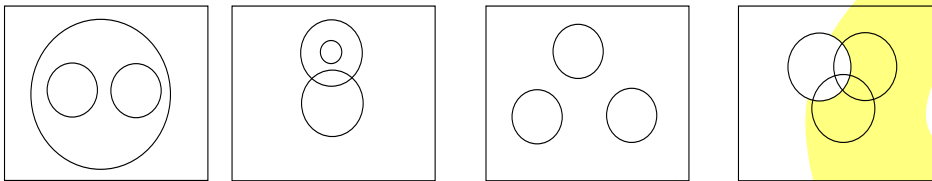


*** In multiple choice questions the options are given as F,T,R & E which correspond to the options A,B,C & D respectively in the OMR sheet.**

**Part – I (MAT)
SECTION – I
(1 – 100)**

Directions (Questions 1 – 3): These questions are based on the following diagrams. In each question a group of words is given which is related to one of the four given diagrams. Observe the diagrams carefully and mark the number of that figure as your answer which you feel would best fit into the group of words given in each question.

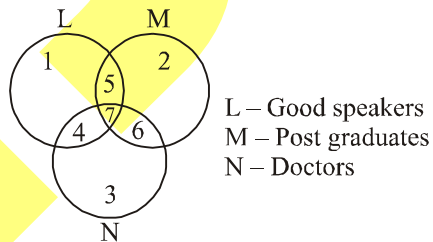


(F) (T) (R) (E)

1. Odd numbers, Prime numbers, Odd multiples of nine
2. Players, Students, Actors
3. Elephants, Wolves, Animals.

4. Which number indicates good speakers who are neither post graduates nor doctors ?

- (F) 6
(T) 2
(R) 5
(E) 1



Directions (Questions 5 – 6): In each of the following questions, find out which of the alternatives (F), (T), (R) or (E) indicates the correct relationship between the three given words?

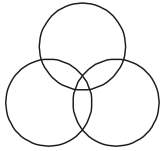
5. Judge, Thieves and Criminals?



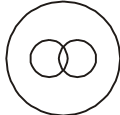
(F) (T) (R) (E)

Space for rough work

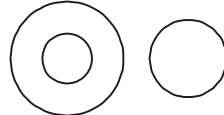
6. Triangle, Four-sided figure, Square



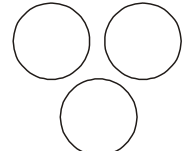
(F)



(T)



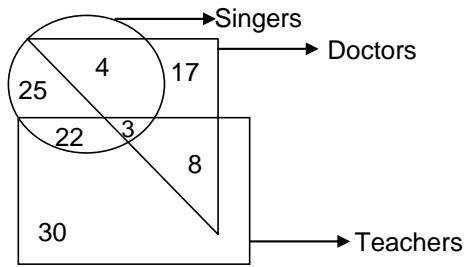
(R)



(E)

7. In a group of students, 100 students know Hindi, 50 know English and 25 know both. Each of the students knows either Hindi or English. How many students are there in the group?
 (F) 120 (T) 123 (R) 125 (E) 152

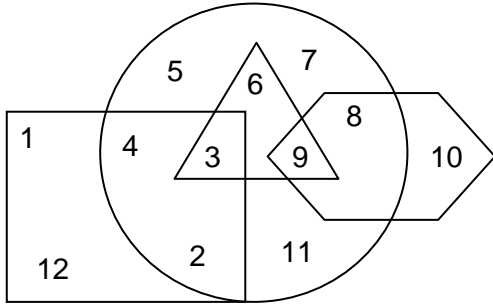
Directions (Questions 8 – 10): Study the following figure and answer the questions given below.



8. How many doctors are neither teachers nor singers?
 (F) 17 (T) 5
 (R) 10 (E) 30
9. How many doctors are both singers and teachers?
 (F) 22 (T) 8
 (R) 3 (E) 17
10. How many teachers are singers?
 (F) 25 (T) 16
 (R) 21 (E) 47

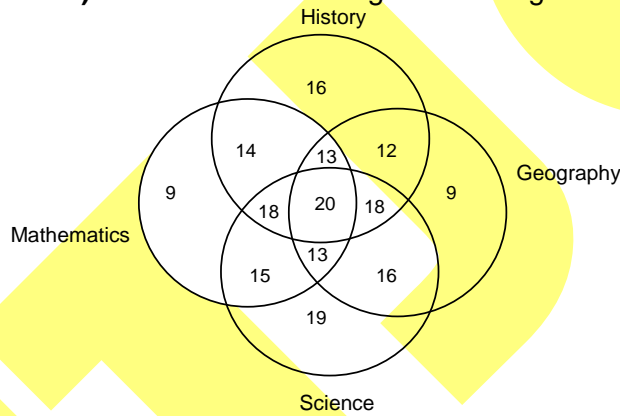
Space for rough work

Directions (Questions 11– 12): Study the figure given below carefully and answer the questions that follow.



11. What is the sum of the numbers which belong to two figures only?
 (F) 20 (T) 29
 (R) 32 (E) 37
12. What is the product of the numbers which belong to three figures only?
 (F) 27 (T) 162
 (R) 648 (E) 216

Directions (Questions 13 – 15): Refer to the following venn – diagram:



13. The number of students who took any three out of the four of the above subjects was:
 (F) 62 (T) 63
 (R) 64 (E) 66
14. The number of students in total, who took History or Mathematics or Science, was:
 (F) 183 (T) 190
 (R) 424 (E) 430
15. The number of students who took both History and Geography among other subjects was:
 (F) 62 (T) 63
 (R) 65 (E) 66

Space for rough work

Directions (Questions 16 – 18): Study the following number sequence and answer the questions given below it:

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

16. How many odd numbers are there in the sequence each of which is immediately followed by an odd number?
 (F) 1 (T) 2
 (R) 3 (E) more than 4
17. How many even numbers are there in the sequence which are immediately preceded by an odd number & immediately followed by an even number?
 (F) 1 (T) 2
 (R) 3 (E) 4
18. How many odd numbers are there in the sequence which are immediately preceded and also immediately followed by an even number?
 (F) 1 (T) 2
 (R) 3 (E) 4
19. Which is the third number to the left of the number which is exactly in the middle of the following sequence of numbers ?
 1 2 3 4 5 6 7 8 9 2 4 6 8 9 7 5 3 1 9 8 7 6 5 4 3 2 1
 (F) 3 (T) 4 (R) 5 (E) 6
20. How many 5's are there in the following number sequence which are immediately preceded by 7 and immediately followed by 6 ?
 7 5 5 9 4 5 7 6 4 5 9 8 7 5 6 7 6 4 3 2 5 6 7 8
 (F) One (T) Two (R) Three (E) Four
21. Vijay's position is 14th from upwards in a class of 43 students. What will be his position from downwards ?
 (F) 30th (T) 28th (R) 29th (E) 31st
22. In a row of forty children, P is thirteenth from the left end and Q is ninth from the right end. How many children are there between P and R if R is fourth to the left of Q?
 (F) 12 (T) 13
 (R) 14 (E) 15
23. In a class of 35 students, Kunal is placed seventh from the bottom whereas Sonali is placed ninth from the top. Pulkit is placed exactly in between the two. What is Kunal's position from Pulkit?
 (F) 9th (T) 10th
 (R) 11th (E) 13th

Space for rough work

24. In a class, Vijay's rank is 34th from the left and Ajay's rank is 37th from the right. If only Diwakar sits exactly in between them. What could be the minimum number of students in the class?
(F) 59 (T) 37 (R) 68 (E) None of these
25. Jinni is 7th from the right end and Money is 10th from the left end in a row of girls. If there are 10 girls between Jinni and Money, how many girls are there in that row?
(F) 27 (T) 32 (R) 24 (E) 25
26. Dilip's position from the left in a row of students is 10th and Jagdish's position is 20th from the right. Both of them interchange their positions and Jagdish becomes 23rd from the right. How many students are there in the row?
(F) 33 (T) 44 (R) 42 (E) 32
27. In a row, Yash is 15th from left end while Rima is 56th from right end and 16th to the right of Monu. Find out total number of persons of this queue?
(F) 65 (T) 83
(R) 97 (E) Cannot be determined
28. Anuj is fourteenth from left and Raj is eighteenth from right. When they interchange their positions respectively, then Anuj becomes twenty third from left. What will be Raj's position from right after interchanging?
(F) 25th (T) 26th
(R) 27th (E) 28th
29. Pratap correctly remembers that his mother's birthday is before twenty third April but after Nineteenth April, where as his sister correctly remembers that their mother's birthday is not on or after twenty second April. On which day in April is definitely their mother's birthday?
(F) 20th (T) 21st
(R) 20th or 21st (E) 22nd
30. If tenth day of the month is three days earlier than Sunday, then what will it be on the 19th day of the month?
(F) Monday (T) Tuesday
(R) Thursday (E) Saturday
31. In a telephone Directory, which of the following names will appear at the third position from beginning?
(F) Randhir (T) Randesh
(R) Rama (E) Raamed
32. If the letters in the word POWERFUL are rearranged as they appear in the English alphabet, the position of how many letters will remain unchanged after the rearrangement?
(F) None (T) One
(R) Two (E) Three

Space for rough work

33. If the first three letters of the word COMPREHENSION are reversed, then the last three letters are added and then the remaining letters are reversed and added, then which letter will be exactly in the middle?
 (F) H (T) N
 (R) R (E) S
34. A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
 Which letter should be ninth letter to the left of ninth letter from the right, if the first half of the given alphabets are reversed?
 (F) D (T) E (R) F (E) I
35. How many pairs of letters in the word BRIGHTER have as many letters between them in the word as in the alphabet?
 (F) 1 (T) 2 (R) 3 (E) 4
36. If English alphabet is written in the backward order, then which letter is 7th to the right of K ?
 (F) A (T) B (R) C (E) D
37. In the word 'PARADISE' how many pairs of letters are there which have as many letters between them in the word as in the English alphabet?
 (F) Two (T) Three
 (R) Four (E) One

Directions (Questions 38 – 40): Study the information given below carefully and answer the questions that follow:

A, B, C, D, E, F, G, H and I are nine houses. C is 2 km east of B. A is 1 km north of B and H is 2 km south of A. G is 1 km west of H while D is 3 km east of G and F is 2 km north of G. I is situated just in middle of B and C while E is just in middle of H and D.

38. Distance between E and G is
 (F) 1km (T) 1.5km
 (R) 2km (E) 5km
39. Distance between E and I is
 (F) 1km (T) 2km
 (R) 3km (E) 4km
40. Distance between A and F is
 (F) 1km (T) 1.41km
 (R) 2km (E) 3km

Space for rough work

41. Ramakant walks northwards. After sometime, he turns to his right & after going a little further he turns to his left. Finally, after walking a distance of one kilometer, he turns to his left again. In which direction is he moving now?
 (F) North (T) South
 (R) East (E) West
42. One evening, Dileep was facing a tree. The shadow of the tree fell to his right. Which direction was he facing?
 (F) North (T) South
 (R) East (E) South - East
43. When watch shows 5:15, if the minute hand points towards the east, then in which direction will the hour hand point at 6:00?
 (F) North (T) South
 (R) North - West (E) South - West
44. Mr. Powar travels 10 km towards west and turns right to travel 4 km. Now he turns right and travels 7 km. In which direction is he now with respect to the starting position?
 (F) South - East (T) South - West
 (R) North - East (E) North - West
45. In a certain code 'REPORT' is written as 'SDONQU'. How is 'PERSON' written in that code?
 (F) QDQRNP (T) QDQRNM
 (R) ODQRNP (E) None of these
46. If 'MORE' is coded as '4695', then 'EXAM' is coded as:
 (F) 524113 (T) 7423
 (R) 7513 (E) 5614
47. In a certain code language, if 'CONTROL' = 104 and 'QUESTION' = 128, then what is the value of the word 'INSTITUTION'?
 (F) 170 (T) 176
 (R) 196 (E) 181
48. In a certain code, RAIN is written 8\$%6 and MORE is written as 7#8@. How would REMAIN be written in that code?
 (F) 8@7\$86 (T) 8@\$7%6
 (R) 8@7\$%6 (E) 8@7%\$6
49. If 'ish lto inm' stands for 'neat and tidy' ; 'qpr inm sen' stands for 'small but neat' and 'hsm sen rso' stands for 'good but erratic', what would 'but' stand for ?
 (F) inm (T) qpr
 (R) sen (E) hsm

Space for rough work

50. In a certain code language, 'CURATIVE' is written as 'BSVDDUHS'. How 'STEAMING' is to be written in the same code language?
 (F) BFUTFMHL (T) TUFBFMHL
 (R) BFUTLHMF (E) BFUTHOJN
51. Find the next term.
 56789231, 5678923, 678923, 67892, ?
 (F) 78923 (T) 8972
 (R) 7896 (E) 7892
52. Find the missing letters:
 m __ mmn __ m __ __ m __ m
 (F) nmmmn (T) mnmnn
 (R) nnmmn (E) nmmnn
53. Find the next term.
 AC, FH, KM, PR, ?
 (F) UV (T) UW
 (R) UX (E) TV
54. Find the next term.
 DF, GJ, KM, NQ, RT, ?
 (F) UW (T) YZ
 (R) XZ (E) UX
55. What comes in place of question marks (?) in the following number series ?
 4, 12, 36, 108, 324, ?
 (F) 520 (T) 680 (R) 475 (E) 972
56. Replace the question mark (?) in the following number series with suitable option.
 3, 3, 4.5, 9, 22.5, ?
 (F) 27.3 (T) 24 (R) 55 (E) 67.5
57. Which comes in place of question mark (?) in the following number series ?
 336, 168, 84, 42, 21, ?
 (F) 17 (T) 10.5 (R) 15 (E) 14.5
58. Replace the question mark (?) in the given series with the suitable option.
 24, 72, 36, 108, 54, ?
 (F) 145 (T) 162 (R) 158 (E) 165

Space for rough work

59. Find the next term of the given series.
3F, 6G, 11I, 18L, ?
(F) 27P (T) 25N (R) 27Q (E) 21O
60. Find the missing term of the given series.
1CV, 5FU, 9IT, ? 17OR
(F) 11LS (T) 14JS (R) 15JS (E) 13LS

Directions (Questions 61 – 63) : In the given questions one set of letters, when sequentially placed at the gaps in the given letter series shall complete it, identify that set.

61. ab _ ab _ ababb _ b _ ab
(F) baaa (T) abbb (R) aaab (E) baab
62. a _ ba _ c _ aad _ aa _ ea
(F) babbb (T) babbd (R) babbc (E) bacde
63. a _ n _ b _ _ ncb _ _ ncb
(F) abbbec (T) abebcb
(R) bacbab (E) bcabab
64. In the following question one number is wrong in the series. Find out the wrong number :
1, 3, 8, 19, 42, 88, 184
(F) 3 (T) 8 (R) 19 (E) 88
65. Find the next term.
132, 182, 306, 380, 552, 870, ____
(F) 930 (T) 1010
(R) 992 (E) 1142

Directions (Questions 66 – 67): These questions are based on the information given below.
A family of eight persons has three married couples among them. A is the grand mother of C and mother – in – law of F. H is the daughter of B, who is the brother of G. D is the only child of G and is the mother of C. E is the wife of B.

66. How is G related to H?
(F) Uncle (T) Father
(R) Brother (E) Cousin
67. How is H related to D?
(F) Sister (T) Daughter
(R) Cousin (E) Mother

Space for rough work

68. If $A + B$ means A is the father of B, $A \div B$ means A is the mother of B, $A - B$ means A is the brother of B, $A \times B$ means A is the wife of B. Which of the following means “ χ is the daughter of S”?
- (F) $S \times R + M - \chi \div Y$ (T) $S \times \chi + M - R$
 (R) $S \times R + M - \chi$ (E) $S \times \chi + M - R \div Y$
69. Pointing to a man, a woman said to her friend. “This man’s mother is mother of my mother”
 The man was the woman’s-
- (F) Brother (T) Maternal Uncle
 (R) Cousin (E) Son
70. Pointing to a photograph Anjali said, "He is the son of the only son of my paternal grandfather." How is the man in the photograph related to Anjali?
- (F) Brother (T) Uncle
 (R) Son (E) Father

Directions (Questions 71 – 72) : Read the following information and answer the question.

1. ' $A + B$ ' Means 'A is the father of B'.
2. ' $A - B$ ' means 'A is the wife of B'.
3. ' $A \times B$ ' means 'A is brother of B'.
4. ' $A \div B$ ' means 'A is the daughter of B'.

71. Which of the following means P is the sister-in-law of Q ?
- (F) $R - P \times Q$ (T) $R + P \times Q$ (R) $P - R \times Q$ (E) $P - R \div Q$
72. If $P \times R + Q$, which of the following is true?
- (F) P is the father of Q (T) P is the grandfather of Q
 (R) P is the uncle of Q (E) P is the brother-in-law of Q

Directions (Questions 73 – 74): In each question below is given a statement followed by two assumptions numbered I and II. You have to consider the statement and the following assumptions and decide which of the assumptions is implicit in the statement.

Give answer

- (F) if only assumption I is implicit
 (T) if only assumption II is implicit
 (R) if either I or II is implicit
 (E) if neither I nor II is implicit

73. Statement: Detergents should be used to clean clothes.
 Assumptions: I. Detergents form more lather.
 II. Detergents help to dislodge grease and dirt.
74. Statement: His recent investment in the shares of Company A is only a gamble.
 Assumptions: I. He may incur loss on his investment.
 II. He may gain from his investment.

Space for rough work

75. An alloy is to contain copper and zinc in the ratio 9:4. The zinc required to be melted with 24kg of copper is:
(F) $10\frac{2}{3}$ kg (T) $10\frac{1}{3}$ kg
(R) $9\frac{2}{3}$ kg (E) 9 kg
76. A sum of money is to be distributed among A, B, C & D in the proportion of 5:2:4:3. If C gets Rs 1000 more than D, what is B's share?
(F) Rs 500 (T) Rs 1500
(R) Rs 2000 (E) None of these
77. The fourth proportional to 5, 8, 15 is:
(F) 18 (T) 24
(R) 19 (E) 20
78. The ratio of the incomes of A and B is 5 : 4 and the ratio of their expenditures is 3 : 2. If at the end of the year, each saves Rs 1600, then the income of A is:
(F) Rs 3400 (T) Rs 3600
(R) Rs 4000 (E) Rs 4400
79. Two numbers are in the ratio 1 : 2. If 7 is added to both, their ratio changes to 3 : 5. the greater number is?
(F) 24 (T) 26
(R) 28 (E) 32
80. The ratio of the number of boys and girls in a school is 3:2. If 20% of the boys and 25% of the girls are scholarship holders, what percentage of the students does not get the scholarship?
(F) 56 (T) 70
(R) 78 (E) 80
81. 45 men can complete a work in 16 days. Six days after they started working, 30 more men joined them. How many days will they now take to complete the remaining work?
(F) 8 days (T) 5 days
(R) 6 days (E) 7 days

Space for rough work

82. 2 men and 3 boys can do a piece of work in 10 days while 3 men and 2 boys can do the same work in 8 days. In how many days can 2 men and 1 boy do the work?

(F) $12\frac{1}{2}$ days

(T) $11\frac{1}{2}$ days

(R) $13\frac{1}{4}$ days

(E) $15\frac{1}{2}$ days

83. A can do a piece of work in 20 days and B can do the same work in 30 days. They finished the work with the help of C in 8 days. If they earned a total of Rs 5550, then what is the share of C?

(F) Rs 1800

(T) Rs 1850

(R) Rs 1900

(E) Rs 1950

Directions (Questions 84 – 85) : Each of these questions has a statement followed by two Conclusions I and II. Consider statement and the following conclusions. Decide which of the conclusion follows from the statement.

Give answer

(F) if Conclusion I follows

(T) if Conclusion II follows

(R) if either Conclusion I or II follows

(E) if neither Conclusion I nor II follows

84. Statement : Quality has a price tag. India is allocating lots of funds to education.

Conclusions :

I. Quality of education in India would improve soon.

II. Funding alone can enhance quality of education.

85. Statement : Industries destroy the natural resources.

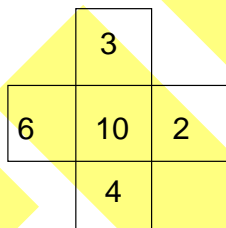
Conclusions :

I. All natural resources are destroyed by industries.

II. No industries, no environmental pollution.

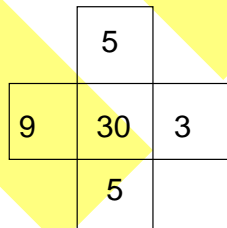
Directions (Questions 86 - 100): Find the missing term.

- 86.



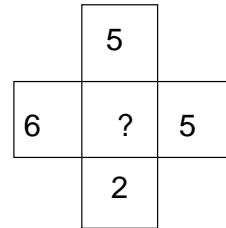
(F) 15

(R) 25



(T) 20

(E) 40

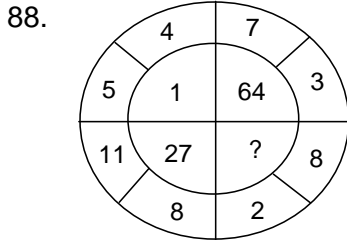


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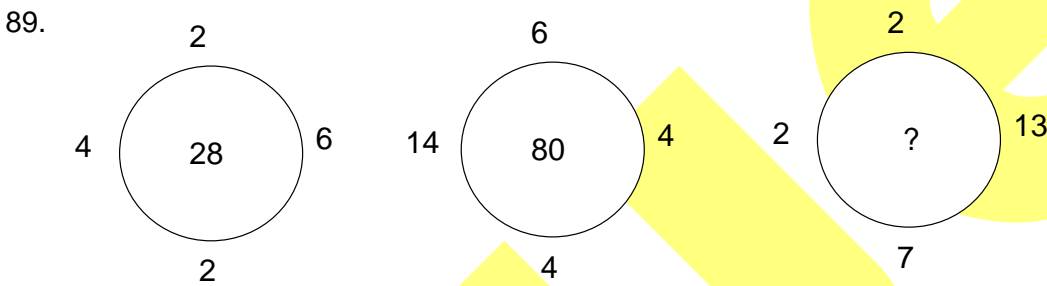
87.

7	6	9
2	8	4
4	3	?
36	42	26

- (F) 5 (T) 2
(R) 3 (E) 4



- (F) 125 (T) 216
(R) 121 (E) 225

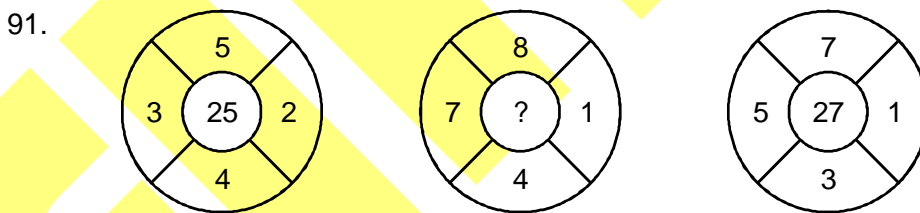


- (F) 40 (T) 32
(R) 35 (E) 30

90.

11	6	8
17	12	?
25	34	19
19	28	11

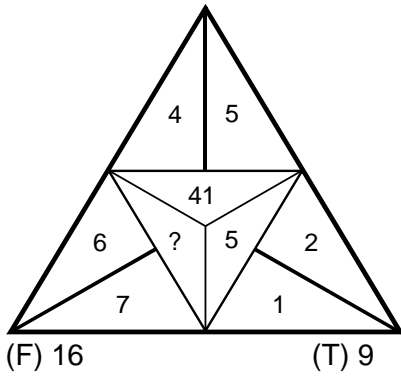
- (F) 9 (T) 13 (R) 15 (E) 16



- (F) 28 (T) 40 (R) 39 (E) 42

Space for rough work

92.



(R) 85

(E) 112

93.

14	9	12	20
4	9	8	10
12	13	7	20
3	3	11	?
20	42	19	40

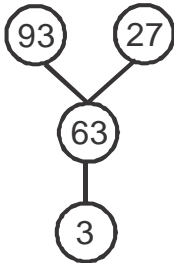
(F) 2

(T) 8

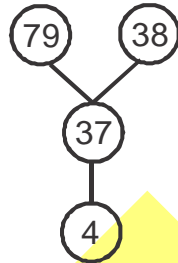
(R) 12

(E) 14

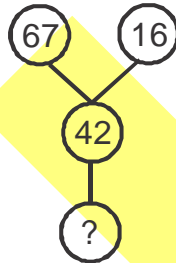
94.



(F) 5



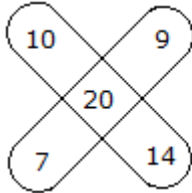
(T) 6



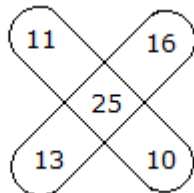
(R) 8

(E) 9

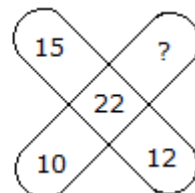
95.



(F) 6
(R) 8



(T) 7
(E) 9



Space for rough work

96.

4	9	2
3	5	7
8	1	?

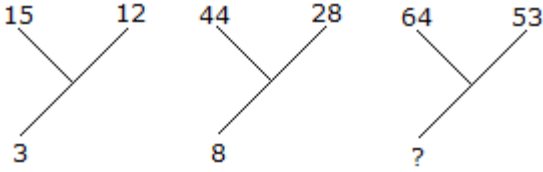
(F) 9

(T) 6

(R) 15

(E) 14

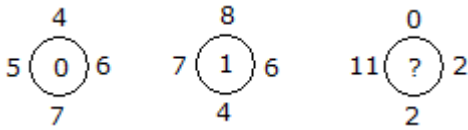
97.



(F) 30
(R) 70

(T) 13
(E) 118

98.



(F) 0
(R) 11

(T) 2
(E) 12

99.

72	8	8	2	12	6
83	19	?			
9	2	3	7	4	3

(F) 11
(R) 21

(T) 24
(E) 22

100.

1	$\frac{1}{2}$	$\frac{3}{2}$
2	$\frac{2}{3}$	$\frac{8}{3}$
3	?	$\frac{19}{5}$

(F) $\frac{1}{2}$
(R) $\frac{3}{4}$

(T) $\frac{2}{3}$
(E) $\frac{4}{5}$

Part – II (SAT)
SECTION – II (Physics)

1. A body of weight w_1 is suspended from the ceiling of a room through a chain weight w_2 . The ceiling pulls the chain by a force
 (F) w_1 (T) w_2 (R) $w_1 + w_2$ (E) $\frac{w_1 + w_2}{2}$
2. A string attached to a body
 (F) can only pull it (T) can only push it
 (R) can pull as well as push it (E) can't exert force
3. For a satellite to be Geo stationary:
 (F) the time period of the satellite around the earth must be equal to the rotational period of earth (i.e. 24 hrs).
 (T) the direction of motion of the satellite must be same as that of the earth.
 (R) its height from the surface of the earth must be about 36,000 km.
 (E) all of these
4. The weights of an object in a coal mine, at sea level and at the top of mountains are w_1 , w_2 and w_3 respectively then
 (F) $w_1 > w_2 > w_3$ (T) $w_1 = w_2 = w_3$ (R) $w_1 < w_2 < w_3$ (E) $w_1 < w_2 > w_3$
5. Escape velocity of a projectile from the surface of earth is about:
 (F) 3×10^{10} cm/s (T) 18600 cm/s
 (R) 11.2 km/s (E) 8 km/s
6. The earth revolves round the sun in an elliptical orbit. Its speed
 (F) goes on decreasing continuously
 (T) is greatest when it is closest to the sun
 (R) is greatest when it is farthest from the sun
 (E) is constant at all the points on the orbit.
7. A force of 22 N is needed to overcome a frictional force of 10 N and accelerate a 3 kg mass across a floor. What is the acceleration of the mass?
 (F) 4 m/s^2 (T) 5 m/s^2 (R) 7 m/s^2 (E) 20 m/s^2
8. Friction
 (F) can occur only between two surfaces that are moving relative to one another
 (T) is equal to the normal force divided by the coefficient of friction
 (R) opposes the relative motion between two surfaces in contact
 (E) only depends on one of the surfaces in contact

Space for rough work

9. Which of the following statements is False? No net force act on:
 (F) A rain drop falling vertically with a constant speed
 (T) A car moving with uniform velocity on a rough road
 (R) A car moving with uniform velocity on a circular track
 (E) A cork floating on water surface
10. If a rock is brought from the surface of the moon
 (F) its mass will change (T) its weight will change, but not mass
 (R) both mass and weight will change (E) its mass and weight will remain the same
11. The ratio of time periods of two satellites revolving around the earth in the orbits of radii 1 : 4 will be
 (F) 1 : 4 (T) 4 : 1 (R) 1 : 8 (E) 8 : 1
12. A bus takes 2 hours to cover a distance of 300 km. What is the average speed of the bus?
 (F) 50 km/h (T) 100 km/h
 (R) 150 km/h (E) 200 km/h
13. An object dropped from a cliff falls with a constant acceleration of 10 m/s^2 . Find its speed 4 s after it was dropped.
 (F) 10 m/s (T) 20 m/s
 (R) 30 m/s (E) 40 m/s

SECTION – III (Chemistry)

1. Which of the following is the most stable?
 (F) True solution (T) Colloidal solution (R) Suspension (E) Milk
2. The particles of suspension
 (F) can't be seen with a naked eye
 (T) can't be seen with the help of powerful microscope
 (R) can be seen with naked eye
 (E) can't be seen with the electron microscope
3. Strength of solution which contains 2.5 g of sugar in 25 mL of its aqueous solution is:
 (F) 100 g/L (T) 50 g/L (R) 10 g/L (E) 20 g/L
4. The boiling point of four liquids is given below.
- | Liquid | P | Q | R | S |
|--------------------|-----|-----|-----|-----|
| Boiling Point in K | 250 | 380 | 120 | 100 |
- Which two liquids can be most effectively be separated by fractional distillation process?
 (F) P and S (T) R and S (R) Q and S (E) P and R
5. Pigments of natural colours can be separated by
 (F) chromatography (T) centrifugation (R) filtration (E) sublimation

Space for rough work

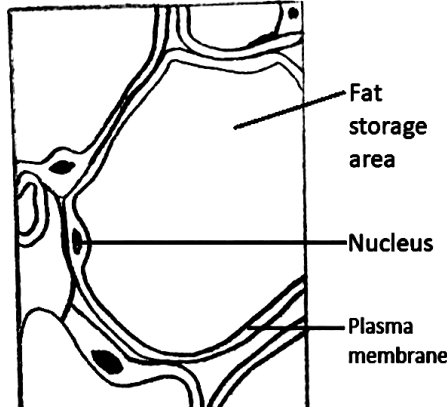
6. Smoke is an example of
(F) gas dispersed in liquid (T) gas dispersed in solid
(R) solid dispersed in gas (E) solid dispersed in solid
7. Which gas present in air has the highest boiling point?
(F) Oxygen (T) Nitrogen (R) Argon (E) Hydrogen
8. All the gases will occupy zero volume when the temperature is reduced to
(F) 273°C (T) 273 K
(R) - 273°C (E) 0°C
9. Tincture of iodine has the antiseptic properties. This solution is made by dissolving
(F) Iodine in potassium iodide (T) Iodine in Vaseline
(R) Iodine in water (E) Iodine in Alcohol
10. Boron and carbon are
(F) Metalloids
(T) Metalloids and non-metal respectively
(R) Metal
(E) Non-metal and metalloid respectively
11. Which of the following contains one kind of atom?
(F) Brass (T) Steel
(R) Lead (E) Sand
12. A solution of water and acetone can be separated to its components by
(F) Distillation (T) Crystallization
(R) Centrifugation (E) Sieving
13. Which of the following phenomena would increase on raising the temperature?
(A) Diffusion, evaporation, compression of gases
(T) evaporation, compression of gases, solubility
(R) Evaporation, diffusion, expansion of gases
(E) Evaporation, solubility, diffusion, compression of gases

SECTION – IV (Biology)

1. Which of the following disease is caused by Plasmodium?
(F) Typhoid (T) Malaria
(R) Tuberculosis (E) Hepatitis A

Space for rough work

2. What is the name of the tissue given in the following figure?



- (F) Areolar tissue
(R) Bone
(T) Adipose tissue
(E) Cartilage

3. Which of the following is a living structure?

- (F) Sclerenchyma
(R) Xylem vessel
(T) Parenchyma
(E) Tracheid

4. Lignin is absent in:

- (F) Stone cells
(R) Tracheids
(T) Sclerenchymatous fibres
(E) Sieve cells

5. Influenza disease is caused by which of the following microorganism?

- (F) Bacteria
(R) Fungi
(T) Viruses
(E) Protozoa

6. The supportive skeletal structures in the human external ears and in the nose tip are example of:

- (F) Ligament
(R) Bone
(T) Areolar tissue
(E) Cartilage

7. Tendon and ligament are example of:

- (F) Dense regular connective tissue
(R) Loose connective tissue
(T) Dense irregular connective tissue
(E) Specialized connective tissue

8. Match the following:

Column-I		Column-II	
(p)	Adipose tissue	(i)	Nasal septum
(q)	Stratified epithelium	(ii)	Blood
(r)	Hyaline cartilage	(iii)	Skin
(s)	Fluid connective tissue	(iv)	Fat storage

- (F) (p)-(i); (q)-(ii); (r)-(iii); (s)-(iv)
(R) (p)-(iii); (q)-(i); (r)-(iv); (s)-(ii)
(T) (p)-(iv); (q)-(iii); (r)-(i); (s)-(ii)
(E) (p)-(ii); (q)-(i); (r)-(iv); (s)-(iii)

9. Health is defined as:

- (F) A state of complete physical well-being
(R) A state of complete social well-being
(T) A state of complete mental well-being
(E) All of these

10. A patient suffering from chronic disease:

- (F) Suffers from disease for a very long period
(T) Has abrupt attack of disease
(R) Suffers from disease for short period
(E) Both (T) and (R)

11. Intercalated disc are characteristic of muscles found in:
 (F) Heart (T) Thigh
 (R) Urinary bladder (E) Stomach
12. Which one of the following types of cell is involved in making of the inner walls of blood vessels?
 (F) Cuboidal epithelium (T) Columnar epithelium
 (R) Squamous epithelium (E) Stratified epithelium
13. What are cuboidal or columnar cells called when they bear cilia?
 (F) Ciliated epithelium (T) Flagellated epithelium
 (R) Convolved epithelium (E) Brush bordered epithelium
14. Which of these is the correct order of events in the cell cycle?
 (F) G1 → G2 → S → M (T) G1 → G2 → M → S
 (R) G1 → S → G2 → M (E) S → M → G1 → G2

SECTION – V (Mathematics)

1. If $64^{2x-5} = 4 \times 8^{x-5}$, then the value of x is?
 (F) $\frac{17}{9}$ (T) $\frac{17}{10}$
 (R) $\frac{20}{9}$ (E) $\frac{9}{17}$
2. In a right angled triangle with sides 'a' and 'b' and hypotenuse 'c', the altitude drawn on the hypotenuse is x then x equals to
 (F) $\frac{c}{ab}$ (T) $\frac{ab}{c}$
 (R) $\frac{bc}{a}$ (E) bc
3. If the perimeter of an equilateral triangle is 12cm then the length of each median is
 (F) $2\sqrt{5}$ cm (T) $\sqrt{3}$ cm
 (R) $2\sqrt{3}$ cm (E) $3\sqrt{2}$ cm
4. If $x < 0$ and $y > 0$, then the point (x, y) lies in?
 (F) quadrant I (T) quadrant II
 (R) quadrant III (E) quadrant IV

Space for rough work

5. Sum of two numbers is 35 and their difference is 13. The greater number is
 (F) 19 (T) 11
 (R) 24 (E) 20
6. The sides of a triangular plot are in the ratio 3 : 5 : 7 and its perimeter is 300 cm. Find the area of triangle.
 (F) $500\sqrt{3}$ cm² (T) $7500\sqrt{3}$ cm²
 (R) $4500\sqrt{3}$ cm² (E) $1500\sqrt{3}$ cm²
7. Find the area of quadrilateral whose vertices, taken in order, are A (-3, 2), B (5, 4), C (7, -6) and D (-5, -4).
 (F) 80 sq. units (T) 82 sq. units
 (R) 88 sq. units (E) 86 sq. units
8. The difference between the semi – perimeter and the sides of a ΔABC are 8 cm, 7 cm and 5 cm respectively. The area of the triangle is
 (F) $20\sqrt{7}$ cm² (T) $10\sqrt{14}$ cm²
 (R) $20\sqrt{14}$ cm² (E) None of these
9. The perpendicular bisectors of sides of a triangle are concurrent, then the point of their concurrence is called
 (F) circumcentre (T) orthocentre
 (R) incentre (E) none of these
10. In a triangle ABC, points P, Q and R are the mid-points of the sides AB, BC and CA respectively. If the area of the triangle ABC is 20 sq. units, then area of the triangle PQR equal to
 (F) 10 sq. units (T) $5\sqrt{3}$ sq. units
 (R) 5 sq. units (E) 5.5 sq. units
11. In what ratio does the x – axis divide the line segment joining the points (2, -3) and (5, 6)?
 (F) 1 : 1 (T) 1 : 2
 (R) 2 : 3 (E) 3 : 1
12. If the centroid of the triangle formed by (7, x), (y, -6) and (9, 10) is at (6, 3) then (x, y) = ?
 (F) (4, 5) (T) (5, 4)
 (R) (-5, -2) (E) (5, 2)

Space for rough work

13. The angles of a triangle are $(x + 5)^\circ$, $(2x - 3)^\circ$ and $(3x + 4)^\circ$. The value of x is?
(F) 30° (T) 31°
(R) 29° (E) 28°
14. The percentage increase in the area of a triangle if its each side is tripled is?
(F) 800% (T) 850%
(R) 600% (E) 900%
15. Which of the following is a factor of $P(x) = 2x^3 - 5x^2 + 16x + 42$?
(F) $2x + 7$ (T) $2x - 7$
(R) $2x + 3$ (E) $x - 3$
16. The hypotenuse of a right angled isosceles triangle is 5cm then its area is
(F) $\frac{21}{4} \text{ cm}^2$ (T) $\frac{26}{4} \text{ cm}^2$
(R) $\frac{25}{4} \text{ cm}^2$ (E) none of these
17. If $x + 5$ is a factor of $x^3 - 20x + 5k$, then $k = ?$
(F) -5 (T) 5
(R) 3 (E) -3
18. The distance between points A (2, 0) and B (6, 3) is?
(F) 7 units (T) 6 units
(R) 5 units (E) 4 units
19. In a square PQRS, if P(1,0), Q(4,0) and S(1,3), then the coordinates of point R will be?
(F) (4, 1) (T) (4, 4)
(R) (3, 4) (E) (4, 3)
20. In a triangle ABC, $AB^2 > AC^2 + BC^2$, then the triangle ABC is:
(F) acute triangle (T) obtuse triangle
(R) right triangle (E) cannot be determined

Space for rough work

SECTION – VI (Social Science)

1. How did the Russian Revolution contribute to the rise of the Soviet Union?
(F) By establishing a communist government
(T) By maintaining the monarchy
(R) By promoting capitalist policies
(E) By aligning with Western powers
2. What were the two main phases of the Russian Revolution?
(F) The February Revolution and the October Revolution
(T) The March Revolution and the November Revolution
(R) The January Revolution and the December Revolution
(E) The Spring Revolution and the Fall Revolution
3. Which of the following best describes the economic conditions in Russia leading up to the revolution?
(F) Highly industrialized with a strong middle class
(T) Largely agrarian with many peasants facing harsh conditions
(R) Wealthy and prosperous due to trade
(E) Dependent on foreign aid and investment
4. Which event triggered the February Revolution in 1917?
(F) The abdication of Tsar Nicholas II
(T) The Bolshevik takeover
(R) Protests and strikes in Petrograd
(E) The signing of the Treaty of Brest-Litovsk
5. What was the primary demand of the protesters on International Women's Day during the February Revolution?
(F) End of Monarchy
(T) Workers' Rights
(R) Freedom and Equality
(E) Peace, Land, and Bread
6. What significant action did Tsar Nicholas II take on March 2, 1917?
(F) He called for a national referendum
(T) He declared war on Germany
(R) He established a new government
(E) He abdicated the throne
7. What decision made by the Provisional Government contributed to its unpopularity?
(F) To continue fighting in World War I
(T) To disband the army
(R) To negotiate peace with Germany
(E) To establish a new constitution
8. What was the outcome of the October Revolution in 1917?
(F) The establishment of a democratic government
(T) The rise of the Bolsheviks and the beginning of Soviet rule
(R) The end of World War I
(E) The restoration of the monarchy
9. In the context of Russia what was 'kolkhoz'?
(F) Collective farm
(R) Political party
(T) Well do to farmers
(E) Poor and Landless peasants

10. Who were Jadidists?
(F) Muslim reformers within the Russian Empire
(T) Prince of Russia
(R) Peasants of Russia
(E) None of these
11. By whom was 'Das Kapital' written?
(F) Karl Marx
(R) Lenin
(T) Robert Owen
(E) Stalin
12. Who was the leader of a Military Revolutionary Committee appointed by the Soviet to organize seizure of power?
(F) Kerenskii
(R) Stalin
(T) Leon Trotsky
(E) Lenin
13. Which mountain range forms the northern boundary of India and is known as the 'Roof of the World'?
(F) The Aravalli Range
(R) The Himalayas
(T) The Eastern Ghats
(E) The Western Ghats
14. What is the approximate length of the Himalayan Mountain Range?
(F) 1,000 kilometers
(R) 2,400 kilometers
(T) 4,000 kilometers
(E) 3,500 kilometers
15. How do the Himalayas influence the climate of the Indian subcontinent?
(F) They have no significant impact on the climate.
(T) They are responsible for the tropical climate.
(R) They act as a barrier affecting monsoon patterns.
(E) They create a desert climate.
16. Which of the following regions is known as one of the most fertile areas in the world, located south of the Himalayas?
(F) The Western Ghats
(R) The Indo-Gangetic Plain
(T) The Thar Desert
(E) The Deccan Plateau
17. What makes the Indo-Gangetic Plain particularly suitable for agriculture?
(F) Its proximity to the ocean
(R) Its rich soil
(T) Its arid climate
(E) Its high elevation
18. Which of the following statements is true about the Thar Desert?
(F) It is primarily located in the eastern part of India.
(T) It is known for its lush vegetation.
(R) It is one of the largest deserts in the world.
(E) It has a temperate climate.
19. What is a significant characteristic of the Thar Desert located in northwest India?
(F) It is the smallest desert in the world.
(T) It is one of the largest deserts in the world.
(R) It has a tropical rainforest climate.
(E) It is primarily located in southern India.
20. Which mountain range is recognized as a UNESCO World Heritage site and extends from Gujarat to Tamil Nadu?
(F) The Himalayas
(R) The Eastern Ghats
(T) The Western Ghats
(E) The Vindhya Range

21. What is the total length of India's coastline?
(F) 5,000 kilometers (T) 6,500 kilometers
(R) 8,000 kilometers (E) 7,517 kilometers
22. Which coastal plain in India stretches from Gujarat to Kerala?
(F) The Southern Coastal Plain (T) The Northern Coastal Plain
(R) The Western Coastal Plain (E) The Eastern Coastal Plain
23. What is the primary purpose of electoral politics?
(F) To manage government budgets
(T) To organize political parties
(R) To allow citizens to choose their representatives in government
(E) To determine the best policies for a country
24. Which of the following is a key function of elections in a democracy?
(F) To enforce laws without public input
(T) To allow citizens to choose individuals who represent their interests
(R) To limit the number of political parties
(E) To increase government spending
25. What mechanism do elections provide for voters regarding their leaders?
(F) A process to select judges
(T) A method to change the constitution
(R) A means to hold leaders accountable
(E) A way to influence government spending
26. In a First-Past-the-Post (FPTP) electoral system, what determines the winner?
(F) The candidate with the highest percentage of votes
(T) The candidate with the most votes in a single-member district
(R) The candidate who is endorsed by the most political parties
(E) The candidate who receives the most campaign contributions
27. What is the first step in the electoral process?
(F) Campaigning (T) Voter registration
(R) Voting (E) Debating
28. When government officers work in election duty, they are under the control of:
(F) The Government (T) Election Commission
(R) The Parliament (E) The Judiciary
29. What is By – Election?
(F) Elections held to fill a vacancy caused by the death or any other reasons
(T) Elections held after a specific period
(R) Elections held to form the new government
(E) Elections held in between the fixed term of the House
30. What is an amendment in the context of a constitution?
(F) A summary of the constitution's history
(T) A document that lists the rights of citizens
(R) A formal change or addition to the constitution
(E) A section that outlines the duties of the President
31. What is the significance of the Preamble in a constitution?
(F) It lists the amendments to the constitution
(T) It outlines the fundamental principles and purposes of the constitution
(R) It describes the penalties for breaking the law
(E) It serves as a historical document

32. What role does the Bill of Rights typically play in a constitution?
(F) It outlines the duties of government officials
(T) It guarantees certain fundamental rights to citizens
(R) It defines the structure of the military
(E) It establishes the process for amending the constitution
33. What is one benefit of a well-designed constitution?
(F) It allows for unlimited government power
(T) It eliminates the need for laws
(R) It promotes political stability and legitimacy
(E) It restricts citizen participation in governance
34. What is the primary function of the articles in a constitution?
(F) To outline the rights of citizens
(T) To list the amendments to the constitution
(R) To detail the structure and functions of government
(E) To provide a historical account of the nation
35. What is a key characteristic of a written constitution?
(F) It is only applicable to federal systems
(T) It is based solely on tradition and customs
(R) It is a single document outlining governance
(E) It does not include a bill of rights
36. What does the term 'human capital' refer to in economic development?
(F) The natural resources found in a country.
(T) The financial resources available for investment.
(R) The skills, knowledge, and abilities that individuals possess.
(E) The physical assets owned by a company.
37. What is a critical factor for a nation's growth and prosperity?
(F) Natural resources alone.
(T) The talents and potential of the population.
(R) Government regulations.
(E) Technological advancements only.
38. How does education impact job opportunities for individuals?
(F) It guarantees a job in any field.
(T) It leads to higher-paying jobs and increased job security.
(R) It has no effect on job opportunities.
(E) It limits job options to low-paying positions.
39. Why is health considered an important aspect of human capital?
(F) Health has no impact on productivity.
(T) Healthy individuals are more productive and contribute more effectively to their workplaces.
(R) Healthy individuals take more sick days.
(E) Healthy individuals are less productive.
40. What role do governments play in developing human capital?
(F) They can only regulate the economy.
(T) They can invest in education systems, healthcare, and skill development programs.
(R) They have no influence on human capital.
(E) They primarily focus on natural resource management.

Space For Rough Work

FIITJEE INTERNAL TEST

BATCHES: Four Year CRP428 (R & W)

PHASE TEST – 2

(MAT & SAT)

QP CODE:

Answers

SECTION – I (MAT)

1. T	2. E	3. F	4. E
5. F	6. R	7. R	8. F
9. R	10. F	11. F	12. F
13. F	14. F	15. T	16. E
17. R	18. E	19. T	20. F
21. F	22. R	23. T	24. R
25. F	26. E	27. E	28. R
29. R	30. E	31. T	32. T
33. E	34. T	35. R	36. E
37. T	38. R	39. F	40. F
41. E	42. F	43. T	44. E
45. E	46. E	47. E	48. R
49. R	50. F	51. E	52. F
53. T	54. E	55. E	56. E
57. T	58. T	59. F	60. E
61. F	62. E	63. E	64. E
65. R	66. F	67. R	68. F
69. T	70. F	71. R	72. R
73. T	74. R	75. F	76. R
77. T	78. R	79. R	80. R
81. R	82. F	83. T	84. F
85. E	86. T	87. T	88. T
89. F	90. E	91. T	92. R
93. T	94. E	95. T	96. T
97. T	98. R	99. F	100. E

SECTION – II (Physics)

- | | | | |
|-------|-------|-------|-------|
| 1. R | 2. F | 3. E | 4. E |
| 5. R | 6. T | 7. F | 8. R |
| 9. R | 10. T | 11. R | 12. R |
| 13. E | | | |

SECTION – III (Chemistry)

- | | | | |
|-------|-------|-------|-------|
| 1. F | 2. R | 3. F | 4. T |
| 5. F | 6. R | 7. F | 8. R |
| 9. E | 10. T | 11. R | 12. F |
| 13. R | | | |

SECTION – IV (Biology)

- | | | | |
|-------|-------|-------|-------|
| 1. T | 2. T | 3. T | 4. E |
| 5. T | 6. E | 7. F | 8. T |
| 9. E | 10. F | 11. F | 12. R |
| 13. F | 14. R | | |

SECTION – V (Mathematics)

- | | | | |
|-------|-------|-------|-------|
| 1. F | 2. T | 3. R | 4. T |
| 5. R | 6. E | 7. F | 8. R |
| 9. F | 10. R | 11. T | 12. E |
| 13. R | 14. F | 15. R | 16. R |
| 17. T | 18. R | 19. E | 20. T |

SECTION – VI (Social Science)

- | | | | |
|-------|-------|-------|-------|
| 1. F | 2. F | 3. T | 4. R |
| 5. E | 6. E | 7. F | 8. T |
| 9. F | 10. F | 11. F | 12. T |
| 13. R | 14. R | 15. R | 16. R |
| 17. R | 18. R | 19. T | 20. T |
| 21. E | 22. R | 23. R | 24. T |
| 25. R | 26. T | 27. T | 28. T |
| 29. F | 30. R | 31. T | 32. T |
| 33. R | 34. R | 35. R | 36. R |
| 37. T | 38. T | 39. T | 40. T |

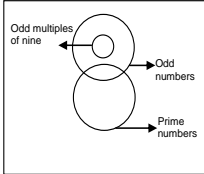
Answers & Solutions

Part – I (MAT)

SECTION – I

1. T

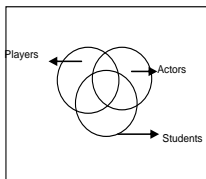
Sol. We know that odd multiples of nine are also odd numbers. So the group of odd multiples of nine is a subset of odd numbers and none of these multiples is a prime number. But in the list of odd numbers we can also have prime numbers but not all prime numbers are odd as 2 is an even prime.



The above diagram is the most appropriate representation of the given group.

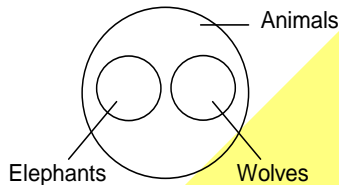
2. E

Sol.



3. F

Sol.



Elephants and Wolves are entirely different. But, both are animals.

4. E

Sol. In the given diagram, it is clear that the required part in the question is covered by number "1".

5. F

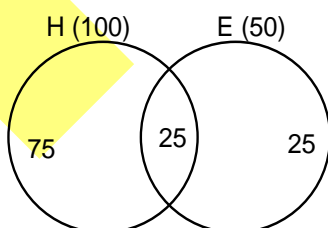
Sol. By analysis, the correct answer is F.

6. R

Sol. By analysis, the correct answer is R.

7. R

Sol. No. of students who know only Hindi = $100 - 25 = 75$
 No. of students who know only English = $50 - 25 = 25$
 Total No. of students = $75 + 25 + 25 = 125$



8. F

Sol. The number of doctors who are neither teacher nor singers is 17.

9. R
Sol. The number of doctors who are both singers and teachers is 3.
10. F
Sol. Number of teachers who are singers = $22 + 3 = 25$
11. F
Sol. Sum = $4 + 2 + 6 + 8 = 20$
12. F
Sol. Product = $3 \times 9 = 27$
13. F
Sol. The required set of students is denoted by regions common to any three circles only.
 \therefore Required number = $(13 + 13 + 18 + 18) = 62$
14. F
Sol. The required set of students is denoted by regions lying inside the circles representing History, Mathematics and Science.
 \therefore Required number = $(9 + 14 + 18 + 15 + 16 + 13 + 12 + 20 + 18 + 13 + 16 + 19) = 183$
15. T
Sol. The required set of students is denoted by the regions common to the circles representing History and Geography.
 \therefore Required number = $(20 + 13 + 12 + 18) = 63$
16. E
Sol. $\boxed{5} 1 4 \boxed{7} \boxed{3} 9 8 \boxed{5} 7 2 6 \boxed{3} \boxed{1} 5 8 6 3 8 5 4 2 4 1 4 9 6$
17. R
Sol. $5 1 4 7 3 9 8 5 7 \boxed{2} 6 3 1 5 \boxed{8} 6 3 8 5 \boxed{4} 2 4 1 4 9 6$
18. E
Sol. $5 1 4 7 3 9 8 5 7 2 6 3 1 5 8 6 \boxed{3} 8 \boxed{5} 4 2 4 \boxed{1} 4 \boxed{9} 6$
19. T
Sol. There are 27 number in the given sequence.
So, middle number = 14^{th} number = 9.
Clearly, the third number to the left of this 9 is 4.
20. F
Sol. $7 5 5 9 4 5 7 6 4 5 9 8 7 \boxed{5} 6 7 6 4 3 2 5 6 7 8$
21. F
Sol. Vijay's position from downwards = $[\text{Total students} - \text{Vijay's position from upwards}] + 1$
 $= [43 - 14] + 1 = 30.$
22. R
Sol. Q is 9^{th} from right end and R is fourth to the left of Q. So, R is 13^{th} from the right end.
Number of children to the left of R = $(40 - 13) = 27$
Thus, R is 28^{th} from the left end. Also, P is 13^{th} from the left end.
Clearly, there are 14 persons between P and R.
23. T
Sol. Number of students between Kunal and Sonali = $35 - (7 + 9) = 19$

Clearly, there are 9 students between Kunal and Pulkit, as well as Pulkit and Sonali.
So, Kunal is 10th from Pulkit.

24. R

Sol. To count the minimum number students we have to consider this as the case of overlapping.
Thus, the minimum number of students in the class is = Rank of Vijay + Rank of Ajay – 3
= 34 + 37 – 3 = 68

25. F

Sol. The number of girls is = 7 + 10 + 10 = 27

26. E

Sol. Total student are there = 10 + 23 – 1 = 33 – 1 = 32

27. E

Sol. To find out the total member of a row we have to know the position of a person from the left end and the position of a person from the right end and there must be a relation among that two persons.

Here, the position of Yash and Rima are given but there is no relation among them.

Hence, the given data is not sufficient to answer this question.

28. R

Sol. Before interchanging → 13 Anuj ___ Raj 17
After interchanging → 13 Raj 8 Anuj 17
After interchanging Raj's position from right = 27.

29. R

Sol. According to Pratap, 20, 21 and 22 and
According to his sister birthday is not on or after 22nd
So, Pratap's mother's birthday is on 20th or 21st

30. E

Sol. 10th is three days earlier than Sunday, it means 10th is Thursday. So, 17th is also Thursday
so 19th is Saturday.

31. T

Sol. Arrangement will be as follows (1) Raamed (2) Rama (3) Randesh (4) Randhir

32. T

Sol. Sequence of the word: P O W E R F U L
Sequence of English Alphabet: E F L O P R U W
Clearly, the position of letter U remains unchanged. Hence, the answer is B.

33. E

Sol. Clearly, we have
COMPREHENSION → (COM) (PREHENS) (ION) → MOCIONSNEHERP
The middle letter is the seventh letter, which is S. Hence, the answer is (E).

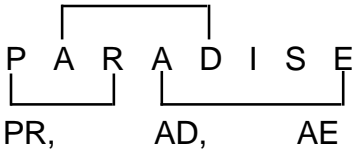
34. T

Sol: Ninth letter to the left of the ninth letter from the right is 18th letter from right, i.e., 26-18+1=9th
letter from the left.
Since first half is reversed, so 9th letter from left is E

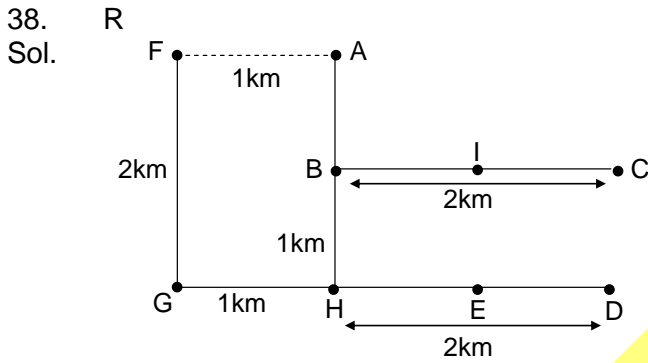
35. R

Sol: three pairs are: G and H; T and R; I and E

36. E
Sol. ZYXWVUTSRQPONMLKJIHGFEDC BA

37. T


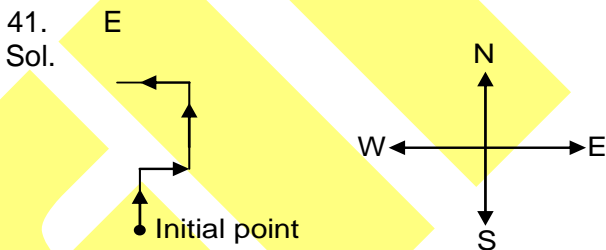
Sol. Total number of such pair = 3



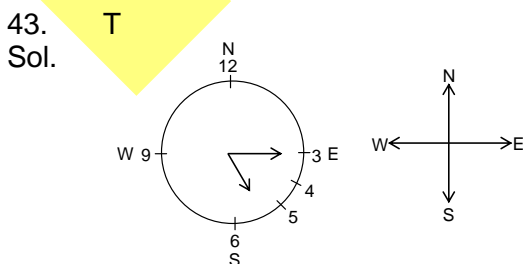
Since E lies in middle of H and D, so $HE = ED$.
 But $HD = 2\text{km}$. So, $HE = ED = 1\text{km}$
 \therefore required distance = $GE = GH + HE$
 $= (1 + 1)\text{ km} = 2\text{km}$

39. F
Sol. I lies in middle of B and C. So, $BI = IC$
 But $BC = 2\text{km}$. So, $BI = IC = 1\text{ km}$
 So, I lies directly above E.
 \therefore required distance = $EI = HB = 1\text{ km}$.

40. F
Sol. Since $GF = AH = 2\text{ km}$, so F and A lie in the same line.
 \therefore required distance = $AF = GH = 1\text{km}$

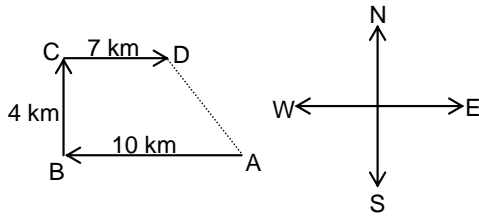


42. F
Sol. \therefore To the right of Dileep is east as sun is in the west in the evening.
 \therefore He is facing north.



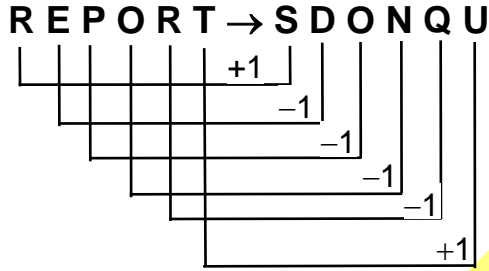
At 6:00, the hour hand will be at 6, which is towards south.

44. E
Sol.



Now, D is to the North – West of A.

45. E
Sol.



Hence **PERSON - QDQRNO**

46. E
Sol.

$M = 13 \rightarrow 1 + 3 = 4$, $O = 15 \rightarrow 1 + 5 = 6$, $R = 18 \rightarrow 1 + 8 = 9$, $E = 5$
EXAM \rightarrow
 $E = 5$
 $X = 24 \rightarrow 2 + 4 = 6$
 $A = 1$
 $M = 13 \rightarrow 1 + 3 = 4$

47. E
Sol.

In this the sum of the values of the letters as in the alphabet are taken and to this the total number of letters in the word are added.
i.e., CONTROL $\Rightarrow 3 + 15 + 14 + 20 + 18 + 15 + 12 = 97$
Number of letters in CONTROL = 7
i.e., $97 + 7 = 104$
QUESTION $\Rightarrow 17 + 21 + 5 + 19 + 20 + 9 + 15 + 14 = 120$
Number of letters in QUESTION = 8
i.e., $120 + 8 = 128$
Similarly, INSTITUTION
 $= 9 + 14 + 19 + 20 + 9 + 20 + 21 + 20 + 9 + 15 + 14$
 $\Rightarrow 170 + 11 = 181$

48. R

Sol. R → 8 Similarly M → 7
 A → \$ O → #
 I → % R → 8
 N → 6 E → @

Similarly R → 8
 E → @
 M → 7
 A → \$
 I → %
 N → 6

49. R
 Sol: In the second and third statements, the common code word is 'sen' and the common word is 'but'.

50. F

Sol.

51. E
 Sol: In the second number, last digit is missing; and in the third number, first digit is missing and it is following the series.

52. F
 Sol. $m \underline{n} m / mn \underline{m} / m \underline{n} \underline{m} / m \underline{n} m$

53. T

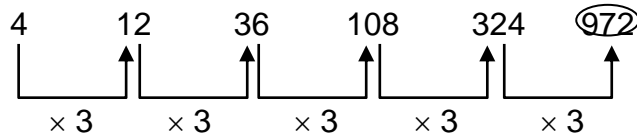
Sol.

54. E

Sol.

55. E

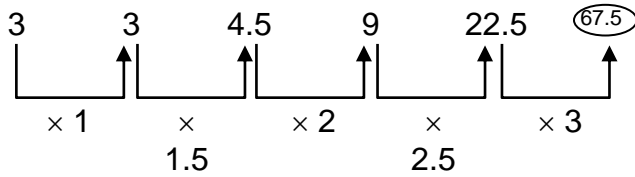
Sol. In the given series, previous element is multiplied by 3 to obtain the next element and therefore the ratio between two consecutive elements is same.



$\therefore ? = 972$

56. E

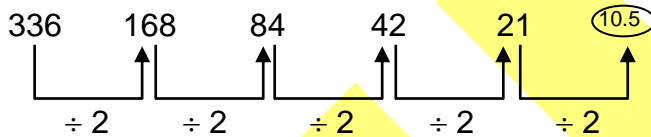
Sol. In the given series, previous element two consecutive elements is in increasing order and elements are multiplied by the numbers in increasing order



$\therefore ? = 67.5$

57. T

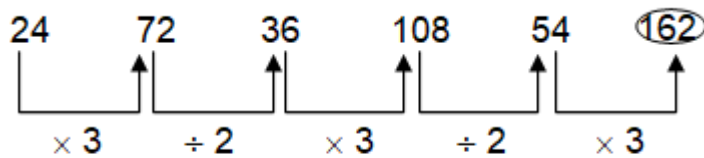
Sol. In the given series, previous element is divided by 2 to get the next element.



$\therefore ? = 10.5$

58. T

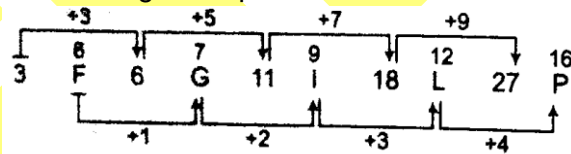
Sol. The series pattern is $\times 3, \div 2, \times 3, \div 2$ and so on.



$\therefore ? = 162$

59. F

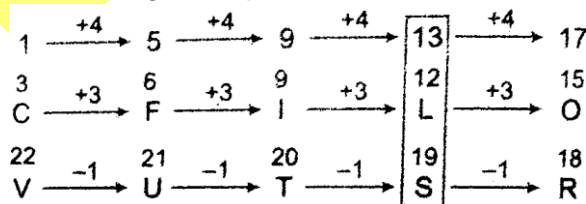
Sol. Pattern of given alpha-numeric series is as follows



$\therefore ? = 27 P$

60. E

Sol. Pattern of given alpha-numeric series is as follows



$? = 13 LS$

61. F
Sol. abba/baab/abba/baab

62. E
Sol. abba/acca/adda/aeea

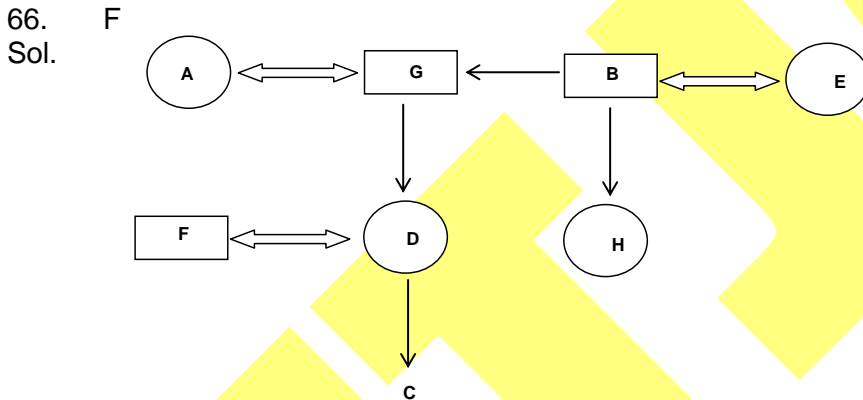
63. E
Sol: The series is abncb/abncb/abncb. Thus, the pattern 'abncb' is repeated.

64. E
Sol.

1	3	8	19	42	(88)	184
-----		-----		-----		-----
2		5		11		23
x2+1		x2+1		x2+1		
						46
						96

Instead of 46, 47 should come so 88 is wrong term here, this should be replaced by 89.

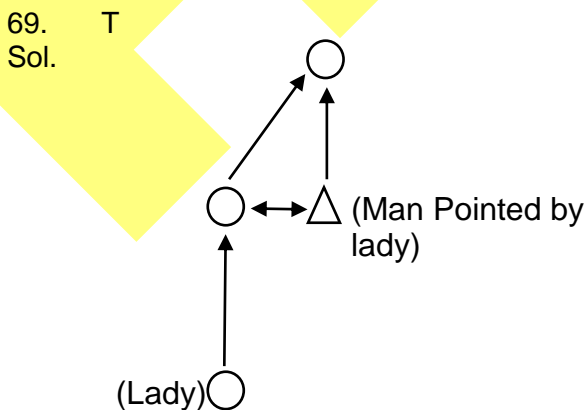
65. R
Sol. $\Rightarrow 11^2 + 11, 13^2 + 13, 17^2 + 17, 19^2 + 19, 23^2 + 23, 29^2 + 29, \underline{\quad}$
The given numbers are in $n^2 + n$ form of consecutive prime numbers in increasing order, starting with 11. Hence, the next number in the series is $31^2 + 31 = 992$.



So, G is the Uncle of H.

67. R
Sol. H and D are Cousins.

68. F
Sol. Reject (T) because it shows χ is the husband of S
Reject (R) because gender of χ is not given
Reject (E) because it shows χ is the husband of S
So only option (F) shows the desired relationship.



Hence, Pointed Man will be Maternal Uncle of the lady.

70. F

Sol: The man in the photograph is son of Anjali's grandfather's son i.e., the son of Anjali's father. Hence, the boy is the brother of Anjali.

71. R

Sol. $(P \leftrightarrow R) \leftrightarrow Q$

(Symbols which are used here $\circ \rightarrow$ female, $\square \rightarrow$ male, $\leftrightarrow \rightarrow$ married couples, $\leftrightarrow \rightarrow$ siblings)

72. R

Sol. $(P \leftrightarrow R) \downarrow Q$

73. T

Sol. Nothing is mentioned about lather formation by the detergent. So, I is not implicit. Also, detergents should be used as they clean clothes better and more easily. So, II is implicit.

74. R

Sol. The use of the world 'gamble' indicates that he may, either gain or lose in the deal.

75. F

Sol. Let the required quantity of copper be x kg.

$$\text{Then, } 9 : 4 :: 24 : x \Leftrightarrow 9x = 4 \times 24 \Leftrightarrow x = \frac{4 \times 24}{9} = 10\frac{2}{3}$$

Hence, the required quantity of copper is $10\frac{2}{3}$ kg

76. R

Sol. Let the shares of A, B, C and D be Rs 5x, Rs 2x, Rs 4x and Rs 3x respectively.

$$\text{Then, } 4x - 3x = 1000 \Leftrightarrow x = 1000$$

$$\therefore \text{ B's share} = \text{Rs. } 2x = \text{Rs. } (2 \times 1000) = \text{Rs. } 2000$$

77. T

Sol. Let the fourth proportional to 5, 8, 15 be x.

$$\text{Then, } 5 : 8 :: 15 : x \Leftrightarrow 5x = (8 \times 15) \Leftrightarrow x = \frac{(8 \times 15)}{5} = 24$$

78. R

Sol. Let the incomes of A and B be Rs 5x and Rs 4x respectively and let their expenditures be Rs 3y and Rs 2y respectively.

$$\text{Then, } 5x - 3y = 1600 \quad \dots(i)$$

$$\text{and } 4x - 2y = 1600 \quad \dots(ii)$$

On multiplying (i) by 2 & (ii) by 3 and subtracting, we get : $2x = 1600 \Leftrightarrow x = 800$

$$\therefore \text{ A's income} = \text{Rs } 5x = \text{Rs } (5 \times 800) = \text{Rs } 4000$$

79. R

Sol. Let the numbers be x and 2x. Then, $\frac{x+7}{2x+7} = \frac{3}{5} \Leftrightarrow 5(x+7) = 3(2x+7) \Leftrightarrow x = 14$

$$\therefore \text{ Greater number} = 28$$

80. R

Sol. Let boys = $3x$ and girls = $2x$
 Number of those who do not get scholarship
 $= (80\% \text{ of } 3x) + (75\% \text{ of } 2x) = \left(\frac{80}{100} \times 3x\right) + \left(\frac{75}{100} \times 2x\right) = \frac{39x}{10}$
 Required percentage = $\left(\frac{39x}{10} \times \frac{1}{5x} \times 100\right)\% = 78\%$

81. R
 Sol. (45×16) men can complete the work in 1 day.

$$\therefore 1 \text{ man's 1 day's work} = \frac{1}{720}$$

$$45 \text{ men's 6 day's work} = \left(\frac{1}{16} \times 6\right) = \frac{3}{8}. \text{ Remaining work} = \left(1 - \frac{3}{8}\right) = \frac{5}{8}$$

$$75 \text{ men's 1 day's work} = \frac{75}{720} = \frac{5}{48}$$

Now, $\frac{5}{48}$ work is done by them in 1 day.

$$\therefore \frac{5}{8} \text{ work is done by them in } \left(\frac{48}{5} \times \frac{5}{8}\right) = 6 \text{ days}$$

82. F
 Sol. Let 1 man's 1 day's work = x and 1 boy's 1 day's work = y

$$\text{Then, } 2x + 3y = \frac{1}{10} \text{ and } 3x + 2y = \frac{1}{8}$$

$$\text{Solving, we get: } x = \frac{7}{200} \text{ and } y = \frac{1}{100}$$

$$\therefore (2 \text{ men} + 1 \text{ boy})'s 1 \text{ day's work} = \left(2 \times \frac{7}{200} + 1 \times \frac{1}{100}\right) = \frac{16}{200} = \frac{2}{25}$$

So, 2 men and 1 boy together can finish the work in $\frac{25}{2} = 12\frac{1}{2}$ days

83. T
 Sol. Given, A completes the work in 20 days

\therefore A completes $\frac{1}{20}$ of the work in one day.

B completes the work in 30 days

\therefore B completes $\frac{1}{30}$ of the work in one day

In one day A and B together can do $\frac{1}{20} + \frac{1}{30} = \frac{1}{12}$ of the work in one day.

Given A, B and C together completed the work in 8 days.

\therefore They can completed $\frac{1}{8}$ of the work in one day

The work done by C in one day = $\frac{1}{8} - \frac{1}{12} = \frac{1}{24}$ of the work.

Employment done by C in 8 days = $8 \times \frac{1}{24} = \frac{1}{3}$ of the work

\therefore Share of C = $\frac{1}{3}$ of the total earnings

i.e., $\frac{1}{3} \times 5550 = 1850$

84. F

Sol. Only Conclusion I follows because funding along with other factors can improve quality of education but funding alone cannot guarantee the enhancement of quality of education.

85. E

Sol. None of the conclusions follows the statement, It is erroneous to assume that all natural resources are destroyed by industries. Similarly, there are other factors which pollute environment.

86. T

Sol. Here $10 = (6 \times 3) - (4 \times 2)$, $30 = (9 \times 5) - (5 \times 3)$
Similarly, answer = $(6 \times 5) - (2 \times 5) = 20$

87. T

Sol. As $7 + 2 = 9$; $9 \times 4 = 36$
 $6 + 8 = 14$; $14 \times 3 = 42$
Similarly, $9 + 4 = 13$ and $13 \times 2 = 26$.
Hence, number 2 will come in place of question mark.

88. T

Sol. $7 - 3 = 4$ and $4^3 = 64$, similarly $8 - 2 = 6$ and $6^3 = 216$.

89. F

Sol. Here $28 = 4 \times 6 + 2 \times 2$, $80 = 14 \times 4 + 6 \times 4$
Similarly, required answer = $2 \times 13 + 2 \times 7 = 40$

90. E

Sol. In the first column
 $11 + 25 = 17 + 19$
 $36 = 36$
In the several column
 $6 + 34 = 12 + 28$
 $40 = 40$
 $8 + 19 = x + 11$
 $x = 16$

91. T

Sol. $(5 \times 4) + (3 + 2) = 25$
 $(7 \times 3) + (5 + 1) = 27$
 $(8 \times 4) + (7 + 1) = 40$

92. R

Sol. $4^2 + 5^2 = 41$
 $1^2 + 2^2 = 5$
 $6^2 + 7^2 = 85$

93. T

Sol. As,
 $(14 \times 4 - 20) \div 12 = 3$
 $(9 \times 9 - 42) \div 13 = 3$
and $(12 \times 8 - 19) \div 7 = 11$

Similarly, $(20 \times 10 - 40) \div 20 = 8$

94. E

Sol. As, $93 - (27 + 63) = 3$
 $79 - (38 + 37) = 4$
 Similarly, $67 - (16 + 42) = 9$
 Hence, number 9 will come in place of question mark.

95. T

Sol: $(10 + 9 + 14 + 7)/2 = 20$
 and $(11 + 16 + 10 + 13)/2 = 25$
 Therefore, $(15 + ? + 12 + 10)/2 = 22$
 Hence $37 + ? = 44$
 $? = 44 - 37$

96. T

Sol: $(4 + 9 + 2) = (3 + 5 + 7) = (8 + 1 + 6)$

97. T

Sol: $(15 + 12)/9 = 3$ and $(44 + 28)/9 = 8$
 Therefore, $(64 + 53)/9 = 13$.

98. R

Sol: $(6 + 5) - (7 + 4) = 0$ and $(7 + 6) - (8 + 4) = 1$
 Therefore $(11 + 2) - (2 + 0) = 11$.

99. F

Sol. $72 \div 8 \times 9 + 2 = 83$
 $8 \div 2 \times 3 + 7 = 19$
 $12 \div 6 \times 4 + 3 = 11$

100. E

Sol: From I row, $1 + (1/2) = 3/2$
 From II row, $2 + (2/3) = 8/3$
 From III row, $3 + ? = 19/5$
 $? = (19/5) - 3$
 $? = (4/5)$.

Part – II (SAT) SECTION – II (Physics)

1. R

Sol. Both chain & object applies force in downward direction equal to their weight.

2. F

Sol. String can only pull an object.

3. E

Sol. All of these are required conditions for geostationary satellite.

4. E

Sol. Gravity is maximum at sea level. With increase in depth or height, weight decreases.

5. R

Sol. $V = \sqrt{\frac{2GM}{R}} = 11200 \text{ m / sec} = 11.2 \text{ km / sec}$

6. T

Sol. Knowledge based.

7. F

Sol. $F_{\text{net}} = ma$

$$\Rightarrow 22\text{N} - 10\text{N} = 3 \times a \Rightarrow a = \frac{12}{3} = 4 \text{ m/s}^2$$

8. R

Sol. Friction opposes the relative motion between two surfaces in contact.

9. R

Sol. The car is accelerating on a circular track.

10. T

Sol. Mass is constant everywhere, while its weight changes.

11. R

$$\text{Sol. } T^2 \propto R^3 \Rightarrow \frac{T_1}{T_2} = \left(\frac{R_1}{R_2}\right)^{3/2} = \left(\frac{1}{4}\right)^{3/2} = \left(\frac{1}{2}\right)^{2 \times \frac{3}{2}} = \frac{1}{8} = 1:8$$

12. R

$$\text{Sol. } \text{Average speed} = \frac{\text{distance}}{\text{time}} = \frac{300}{2} = 150 \text{ km/h}$$

13. E

Sol. $v = u + at = 0 + 10 \times 4 = 40 \text{ m/s}$.

SECTION – III (Chemistry)

1. F

Sol. True solution is the most stable.

2. R

Sol. The particles of suspension can be seen with naked eye.

3. F

$$\text{Sol. } \text{Strength} = \frac{2.5}{25} \times 1000 \\ = 100 \text{ g/L}$$

4. T

Sol. R and S

5. F

Sol. Pigments of natural colours can be separated by chromatography.

6. R

Sol. Smoke is an example of solid dispersed in gas.

7. F

Sol. Oxygen gas present in air has the highest boiling point.

8. R

Sol. All the gases will occupy zero volume when the temperature is reduced to -273°C .

9. E

- Sol. Tincture of iodine has the antiseptic properties. This solution is made by dissolving iodine in Alcohol
10. T
Sol. Boron and carbon are metalloids and non-metal respectively.
11. R
Sol. Lead contains one kind of atom.
12. F
Sol. A solution of water and acetone can be separated to its components by distillation
13. R
Sol. Evaporation, diffusion, expansion of gases

SECTION – IV (Biology)

1. T
Sol. Malaria is caused by Plasmodium.
2. T
Sol. The above diagram represents adipose tissue.
3. T
Sol. Parenchyma is a living structure.
4. E
Sol. Lignin is absent in sieve cells.
5. T
Sol. Influenza disease is caused by viruses.
6. E
Sol. The supportive skeletal structures in the human external ears and in the nose tip are example of cartilage.
7. F
Sol. Tendon and ligament are example of dense regular connective tissue.
8. T
Sol. Adipose tissue → Fat storage; Stratified epithelium → Skin; Hyaline cartilage → Nose; Fluid connective tissue → Blood.
9. E
Sol. Health is defined as a state of complete physical well-being, a state of complete mental well-being and a state of complete social well-being.
10. F
Sol. A patient suffering from chronic disease suffers from disease for a very long period.
11. F
Sol. Intercalated disc are characteristic of muscles found in heart.
12. R
Sol. Squamous epithelium cell is involved in making of the inner walls of blood vessels.
13. F
Sol. Cuboidal or columnar cells called ciliated epithelium when they bear cilia.

14. R
Sol. $G1 \rightarrow S \rightarrow G2 \rightarrow M$

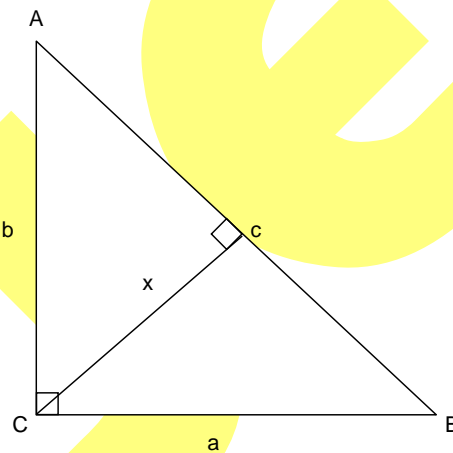
SECTION – V (Mathematics)

1. F

Sol. $64^{2x-5} = 4 \times 8^{x-5}$
 $\frac{8^{4x-10}}{8^{x-5}} = 4$
 $\Rightarrow 8^{3x-5} = 4$
 $\Rightarrow 2^{9x-15} = 2^2$
 $\Rightarrow 9x = 17 \Rightarrow x = \frac{17}{9}$

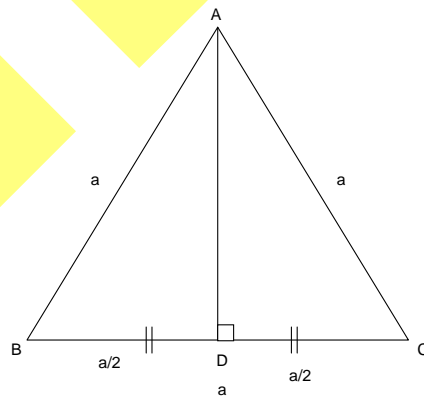
2. T

Sol. $[ABC] = \frac{1}{2}ab = \frac{1}{2}cx$
 $\Rightarrow ab = cx$
 $\Rightarrow x = \frac{ab}{c}$



3. R

Sol. $3a = 12 \Rightarrow a = 4$
 $\triangle ADC$
 $\Rightarrow AD^2 = a^2 - \frac{a^2}{4} = \frac{3}{4}a^2$
 $AD = \frac{\sqrt{3}}{2}a.$
 $= \frac{\sqrt{3}}{2} \times 4 = 2\sqrt{3} \text{ cm}$



4. T

Sol. IInd Quadrant

5. R

Sol. $x + y = 35$
 $x - y = 13$

 $2x = 48$

$x = 24$

$y = 11$

The greater number is 24.

6. E

Sol. According to question $3x + 5x + 7x = 300$

$$\Rightarrow 15x = 300 \Rightarrow x = 20$$

\therefore sides are 60 cm, 100 cm, 140 cm

$$s = \frac{a+b+c}{2} = \frac{60+100+140}{2} = 150$$

\therefore area of triangle = $\sqrt{s(s-a)(s-b)(s-c)}$

$$= \sqrt{150 \times 90 \times 50 \times 10} = 1500\sqrt{3} \text{ cm}^2$$

7. F

Sol. So area of

$$\Delta ABC = \frac{1}{2} [(-3)(4+6) + 5(-6-2) + 7(2-4)]$$

$$= 42 \text{ sq. units}$$

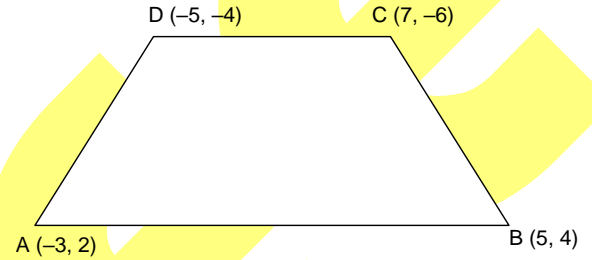
Area of

$$\Delta ACD = \frac{1}{2} [-3(-6+4) + 7(-4-2) + (-5)(2+6)]$$

$$= 38 \text{ sq. units}$$

So, area of quadrilateral ABCD

$$= 42 + 38 = 80 \text{ sq. units}$$



8. R

Sol. $s - a = 8$ (i)

$s - b = 7$ (ii)

$s - c = 5$ (iii)

Adding these $3s - (a + b + c) = 20$

$$\Rightarrow 3s - 2s = 20$$

$$\Rightarrow s = 20$$

$$\therefore \text{Area of } \Delta = \sqrt{s(s-a)(s-b)(s-c)}$$

$$= \sqrt{20 \times 8 \times 7 \times 5}$$

9. F

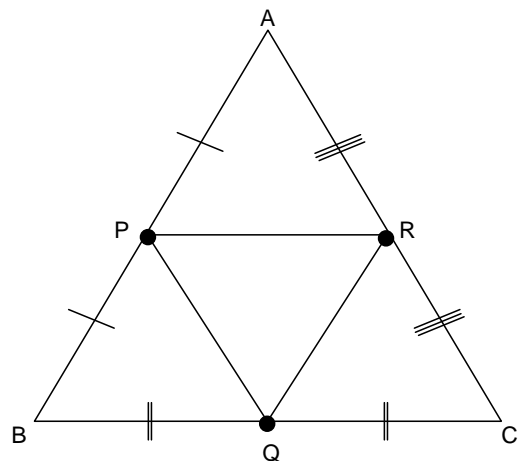
Sol. Meeting point of perpendicular bisectors of respective sides is known as circumcentre.

10. R

Sol. \therefore Area of $\Delta ABC = 20$ sq.

$$\text{and } [APR] = [PQR] = [PBQ] = [QRC]$$

$$\therefore [PQR] = \frac{1}{4} [ABC] = \frac{1}{4} \times 20 = 5 \text{ sq. units}$$



11. T

Sol. Let the required ratio be $\lambda : 1$. Then the co-ordinates of the point on x-axis on which y-ordinate of every point is zero

$$\therefore \frac{6\lambda - 3}{\lambda + 1} = 0$$

Thus the required ratio is $\frac{1}{2} : 1$ or $1 : 2$.

12. E

Sol. Coordinates of centroid are $\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$

$$\therefore 6 = \frac{7+y+9}{3} \Rightarrow y = 18 - 16 = 2 \text{ and } 3 = \frac{x-6+10}{3} \Rightarrow x = 9 - 4 = 5$$

$$\therefore (x,y) = (5, 2)$$

13. R

Sol. $x + 5 + 2x - 3 + 3x + 4 = 180^\circ$ (Angle sum property)

$$\therefore 6x + 6 = 180^\circ$$

$$\therefore x = \frac{174}{6} = 29^\circ$$

14. F

Sol. $s = \frac{1}{2}(a + b + c)$ New side of triangle are $3a, 3b$ and $3c$

$$s' = \frac{1}{2}(3a + 3b + 3c) = 3s$$

$$\Delta = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\Delta' = \sqrt{s'(s'-3a)(s'-3b)(s'-3c)}$$

$$= \sqrt{3s(3s-3a)(3s-3b)(3s-3c)}$$

$$\Delta' = 9\Delta$$

$$\therefore \text{Increase} = 9\Delta - \Delta = 8\Delta$$

$$\text{Hence, \% increase} = \frac{8\Delta}{\Delta} \times 100 = 800\%$$

15. R

Sol. Apply Factor Theorem, $P\left(\frac{-3}{2}\right) = 0$

16. R

Sol. $\Delta PQR \rightarrow$

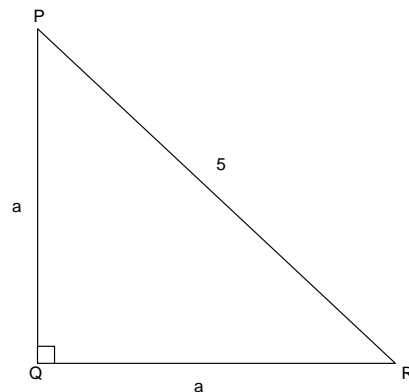
$$\Rightarrow a^2 + a^2 = 25$$

$$\Rightarrow 2a^2 = 25$$

$$a = \frac{5}{\sqrt{2}}$$

$$\therefore \text{area} = \frac{1}{2} \times a \times a = \frac{a^2}{2}$$

$$= \frac{1}{2} \times \frac{25}{2} = \frac{25}{4} \text{ cm}^2$$



17. T

Sol. Since $x + 5$ is a factor

$$\Rightarrow (-5)^3 - 20(-5) + 5k = 0 \Rightarrow k = 5$$

18. R

Sol. $AB = \sqrt{(6-2)^2 + (3-0)^2}$

$$= \sqrt{16+9}$$
$$= 5$$

19. E

Sol. Midpoint of SQ = Midpoint of PR

$$\left(\frac{5}{2}, \frac{3}{2}\right) = \left(\frac{x+1}{2}, \frac{y+0}{2}\right)$$

$$\Rightarrow x = 4, y = 3$$

20. T

Sol. If the sum of squares of two sides is less than the square of third side then triangle is obtuse angle.