sheet to the invigilator before leaving the Examination Hall.
8. Darken completely the ovals of your answer on OMR Sheet in the time limit allotted for that particular paper.
9. Your OMR Sheet will be evaluated through electronic scanning process. Incomplete and incorrect entries may render your OMR Sheet invalid.
10. Use of electronic gadgets, calculator, mobile etc., is strictly prohibited.

## PART-I : MENTAL ABILITY TEST (MAT)

1. If the word FRUIT is coded as 58281, then the word GRAPES is coded as:

- (1) 608604                      (2) 680460  
(3) 680640                      (4) 686040

**Answer (3)**

**Sol.** GRAPES = 7, 18, 1, 16, 5, 19

If single digits are subtract  $-1$  and double digits are add and subtract  $-1$ .

2. If the word GARDEN is coded as 49, then the word FLOWER can be coded as:

- (1) 40                              (2) 59  
(3) 79                              (4) 99

**Answer (3)**

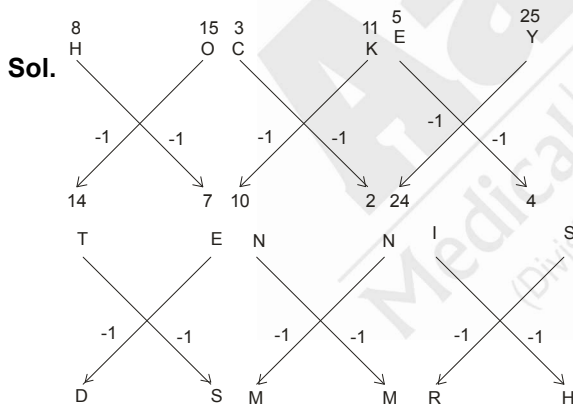
**Sol.** Sum of the place values of the FLOWER is

$$6 + 12 + 15 + 23 + 5 + 18 = 79$$

3. If the word HOCKEY is coded as NGJBXD, then the word TENNIS is coded as:

- (1) DSMMRH                      (2) DSMRHM  
(3) DSRMHM                      (4) DRSMHM

**Answer (1)**

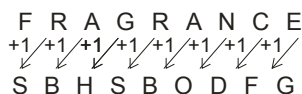


4. In some code language if the word FRAGRANCE can be coded as SBHSBODFG, then the word IMPOSING can be coded as:

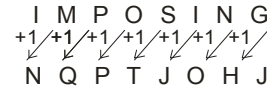
- (1) NQPTJHOJ                      (2) NQPTJOHI  
(3) NQPTJOHJ                      (4) NQTPJOHJ

**Answer (3)**

**Sol.** F + 1 (on last written)

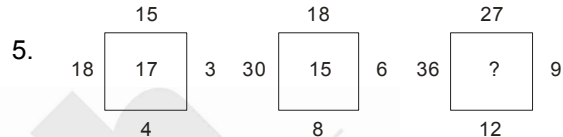


Similarly, I + 1 (on last written)



**Directions: (Questions: 5-7)**

In the questions given below the numbers in the figures are related. Identify their relationship and find the missing numbers in the given figures.

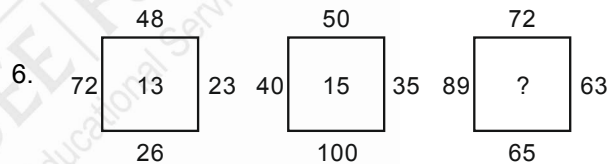


- (1) 21                              (2) 19  
(3) 18                              (4) 16

**Answer (2)**

**Sol.**  $\frac{18}{3} + (15 - 4) = 6 + 11 = 17$

Similarly,  $\frac{36}{9} + (27 - 12) = 4 + 15 = 19$



- (1) 17                              (2) 20  
(3) 23                              (4) 27

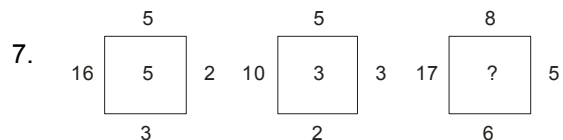
**Answer (1)**

**Sol.** Sum of all sides  $48 + 23 + 26 + 72 = 169$

So,  $\sqrt{169} = 13$

Similarly,  $72 + 63 + 65 + 89 = 289$

i.e.,  $\sqrt{289} = 17$



- (1) 6                              (2) 5  
(3) 4                              (4) 3

**Answer (3)**

**Sol.** Sum of opposite sides

$$16 + 2 = 18$$

$$5 + 3 = 8$$

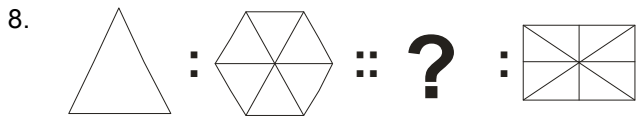
$$\text{Difference} = 18 - 8 = 10$$

Divide by 2 =  $\frac{10}{2} = 5$

Similarly,  $22 - 14 = \frac{8}{2} = 4$

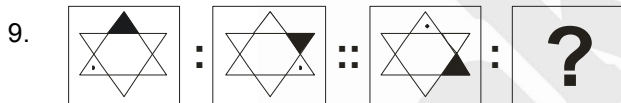
**Directions: (Questions: 8-10)**

Complete the given figure analogy by choosing the correct answer from the given alternatives.



- (1)
- (2)
- (3)
- (4)

**Answer (4)**



- (1)
- (2)
- (3)
- (4)

**Answer (3)**

**Sol.** Symbol (.) moving two consequent block.

Shaded (▲) moving one consequent block.

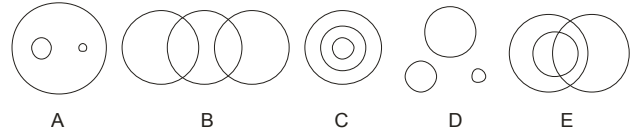


- (1)
- (2)
- (3)
- (4)

**Answer (4)**

**Directions: (Questions: 11-15)**

The following questions are based on figures given below. Each circle represents one item. Match the figure with items in the question on the basis of their relationship:



11. Females, Mothers, Teachers.

- (1) A (2) C  
(3) D (4) E

**Answer (4)**

12. Table, Chair, Furnitures.

- (1) A (2) B  
(3) C (4) D

**Answer (1)**

13. Men, Women, Players.

- (1) C (2) B  
(3) A (4) E

**Answer (2)**

14. Days, Months, Years.

- (1) A (2) D  
(3) C (4) E

**Answer (3)**

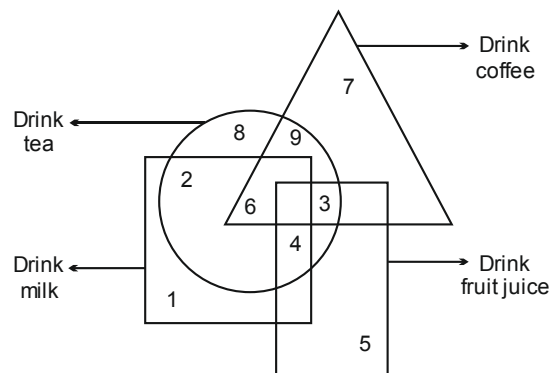
15. Piano, Potato, Axe.

- (1) B (2) A  
(3) C (4) D

**Answer (4)**

**Directions: (Questions: 16-17)**

In the following figure triangle represents those who drink coffee, circle represents those who drink tea, square represents those who drink milk and rectangle represents those who drink fruit juice. Based on the figure answer the following questions:



16. Which number represents those who drink coffee, tea and milk?  
 (1) 3 (2) 9  
 (3) 4 (4) 6

**Answer (4)**

17. Which number represents those who drink only tea and not coffee?  
 (1) 9 (2) 8  
 (3) 5 (4) 7

**Answer (2)**

18. If the product of 1K and K1 is K2K, then the letter K stands for the digit:  
 (1) 9 (2) 4  
 (3) 3 (4) 1

**Answer (4)**

19. The digit represented by L, E and T in the following addition is:

$$\begin{array}{r} \text{LEM} \\ + \text{MELT} \\ \hline 9999 \end{array}$$

- (1) 4, 5, 0 (2) 9, 4, 0  
 (3) 4, 0, 5 (4) 5, 0, 4

**Answer (1)**

**Sol.** Trial and error method.

20. The product of A8 and 3B is 2730, then the letters A and B stands for the digits:  
 (1) 8, 3 (2) 7, 5  
 (3) 5, 7 (4) 6, 5

**Answer (2)**

**Sol.** A = 7 and B = 5

By trial and error method

**Directions: (Questions: 21-23)**

Following 3 questions have a certain pattern. Each box has a single letter/digit. The letter/digit that comes in each box is in the order of:

21.  $m \ n \ | \ \square \ m \ \square \ | \ m \ n \ \square \ | \ \square \ n \ | \ |$   
 (1) l, n, l, m (2) m, n, m, m  
 (3) n, m, l, m (4) n, n, l, m

**Answer (1)**

**Sol.** Divide 4 letters one pair.

22.  $a \ \square \ b \ b \ c \ \square \ a \ a \ b \ \square \ c \ c \ a \ \square \ b \ b \ \square \ c$   
 (1) b, a, c, b, c (2) a, c, b, a, c  
 (3) a, c, b, b, c (4) a, b, c, a, b

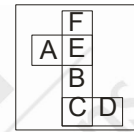
**Answer (2)**

**Sol.** Divide 6 letters one pair.

23.  $13 \ \square \ 2 \ \square \ 5 \ \square \ 6 \ 3 \ 7 \ \square \ 2$   
 (1) 4, 3, 3, 9 (2) 9, 2, 7, 3  
 (3) 2, 7, 3, 9 (4) 3, 9, 7, 2

**Answer (1)**

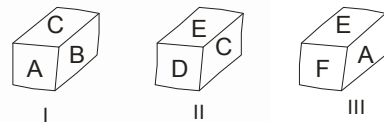
24. When the given figure is folded as a cube, which one of the formation is possible?



- (1) (2)   
 (3) (4)

**Answer (2)**

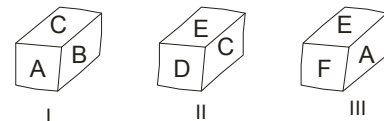
25. The different faces of a cube are shown through three folded cubes. Among the alternatives, identify the unfolded cube which represents these faces:



- (1) (2)   
 (3) (4)

**Answer (3)**

26. Name the letter on the face which is opposite to the face that has letter 'F' on it:



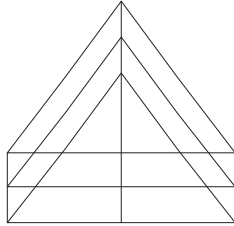
- (1) B (2) A  
 (3) E (4) C

**Answer (4)**

**Directions: (Questions: 27-29)**

Identify the number of specified Geometric shapes in the given diagrams and mark the correct answer.

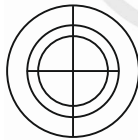
27. How many number of triangles and parallelograms are there in the given figure respectively?



- (1) 22, 17                      (2) 19, 13  
(3) 22, 15                      (4) 19, 17

**Answer (1)**

28. How many semicircles are there in the given figure?



- (1) 8                                      (2) 10  
(3) 12                                    (4) 14

**Answer (2)**

29. How many trapeziums are there in the given figure?



- (1) 20                                    (2) 22  
(3) 24                                    (4) 26

**Answer (3)**

**Directions: (Questions: 30-33)**

Read the instructions and answer the following questions.

- There are five people P, Q, R, S and T.
- Among them one plays football, one plays chess and one plays hockey.
- P and S are spinsters and not participating in any games.
- No women play chess or football.

- In the group there is one pair of married couple and T is the husband.
- Q is the brother of R and does not play chess and hockey.

30. Who is the football player?

- (1) P                                      (2) Q  
(3) R                                      (4) S

**Answer (2)**



R = Women, Play = Hockey

Q = Football

P and S did not play any game.

31. Who is the hockey player?

- (1) P                                      (2) Q  
(3) S                                      (4) R

**Answer (4)**

32. Who is the chess player?

- (1) P                                      (2) R  
(3) T                                      (4) S

**Answer (3)**

33. In the group who are the women?

- (1) P, Q, R                              (2) Q, R, S  
(3) P, Q, S                              (4) P, R, S

**Answer (4)**

**Directions: (Questions: 34-35)**

Given below are 2 matrices containing letters. The rows and columns are numbered 0 to 4 in Matrix I and 5 to 9 in Matrix II. Each letter from these matrices are represented first by its row number and the next by its column number.

Example: Letter "S" is represented as any of the following: 57, 67, 79, 86, 98.

Matrix I					
	0	1	2	3	4
0	D	V	C	P	M
1	P	M	D	V	C
2	V	C	P	M	D
3	M	D	V	C	P
4	C	P	M	D	V

Matrix II					
	5	6	7	8	9
5	S	A	U	T	J
6	T	J	S	A	U
7	A	U	T	J	S
8	J	S	A	U	T
9	U	T	J	S	A

34. Which set of numbers will represent the word DUST?

- (1) 00, 76, 86, 59
- (2) 31, 76, 98, 78
- (3) 24, 69, 55, 66
- (4) 12, 57, 67, 58

**Answer (4)**

**Sol.** According to the matrix coding.

35. Which set of numbers will represent the word PUMP?

- (1) 03, 69, 03, 34
- (2) 41, 88, 23, 43
- (3) 10, 57, 23, 34
- (4) 22, 95, 43, 41

**Answer (3)**

**Directions: (Questions: 36-37)**

Given below are 2 matrices containing letters. The rows and columns are numbered 0 to 4 in Matrix I and 5 to 9 in Matrix II. Each letter from these matrices are represented first by its row number and the next by its column number.

Example: Letter "T" is represented as any of the following: 59, 65, 76, 87, 98.

Matrix I					
	0	1	2	3	4
0	A	R	S	N	C
1	N	C	A	R	S
2	S	N	C	A	R
3	R	S	N	C	A
4	C	A	R	S	N

Matrix II					
	5	6	7	8	9
5	O	E	L	P	T
6	T	O	E	L	P
7	P	T	O	E	L
8	L	P	T	O	E
9	E	L	P	T	O

36. Which word will represent the set of numbers: 86, 12, 31, 76?

- (1) PAST
- (2) PATE
- (3) POTE
- (4) PSAT

**Answer (1)**

**Sol.** According to the matrix coding.

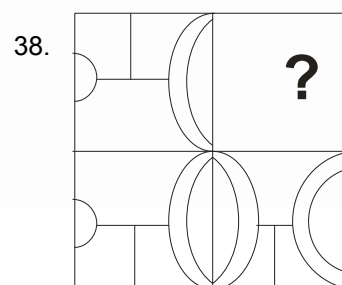
37. Which word will represent the following set of numbers: 21, 67, 14, 59?

- (1) PAST
- (2) RATE
- (3) POET
- (4) NEST

**Answer (4)**

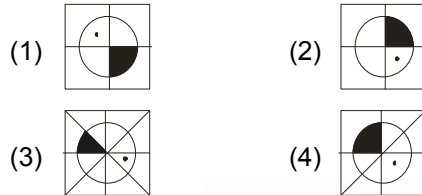
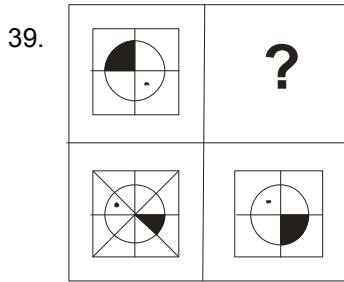
**Directions: (Questions: 38-40)**

Find the missing part of the given figure from the alternatives.

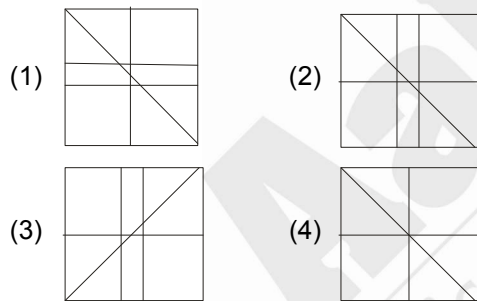
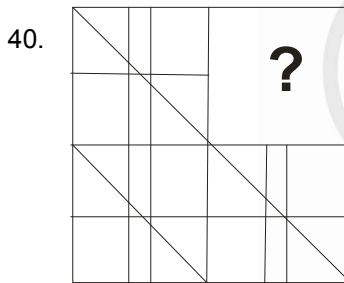


- (1)
- (2)
- (3)
- (4)

**Answer (1)**



**Answer (3)**



**Answer (2)**

**Directions: (Questions: 41-43)**

Identify the wrong number/group of letters in the series:

41. 28, 77, 14, 24, 6, 7, 3

- (1) 6 (2) 7  
(3) 14 (4) 24

**Answer (3)**

**Sol. I.** 28, 14, 6, 3

II. 77, 24, 7

I.  $2^2 - 1 = 3$

$2^3 - 2 = 6$

$2^4 - 3 =$  13

$2^5 - 4 = 28$

II.  $7 \times 3 + 3 = 24$

$24 \times 3 + 5 = 77$

Option (3) is correct.

42. 2, 34, 84, 68, 26, 12

- (1) 26 (2) 34  
(3) 68 (4) 84

**Answer (1)**

**Sol.**  $1 + 1^6 = 2$

$4 + 4^3 = 68$

$2 + 2^5 = 34$

$5 + 5^2 =$  30

$3 + 3^4 = 84$

$6 + 6^1 = 12$

Option (1) is incorrect.

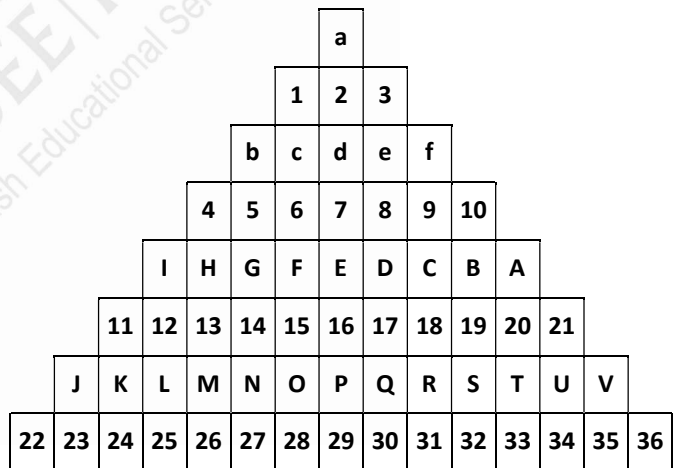
43. URCNS, VPFJX, TSBOR, WOGIY, STAQP :

- (1) WOGIY (2) TSBOR  
(3) VPFJX (4) STAQP

**Answer (4)**

**Directions: (Questions: 44-46)**

The following questions are based on the numbers and letters arranged in the pyramid pattern. Study the pattern and complete the given analogy:



44. Mb1 : Nc2 :: Sf3 : ?

- (1) Qd1 (2) Od3  
(3) Re2 (4) Qe2

**Answer (3)**

45. 26 P 19 : 32 P 13 :: 24 N 17 : ?

- (1) 34 R 15 (2) 30 N 17  
(3) 29 S 16 (4) 28 L 15

**Answer (1)**

**Sol.** Straight lines

46. GN17 : CR 15 :: [?] : e D 5

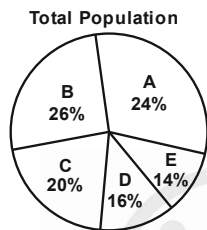
- (1) f C 6                      (2) c F 9  
(3) c F 4                      (4) b G 8

**Answer (2)**

**Sol.** According to that table.

**Directions: (Questions: 47-49)**

Study the following pie-chart and the table and answer the questions based on them:



City	% of Illiterates
A	1
B	5
C	4
D	10
E	8

47. Find the population of the city 'D' if the population of the illiterates in city 'E' is 3360:

- (1) 42,000                      (2) 48,000  
(3) 60,000                      (4) 78,000

**Answer (2)**

**Sol.**  $\frac{8}{100} \times x = 3360$

$$x = 3360 \times \frac{100}{8}$$

$$x = 42000$$

$$14\% \text{ of } D = 42,000$$

$$D = 42000 \times \frac{100}{14}$$

$$D = 300000$$

So, given  $D = 16\%$

$$\frac{16}{100} \times 300000 = 48,000$$

48. If city 'B' has 540 more illiterates than that of city 'E', what is the ratio of literates to illiterates of city B?

- (1) 26 : 5                      (2) 56 : 9  
(3) 19 : 1                      (4) 13 : 7

**Answer (3)**

**Sol.** According to given information,

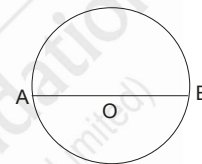
$$\frac{95}{5} = 19 : 1$$

49. What is the total percentage of illiterates of the cities A, B, C, D, E?

- (1) 2.8%                      (2) 5.06%  
(3) 28%                      (4) 72%

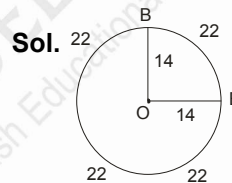
**Answer (3)**

50. Two persons 'A' and 'B' are standing on the circumference of a circular park with centre 'O' and radius 14m, facing each other, as shown in the figure. 'B' walks 22 m in anti-clockwise direction and 'A' walks 11 m in the clockwise direction along the circumference. 'B' turns 90° to his left and walks 14 m. What is the direction of 'A' with respect to 'B'?



- (1) North West                      (2) North East  
(3) South West                      (4) South East

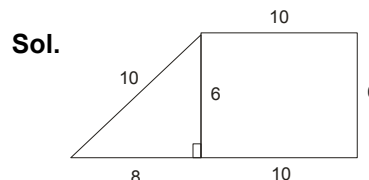
**Answer (1)**



51. A person travels 10m towards east from 'P', then turns right to travel 6 m. again turns right to travel 18m to reach 'Q'. What is the distance between 'P' and 'Q'?

- (1) 10m                      (2) 12m  
(3) 17m                      (4) 34m

**Answer (1)**



52. What was the day of the week on 16th July 1776?

- (1) Monday                      (2) Tuesday  
(3) Wednesday                      (4) Thursday

**Answer (2)**



Sol.  $1775 = 1700 + 75$

$$= \frac{1600}{0} + \frac{100}{5} + \frac{75}{18 \times 2 + 57 \times 1}$$

$$= 5 + 36 + 57$$

$$= \frac{98}{7}$$

R = 0

1776 (Leap Year)

J F M A M J J  
3 1 2 2 3 2 2

Total =  $\frac{16}{7}$  Remainder = 02 (Day)  $\longrightarrow$  Tuesday

53. On what date of March 2005 did second Saturday appear?

- (1) 8 (2) 10  
(3) 11 (4) 12

**Answer (4)**

54. First day of the year 2019 is Tuesday. Which day would the last date of the year 2020 be?

- (1) Tuesday (2) Wednesday  
(3) Thursday (4) Friday

**Answer (3)**

55. In how many of the three digit numerals 8 appears only once?

- (1) 920 (2) 702  
(3) 353 (4) 225

**Answer (2)**

56. In a class there are 40% girls and 75% of them passed in the exams. If the class result is 80%, find the fraction of the boys who passed the exam:

- (1)  $\frac{2}{3}$  (2)  $\frac{3}{4}$   
(3)  $\frac{4}{5}$  (4)  $\frac{5}{6}$

**Answer (4)**

Sol. Girls – 40, Boys – 60

Take  $x = 100$ ,  $75\%$  of  $40 = \frac{3}{4} \times 40 = 30$

But passed is  $80\% = 80$

Passed girls are = 30

Passed boys are = 50

So,  $\frac{50}{60} = \frac{5}{6}$

57. A merchant bought 5 pens each at ₹ 8 and some more pens at ₹ 6 each. He sold all the pens at ₹ 7 each and earns a total profit of ₹ 10. How many pens were bought by the merchant at ₹ 6?

- (1) 10 (2) 15  
(3) 20 (4) 25

**Answer (2)**

Sol. C.P =  $5 \times 8 + x \times 6$

C.P =  $40 + 6x$

S.P =  $7(5 + x)$

P = S.P – C.P =  $35 + 7x - 40 - 6x = 10$

$x = 15$

58. The ratio of the ages of father and daughter is 4 : 1. Ten years ago the sum of their ages was 40. What is the present age of the daughter?

- (1) 20 years (2) 15 years  
(3) 18 years (4) 12 years

**Answer (4)**

Sol. At present 10 years ago

Father 4x 4x – 10

Daughter x x – 10

$(4x - 10) + (x - 10) = 40$

$5x - 20 = 40$

$5x = 60$

$x = 12$

59. Answer the following question based on the sequence of numbers / letters given below :

5 3 8 1 9 7 4 2 6 8 4 2 7 9 1 2 3 4 7 2 1 3 6 5 1 6 3 9 2 1 3 4 7

If the sum of any two consecutive numbers is the very next number, how many times such numbers occur in given sequence?

- (1) 8 (2) 11  
(3) 13 (4) 15

**Answer (3)**

60. If the first ten letters and last ten letters of the English alphabet are written in the reverse order in the series from A to Z, then how many consonants will be there between the letters D and T?

- (1) 11 (2) 12  
(3) 13 (4) 14

**Answer (2)**

61. The missing number in the given sequence is:

- 9, 12, 11, 14, 13, \_\_\_\_\_, 15  
 (1) 12 (2) 16  
 (3) 10 (4) 17

**Answer (2)**

**Sol.** So, pattern is +3 and -1.

62. The next number in the sequence  $\frac{2}{\sqrt{3}}, 1, \frac{4}{3\sqrt{3}}, \frac{5}{9}$  is:

- (1)  $\frac{2}{\sqrt{3}}$  (2)  $\frac{3}{3\sqrt{3}}$   
 (3)  $\frac{2}{3\sqrt{3}}$  (4)  $\frac{4}{\sqrt{3}}$

**Answer (3)**

**Sol.** Multiply  $\frac{3}{2\sqrt{3}}, \frac{4}{3\sqrt{3}}, \frac{5}{4\sqrt{3}}, \frac{6}{5\sqrt{3}}$

So,  $= \frac{2}{3\sqrt{3}}$

63. The next number in the sequence 2, 6, 12, 20, 30, 42 is:

- (1) 86 (2) 42  
 (3) 56 (4) 66

**Answer (3)**

**Sol.** Series is add +4, +6, +8, +10, +12, +14

64. The next number in the sequence  $\frac{1}{81}, \frac{1}{54}, \frac{1}{36}, \frac{1}{24}$  is:

- (1)  $\frac{1}{32}$  (2)  $\frac{1}{9}$   
 (3)  $\frac{1}{18}$  (4)  $\frac{1}{16}$

**Answer (4)**

**Sol.** Multiply by  $\frac{3}{2}$  to get next term

**Directions: (Questions: 65-68)**

Complete the given letter/word analogy by choosing the correct answer from the four alternates given below:

65. ACEG : DFHJ :: QSUW : ?

- (1) KMNP (2) MNPR  
 (3) TQST (4) TVXZ

**Answer (4)**

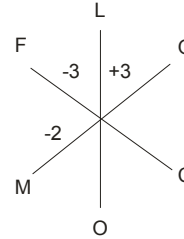
**Sol.** According to place values.

66. FLO : MOC :: RDP : ?

- (1) MGP (2) NGO  
 (3) GMP (4) MPG

**Answer (2)**

**Sol.** Difference is -2, +3, -3



Similarly, NGO is a answer.

67.  $\frac{2}{3} : \frac{30}{6} :: ? : \frac{222}{30}$

- (1)  $\frac{5}{4}$  (2)  $\frac{4}{5}$   
 (3)  $\frac{5}{6}$  (4)  $\frac{6}{5}$

**Answer (4)**

**Sol.**  $\frac{2}{3} : \frac{30}{6} :: ? : \frac{222}{30}$

$2^5 = 32 - 2 = 30, 6^3 + 6 = 216 + 6 = 222$

$3^2 = 9 - 3 = 6, 5^2 + 5 = 25 + 5 = 30$

So,  $\frac{6}{5}$  is a correct answer.

68. 337, 211, 121, ?, 25, 7

- (1) 41 (2) 61  
 (3) 75 (4) 85

**Answer (2)**

**Sol.** Subtract  $18 \times 7, 18 \times 5, 18 \times 3, 18 \times 2, 18 \times 1$

**Directions: (Questions: 69-72)**

In the given questions there are four groups of numbers/pairs of numbers/group of letters of which three are alike and one is different. Identify the one which is different:

69. (1) 216 (2) 841  
 (3) 676 (4) 784

**Answer (1)**

**Sol.** Because it is not a perfect square.

70. (1) 616 (2) 323  
 (3) 244 (4) 482

**Answer (All options are correct)**

**Sol. (i)** Digit sum  $\rightarrow 6 + 1 + 6 = 13 \rightarrow$  Prime  
 $3 + 2 + 3 = 8$   
 $2 + 4 + 4 = 10$   
 $4 + 8 + 2 = 14$   $\rightarrow$  All composite

Option (1)

(ii) Final digit sum

$6 + 1 + 6 \Rightarrow 13 \Rightarrow 1 + 3 \Rightarrow 4$   
 $3 + 2 + 3 \Rightarrow 8 \Rightarrow 8$   
 $2 + 4 + 4 \Rightarrow 10 \Rightarrow 1 + 0 \Rightarrow 1$   
 $4 + 8 + 2 \Rightarrow 14 \Rightarrow 1 + 4 \Rightarrow 5$  } Non-prime  
 Prime

Option (4)

(iii) Except option (2) all are even.

(iv)  $616 \rightarrow 6 \times 1 \times 6 \rightarrow 36 \rightarrow 3 + 6 = 9$   
 $323 \rightarrow 3 \times 2 \times 3 \rightarrow 18 \rightarrow 1 + 8 = 9$   
 $244 \rightarrow 2 \times 4 \times 4 \rightarrow 32 \rightarrow 3 + 2 = 5$   
 $482 \rightarrow 4 \times 8 \times 2 \rightarrow 64 \rightarrow 6 + 4 = 10$  } Comp.  
 Prime

Option (3)

All options (1, 2, 3 and 4) are correct.

71. (1) FNTNR (2) MPTMV  
 (3) UWYUZ (4) FILFP

**Answer (1)**

72. (1) 1278 (2) 3197  
 (3) 2389 (4) 5298

**Answer (4)**

73. At what time between 3 O' clock and 4 O' clock are the hands of a clock are together?

- (1)  $16\frac{4}{11}$  minutes past 3  
 (2)  $16\frac{5}{11}$  minutes past 3  
 (3)  $16\frac{6}{11}$  minutes past 3  
 (4)  $16\frac{3}{11}$  minutes past 3

**Answer (1)**

**Sol.**  $\frac{2}{11}(3 \times 30 \pm 0^\circ) = 16\frac{4}{11}$

74. What is the angle between the hands of a clock at 15 minutes past 5?

- (1)  $72\frac{1}{2}^\circ$  (2)  $67\frac{1}{2}^\circ$   
 (3)  $58\frac{1}{2}^\circ$  (4)  $64\frac{1}{2}^\circ$

**Answer (2)**

**Sol.**  $\theta = \frac{135}{2} = 67\frac{1}{2}$

75. At what time between 4 and 5 will the hands of a clock are mutually in opposite directions?

- (1)  $54\frac{8}{9}$  minutes past 4  
 (2)  $54\frac{6}{11}$  minutes past 4  
 (3)  $54\frac{5}{11}$  minutes past 4  
 (4)  $54\frac{6}{14}$  minutes past 4

**Answer (2)**

**Sol.**  $\frac{2}{11}[120^\circ \pm 180^\circ], \frac{600}{11} = 54\frac{6}{11}$  minutes past 4.

**Directions: (Questions 76-77)**

In the given equations find which of the following interchange of signs/numbers would make the equations correct.

76.  $10 + 10 \div 10 - 10 \times 10 = 10$

- (1) + and - (2) + and  $\div$   
 (3) + and  $\times$  (4)  $\div$  and  $\times$

**Answer (3)**

77.  $5 + 6 \times 3 \div 2 - 4 = 6 \times 4 \div 2 + 3 - 2$

- (1) 5 and 6 (2) 6 and 3  
 (3) 4 and 2 (4) 2 and 3

**Answer (2)**

78. When - and  $\times$ , 3 and 6 are interchanged find which of the following equations would be correct:

- (1)  $6 - 3 \times 2 = 9$  (2)  $3 \times 6 - 4 = 14$   
 (3)  $3 \times 6 - 4 = 33$  (4)  $3 - 6 \times 8 = 10$

**Answer (4)**

79. Seven persons Anil, Bharat, Chand, Dinesh, Eshwar, Ravi, Ganesh, who have gathered at a picnic spot are sitting in row facing a photographer:

- (a) Chand and Dinesh are sitting next to each other.  
 (b) There are exactly four persons between Bharat and Ganesh.  
 (c) Dinesh is sitting to the immediate right of Bharat.

If Anil and Eshwar are separated exactly by two persons then who is sitting to the left of Ganesh?

- (1) Anil (2) Eshwar  
(3) Ravi (4) Chand

**Answer (3)**

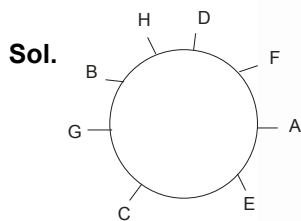
**Sol.** B D C A R G E

80. Four women A, B, C and D and four men E, F, G and H are sitting around circular table facing the center:

- (a) No two women or two men are sitting side by side.  
(b) C, who is sitting between G and E, is facing D.  
(c) F is sitting between D and A and is facing G.  
(d) H is sitting to the right of B. Then who is facing E?

- (1) F (2) B  
(3) G (4) H

**Answer (4)**



**Directions: (Questions: 81-84)**

Complete the given number analogy by choosing the correct answer from the four options given below:

81.  $12 : 864 :: 18 : \square$

- (1) 1624 (2) 1824  
(3) 1260 (4) 2916

**Answer (4)**

**Sol.**  $(12)^2 \times \frac{12}{2} = 864$

$$(18)^2 \times \frac{18}{2} = 2916$$

82.  $143 : 120 :: 221 : \square$

- (1) 168 (2) 189  
(3) 196 (4) 220

**Answer (1)**

**Sol.**  $143 = 11 \times 13$

$$120 = 11^2 - 1$$

$$221 = 13 \times 17$$

$$168 = 13^2 - 1$$

83.  $3541 : 6874 :: 2613 : \square$

- (1) 2136 (2) 5946  
(3) 5225 (4) 6135

**Answer (2)**

**Sol.** Add 4 times 3.

84.  $6 : 149 : 142 :: 7 : \square : \square$

- (1) 165, 158 (2) 198, 205  
(3) 201, 194 (4) 389, 374

**Answer (3)**

**Sol.**  $6 \times 2 = (12)^2 = 144 + 5$  (Add)

$$= 149 - 7$$
 (Sub)

$$= 142$$

Similarly,  $7 \times 2 = (14)^2 = 196 + 5$

$$= 201 - 7$$

$$= 194$$

**Directions: (Questions: 85-87)**

The words are given under Column-I. Their codes are given under Column-II. The order of coding for the letters of the word in the Column-I do not follow the same order in the Column-II. Find the codes for the letters of words in Column-I and find the codes for the given words in questions:

Column-I	Column-II
KIN	qpf
SON	nql
AVE	ecx
DUST	dknb
LOAN	xlmq
TAKE	bcpX

85. ANKLE

- (1) p q x m c (2) x q p m c  
(3) x p q m c (4) x q p c m

**Answer (2)**

86. STUDENT

- (1) n b k d q c b (2) p b d k q c b  
(3) n x k d c q b (4) n b d k c q b

**Answer (4)**

87. SOLUTION

- (1) n l m d b f l q      (2) n l m b d f q l  
 (3) n l m k b f l q      (4) l m n b d q l f

**Answer (1 or 3)**

**Directions: (Questions: 88-89)**

There are five floors in a school building, with one balcony in each floor. They are indicated as 1st, 2nd, 3rd, 4th and 5th floor from the ground. Four students A, B, C and D decide to keep potted plants in the balcony. Only one student is allowed to keep a pot in one balcony. 'A' keeps a pot two floors below where 'C' keeps and 'D' keeps a pot one floor above where 'B' keeps. One balcony is left vacant:

88. If 'A' places the pot in 3rd floor balcony then, which of the following is true?  
 (1) 'B' places pot in the first floor balcony  
 (2) 'C' places pot in the first floor balcony  
 (3) Second floor balcony is empty  
 (4) 'D' places pot in the fifth floor balcony

**Answer (1)**

**Sol.**

5	4	3	2	1
C	-	A	D	B

89. If second floor balcony is vacant then where 'C' can place the pot?  
 (1) In the first floor balcony  
 (2) In the third floor balcony  
 (3) In the fourth floor balcony  
 (4) In the fifth floor balcony

**Answer (2)**

**Sol.**

5	4	3	2	1
D	B	C	-	A

90. Take the given statements as true and decide which of the following conclusions follow logically from these statements:  
 Statements:  
 (a) All mobiles are laptops  
 (b) No laptop is a tablet  
 (c) All laptops are supercomputers

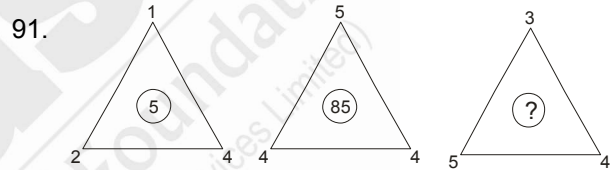
**Conclusions:**

- I. No mobile is a tablet  
 II. No supercomputer is a tablet  
 III. Some supercomputers are tablets  
 IV. All laptops are mobiles  
 (1) Only conclusion II follows along with I  
 (2) Only conclusion IV follows along with I  
 (3) Only conclusions II or III follows along with I  
 (4) Only conclusion IV follows along with II

**Answer (3)**

**Directions: (Questions: 91-92)**

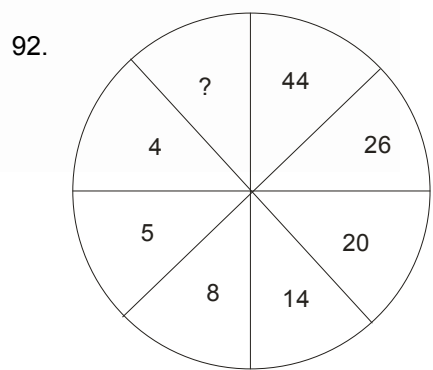
In the questions given below the numbers in the figures are related. Identify their relationship and find the missing number in the given figure:



- (1) 60                      (2) 63  
 (3) 130                    (4) 144

**Answer (3)**

**Sol.**  $2^3 - 4 + 1^2 = 5$ ,  
 $4^3 - 4 + 5^2 = 85$



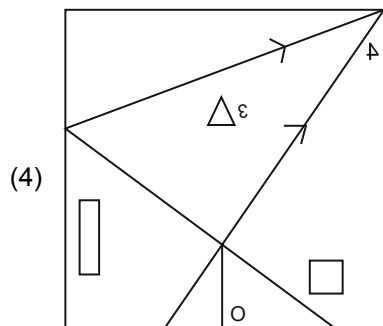
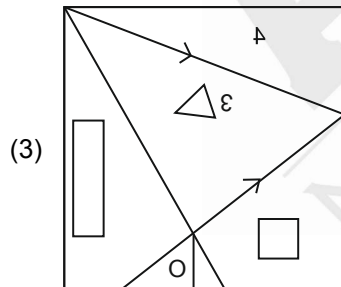
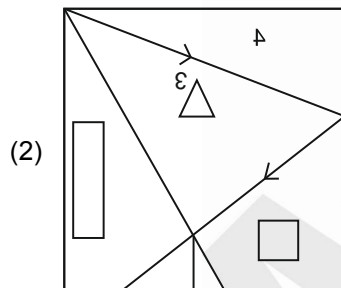
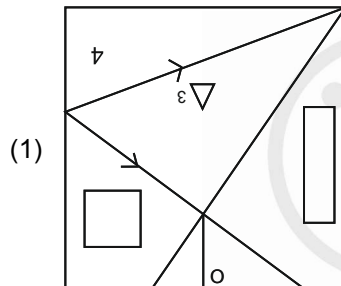
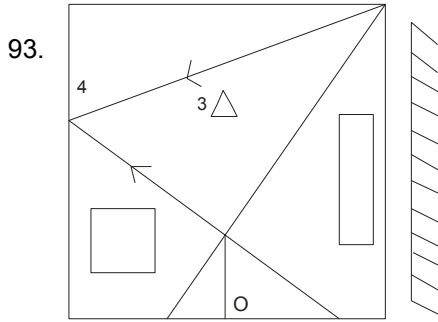
- (1) 82                      (2) 50  
 (3) 76                      (4) 80

**Answer (4)**

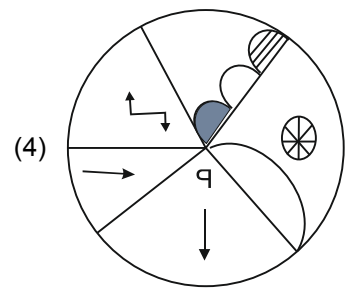
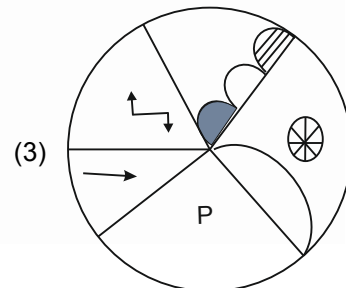
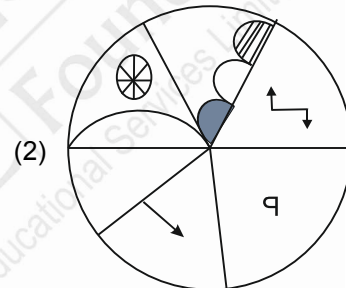
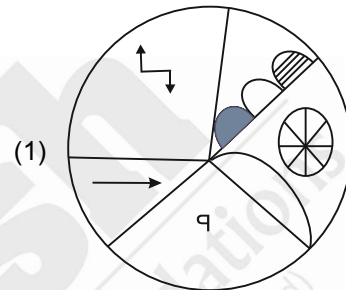
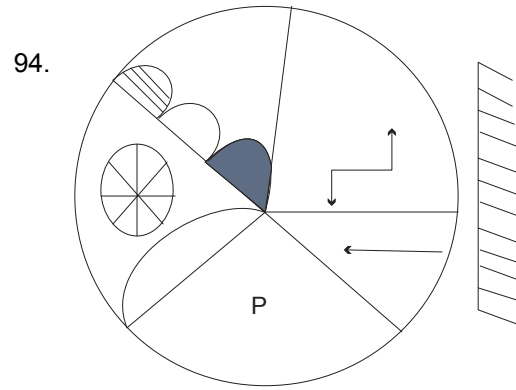
**Sol.**  $4 \times 6 - 4 = 20$   
 $5 \times 6 - 4 = 26$

**Directions: (Questions: 93-94)**

Find the correct mirror image for the following problem figure choosing from the given options:



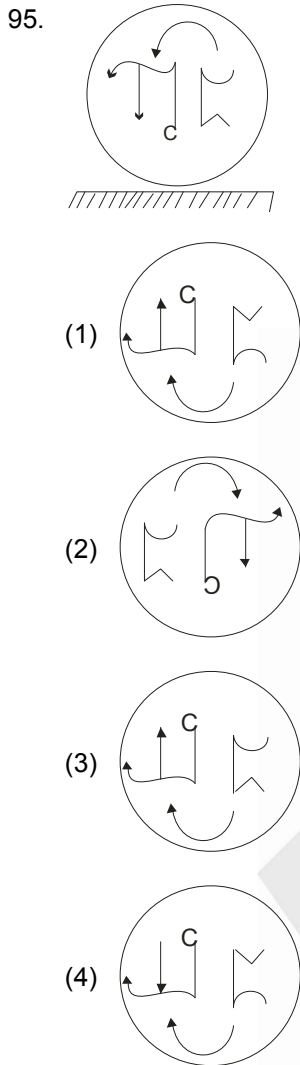
**Answer (3)**



**Answer (1)**

**Directions: (Questions: 95-96)**

Find the correct water image for the following problem figure choosing from the four options:



**Answer (3)**



- (1) K j S k 2 Γ i w Q t
- (2) K ! 2 K 2 Γ i w Q t
- (3) K ! 2 k 2 Γ i w Q t
- (4) K ! 2 K 2 Γ ! w Q t

**Answer (No Option is matching)**

**Directions: (Questions: 97-98)**

In each questions given below statement is given, followed by two conclusions. Assume the given statement to be true and decide which of the given conclusions logically follow from the statement:

97. **Statement:** If you are focussed and disciplined, then only you will become successful.
- Conclusions: (I)** One who is focussed and has a disciplined mind can achieve success.
- (II)** Without discipline there is a possibility of achieving success.
- (1) Both conclusions I and II follow
  - (2) Only conclusion I follows
  - (3) Only conclusion II follows
  - (4) Neither conclusion I nor II follows

**Answer (2)**

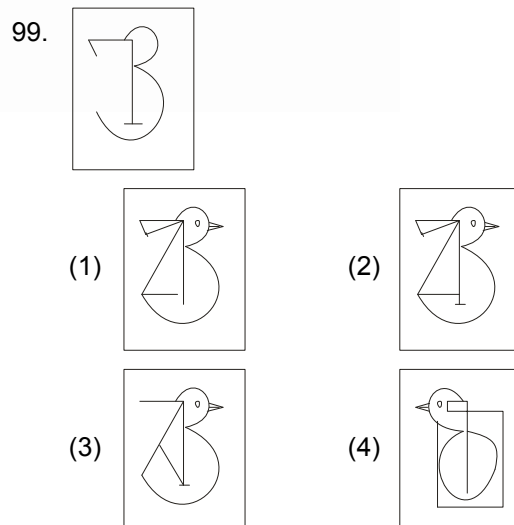
98. **Statement:** "High IQ (Intelligence Quotient) is mandatory to become a scientist".

- Conclusions: (I)** All students with high IQ become scientist.
- (II)** A student with an average I.Q. may also become a scientist.
- (1) Only conclusion I follows
  - (2) Only conclusion II follows
  - (3) Both conclusions I and II follows
  - (4) Neither conclusions I nor II follow

**Answer (4)**

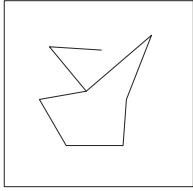
**Directions: (Questions: 99-100)**

In the questions below, a problem figure is given. The problem figure is hidden in one of the figures given below. Pick the correct option:

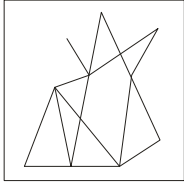


**Answer (2)**

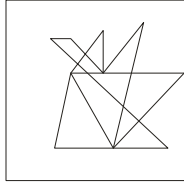
100.



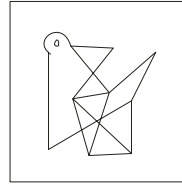
(1)



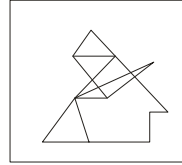
(2)



(3)



(4)



**Answer (3)**





## PART-II : SCHOLASTIC APTITUDE TEST (SAT)

1. A house hold consumes 1 kWh of energy per day. This energy in joules is

- (1)  $3.6 \times 10^5$  J            (2)  $6.3 \times 10^5$  J  
 (3)  $6.3 \times 10^6$  J            (4)  $3.6 \times 10^6$  J

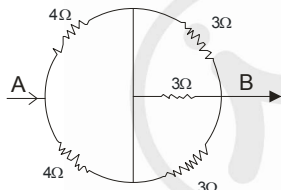
**Answer (4)**

**Sol.** 1 kWh = 1000 × 3600 Js

$$1 \text{ kWh} = 3.6 \times 10^6 \text{ J}$$

2. Resistors are connected as shown in the circuit diagram.

The effective resistance between A and B is



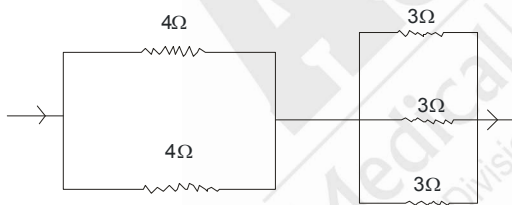
- (1) 3 Ω                            (2) 3.5 Ω  
 (3) 11 Ω                        (4) 5.5 Ω

**Answer (1)**

**Sol.** Combination of resistors:

The two 4 Ω are in parallel and the three 3 Ω are in parallel and their combination in series.

$$R = 3 \Omega$$



3. Two steel balls of mass 1 kg and 2 kgs and a lead ball of 10 kgs are released together from the top of tower 30 m high. Assuming the path to be in vacuum:

- (1) The lead ball reaches the ground earlier  
 (2) The 1 kg iron ball reaches the ground earlier  
 (3) All the balls reach the ground simultaneously  
 (4) The 2 kgs steel ball reaches the ground earlier

**Answer (3)**

**Sol.** Time of flight  $t = \sqrt{\frac{2h}{g}}$  it is independent of mass,

hence all three will fall together.

4. The maximum number of 60 W bulbs that can be run from the main supply of 220 V if you do not want to overload a 5 A fuse:

- (1) 18                            (2) 11  
 (3) 20                            (4) 10

**Answer (1)**

**Sol.** We know that,  $P = VI$

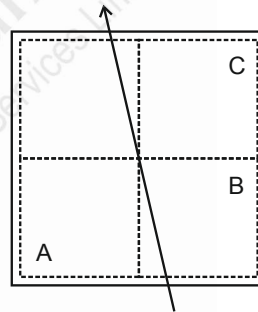
$$60 = 220 \times I$$

$$I = \frac{60}{220} \text{ for single bulb}$$

$$\text{Therefore for 'n' bulbs } 5 = n \times \frac{6}{22}$$

$$n = 18$$

5. The diagram shows a current carrying wire passing through the centre of a square cardboard. The magnetic field at points A, B and C is:



- (1) Equal at A,B and C  
 (2) Stronger at B than A, equal at B and C  
 (3) Stronger at B than C, weaker at B than A  
 (4) Stronger at B than A, weaker at C than A

**Answer (4)**

**Sol.** We know that  $B \propto \frac{1}{d}$

$$d_C > d_A > d_B$$

$$\text{Therefore, } B_B > B_A > B_C$$

Stronger at B than A, weaker at C than A.

6. The solar constant at a place is 1.4 kW/m<sup>2</sup>. The solar energy received by an area of 4 m<sup>2</sup> per second at this place is

- (1) 6.5 kJ                        (2) 6.5 J  
 (3) 5.6 J                        (4) 5.6 kJ

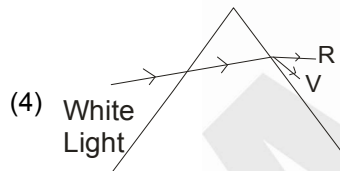
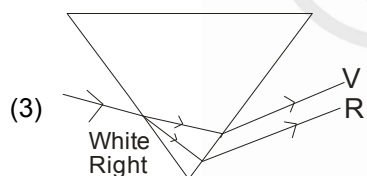
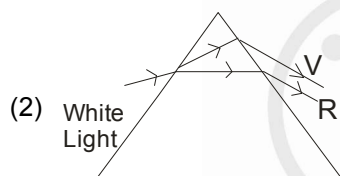
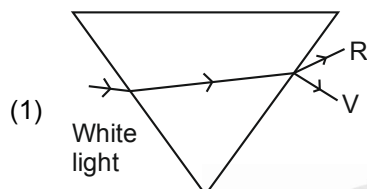
**Answer (4)**

**Sol.** Solar constant =  $\frac{E}{Axt}$

$E = 1.4 \times 10^3 \times 4 \times 1$

$E = 5.6 \text{ kJ}$

7. While performing an experiment of dispersion of white light through a prism, four students represented the dispersion pattern as shown below. Identify the correct representation:



**Answer (3)**

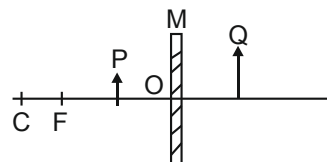
**Sol.** As the white light passes through prism different colours will undergo deviation to different extent due to difference in their wavelengths, Violet undergoes more deviation compared to Red.

8. A spherical mirror and a thin spherical lens each of focal length  $-10 \text{ cm}$  are given. The mirror and lens are likely to be:
- (1) The mirror is concave mirror and the lens is concave lens
  - (2) The mirror is convex mirror and the lens is convex lens
  - (3) The mirror is convex mirror and the lens is concave lens
  - (4) The mirror is concave mirror and the lens is convex lens

**Answer (1)**

**Sol.** By sign convention, focal length is negative for concave mirror and concave lens.

9. In the following diagram 'M' is a mirror and 'P' is an object and 'Q' is its magnified image of 'P' formed by the mirror. The mirror 'M' is



- (1) Concave mirror
- (2) Convex mirror
- (3) Planar mirror
- (4) Plano convex mirror

**Answer (1)**

**Sol.** The image formed is virtual, erect and enlarged therefore the mirror is concave.

10. A person takes hot coffee by pouring it into the saucer when he is in hurry because he knows that:
- (1) The latent heat of steam is high and the coffee will become cold quickly
  - (2) The evaporation increases with the increase in surface area and the cooling of coffee is faster
  - (3) Part of heat will be absorbed by saucer and coffee become cold quickly
  - (4) The high specific heat of water makes the coffee cold quickly

**Answer (2)**

**Sol.** Evaporation is a surface phenomena, as surface area increases the rate of evaporation increases which causes cooling effect.

11. The energy released when 3 g of a material is completely converted into energy during a nuclear reaction is (given, speed of light =  $3 \times 10^8 \text{ m/sec}$ ):
- (1)  $27 \times 10^{16} \text{ J}$
  - (2)  $27 \times 10^{14} \text{ J}$
  - (3)  $27 \times 10^{19} \text{ J}$
  - (4)  $27 \times 10^{13} \text{ J}$

**Answer (4)**

**Sol.**  $E = mc^2$

$E = 3 \times 10^{-3} \times (3 \times 10^8)^2$

$E = 27 \times 10^{13} \text{ J}$

12. Consider the following Assertion and the Reason and select the correct alternative:

**Assertion (A):** Alloys are used in electric heating devices.

**Reasons (R):** Alloys do not oxidise readily at high temperature.

- (1) A is true and R is true but R is not the correct explanation of A  
 (2) Both A and R are false  
 (3) Both A and R are true and R is the correct explanation of A  
 (4) A is false R is true

**Answer (3)**

**Sol.** A: True as alloys have high melting point.

B: True as alloys do not get deformed readily.

Both A and R are true and R is the correct explanation of A.

13. Consider the following statements and select the correct alternative:

**Statement (A):** The frequency of the sound wave whose wavelength is 1.5 cm with speed 339 m/s is 22600 Hz.

**Statement (B):** The given sound is audible to human being.

- (1) Statement A is true, Statement B is false  
 (2) Both statements A and B are true  
 (3) Statement A is false, Statement B is true  
 (4) Both Statements A and B are false

**Answer (1)**

**Sol.** A:  $v = 339 \text{ ms}^{-1}$

$$\lambda = 1.5 \text{ cm}$$

$$\text{WKT } v = f\lambda$$

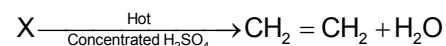
$$f = \frac{339 \times 100}{1.5}$$

$$f = 22,600 \text{ Hz}$$

B: As f is greater than 20,000Hz it is not audible by human beings

Statement A is true, B is false.

14. A reaction is described below,  
 $2\text{Na} + \text{X} \rightarrow \text{Sodium ethoxide} + \text{Hydrogen}$

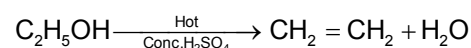


Identify 'X':

- (1)  $\text{CH}_3 - \text{COOH}$       (2)  $\text{CH}_3 - \text{CHO}$   
 (3)  $\text{CH}_3 - \text{CH}_2 - \text{OH}$       (4)  $\text{CH}_3 - \text{CH}_3$

**Answer (3)**

**Sol.**  $2\text{Na} + 2\text{CH}_3 - \text{CH}_2 - \text{OH} \rightarrow 2\text{C}_2\text{H}_5\text{ONa} + \text{H}_2$   
Sodium ethoxide



15. Match the salts with their common name.

Hydrated Salt		Common Name	
A	$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	i	Gypsum
B	$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	ii	Green Vitriol
C	$\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$	iii	Blue Vitriol
D	$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$	iv	Epsom

- (1) A-iv, B-iii, C-ii, D-i  
 (2) A-iv, B-ii, C-i, D-iii  
 (3) A-iv, B-ii, C-iii, D-i  
 (4) A-iv, B-i, C-iii, D-ii

**Answer (1)**

**Sol.**  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$  called as Epsom salt

$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  called as Blue vitriol

$\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$  called as Green vitriol

$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$  called as Gypsum

16. The volume occupied by half a mole of a gas at standard temperature and pressure is:

- (1) 5.6 L                                      (2) 11.2 L  
 (3) 22.4 L                                    (4) 2.8 L

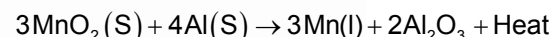
**Answer (2)**

**Sol.** At STP one mole of any gas occupies 22.4 L of volume

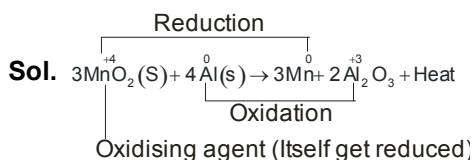
$$1 \text{ mole} \rightarrow 22.4 \text{ L}$$

$$0.5 \text{ mole} \rightarrow 11.2 \text{ L}$$

17. Choose the correct statements about the given chemical reaction:



- a) Reaction is exothermic.  
 b) Al is acting as oxidizing agent.  
 c)  $\text{MnO}_2$  is getting reduced.  
 d) Al is more reactive than Mn.  
 (1) a, c and d                              (2) a, b and c  
 (3) a, b and d                              (4) a, b c and d

**Answer (1)**

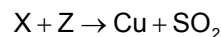
18.  $\text{NH}_3$  gas can be dried by passing it over:

- (1) Concentrated  $\text{H}_2\text{SO}_4$
- (2)  $\text{P}_2\text{O}_5$
- (3) Anhydrous  $\text{CaCl}_2$
- (4)  $\text{CaO}$

**Answer (4)**

**Sol.**  $\text{NH}_3$  reacts with all other drying agents except  $\text{CaO}$ .

19.  $\text{X} + \text{Y} \rightarrow \text{Z} + \text{SO}_2$



Identify X, Y and Z:

- (1)  $\text{X} - \text{Cu}_2\text{O}$ ,  $\text{Y} - \text{H}_2\text{SO}_4$  and  $\text{Z} - \text{Cu}_2\text{S}$
- (2)  $\text{X} - \text{Cu}_2\text{S}$ ,  $\text{Y} - \text{H}_2\text{S}$  and  $\text{Z} - \text{Cu}_2\text{O}$
- (3)  $\text{X} - \text{Cu}_2\text{S}$ ,  $\text{Y} - \text{O}_2$  and  $\text{Z} - \text{Cu}_2\text{O}$
- (4)  $\text{X} - \text{Cu}_2\text{S}$ ,  $\text{Y} - \text{H}_2\text{SO}_4$  and  $\text{Z} - \text{Cu}_2\text{O}$

**Answer (3)**

**Sol.**  $2\text{Cu}_2\text{S} + 3\text{O}_2 \rightarrow 2\text{Cu}_2\text{O} + 2\text{SO}_2$  } Self reduction or  
 $\text{Cu}_2\text{S} + 2\text{Cu}_2\text{O} \rightarrow 6\text{Cu} + \text{SO}_2$  } Auto reduction

20. Identify the correct order of elements according to their metallic character:

- (1)  $\text{K} > \text{Na} > \text{Li} > \text{Mg}$
- (2)  $\text{K} > \text{Na} > \text{Mg} > \text{Li}$
- (3)  $\text{K} > \text{Mg} > \text{Na} > \text{Li}$
- (4)  $\text{K} > \text{Li} > \text{Na} > \text{Mg}$

**Answer (1)**

**Sol.** In a group top to bottom metallic nature increase  
 $\text{K} > \text{Na}$

In a period left to right metallic nature decreases  
 $\text{Na} > \text{Mg}$

Group I metals are more metallic than group II  
 $\text{K} > \text{Na} > \text{Li} > \text{Mg}$

21. Consider the elements of group-14. Choose the correct alternative:

- a) Si and Ge are semi conductors
  - b) Carbon and silicon are non-metals
  - c) Sn and Pb are metals
  - d) Si and Ge are metalloids
- (1) a, b, c and d
  - (2) a, b and d
  - (3) a, c and d
  - (4) a, b and c

**Answer (3)**

**Sol.**

C	Si	Ge	Sn	Pb
Nonmetal	Metalloids		Metals	

In a group top to bottom metallic nature increases.

22. The following statements applies to  $\text{SO}_2$  but NOT to  $\text{H}_2\text{S}$ .

- (1) The gas is soluble in water
- (2) It is an oxidising as well as a reducing agent
- (3) It is a dibasic acid
- (4) It is easily liquefiable

**Answer (2)**

**Sol.**  $\text{SO}_2$  acts as oxidising agent as well as reducing agent. But  $\text{H}_2\text{S}$  acts as only reducing agent.

23. **Statement (A):** Iron does not burn on heating.

**Statement (B):** Iron fillings burn vigorously, when sprinkled in the flame of the burner.

- (1) Both the statements 'A' and 'B' are true
- (2) Both the statements 'A' and 'B' are false
- (3) Statement 'A' is true, but statement 'B' is false
- (4) Statement 'A' is false, but statement 'B' is true

**Answer (1)**

**Sol.** Huge mass of iron can't attain its ignition temperature by heating. Hence iron does not burn on heating. But in the case of iron filling burn vigorously when sprinkled on the flame of the burner due to attain its ignition temperature by more surface area exposed to fire.

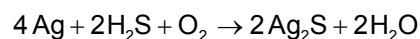
24. **Assertion (A):** Silver articles becomes black after some time when exposed to air.

**Reason (R):** It reacts with oxygen in the air to form a coating of silver oxide.

- (1) 'A' and 'R' are correct and 'R' is the correct explanation of 'A'
- (2) 'A' and 'R' are correct, but 'R' is not the correct explanation of 'A'
- (3) 'A' is true but 'R' is false
- (4) Both 'A' and 'R' are false

**Answer (3)**

**Sol.** Silver articles becomes black after sometime when exposed to air due to formation of  $\text{Ag}_2\text{S}$



25. **Assertion (A):** Calcium ( $Z=20$ ) and Argon ( $Z=18$ ) are examples for isobars.

**Reason (R):** The total number of nucleons is same in the atoms of this pair of elements.

Select the correct option from the given alternatives:

- (1) 'A' and 'R' are correct and 'R' is the correct explanation of 'A'
- (2) 'A' and 'R' are correct, but 'R' is not the correct explanation of 'A'
- (3) 'A' is true but 'R' is false
- (4) Both 'A' and 'R' are false

**Answer (1)**

**Sol.** Calcium ( $Z = 20$ ) and Argon ( $Z = 18$ ) have same mass number hence called as isobars. Isobars have same mass numbers but different atomic numbers. Total number of nucleons (protons + neutrons) equal to mass number

26. The compounds which do not undergo hydrogenation

- (1)  $C_6H_{12}$  and  $C_4H_{10}$
- (2)  $C_8H_{10}$  and  $C_5H_{12}$
- (3)  $C_{13}H_{24}$  and  $C_{14}H_{28}$
- (4)  $C_{14}H_{30}$  and  $C_5H_{12}$

**Answer (4)**

**Sol.** Both  $C_{14}H_{30}$  and  $C_5H_{12}$  follow same general formula  $C_nH_{2n+2}$  which is alkane.

Alkanes participates in substitution reaction instead of addition (Hydrogenation) reactions.

27. **Assertion (A):** During the day plants do not release  $CO_2$ .

**Reason (R):**  $CO_2$  generated during respiration is used for photosynthesis.

- (1) 'A' is true and 'R' is false
- (2) 'A' is false and 'R' is true
- (3) Both 'A' and 'R' is true and 'R' explains 'A'
- (4) Both 'A' and 'R' is true but 'R' doesn't explain 'A'

**Answer (3)**

**Sol.** During day plants respire but do not release  $CO_2$  as they use it for photosynthesis.

28. The following statements about blood vessels is/are correct.

- (A) Arteries have thin and less muscular walls
- (B) Walls of veins are non-elastic
- (C) Arteries have no valves in their inner lining
- (D) Veins do not collapse when empty

- (1) A and D
- (2) Only D
- (3) B and C
- (4) A and C

**Answer (3)**

**Sol.** Arteries are thick & have muscular walls

Veins collapse when empty

Hence, these options A & D are false and B & C are correct.

29. Remarkable reduction in blood pressure affects normal functioning of the kidney as follows:

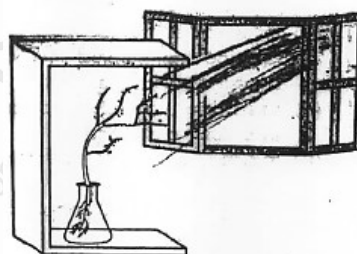
- (1) Reduces secretion of nitrogenous wastes
- (2) Reduces renal filtration
- (3) Reduces reabsorption of useful materials
- (4) Reduces tubular secretion.

**Answer (2)**

**Sol.** If, there is less blood pressure, it directly affects the glomerular filtration.

If the filtration is reduced, then the other processes like removal of nitrogenous waste are also affected which leads to abnormal kidney functioning.

30. The changes that are likely to happen in the plant in the following picture:



- (A) A hormone abscisic acid is synthesized at the shoot tip
- (B) When light is coming from one side of the plant, auxin diffuses towards the shady side of the plant
- (C) Abscisic acid helps the cells to grow longer
- (D) Cells grow longer on the side of the shoot which is away from light

Select the correct option.

- (1) A and B
- (2) B and C
- (3) C and D
- (4) B and D

**Answer (4)**

**Sol.** Auxin is synthesized in root tip.

Cytokinin helps the cells to grow longer.

Hence B & D are correct statements related to picture.

31. Choose the most appropriate statement from the options listed below that explains the factors which affects transpiration.

- (A) If the wind blows faster, the water vapour released during transpiration is factor.  
 (B) Increase in atmospheric pressure increases the rate of transpiration.  
 (C) Decrease in temperature allows more water to evaporate.  
 (D) High humidity in the air increases the rate of transpiration.

- (1) A only                      (2) B and C only  
 (3) D only                      (4) A and D only

**Answer (1)**

**Sol.** Because increase in atm. Pressure decreases rate of transpiration.

Decrease in temp allows less water to evaporate.

High humidity in air decreases rate of transpiration.

32. Match column-I with column-II and identify the correct answer:

Column-I		Column-II	
<b>A</b>	Insulin	<b>i</b>	Promotes tissue metabolism
<b>B</b>	Thyroxine	<b>ii</b>	Stimulates milk secretion
<b>C</b>	Antidiuretic Hormone (ADH)	<b>iii</b>	Testosterone secretion
<b>D</b>	Oxytocin	<b>iv</b>	Promotes glucose utilization by the body cells
		<b>v</b>	Increase reabsorption of water from kidney

- (1) A-iv, B-i, C-v, D-ii  
 (2) A-ii, B-iii, C-iv, D-i  
 (3) A-iii, B-v, C-i, D-ii  
 (4) A-v, B-i, C-ii, D-iii

**Answer (1)**

**Sol.** A-iv, B-i, C-v, D-ii

33. The correct route that sperm follows when it releases from the testis of a mammal:

- (1) Vas deferens → Epididymis → Urethra  
 (2) Urethra → Epididymis → Vas deferens  
 (3) Epididymis → Urethra → Vas deferens  
 (4) Epididymis → Vas deferens → Urethra

**Answer (4)**

**Sol.** Epididymis → Vas deferens → Urethra

34. Pattern baldness is more common in males than in females due to:

- (1) dominant genes of such traits are found in the 'X' chromosome  
 (2) dominant genes of such traits are found in the 'Y' chromosome  
 (3) recessive genes of such traits are found in the 'X' chromosome  
 (4) recessive genes of such traits are found in the 'Y' chromosome

**Answer (3)**

**Sol.** It is an autosomal sex influenced trait seen in both males & females, but expressed evidently in one sex.

∴ It is X-linked recessive gene [If it was Y, it would not be present in females]

It is recessive because, it is less common in females, which means it is expressed only in homozygous condition. i.e.,  $X^{PB}X^{PB}$

If it was dominant, then most females show pattern baldness even if one of the sex chromosome has this gene i.e.,  $X^{PB}X$ .

35. An useful biological indicator of  $SO_2$  pollution:

- (1) Bryophytes                      (2) Algal bloom  
 (3) Lichens                          (4) Pseudomonas

**Answer (3)**

**Sol.** Lichens

36. Animal species that is being conserved in 'Dachigam National Park':

- (1) Musk deer  
 (2) Golden Oriole  
 (3) Hangul or Kashmir stag  
 (4) Tiger

**Answer (3)**

**Sol.** Hangul or Kashmir stag

37. The correct sequence of aerobic respiration in yeast is:

- (1) Glucose  $\xrightarrow{\text{Cytoplasm}}$  Pyruvate  $\xrightarrow{\text{Mitochondria}}$   $\text{CO}_2 + \text{Water} + \text{Energy}$
- (2) Glucose  $\xrightarrow{\text{Cytoplasm}}$  Pyruvate  $\xrightarrow{\text{Cytoplasm}}$  Ethanol +  $\text{CO}_2 + \text{Energy}$
- (3) Glucose  $\xrightarrow{\text{Cytoplasm}}$  Pyruvate  $\xrightarrow{\text{Mitochondria}}$  Lactic Acid + Energy
- (4) Glucose  $\xrightarrow{\text{Cytoplasm}}$  Pyruvate  $\xrightarrow{\text{Cytoplasm}}$  Ethanol +  $\text{CO}_2$

**Answer (1)**

**Sol.** Since it is aerobic respiration in yeast as yeast are facultative anaerobes.

38. Some dinosaurs had feathers although they couldn't fly but birds have feathers that help them to fly. In the context of evolution this means:

- (1) Reptiles have evolved from birds
- (2) There is no evolutionary connection between reptiles and birds
- (3) Birds have evolved from reptiles
- (4) Feathers are homologous structures in both the organisms

**Answer (3)**

**Sol.** Birds have evolved from reptiles.

39. Examine the following statements and select the correct option:

**Statement (A):** Speciation may take place when variation is combined with geographical isolation.

**Statement (B):** Traits in one individual may not be inherited separately.

- (1) 'A' is true and 'B' is false
- (2) 'A' is false and 'B' is true
- (3) Both 'A' and 'B' true
- (4) Both 'A' and 'B' false

**Answer (3)**

**Sol.** Trait in an individual is expressed, only if the alleles from both the parents are present.

This is according to principle of paired factor.

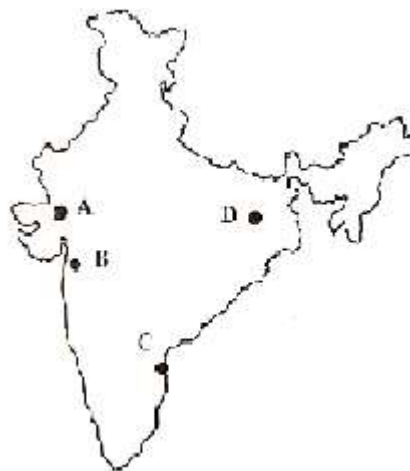
40. The fluid that protects the developing embryo:

- (1) Vitreous humour (2) Aqueous humour
- (3) Endolymph fluid (4) Amniotic fluid

**Answer (4)**

**Sol.** Amniotic fluid

41. Identify the given regions in the map with their corresponding European settlements in India and select the correct option using the codes given below:



- (1) A - Ahmedabad, B - Bharuch, C - Machlipatnam, D - Chandranagor
- (2) A - Chandranagor, B - Ahmedabad, C - Bharuch, D - Machlipatnam
- (3) A - Bharuch, B - Chandranago, C - Machlipatnam, D - Ahmedabad
- (4) A - Machlipatnam, B - Broach, C - Ahmedabad, D - Chandrangor

**Answer (1)**

**Sol.** Map Identification question, 1 is correct option

42. Identify the correct statements with regard to the Solanki dynasty:

- A. Chandradeva was the founder of this dynasty.
- B. Moolaraja II defeated Mohammed Ghazni near Mount Abu.
- C. During the rule of this dynasty, the famous Jain Scholar Hemachandra compiled Prakruth dictionary 'Deshimala'.
- D. Ullaf Khan and Nusrath Khan, the military generals of Allauddin Khilji defeated Karnadeva

- (1) Only A, B and C are correct
- (2) Only B, C and D are correct
- (3) Only A, C and D are correct
- (4) Only C and D are correct

**Answer (2)**

**Sol.** D is wrong, only B, C, D are correct.

43. The correct family chart in ascending order of the important rulers of Shatavahana dynasty is
- (1) Simukha, Gautamiputra Shatakarni, Vashistaputra Pulamayi, Yajnashri Shatakarni
  - (2) Simukha, Vashistaputra Pulamayi, Gautamiputra
  - (3) Simukha, Yajnashri Shatakarni, Vashistaputra Pulamayi, Gautamiputra Shatakarni
  - (4) Simukha, Vashistaputra Pulamayi, Yajnashri shatakarani, Gautamiputra Shatakarni

**Answer (1)**

**Sol.** It is family chart-based question related to Shatavahana dynasty, except option 1 remaining are not correct.

44. Read the given statements and select the correct answer:

**Assertion (A):** There was a Sun temple in all Inca centres.

**Reason (R):** The people of Inca believed that the Sun God was the link between the people and God Veerakocho.

- (1) 'A' is true 'R' is false
- (2) 'A' is false and 'R' is true
- (3) Both 'A' and 'R' are true and 'R' is the correct explanation of 'A'
- (4) Both 'A' and 'R' are true and 'R' is not the correct explanation of 'A'

**Answer (3)**

**Sol.** In this question, both Assertion and Reason are true R is correct explanation of A.

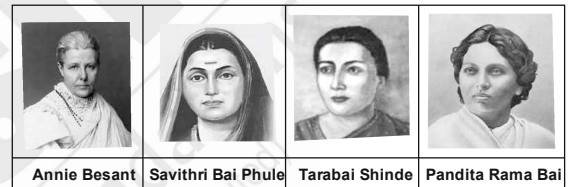
45. Read the given statements and identify the correct option related to them:
- A. It has Mukhamantapa and Garbhagruha with a Nandi idol in front of this historical temple.
  - B. Garbhagruha on top of the Garbhagruha is a special feature of this temple.
  - C. Henry cousins, the art critic observed the sculpture of Garuda on the door of Garbhagruha and called it a Vaishnava temple.
  - D. Since a saint lived here for a number of days people called it in his name.
- (1) Birla Mandir            (2) Ladhkhan Temple
  - (3) Tulsidas Mandir      (4) Gurunanak Dwara

**Answer (2)**

**Sol.** It is identification type question on Archaeological types, 2 is the correct answer.

46. Observe the following pictures of social reformers and identify the order of the statements correctly related to them:

- A. Dedicated her life for the betterment of women of India and established 'Mukti Mission'.
- B. She opposed the exploitation of women in her book 'Stri Purusha Tulana'.
- C. While treating the patients of plague along with her son, she died of it.
- D. Called for universal brotherhood without distinction of race, creed, sex, caste and colour.



- |       |    |     |     |    |
|-------|----|-----|-----|----|
|       | i  | ii  | iii | iv |
| i     | ii | iii | iv  |    |
| (1) B | C  | D   | A   |    |
| (2) A | B  | D   | C   |    |
| (3) C | A  | B   | D   |    |
| (4) D | C  | B   | A   |    |

**Answer (4)**

**Sol.** It is related to Social reformation chapter, especially achievement with women welfare, option 4 is correct response.

47. The important events those took place during the American war of Independence is depicted in the following flow diagram. Identify the correct chronological sequence:



- A. Cornwallis surrender
  - B. The sugar and Molasses Act
  - C. Second Congress of Philadelphia
  - D. Boston Tea Party
- |       |   |    |     |    |
|-------|---|----|-----|----|
|       | i | ii | iii | iv |
| (1) B | C | D  | A   |    |
| (2) B | D | C  | A   |    |
| (3) A | B | D  | C   |    |
| (4) C | B | A  | D   |    |



**Answer (2)**

**Sol.** It is timeline-based question related to American war of Independence, except 2 remaining all wrong answers.

48. Choose the correct sequence to indicate the given statement of the results of the Battle of Plassey as True (T) or False (F):

- A. The battle of Plassey brought out the immorality, lack of unit among the Indians and the greed of Indian business men.
- B. After the Battle of Plassey, Siraj-ud-daulah became the Nawab of Bengal.
- C. The company gained exclusive rights to do business in Bengal after the Battle of Plassey.
- D. Mir Jaffar had to pay huge amount as a war relief.

- (1) T T T T                      (2) T F T F  
 (3) T F F T                      (4) T F T T

**Answer (4)**

**Sol.** In 1757, Plassey war option b is wrong remaining options are correct.

49. Read the given statements and identify the correct Act which is related to all of them:

- A. This act formulated Bi-cameral legislative body at the centre.
- B. As per this Act "Diarchy" was allowed at regional government.
- C. As per this Act a High Commissioner was appointed for India.
- D. As per this Act Provincial budget was separated from Central budget.

- (1) Indian Government Act of 1935  
 (2) Indian Council Act of 1909  
 (3) Indian Council Act of 1892  
 (4) Indian Council Act of 1919

**Answer (4)**

**Sol.** In this question according to British Acts option 4 is correct.

50. In the List- A Authors and List- B their work given. Choose the correct answer by matching them:

List-A	List-B
A. Charles Dickens	i. Mayor of Casterbridge
B. Emile Zola	ii. Germinal
C. Thomas Hardy	iii. Jane Eyre
D. Charlotte Brontte	iv. Hard times

- (1) A-ii, B-iii, C-i, D-iv  
 (2) A-iv, B-iii, C-i, D-i  
 (3) A-iv, B-ii, C-ii, D-iii  
 (4) A-iii, B-ii, C-iv, D-i

**Answer (3)**

**Sol.** In this question except option 3 remaining 1, 2 and 4 are wrong.

51. The group of wild life sanctuaries and the states in which they are located is given below. Identify the correctly matched group:

- (1) Manas - Meghalaya  
 Bhadra - Karnataka  
 Annamalai – Tamilnadu  
 Mudumalai – Kerala
- (2) Biligiriranga Hills - Karnataka  
 Ranthambore – Gujarat  
 Nagarjuna Sagar – Andhra Pradesh  
 Jaldapara - Kerala
- (3) Nagarjuna Sagar – Telangana  
 Bharathpura – Rajasthan  
 Manas – Assam  
 Dandeli – Karnataka
- (4) Mudumalai – Tamilnadu  
 Periyar – Kerala  
 Bharathpur – Gujarat  
 Jaladapara - Assam

**Answer (3)**

**Sol.** It is concept based question in Geography, option 3 is the right answer.

52. Identify the correct statements related to 'cotton crop' from the options given below:

- i. It is grown as a Rabi Crop in India.  
 ii. It is tropical and sub-tropical zone crop.  
 iii. It requires 10° to 15°C temperature.  
 iv. It requires 50 to 100 cm annual rainfall.

- (1) (i) and (ii) only correct  
 (2) (iii) and (iv) only correct  
 (3) (i) and (iii) only correct  
 (4) (ii) and (iv) only correct

**Answer (4)**

**Sol.** Related to Indian commercial crops option 4 is correct remaining all wrong answer.

53. Read the following statements and choose the correct answer:

**Assertion (A):** Laterite soil is not that much useful for agriculture.

**Reason (R):** Laterite soil Undergoes more leaching process.

- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A)
- (2) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
- (3) (A) is correct, (R) is incorrect
- (4) (A) is incorrect, (R) is correct

**Answer (1)**

**Sol.** Related to Laterite soil, option 1 is the right answer.

54. Refer to the given circles below, select the correct option regarding 'X' and 'Y':

The East flowing River	The West flowing River
(X)	(Y)

- (1) 'X' can be 'Narmada' and 'Y' can be 'Godavari'
- (2) 'X' can be 'Kaveri' and 'Y' can be 'Netravati'
- (3) 'X' can be 'Mahanadi' and 'Y' can be 'Krishna'
- (4) 'X' can be 'Sharavathi' and 'Y' can be 'Tapi'

**Answer (2)**

**Sol.** Related to south Indian rivers option 2 is the correct answer remaining all west flowing rivers.

55. Match the column 'A' with the column 'B' and choose the correct answer:

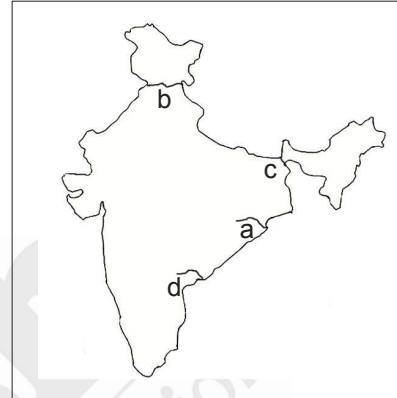
List-A	List-B
A. Veer Savarkar International Airport	i. Nagpur
B. Lal Bahadur Shastri International Airport	ii. Bhubaneswar
C. Babasaheb Ambedkar International Airport	iii. Port Blair
D. Sardar Vallabhbhai International Airport	iv. Ahmedabad
	v. Varanasi

- (1) A-ii, B-v, C-iv, D-i
- (2) A-iii, B-v, C-i, D-iv
- (3) A-iv, B-iii, C-i, D-ii
- (4) A-iii, B-i, C-iv, D-ii

**Answer (2)**

**Sol.** Map related question on International Airports in India, option 2 is the correct answer.

56. Match the marked multipurpose river valley projects on the map of India (i, ii, iii, iv) with their respective names:



- i. Bhakra Nangal
- ii. Nagarjuna Sagar
- iii. Kosi
- iv. Hirakud

- (1) a-ii, b-iii, c-i, d-iv
- (2) a-iv, b-i, c-iii, d-ii
- (3) a-i, b-iv, c-ii, d-iii
- (4) a-iii, b-i, c-iv, d-ii

**Answer (2)**

**Sol.** On Multipurpose river valley project, option 2 is the correct one remaining all mismatched.

57. A tourist was travelling across Indian states. He first visited Pykara hydroelectric power station, secondly Jawaharlal Nehru sea Port, thirdly Bokaro steel plant station and lastly Govind Ballabh Panth reservoir. Identify the proper sequence of the states the tourist travelled:

- (1) Maharashtra, Andhra Pradesh, Chhattisgarh, Gujarat
- (2) Andhra Pradesh, Maharashtra, Bihar, Karnataka
- (3) Kerala, Tamil Nadu, Odisha, Gujarat
- (4) Tamil Nadu, Maharashtra, Jharkhand, Uttar Pradesh

**Answer (4)**

**Sol.** It is related to hydropower projects along with states, option 4 is the correct answer.

58. While teaching a topic on 'Minerals and Energy Resources' the geography teacher had made the following statement about a particular resource in the class:

"This resource is formed plant residue and transformed due to high temperature and pressure. It is composed largely of carbon"

The teacher has stated about the resource mentioned below.

- (1) Manganese                      (2) Iron  
(3) Coal                                (4) Bauxite

**Answer (4)**

59. Read the following statements and choose the correct answer:

**Assertion (A):** The population is high in the Northern plain of India

**Reason (R):** The fertility of soil is one of the factors affecting on the distribution of population.

- (1) (A) is correct, (R) is incorrect  
(2) (A) is incorrect, (R) is correct  
(3) Both (A) and (R) are correct and (R) is the correct explanation of (A)  
(4) Both (A) and (R) are correct and (R) is not the correct explanation of (A)

**Answer (3)**

**Sol.** Related to growth of population in India both Assertion and Reason are correct and R is the correct explanation.

60. The type of vegetation shown in the picture is found in this type of forests in India:



- (1) Mangrove Forest  
(2) Mountain Forest  
(3) Monsoon Forest  
(4) Evergreen Forest

**Answer (1)**

**Sol.** It is picture identification question in that option 1 is Correct, it is also called Mangrove or Tidal forest.

61. The list 'A' contains fundamental rights and the list 'B' their article numbers. Choose the correct option that matches them:

List-A	List-B
A. Right to Freedom	i. 23 and 24 articles
B. Right to freedom of religion	ii. 14 to 18 articles
C. Right against exploitation	iii. 29 and 30 articles
D. Cultural and educational rights	iv. 19 to 22 articles
	v. 25 to 28 articles

- (1) A-ii, B-iii, C-i, D-iv  
(2) A-v, B-i, C-ii, D-iii  
(3) A-iv, B-v, C-i, D-iii  
(4) A-i, B-iv, C-iii, D-ii

**Answer (3)**

**Sol.** According to the constitution articles option 3 is the correct response.

62. The process of creation of an act in the state's legislature is jumbled up. Find the correct option that shows proper order of process of creation of an act:

- A. A discussion takes place on the bill and sent to respective house committee.  
B. The house approves the bill with 2/3 majority.  
C. The person who tables the bill reads out the text loudly.  
D. The bill is sent to the Governor's office for approval.  
E. The house committee deliberates on the bill and submits report to the legislative house.

- (1) A C D B E                      (2) C A E B D  
(3) E A C B D                      (4) C E B D A

**Answer (2)**

**Sol.** Related to the process of creation of an act in the state's legislature option 2 is correct.

63. He discussed the origin, development and functions of state in his book 'Politics'.

Identify the person:

- (1) Plato                                (2) Aristotle  
(3) Socrates                            (4) Herodotus

**Answer (2)**

**Sol.** Aristotle was declared as a father of Political science, he wrote the famous book 'Politics'.



70. **Assertion (A):** Section 17 of the constitution prohibits the practice of untouchability.

**Reason (R):** The Act of 1989 has given some responsibilities for the government in eradication of untouchability.

- (1) A is true and R is false  
 (2) A is false and R is true  
 (3) Both A and R are true and R is related to A  
 (4) Both A and R are true and R is not related to A

**Answer (3)**

**Sol.** In our constitution, Section 17 of the constitution prohibits the practice of untouchability, option 3 is the correct answer.

71. A Set of four sentences related to Globalisation is given. Choose the correct option:

- A. Globalisation creates free trade zone by removing the import and export duties.  
 B. Globalisation creates international agreements.  
 C. Globalisation fight out child labour and slavery.  
 D. Globalisation promotes specialization in production.

- (1) Only A, B and D are correct  
 (2) Only A, B and C are correct  
 (3) Only A is correct  
 (4) Only C is correct

**Answer (1)**

**Sol.** Related to Globalisation option 1 is correct.

72. The purpose of Pradhan Mantri Mudra Yojana is:

- A. To ensure access to financial services in nationalised banks.  
 B. To help every rural citizen to open bank account.  
 C. To provide loan for small businessmen / startups from 50,000 to 10 Lakh.  
 D. To provide life insurance to all citizens between the age of 18 to 50 years.

- (1) A (2) B  
 (3) C (4) D

**Answer (3)**

**Sol.** The purpose of Pradhan Mantri Mudra Yojana, It will provide loan for small businessmen / start-ups from 50,000 to 10 Lakh.

73. Gender inequality index (GII) is calculated at the international level by one of the following agencies:

- A. U.N.D.P  
 B. UNICEF  
 C. UN's General Assembly  
 D. UNESCO

- (1) A (2) B  
 (3) C (4) D

**Answer (1)**

**Sol.** Option 1. United National Development Programme is the correct answer.

74. The main aim of 73rd amendment of the constitution in 1993 with respect to Panchayatraj system is:

- A. Centralization of power and responsibilities of village administration.  
 B. Abolition of special powers of village administration.  
 C. Decentralize and confer constitutional status to the panchayat institutions.  
 D. To bring village administration under the direct control of state.

- (1) A (2) B  
 (3) C (4) D

**Answer (3)**

**Sol.** The main aim of 73rd amendment of the constitution in 1993 with respect to Panchayatraj system decentralize and confer constitutional status to the Panchayat institutions.

75. **Statement (A):** Foreign direct investment is an investment of foreign assets into domestic structures, equipment and organisations.

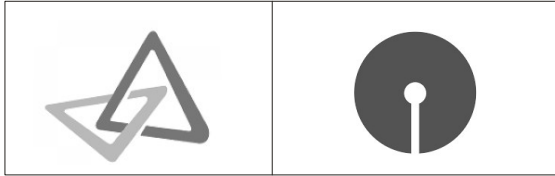
**Reason (R):** FDI does not include foreign investment into the stock markets.

- (1) 'A' is wrong 'R' is correct  
 (2) 'A' and 'R' both are wrong  
 (3) Only 'A' is correct  
 (4) 'A' is correct, 'R' is the correct explanation of 'A'

**Answer (3)**

**Sol.** Option 3 is correct.

76. The two Nationalised banks logos are given. Identify the correct option that matches.



- A. Syndicate Bank and Canara Bank  
B. Canara Bank and Punjab National Bank  
C. Canara Bank and State Bank of India  
D. State Bank of India and H.D.F.C. Bank

- (1) A (2) B  
(3) C (4) D

**Answer (3)**

**Sol.** Related to Nationalised bank logos option 3 is the correct answer.

77. **Assertion (A):** The private sector consists of business owned by individuals or a group of individuals.

**Reason (R):** The private sector may either be partly or wholly owned by central or state government as per 1991 industrial policy.

- (1) 'A' is right, 'R' is the correct explanation of 'A'  
(2) 'A' is right, 'R' is not the correct explanation of 'A'  
(3) Both 'A' and 'R' are wrong  
(4) Only 'A' is wrong

**Answer (2)**

**Sol.** Option 2 is the correct answer.

78. One of the privileges of a private limited company is given. Choose the option which is related to it:
- A. A private company can be formed by only two members.  
B. Need to issue a prospectus as public is invited to subscribe to shares  
C. It is mandatory to keep an index of members in private company.  
D. Allotment of shares cannot be done without receiving the minimum subscription.

- (1) A (2) B  
(3) C (4) D

**Answer (2)**

**Sol.** Option 2 is the correct option on Private limited company.

79. The benefits of e-banking are listed. Choose the wrong statement:

- A. Customer of e-bank can make some permitted transaction from office or house.  
B. e-banking inculcates a sense of financial discipline by recording each and every transaction.  
C. Unlimited access to the bank by the customers.  
D. It allows customers to transact only with the government.

- (1) A (2) B  
(3) C (4) D

**Answer (4)**

**Sol.** Related to Electronic Banking, option 4 is the correct answer.

80. Observe the picture and find the suitable statement related to the person:



- A. She is called the 'Queen of Indian television sector.'  
B. The founder chairman of JET Airways  
C. The founder of Apollo Hospitals.  
D. Chairman and Managing Director of Biocon Ltd.

- (1) A and B only (2) B only  
(3) C and D only (4) D only

**Answer (4)**

**Sol.** This question belongs to Entrepreneurship chapter, the picture is belongs to the chairman and managing director of Biocon Ltd.

81. If the zeros of polynomial  $f(x) = x^3 - 3x^2 + m$  are in Arithmetic Progression, then the value of 'm' is

- (1) 3 (2) 2  
(3) -3 (4) -2

**Answer (2)**

**Sol.** Let roots be  $a - d, a, a + d$

$$a - d + a + a + d = 3$$

$$3a = 3$$

$$a = 1$$

$$1 - 3 + m = 0$$

$$m = 2$$

82. The Least Common Multiple (LCM) and the Highest Common Factor (HCF) of two numbers are 168 and 12 respectively. If the sum of those two numbers is 108, find the difference between them:

- (1) 36
- (2) 40
- (3) 60
- (4) 64

**Answer (3)**

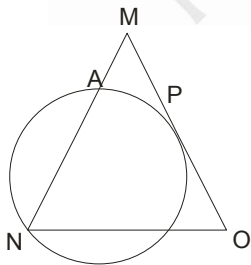
**Sol.** Let  $a, b$  be the numbers

$$a \cdot b = 168 \times 12$$

$$a + b = 108$$

$$\begin{aligned} (a - b) &= \sqrt{(a + b)^2 - 4ab} \\ &= \sqrt{108 \times 108 - 4 \times 168 \times 12} \\ &= \sqrt{11664 - 8064} \\ &= \sqrt{3600} = 60 \end{aligned}$$

83.  $MNO$  is an isosceles triangle where  $\overline{MN} = \overline{MO}$ . A circle through the vertex 'N' touches side  $\overline{MO}$  at its middle point 'P' and intersects side  $\overline{MN}$  at point 'A'. If  $\overline{AM} = 3$  cm, then the length of  $\overline{MO}$  is:



- (1) 6 cm
- (2) 9 cm
- (3) 12 cm
- (4) 15 cm

**Answer (3)**

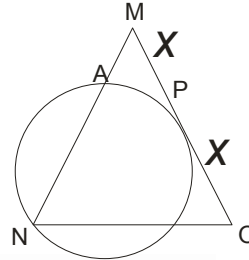
**Sol.**  $MN = 2x$

$$MA \times MN = MP^2$$

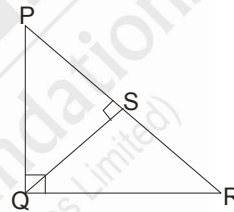
$$3 \times 2x = x^2$$

$$x = 6$$

$$MO = 2x = 12$$



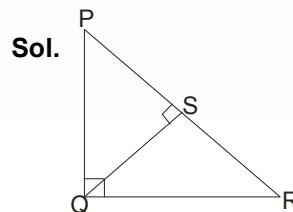
84. In  $\triangle PQR$ ,  $\angle PQR = 90^\circ$  and  $\overline{QS} \perp \overline{PR}$ . The true relation among the following.



- A.  $\overline{QS}^2 = \overline{PS} \times \overline{SR}$
- B.  $\overline{PQ}^2 = \overline{RS} \times \overline{PR}$
- C.  $\overline{QR}^2 = \overline{PS} \times \overline{SR}$
- D.  $\overline{PQ} \times \overline{QR} = \overline{QS} \times \overline{PS}$

- (1) Only A
- (2) Only A and B
- (3) Only A and C
- (4) Only A and D

**Answer (4)**



$$\triangle PSQ \approx \triangle PQR$$

$$\triangle PSQ \approx \triangle QSR$$

$$\triangle PSQ \& \triangle QSR$$

$$\frac{PS}{QS} = \frac{QS}{SR} \Rightarrow QS^2 = PS \times SR$$

$$\triangle PQR \& \triangle QSR$$

$$\frac{PQ}{PR} = \frac{QS}{QR} \Rightarrow PQ \times QR = QS \times PR$$

85. If the area of the triangle formed by joining the points (0, a), (-a, 0) and (a, 0) is  $16a \text{ cm}^2$ , then the value of 'a' is:

- (1) 16 cm                      (2) 8 cm  
(3) 4 cm                        (4) 2 cm

**Answer (1)**

**Sol.** (0,a)(-a,0)(a,0)

$$16a = \frac{1}{2} \cdot 2axa$$

$$a = 16 \text{ cm}$$

86. The interior angles of a polygon are in an Arithmetic Progression and the common difference is 10. If the biggest exterior angle is  $85^\circ$ , then the number of sides of the polygon will be

- (1) 5                              (2) 6  
(3) 7                              (4) 8

**Answer (2)**

**Sol.**  $(n-2)\pi = \frac{n}{2} [2 \times 95^\circ + (n-1)10^\circ]$

$$(n-2)180 = 5n(18+n)$$

$$n^2 - 18n + 72 = 0$$

$$n = 6 \text{ (or) } 12$$

87. If A (0, 7), B (-6,0) and C(0,-4) are the vertices of  $\Delta ABC$ , then the distance from centroid of  $\Delta ABC$  to vertex 'A' is

- (1)  $\sqrt{40}$                       (2)  $\sqrt{32}$   
(3)  $\sqrt{68}$                       (4)  $\sqrt{60}$

**Answer (1)**

**Sol.** A = (0,7) B = (-6,0) C = (0,-4)

$$G = (-2,1) \quad AG = \sqrt{4+36} = \sqrt{40}$$

88. Following two statements speak about Arithmetic Progression:

**Statement (A):** In an Arithmetic Progression series:

$$20 + 19\frac{1}{3} + 18\frac{2}{3} + \dots \dots \dots 25 \text{ terms is } 300$$

**Statement (B):** In an Arithmetic progression series:

$$20 + 19\frac{1}{3} + 18\frac{2}{3} + \dots \dots \dots 36 \text{ terms is } 300$$

Pick the correct option from below:

- (1) Only statement A is true  
(2) Only statement B is true  
(3) Both the statements are true  
(4) Both the statements are false

**Answer (3)**

**Sol.**  $a_1 = 20 = \frac{60}{3}, a_2 = \frac{58}{3}, a_3 = \frac{56}{3}$

$$S_{25} = \frac{25}{2} \left[ 2 \times \frac{60}{3} + 24 \left( \frac{-2}{3} \right) \right] = 25(20 - 8) = 300$$

$$S_{36} = \frac{36}{2} \left[ 2 \times \frac{60}{3} + 35 \left( \frac{-2}{3} \right) \right] = 36 \left( \frac{25}{3} \right) = 300$$

89. The product of mean and median of first five prime numbers is

- (1) 54.6                      (2) 28  
(3) 27                        (4) 10.8

**Answer (2)**

**Sol.** 2,3,5,7,11

$$\text{Mean} = \frac{28}{5}, \text{Median} = 5$$

$$\text{Product} = 28$$

90. If the difference between sum of the roots and product of the roots of a quadratic equation  $(ax)^2 + bx + c = 0$  (where  $a \neq 0$ ) is 'zero', then:

- (1)  $-b + c = 0$               (2)  $b + c = 0$   
(3)  $a^2 - b + c = 0$         (4)  $a^2 + b + c = 0$

**Answer (2)**

**Sol.**  $a^2x^2 + bx + c = 0$

$$\alpha + \beta = \frac{-b}{a^2}$$

$$\alpha\beta = \frac{c}{a^2}$$

$$\alpha + \beta - \alpha\beta = 0$$

$$\frac{-b-c}{a^2} = 0 \Rightarrow b + c = 0$$

91. If  $\sin 52^\circ \cdot \text{cosec}(90^\circ - 2A) = 1$ , then the measure of angle 'A' is

- (1)  $19^\circ$                       (2)  $26^\circ$   
(3)  $38^\circ$                       (4)  $52^\circ$

**Answer (1)**



**Sol.**  $\sin 52^\circ \operatorname{cosec}(90^\circ - 2A) = 1$

$$52^\circ = 90^\circ - 2A$$

$$2A = 38^\circ$$

$$A = 19^\circ$$

92. The value of 'x' and 'y' for the linear equations:

$$a_1x + b_1y + c_1 = 0 \text{ and}$$

$$a_2x + b_2y + c_2 = 0 \text{ are}$$

$$(1) \quad x = \frac{b_1c_1 - b_2c_2}{a_1b_2 - a_2b_1} \text{ and } y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$$

$$(2) \quad x = \frac{b_2c_1 - b_2c_2}{a_1b_2 - a_2b_1} \text{ and } y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$$

$$(3) \quad x = \frac{b_2c_1 - b_1c_2}{a_2b_1 - a_1b_2} \text{ and } y = \frac{c_1a_1 - c_2a_1}{a_2b_1 - a_1b_2}$$

$$(4) \quad x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1} \text{ and } y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$$

**Answer (4)**

**Sol.**  $a_1x + b_1y + c_1 = 0$

$$a_2x + b_2y + c_2 = 0$$

$$\frac{x}{b_1c_2 - b_2c_1} = \frac{y}{c_1a_2 - c_2a_1} = \frac{1}{a_1b_2 - a_2b_1}$$

$$x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}, \quad y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$$

93. If  $(\sin\theta + \tan\theta) = a$  and  $(\tan\theta - \sin\theta) = b$ , then

$$a^2 - b^2 =$$

(1)  $ab$

(2)  $2\sqrt{ab}$

(3)  $4ab$

(4)  $4\sqrt{ab}$

**Answer (4)**

**Sol.**  $\sin\theta + \tan\theta = a$

$$\tan\theta + \sin\theta = b$$

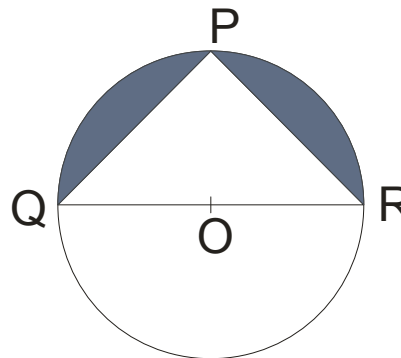
$$a^2 - b^2 = 4\sin\theta \tan\theta$$

$$ab = \tan^2\theta - \sin^2\theta$$

$$= \tan^2\theta - \sin^2\theta$$

$$a^2 - b^2 = 4\sqrt{ab}$$

94. 'O' is the centre of the circle. The area of the shaded region in the given figure is  $126 \text{ cm}^2$ ,  $\overline{PQ} = \overline{PR}$ , then the diameter QR is:



(1) 21 cm

(2)  $21\sqrt{2}$  cm

(3) 7 cm

(4)  $7\sqrt{2}$  cm

**Answer (2)**

**Sol.**  $\frac{\pi r^2}{2} - r^2 = 126$

$$r^2(\pi - 2) = 126 \times 2$$

$$r^2 \frac{8}{7} = 2 \times 126$$

$$2r = 7 \times 3\sqrt{2} = 21\sqrt{2} \text{ cm}$$

95. The radius of a solid right circular cone increases by 20% and its height decreases by 20%. The percentage change in its volume is

(1) 15.2%

(2) 20%

(3) 25.2%

(4) 30%

**Answer (1)**

**Sol.**  $V = \frac{1}{3}\pi r_f h$

$$r_f = \frac{6r}{5}, \quad h_f = \frac{4h}{5}$$

$$V_f = \frac{1}{3}\pi (r_f)^2 h_f$$

$$V_f = \frac{1}{3}\pi \frac{36r^2}{25} \times \frac{4h}{5} = \frac{1}{3}\pi r^2 h \left(\frac{144}{125}\right)$$

$$\frac{V_f - V}{V} = \frac{1}{3}\pi r^2 h \left(\frac{144}{125} - 1\right)$$

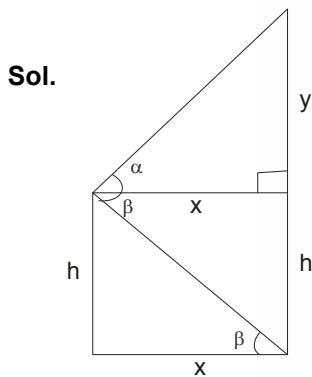
$$= \frac{2}{3} \frac{\pi r^2 h}{V} \left(\frac{19}{125}\right) 100$$

$$0.152 \times 100 = 15.2\%$$

96. From the top of a building of height 'h' meter, the angle of elevation of the top of the tower is ' $\alpha$ ' and angle of depression of the foot of the tower is ' $\beta$ '.  
The height of the tower is

- (1)  $\frac{h + (\tan \alpha + \tan \beta)}{\tan \beta}$   
 (2)  $\frac{h(\tan \alpha + \tan \beta)}{\tan \beta}$   
 (3)  $\frac{h \tan(\alpha + \beta)}{\tan \beta}$   
 (4)  $\frac{h + \tan(\alpha + \beta)}{\tan \beta}$

**Answer (2)**



$$\tan \alpha = \frac{y}{x}$$

$$\tan \beta = \frac{h}{x}$$

$$\frac{\tan \alpha}{\tan \beta} = \frac{y}{h}$$

$$h + y = h \left( 1 + \frac{\tan \alpha}{\tan \beta} \right)$$

97. The perimeter of a square is found to be equal to the circumference of a circle. The ratio of the area of that square to the area of that circle would be:
- (1) 14:11                      (2) 22:7  
 (3) 11:14                      (4) 7:22

**Answer (3)**

**Sol.**  $4x = 2\pi r$

$$x = \frac{\pi r}{2}$$

$$\frac{A_{\text{square}}}{A_{\text{circle}}} = \frac{x^2}{\pi r^2} = \frac{\frac{\pi^2 r^2}{4}}{\pi r^2} = \frac{\pi}{4} = \frac{22}{4 \times 7} = \frac{11}{14}$$

98. A metal cube is completely submerged in a cylindrical vessel containing water. The diameter of the vessel is 30 cm, the level of water is raised by  $1\frac{41}{49}$  cm. The length of the edge of the cube is
- (1) 40 cm                      (2) 30 cm  
 (3) 20 cm                      (4) 10 cm

**Answer (4)**

**Sol.** Edge = a

$$2r = 30 \Rightarrow r = 15$$

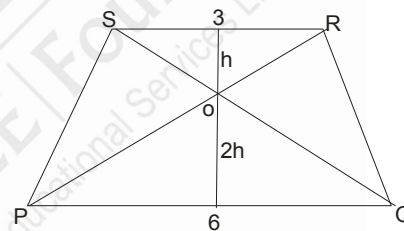
$$a^3 = \pi r^2 h$$

$$a^3 = \frac{22}{7} \times 15 \times 15 \times \frac{140}{99} = 1000$$

$$a = 10 \text{ cm}$$

99. In trapezium PQRS,  $PQ \parallel RS$  and its diagonal intersect at 'O'. If  $PQ = 6$  cm and  $RS = 3$  cm, then the ratio of the areas of  $\Delta POQ$  and  $\Delta ROS$  is
- (1) 4:1                          (2) 1:2  
 (3) 2:1                          (4) 1:4

**Answer (1)**



**Sol.**  $\frac{\text{Ar}(\Delta POQ)}{\text{Ar}(\Delta ROS)} = \frac{\frac{1}{2} \times 6 \times 2h}{\frac{1}{2} \times 3 \times h} = \frac{4}{1}$

100. The table below shows the value probability when three identical coins are tossed. They are not matched correctly

Column-A		Column-B	
i)	Getting at most two heads	a)	$\frac{4}{8}$
ii)	Getting at least two heads	b)	$\frac{5}{8}$
iii)	Getting exactly one head	c)	$\frac{6}{8}$
iv)	Getting neither all heads nor all Tails	d)	$\frac{3}{8}$
		e)	$\frac{7}{8}$

Match the columns correctly:

- (1) i-e, ii-a, iii-b, iv-d
- (2) i-d, ii-b, iii-a, iv-e
- (3) i-d, ii-b, iii-c, iv-e
- (4) i-e, ii-a, iii-d, iv-c

**Answer (4)**

**Sol.** (i)  $P(E_1) = \frac{7}{8}$  ——— e

(ii)  $P(E_2) = \frac{4}{8}$  ——— a

(iii)  $P(E_3) = \frac{3}{8}$  ——— d

(iv)  $P(E_4) = \frac{6}{8}$  ——— c

