

FIITJEE INTERNAL TEST

BATCHES: Four Year CRP428 (R & W)

PHASE TEST – III + IV

(MAT & SAT)
QP CODE: 100857

Time: 3 hours 20 Minutes

Maximum Marks: 200

Please read the instructions carefully.

INSTRUCTIONS

A: General :

1. Immediately fill in the particulars on this page of the Test Booklet with Blue/Black Ball point pen.
2. Use **Blue/Black Ball Point Pen only** for writing particulars on **Side-1** and **Side-2** of the Answer Sheet. **Use of pencil is strictly prohibited.**
3. Darken the appropriate bubbles with **HB Pencil** only.
4. Blank papers, clipboards, log tables, slide rules, calculators, cellular phones, pagers and electronic gadgets in any form are not allowed.
5. The answer sheet, a machine-gradable Objective Response Sheet (ORS) is provided separately.
6. Do not Tamper/mutilate the **ORS** or this booklet.
7. No additional sheets will be provided for rough work
8. On completion of this test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall. **However, the candidates are allowed to take away this Test Booklet with them.**

B: Questions paper format and Marking Scheme:

1. This paper contains two parts:

Part I: Section – I (MAT) Q.1 – 100 questions

Part II: SAT: 100 questions

Section – II (Physics) Q.1 – Q.13, Section – III (Chemistry) Q.1 – Q. 13, Section – IV (Biology) Q. 1 – Q.14, Section – V (Mathematics) Q. 1 – Q. 20 & Section – VI (Social Science) Q. 1 – Q. 40.

2. For each question you will be awarded **+1 mark** if you darken the bubble corresponding to the correct answer and zero mark if no bubbles is darkened. **There will be no Negative marking.**

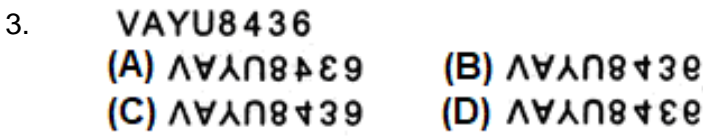
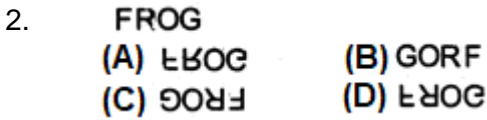
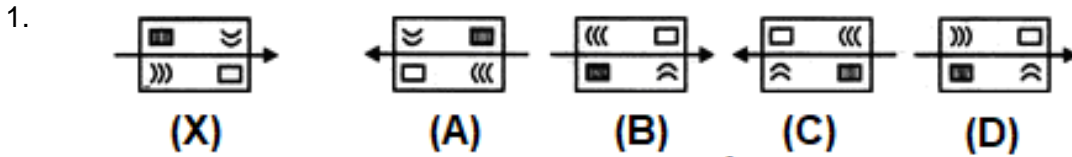
Enrollment No. : Batch : _____

Name : _____

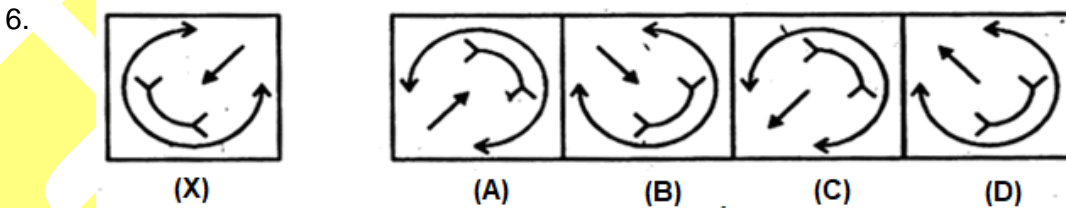
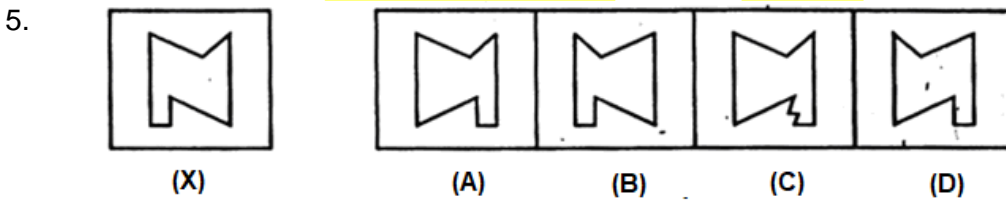
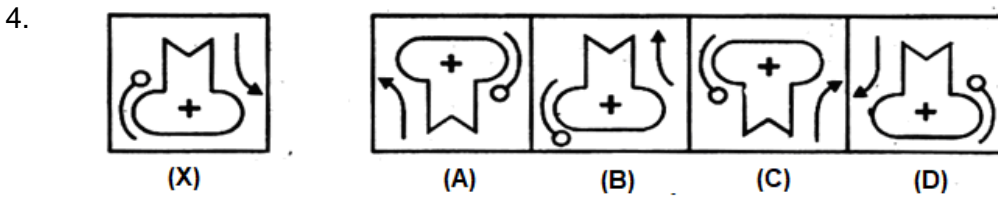
Candidate's Signature _____ Invigilator's Signature: _____

Part – I (MAT)
SECTION – I
(1 – 100)

Direction (Q.1 – Q.3): Find the water image of the following figure (X).



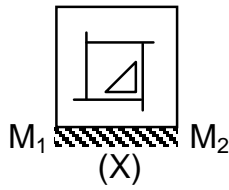
Direction (Q.4 – Q.6): Find the mirror image of the following figure (X).



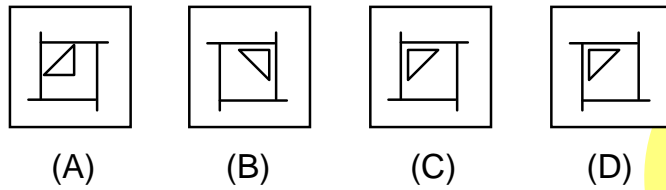
Space For Rough Work

Directions (Q.7 – Q.9): In each of the following questions, choose the correct mirror-image of the figure (X) from amongst the four alternatives (A), (B), (C) and (D) given along with it. The mirror may be represented by a line M_1M_2 .

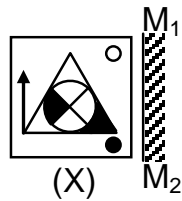
7. **Main Figure**



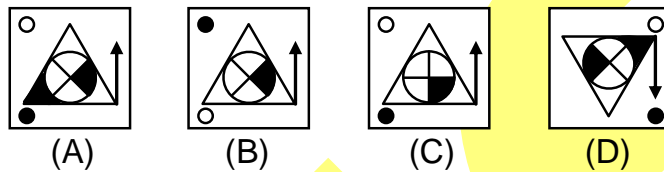
Answer Figure



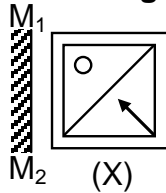
8. **Main Figure**



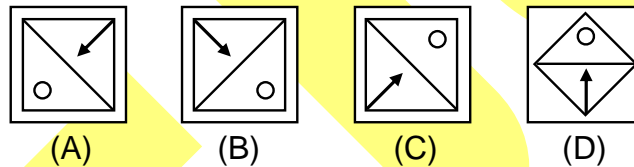
Answer Figure



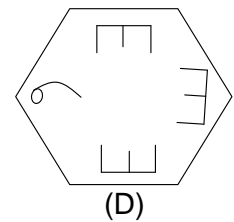
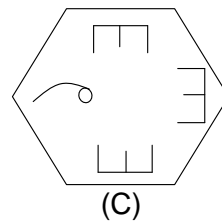
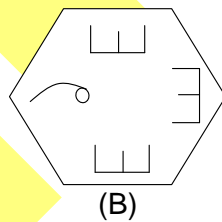
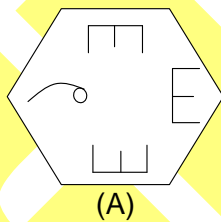
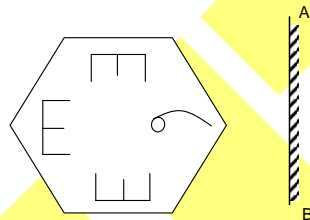
9. **Main Figure**



Answer Figure



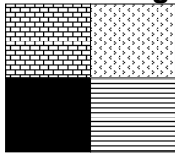
10. Find the mirror image.



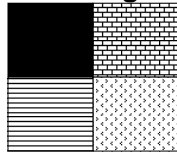
Space For Rough Work

11. Choose the right water – image of the question figure from the given answer figures.

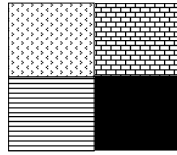
Question Figure:



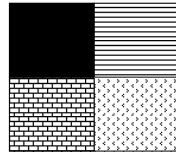
Answer Figure:



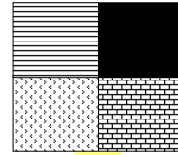
(A)



(B)



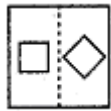
(C)



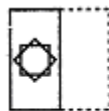
(D)

Directions (Q.12 – Q.13): In each of the following problems, a square transparent sheet with a pattern is given. Figure out from amongst the four alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.

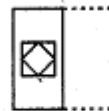
12. **Transparent Sheet**



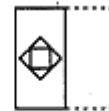
Response Figures



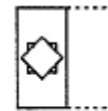
(A)



(B)

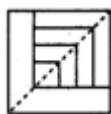


(C)

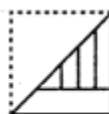


(D)

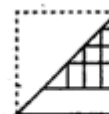
13. **Transparent Sheet**



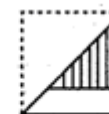
Response Figures



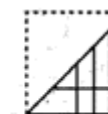
(A)



(B)



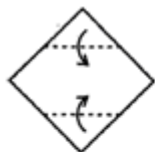
(C)



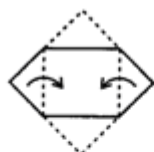
(D)

Directions (Q.14 – Q.15): Each of the following questions consists of a set of three figures X, Y and Z showing a sequence of folding of a piece of paper. Fig (Z) shows the manner in which the folded paper has been cut. These three figures are followed by four answer figures from which you have to choose a figure which would most closely resemble the unfolded form of fig. (Z).

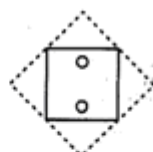
14.



X



Y



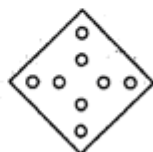
Z



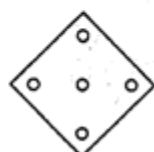
(A)



(B)

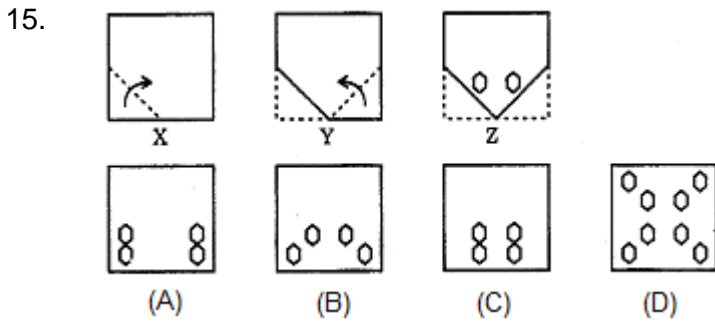


(C)

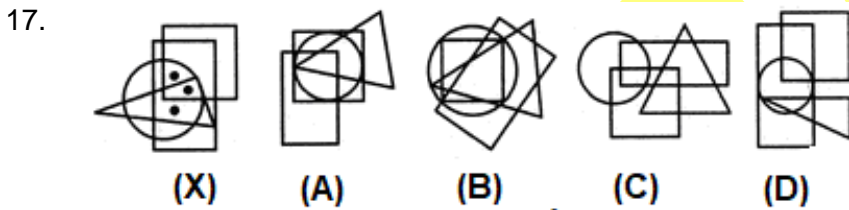
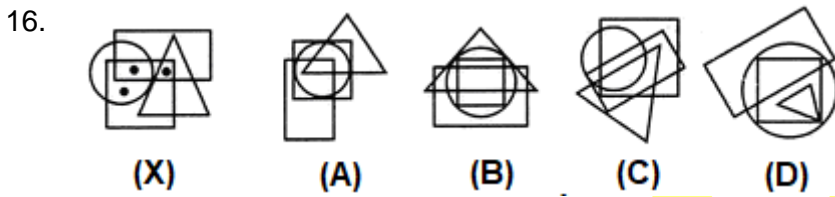


(D)

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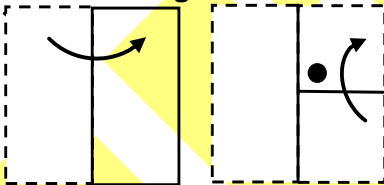


Directions (Q.16 – Q.17): In the following questions, a figure (X) is given. In figure (X) one or more dots are placed at certain positions. Choose one of the alternatives which can represent exact same dot position.

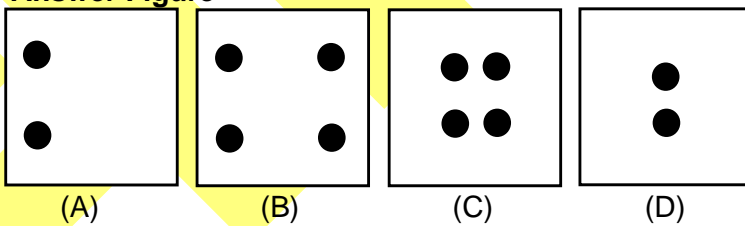


18. A piece of paper is folded and cut as shown below in the question figures. From the given answer figures, indicate how it will appear when opened.

Question Figure

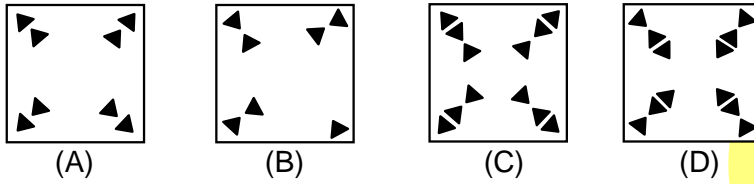
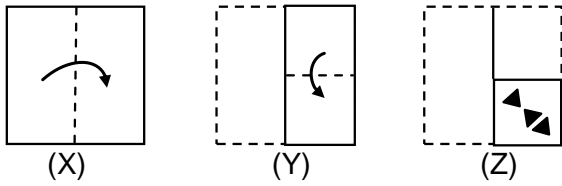


Answer Figure

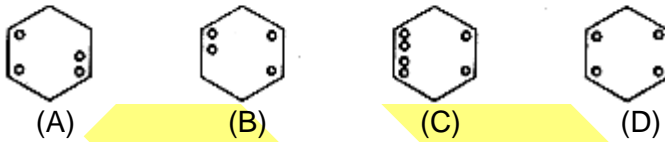
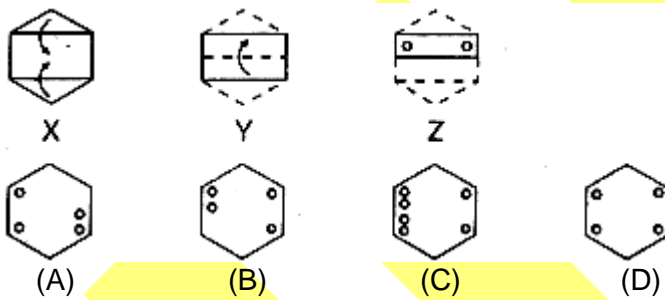


Space For Rough Work

19. In the following question, a set of three figures X, Y and Z showing a sequence in which a paper is folded and finally cut from a particular section. Below these figures a set of answer figures marked (A, B, C & D) showing the design which the paper actually acquires when it is unfolded. You have to select the answer figure which most closely resembles the unfolded piece of paper.



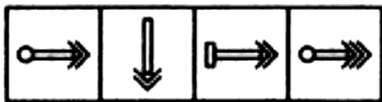
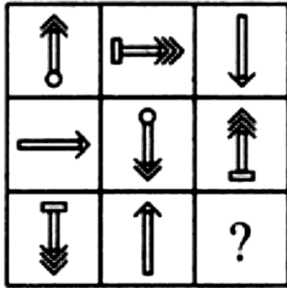
20. In the given question, a set of three figures X, Y and Z showing a sequence in which a paper is folded and finally cut from a particular section. Below these figures a set of answer figures marked (A, B, C & D) showing the design which the paper actually acquires when it is unfolded. You have to select the answer figure which most closely resembles the unfolded piece of paper.



Space For Rough Work

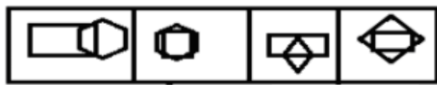
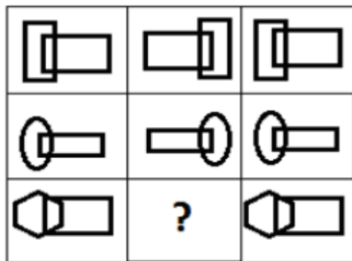
Directions (Q.21 – Q.24): Select a suitable figure from the four alternatives that would complete the figure matrix.

21.



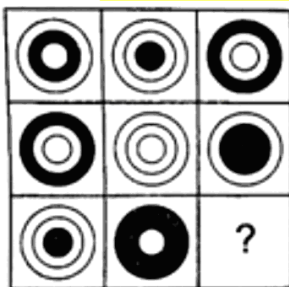
(A) (B) (C) (D)

22.



(A) (B) (C) (D)

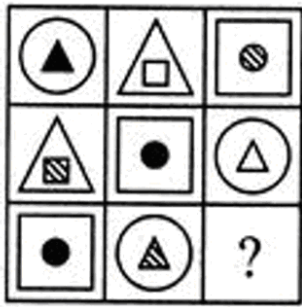
23.



(A) (B) (C) (D)

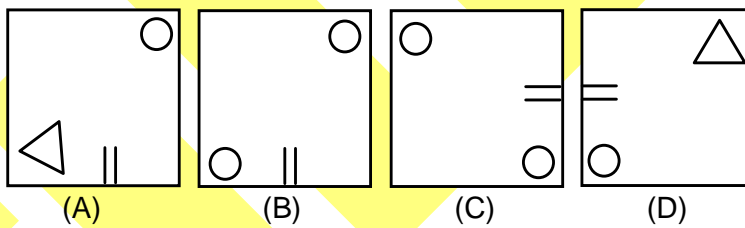
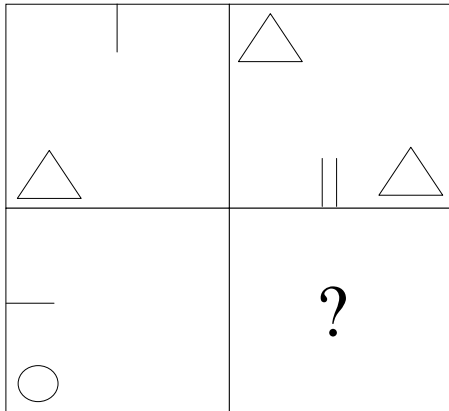
Space For Rough Work

24.



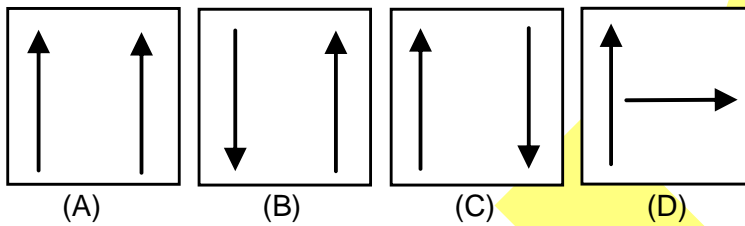
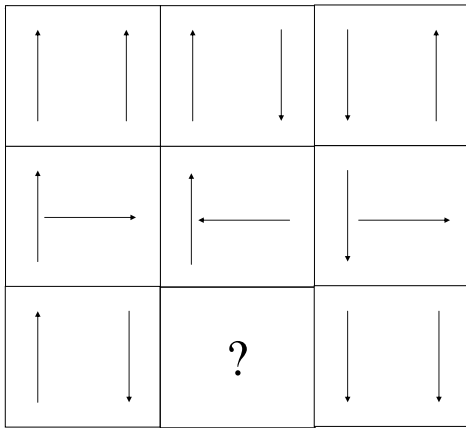
(A) (B) (C) (D)

25. In the following question, find out which of the answer figure (A), (B), (C) and (D) completes the figure matrix?

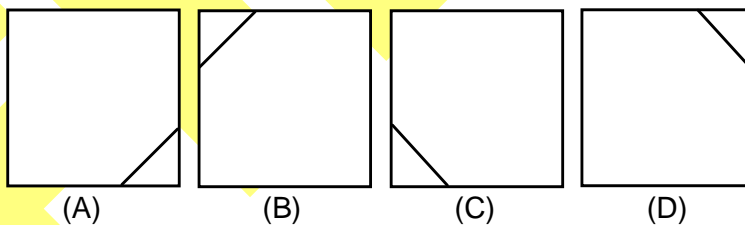
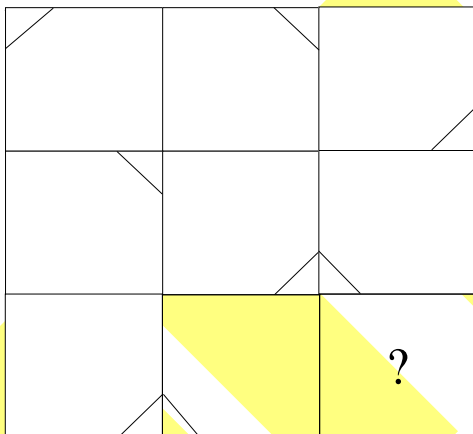


Space For Rough Work

26. In the following question, find out which of the answer figure (A), (B), (C) and (D) completes the figure matrix?

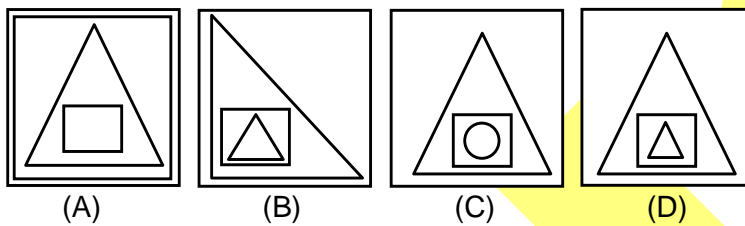
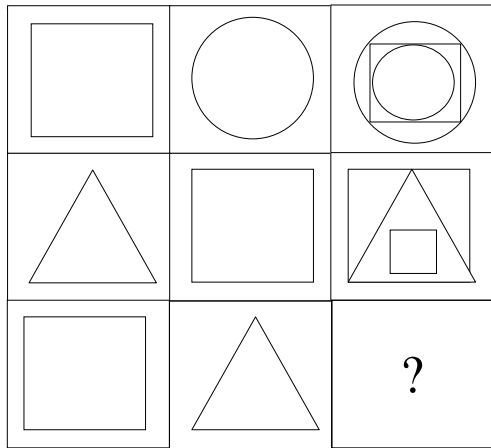


27. In the following question, find out which of the answer figure (A), (B), (C) and (D) completes the figure matrix?



Space For Rough Work

28. In the following question, find out which of the answer figure (A), (B), (C) and (D) completes the figure matrix?



Directions (Q.29 - Q.38): In these questions, there is some relationship between the two terms to the left of :: and the same relationship holds between the two terms to its right. Find out the related word/letters/number from the given alternatives.

29. TEW : PAS :: IVX : ?
 (A) ETR (B) SQR
 (C) ERT (D) RNP
30. PEON : QGRR :: RUDE : ?
 (A) MLNO (B) SWGI
 (C) TVSA (D) STRR
31. Horse : Hay :: Cow : ?
 (A) Leaves (B) Fodder
 (C) Milk (D) Straw
32. Convenient : Inconvenient :: Reveal : ?
 (A) Outspoken (B) Disclose
 (C) Conceal (D) Communicate

Space For Rough Work

33. West : North-East :: South : ?
 (A) South-East (B) South-West
 (C) North-East (D) North-West
34. Rajiv Gandhi Airport : Hyderabad :: Indira Gandhi Airport : ?
 (A) Mumbai (B) Bangalore
 (C) Delhi (D) Kolkata
35. 6 : 108 :: 11 : ?
 (A) 363 (B) 333
 (C) 253 (D) 340
36. 72 : 14 :: 89 : ?
 (A) 75 (B) 72
 (C) 65 (D) 64
37. 167 : 14 :: 245 : ?
 (A) 22 (B) 11
 (C) 15 (D) 18
38. 5 : 35 :: 7 : ?
 (A) 35 (B) 45
 (C) 47 (D) 77

Directions (Q.39 - Q.40): In each of the following questions, four pairs of words are given out of which the words in three pairs bear a certain common relationship. Choose the pair in which the words are differently related.

39. (A) Hard : Soft (B) Long : High
 (C) Sweet : Sour (D) Pointed : Blunt
40. (A) Gold : Ornaments (B) Pitcher : Pottery
 (C) Twigs : Nest (D) Wood : Furniture
41. 'Birds' is related to 'Ornithology' in a same way as 'Cell' is related to.....?
 (A) Diseases (B) Cytology
 (C) Anthropology (D) Etymology
42. 'Push' is related to 'Pull' in a same way as 'Throw' is related to.....?
 (A) Game (B) Pick
 (C) Jump (D) Collect
43. 'Tailor' is related to 'Needle' in a same way as 'Author' is related to.....?
 (A) Library (B) Book
 (C) Writings (D) Pen

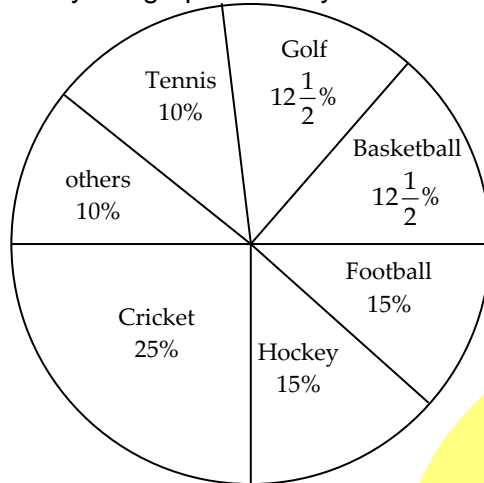
Space For Rough Work

Directions (Q.44 – Q.53): In each of the following questions, four numbers/letters are given. Out of these, three are alike in a certain way but the rest one is different. Choose the one which is different from the rest three.

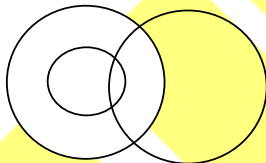
44. (A) CLU (B) HQZ
(C) AJS (D) OXF
45. (A) TSR (B) QPO
(C) NML (D) ABC
46. (A) GET (B) MET
(C) SET (D) EAT
47. (A) BDFH (B) MOQS
(C) RTVX (D) HJMO
48. (A) IBB (B) KOO
(C) EDD (D) ASS
49. (A) 176 (B) 263
(C) 132 (D) 297
50. (A) 7642 (B) 4520
(C) 3927 (D) 5841
51. (A) 125 (B) 64
(C) 27 (D) 144
52. (A) 23 (B) 71
(C) 17 (D) 63
53. (A) 7202 (B) 6023
(C) 5061 (D) 4304

Space For Rough Work

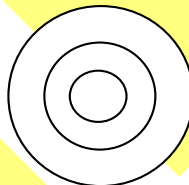
Directions (Q.54 – Q.57): The pie chart drawn here, shows the spending of a country on various sports during a particular year. Study the graph carefully and answer the questions that follow?



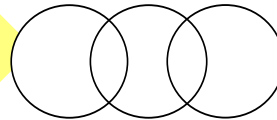
54. Graph shows that the most popular game of the country is:
 (A) Football (B) Hockey (C) Cricket (D) Tennis
55. Out of the following the country spent the same amount on:
 (A) Hockey and Cricket (B) Hockey and Football
 (C) Hockey and Golf (D) Tennis and Golf
56. The ratio of the total amount spent on football to that spent on hockey is:
 (A) 2 : 1 (B) 1 : 1 (C) 1 : 2 (D) 3 : 2
57. If the total amount spent on sports during the year was Rs 1,20,00,000, how much was spent on basketball?
 (A) 16,00,000 (B) 18,00,000 (C) 3,00,000 (D) 15,00,000
58. Which one of the following diagrams best depicts the relationship among People, Women and Mothers?



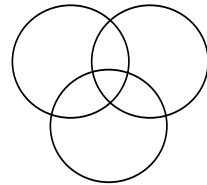
(A)



(B)



(C)



(D)

59. A man walks 20 m towards north, then he turns right and walks 3 m, then turns left and walks 4 m and from there he walks 4 m towards east. How far and in which direction is he from his initial position?
 (A) 25 m south-west (B) 25 m north-east
 (C) 20 m north-east (D) 24 m north-east

Space For Rough Work

60. A driver left his village and drove South for 20 km after which he stopped for breakfast. Then he turned left and drove another 30 km, when he stopped for lunch. After some rest, he again turned left and drove 20 km before stopping for evening tea. And then he turned right and drove 30 km to reach the town. After evening tea, in which direction did he drive?
 (A) West (B) East
 (C) North (D) South
61. CIRCLE is related to RICELC in a same way as SQUARE is related to.....?
 (A) QSUERA (B) QUSERA
 (C) UQSAER (D) UQSERA
62. EJOTY is related to VQLGB in a same way as LOWER is related to.....?
 (A) OLVDI (B) OLVID
 (C) OLDVI (D) OLDIV
63. In a certain code language, "RAINBOW" is written as "1987645" and "SNAP" is written as "3790". How is "PIANO" written in that code language?
 (A) 08976 (B) 08947
 (C) 08974 (D) 08977
64. In a certain code language, "DISORDER" is written as "OSIDREDR". How is "PRACTICE" written in that code language?
 (A) CARPECIT (B) CAREPCIT
 (C) CARTICEP (D) CARECEIT
65. Arrange the given words in the sequence in which they occur in the dictionary.
 i. Pitiful
 ii. Plague
 iii. Pitiless
 iv. Plaque
 v. Plankton
 (A) iii, i, ii, v, iv (B) i, iii, iv, v, ii
 (C) i, iii, ii, iv, v (D) i, iii, ii, v, iv
66. Each vowel of the word ADJECTIVE is substituted with the next letter of the English alphabetical series, and each consonant is substituted with the letter preceding it. How many vowels are present in the new arrangement?
 (A) Four (B) One
 (C) Two (D) Three

Space For Rough Work

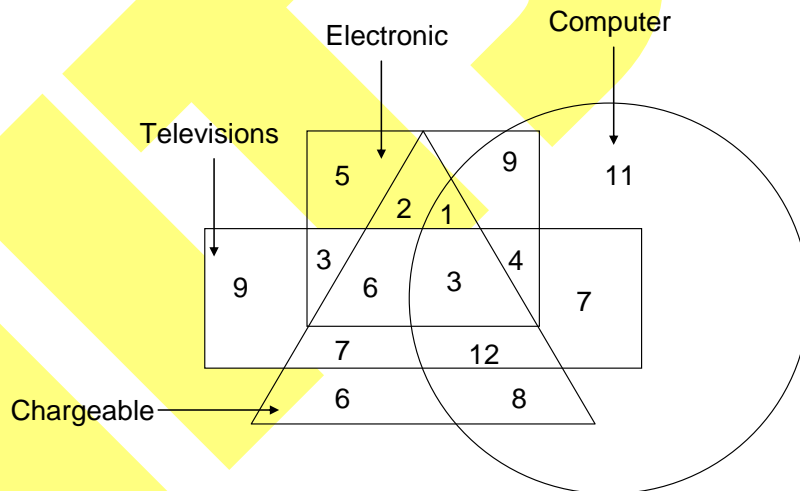
67. Nineteen students are standing in horizontal row from left to right. If all the odd numbered students in the row are shifted to successive odd-numbered positions, what will be the position of Gitika after shifting who was 9th from the left end in the row initially?
 (A) 9th from the left end (B) 8th from the right end
 (C) 9th from the right end (D) 8th from the left end
68. In a row at a bus stop, Amit is 7th from the left and Prakash is 9th from the right. Both of them interchange their positions and thus Amit becomes 11th from the left. How many people are there in that row?
 (A) 18 (B) 19 (C) 21 (D) 20

Directions (Q.69 – Q.71): Read the following information carefully and answer the following questions.

- I. $P \times Q$ means 'P is brother of Q'
- II. $P - Q$ means 'P is sister of Q'
- III. $P + Q$ means 'P is father of Q'
- IV. $P \div Q$ means 'P is mother of Q'

69. Which of the following represents 'M is nephew of N'?
 (A) $N - K + M$ (B) $N \times K \div M$ (C) $N \div K \times M$ (D) $N - K \div M \times T$
70. How is T related to D in the expression $H + T \div R - D$?
 (A) Nephew (B) Niece (C) Nephew or Niece (D) None of these
71. Which of the following represents F is the daughter of W?
 (A) $W \div R + F$ (B) $W \times R \times F$ (C) $W + R \times F - T$ (D) None of these

Directions (Q.72 – Q.73): In the figure below square represents goods which are electronic, rectangle represents televisions, circle represents computers, triangle represents chargeable.



72. How many computers are chargeable which are electronic but not television?
 (A) 1 (B) 4 (C) 16 (D) 24

Space For Rough Work

73. How many items in total are either electronics only or televisions only?
 (A) 3 (B) 5
 (C) 9 (D) 14

Directions (Q.74 – Q.75): Find the next term of given series

74. 10, 12, 15, 20, 27, 38, ?
 (A) 51 (B) 48
 (C) 53 (D) 49
75. 313, 265, 230, 206, ?, 183
 (A) 176 (B) 191 (C) 181 (D) 201

Directions (Q.76 – Q.77): Consider the letters of the alphabet written in the order from left to right i.e., from A to Z.

76. The letter which is fourth to the left of the letter, which is fifth to the right of F is
 (A) C (B) W
 (C) E (D) G
77. The letter which is 6th to the left of the letter which is 8th to the right of P is
 (A) E (B) D
 (C) S (D) R

Directions (Q.78 – Q.79): In the following question, a statement is given followed by two conclusions numbered I and II.

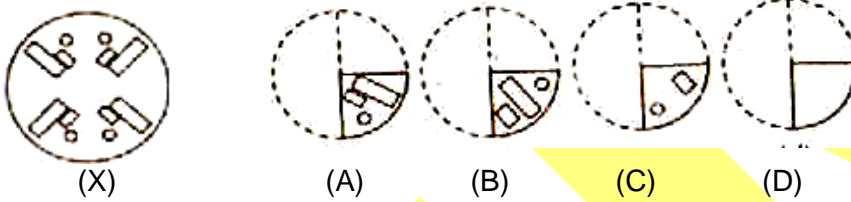
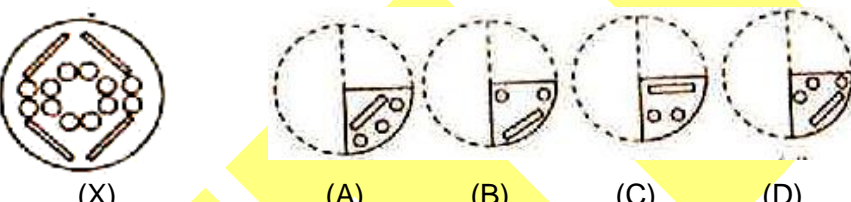
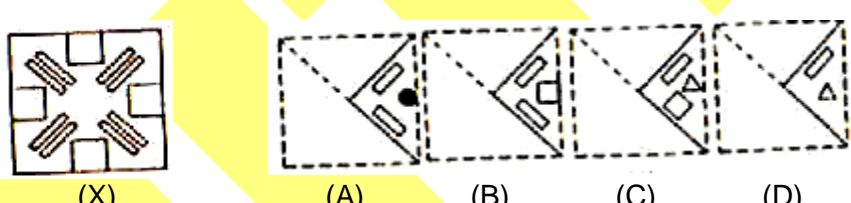
Given answer.

- (A) if only conclusion I follows
 (B) if only conclusion II follows
 (C) if either I or II follows
 (D) if neither I nor II follows
78. Statement: Until our country achieves economic equality, political freedom and democracy would be meaningless.
 Conclusion: I. Political freedom and democracy go hand in hand.
 II. Economic equality leads to real political freedom and democracy.
79. Statement: Industries destroy the natural resources.
 Conclusion: I. All natural resources are destroyed by industries.
 II. No industries, no environmental pollution.

Space For Rough Work

80. In a class of 45 students, a boy is ranked 20th. When two boys joined, his rank was dropped by one. What is his new rank from the end?
 (A) 25th (B) 26th
 (C) 27th (D) 28th
81. In a certain code '786' means 'study very hard' '958' means 'hard work pays' and '645' means 'study and work' which of the following is the code for 'very'?
 (A) 8 (B) 6
 (C) 7 (D) Can't be determined
82. In the following question a word is given followed by four different words, one of which can be formed by using the letters of the given word, find the word.
 IMMEDIATELY
 (A) DIALECT (B) LIMITED (C) DIAMETER (D) DICTATE

Directions (Q.83 – Q.85): In each one of the following question, a sheet of paper is folded and punch is made. When unfolded the paper sheet look like the question figure. See the answer figures and select the one that follows the manner in which the paper is folded and punch is made.

83. 
 (X) (A) (B) (C) (D)
84. 
 (X) (A) (B) (C) (D)
85. 
 (X) (A) (B) (C) (D)

86. If 381A is divisible by 9, find the value of smallest natural number A.
 (A) 5 (B) 8
 (C) 7 (D) 6

Space For Rough Work

87. Find the units digit of the expression $55^{725} + 73^{5810} + 22^{853}$.
(A) 4 (B) 0
(C) 6 (D) 5
88. Find the number of zeroes in the end of given equation $275! + 290!$
(A) 68 (B) 65
(C) 70 (D) 95
89. Find the last digits of 87^{474}
(A) 9 (B) 7
(C) 1 (D) 3
90. What is binary conversion of $(AE)_{16}$?
(A) 10110110 (B) 10101110
(C) 10101010 (D) 10101001
91. The ratio between the speeds of two trains is 7:8. If the second train runs 400 kms in 4 hours, then the speed of the first train is:
(A) 70 km/hr (B) 75 km/hr
(C) 84 km/hr (D) 87.5 km/hr
92. The population of a village is 25,000. One-fifth are females and the rest are males. 5% of males and 40% of females are uneducated. What percentage on the whole are educated?
(A) 75% (B) 88%
(C) 55% (D) 85%
93. In a college, 40% of the students were allotted group A, 75% of the remaining were given group B and the remaining 12 students were given group C. Then the number of students who applied for the group is?
(A) 100 (B) 60
(C) 80 (D) 92
94. A man spends 40% of his monthly salary on food and one-third of the remaining on transport. If he saves Rs.4,500 per month, which is equal to half the balance after spending on food and transport, his monthly salary is?
(A) Rs.11,250 (B) Rs.22,500
(C) Rs.25,000 (D) Rs.45,000
95. In an election 2 candidates participated. 20% votes declared invalid and the winner gets 70% of the valid votes and won by 9600 votes. Find total no. of voters?
(A) 30000 (B) 24000
(C) 48000 (D) 56000

Space For Rough Work

96. What sum of money must be given at simple interest for six months at 4% per annum in order to earn Rs.150 interest?
(A) Rs.5000 (B) Rs.7500
(C) Rs.10000 (D) Rs.15000
97. A sum of money invested at simple interest triples itself in 8 years. How many times will it become in 20 years time?
(A) 8 times (B) 7 times
(C) 6 times (D) 9 times
98. A sum borrowed under compound interest doubles itself in 10 years. When will it become fourfold of itself at the same rate of interest?
(A) 15 years (B) 20 years
(C) 24 years (D) 40 years
99. In what time will Rs.1000 amounts to Rs.1331 at 20% per annum, compounded half yearly?
(A) $\frac{3}{2}$ years (B) 2 years
(C) 1 year (D) $2\frac{1}{2}$ years
100. A train passes an electric pole in 10 seconds and a platform 120 m long in 18 seconds. Its length in metres is :
(A) 150 m (B) 130 m
(C) 240 m (D) 180 m

Space For Rough Work

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

1. A boy pulls up a bucket of water from a well 80 m deep. If the mass of bucket along with water is 25 kg, the work done by the boy is [$g = 10 \text{ m/s}^2$]
 (A) 10 kJ (B) 15 kJ
 (C) 20 kJ (D) none of these
2. One gram of a rocket fuel on complete combustion produces 1250 kJ of energy. If 24 kg of rocket fuel burns in 200 sec, the power developed by the rocket is :
 (A) 150 MW (B) 100 MW
 (C) 75 MW (D) 50 MW
3. A bullet of mass 50 gm strikes a wooden plank with velocity of 200 m/s and emerges out with a velocity of 50 m/s. The work done by the bullet against the resistive force offered by plank is :
 (A) 1062.5 J (B) 937.5 J
 (C) 1000 J (D) 625.5 J
4. An object of mass 'm' is moving with a constant velocity 'v'. How much work should be done on it to stop it?
 (A) mv (B) mv^2
 (C) $\frac{m^2v}{2}$ (D) $\frac{1}{2}mv^2$
5. When a spring is compressed, the work done during compression is stored in the spring in the form of
 (A) Gravitational Energy (B) Elastic Potential Energy
 (C) Elastic Kinetic Energy (D) Frictional Energy
6. A cube of ice floats in a beaker of water when the ice melts, the level of water in beaker
 (A) falls (B) rises
 (C) remains the same (D) may rises or fall
7. Pascal's law is related to
 (A) Stream line flow (B) Transmission of fluid pressure
 (C) Viscous flow (D) none of these
8. A hydraulic lift is used to lift a car. The small piston has a radius of 5 cm and large piston has a radius of 50 cm. If a driver applies a force of 88 N to the small piston, what is the weight of the car the large piston can support?
 (A) 880 N (B) 88 N
 (C) 8800 N (D) None of these

Space For Rough Work

9. The distance between a crest and the next trough in a periodic wave is:
 (A) λ (B) $\frac{\lambda}{2}$
 (C) $\frac{\lambda}{4}$ (D) 2λ
10. An ice berg of density 900 kg/m^3 is floating in water of density 1000 kg/m^3 . The percentage of volume of ice cube outside of two water is :
 (A) 35% (B) 30%
 (C) 20% (D) 10%
11. A bat can hear sound at frequencies upto 120 KHz. The wavelength of sound in air at this frequency is : Speed of sound in air 344 m/s
 (A) 2.86 mm (B) 2.46 mm
 (C) 2.56 mm (D) 2.04 mm
12. The sound from the blast of a ship's siren takes 2 sec to travel to another ship. How far apart are the ships? [velocity of sound = 340 m/s]
 (A) 600 m (B) 680 m
 (C) 720 m (D) 840 m
13. Two sand waves, in air, have wavelength in the ratio 1 : 3. The ratio of their frequencies :
 (A) 9 : 1 (B) 1 : 9
 (C) 1 : 3 (D) 3 : 1

SECTION – III (Chemistry)

1. The weight ratio of S and O in SO_3 is
 (A) 3 : 2 (B) 2 : 3
 (C) 1 : 3 (D) 2 : 1
2. How many g of S is present in 98 g of H_2SO_4 ?
 (A) 2 g (B) 32 g
 (C) 64 g (D) cannot be predicted
3. Which of the following contains maximum number of atoms?
 (A) 1 g CO_2 (B) 1g N_2
 (C) 1g O_2 (D) 1g CH_4
4. What will be percentage of Aluminium in $\text{Al}_2(\text{SO}_4)_3$?
 (A) 30.4 % (B) 15.7 %
 (C) 55.1% (D) 16.8%

Space For Rough Work

5. The existence of a nucleus in an atom was proposed by
(A) Dalton (B) Thomson
(C) Rutherford (D) Bohr
6. 1 mole of water vapour is condensed to liquid at 25°C. Now this water contains
(i) 3 moles of atoms (ii) 1 mole of hydrogen molecules
(iii) 10 moles of electrons (iv) 16 g of oxygen
- The correct combination is
(A) (i) & (ii) are correct (B) (i) & (iii) are correct
(C) (i) & (iv) are correct (D) All are correct
7. The empirical formula of an acid is CH_2O_2 , the probable molecular formula of acid may be
(A) CH_2O (B) CH_2O_2
(C) $\text{C}_2\text{H}_4\text{O}_2$ (D) $\text{C}_2\text{H}_6\text{O}_4$
8. If valency of an element A is 4 and of element B is 3 then the formula of compound AB will be given as
(A) A_3B_4 (B) A_4B_3
(C) AB (D) A_8B_6
9. The increasing order of specific charge of electron(e), Proton(p), alpha particle(α) and neutron(n) is : (specific charge in terms of magnitude)
(A) e, p, n, α (B) n, p, e, α
(C) n, α , p, e (D) n, p, α , e
10. Which of the following is not a postulate of Daltons atomic theory?
(A) Atoms of different elements can have same mass number
(B) Atoms combine in the ratio of small whole numbers to form compounds
(C) Atoms are indivisible particles
(D) Atoms of same elements are identical in all respect
11. Amorphous solids are those which have
(A) Fixed arrangement of atoms and molecules (B) No fixed regular geometry
(C) have regular geometry (D) All the above properties
12. The ratio between the number of neutrons present in C^{12} and Si^{30} atoms is
(A) 3:8 (B) 2:5
(C) 3:7 (D) 1:1
13. Bohr's model of atom explains
(A) Zeeman effect (B) Photoelectric effect
(C) Stark effect (D) Hydrogen atomic spectrum

Space For Rough Work

SECTION – IV (Biology)

1. _____ are cemented to one another, forming an irregular layer. These form the outer protective layer of the skin in an animal's body.
 - (A) Connective tissue
 - (B) Muscular tissues
 - (C) Nervous tissues
 - (D) Compound epithelium cells
2. Weeds are the unwanted plants that grow along with the cultivated plants. How do they affect the crop plants?
 - (A) By killing plants in the field before they grow
 - (B) By dominating the plants to grow
 - (C) Competing for various resources of plants causing low availability of nutrients
 - (D) All of above
3. In the five – kingdom system of classification developed by Robert Whittaker, members of the Kingdom Plantae are autotrophic, enkaryotic and _____.
 - (A) Multicellular
 - (B) Motile
 - (C) Have sexual reproduction
 - (D) Either unicellular or multicellular
4. Depletion of ozone molecules in the stratosphere is due to _____.
 - (A) Chlorine compound
 - (B) Fluorine compound
 - (C) Halogen compound
 - (D) None of these
5. The nitrogen molecules present in air can be converted into nitrates and nitrites by:
 - (A) a biological process of nitrogen fixing bacteria present in soil
 - (B) a biological process of carbon fixing factor present in soil
 - (C) any of the industries manufacturing nitrogenous compounds
 - (D) the plants used as cereal crops in field
6. The group of similar plants which breed freely among themselves constitute a _____.
 - (A) Species
 - (B) Family
 - (C) Order
 - (D) Genus
7. Diarrhea, cholera, typhoid are the diseases that have one thing in common that is:
 - (A) All of them are caused by bacteria
 - (B) All of them is transmitted by contaminated food and water
 - (C) All of them are cured by antibiotics
 - (D) All of the above
8. The correct sequence of taxonomic categories is:
 - (A) Species → Genus → Order → Phylum
 - (B) Species → Order → Genus → Kingdom
 - (C) Genus → Species → Order → Kingdom
 - (D) None of these
9. As per the Fluid Mosaic model, plasma membrane is composed of:-
 - (A) phospholipids and integral proteins
 - (B) phospholipids, extrinsic proteins, and intrinsic proteins
 - (C) phospholipids and hemicellulose
 - (D) phospholipids and oligosaccharides
10. Some chemical elements are required in large amounts by the plants for their proper growth. These inorganic elements are called macronutrients. Which of the following elements do not come under the category of macronutrients?

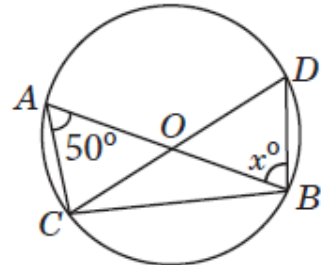
I. Phosphorus	II. Manganese
III. Magnesium	IV. Iron

 - (A) Both (I) and (II)
 - (B) Only (II)
 - (C) Both (II) and (IV)
 - (D) Both (II) and (III)

11. Using fertilizers in farming is an example of:
 (A) No cost production (B) Low cost production
 (C) High cost production (D) None of these
12. Nitrogen, phosphorus and potassium are examples of
 (A) Micro-nutrients (B) Macro-nutrients
 (C) Fertilizers (D) Both (A) and (B)
13. What is the other name for *Apis cerana indica*?
 (A) Indian cow (B) Indian buffalo
 (C) Indian bee (D) None of these"
14. Pesticides disturb the ecosystem by eliminating the:
 (A) organisms that protect the environment
 (B) organisms which forms the food chain
 (C) microorganism of crop
 (D) none of the above

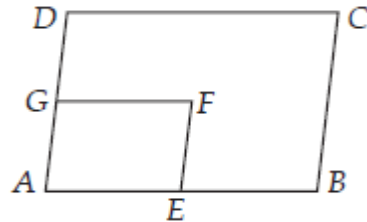
SECTION – V (Mathematics)

1. If O is the centre of a circle, find the value of x in the following figure.
 (A) 130° (B) 40°
 (C) 50° (D) 60°

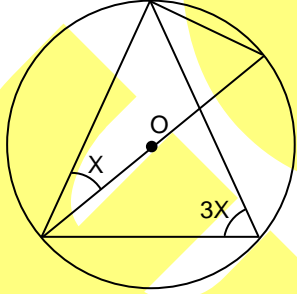


2. The radius and height of a cone are in the ratio 4 : 3. If the area of base is 154 cm^2 then its curved surface area is :
 (A) 190.5 cm^2 (B) 192.5 cm^2
 (C) 180.5 cm^2 (D) 182.5 cm^2

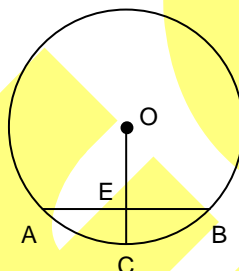
3. In the given figure, ABCD and AEFG are two parallelograms. If $\angle C = 50^\circ$, then $\angle F =$
 (A) 60°
 (B) 50°
 (C) 130°
 (D) None of these



Space For Rough Work

4. The arithmetic mean and mode of a data is 24 and 12 respectively, then the median of the data is
 (A) 21 (B) 18
 (C) 20 (D) 22
5. A bag contains equal number of red, green and white balls. A ball is drawn from the bag. What is the probability that drawn ball is green?
 (A) $\frac{1}{3}$ (B) 1
 (C) $\frac{2}{3}$ (D) $\frac{1}{2}$
6. In the given figure O is the centre of the circle. Find the value of x (in degrees).
 (A) 30 (B) 45
 (C) 22.5 (D) 35
- 
7. A sphere is melted to form a cylinder whose height is 36 times of its radius. What is the ratio of radii of sphere to the cylinder?
 (A) 3 : 1 (B) 6 : 1
 (C) 1 : 3 (D) 1 : 6
8. Find the sum of the length of the bases of a trapezium whose area is 4.2 m^2 and whose height is 280 cm.
 (A) 2 m (B) 3 m
 (C) 4 m (D) 7 m
9. The mean of squares of first n natural numbers :
 (A) $\frac{n(n+1)(2n+1)}{6}$ (B) $\frac{n^2(n+1)^2}{4}$
 (C) $\frac{(n+1)(2n+1)}{6}$ (D) $\frac{n(n+1)}{4}$
10. Three spherical balls of iron whose radii are 6 cm, 8 cm and 10 cm respectively are melted and formed into a single spherical ball. What is the radius of new Ball?
 (A) 24cm (B) 16 cm
 (C) 12 cm (D) 14 cm

Space For Rough Work

11. ABCD is a cyclic rhombus. Find the angle subtended by side AB at the centre of circle.
 (A) 45° (B) 90° (C) 60° (D) 120°
12. A bag contains equal number of red, green and white balls. A ball is drawn from the bag. What is the probability that drawn ball is either red or white?
 (A) $\frac{1}{3}$ (B) 1 (C) $\frac{2}{3}$ (D) $\frac{1}{2}$
13. Which of the following is correct for data $-1, 0, 1, 2, 3, 5, 5, 6, 8, 10, 11$?
 (A) mean = mode = median (B) mean = 5
 (C) mean = mode (D) mode = median
14. In the given figure, O is the centre of the circle and AB is a chord of length 16 cm. If OC is perpendicular to AB and CE = 4 cm then what is the radius of circle?
 (A) 8 cm (B) 9 cm
 (C) 10 cm (D) 11 cm
- 
15. In a rectangle ABCD, if AC = 36 cm and diagonal AC and BD intersect at O such that $OB = 2x + 4y$ and $OD = 4x - y$ then $x + y$ is equal to
 (A) 10 cm (B) 15 cm (C) 8 cm (D) 7 cm
16. Mean of 20 observations is 15.5 Later it was found that the observation 24 was misread as 42. The correct mean is :
 (A) 14.2 (B) 14.8 (C) 14.0 (D) 14.6
17. The median of the following items, 25, 15, 23, 40, 27, 25, 23, 25 and 20 is
 (A) 27 (B) 40 (C) 25 (D) 23
18. A sequence a, ax, ax^2, \dots, ax^n has odd numbers of terms. Find its median.
 (A) ax^{n-1} (B) $ax^{\frac{n-1}{2}}$ (C) $ax^{\frac{n}{2}}$ (D) $ax^{\frac{n+1}{2}}$
19. In a rhombus ABCD having diagonals AC and BD intersect at E such that $AE = \frac{2}{3}x$ and $EC = x - 10$ then value of 'x' is
 (A) 45 (B) 60 (C) 30 (D) 90
20. The area of a rhombus is half the product of the length of its
 (A) diagonals (B) sides (C) base (D) none of these

Space For Rough Work

SECTION – VI (Social Science)

1. In which state does the Gaddi shepherds live?
 (A) Jammu & Kashmir (B) West Bengal
 (C) Assam (D) Himachal Pradesh
2. What does “The Bugyal” stand for ____
 (A) High grassland (B) Dense forest
 (C) Low grassland (D) River valley
3. Which of the pastrolists community belong to Maharashtra?
 (A) Gujjars (B) Bakarwals
 (C) Bhotiyas (D) Dhangars
4. In which state does the Gollas community reside?
 (A) Himachal Pradesh (B) Andhra Pradesh
 (C) Jammu & Kashmir (D) Maharashtra
5. When was the Criminal Tribes Act passed by British in India?
 (A) 1871 (B) 1872
 (C) 1873 (D) 1874
6. What does the word Maasai stand for?
 (A) My animals (B) My people
 (C) My village (D) My father
7. When was Indian Forest Service setup?
 (A) 1858 (B) 1864
 (C) 1868 (D) 1862
8. How does the best forest known as?
 (A) Village forests (B) Protected forests
 (C) Reserved forests (D) None of these
9. How is the shifting cultivation known as in Sri Lanka?
 (A) Lading (B) Tavy
 (C) Milpa (D) Chena
10. Who were Kalangs?
 (A) The tribes of India (B) The fisherman of Java
 (C) Skilled forest cutter of Java (D) None of these
11. What is the tenure of the members of the Upper House?
 (A) 4 years (B) 5 years
 (C) 6 years (D) 7 years
12. Which among the following is the final authority for making laws in any democratic country?
 (A) The Parliament (B) The President
 (C) The Justice of the Supreme Court (D) The Election Commission
13. Who presides over the joint session of the Parliament?
 (A) Prime Minister (B) President
 (C) Vice President (D) Speaker
14. For how long can the Rajya Sabha delay a Money Bill?
 (A) 15 days (B) 1 month
 (C) 3 month (D) 14 days

15. Which body acts as guardian of Fundamental Rights?
(A) District Courts (B) Supreme Court
(C) Election Commission (D) Legislature
16. Which organisation raised its voice in support of the prisoners in Guantanamo Bay?
(A) The Peace Council (B) Welfare International
(C) Amnesty International (D) None of these
17. Which of the fundamental right is also known as the 'rule of law'?
(A) Right to Equality (B) Right to Freedom
(C) Right against exploitation (D) Right to freedom of religion
18. Right to contest election is a ____
(A) Economic right (B) Civil right
(C) Legal right (D) Political right
19. Which of the fundamental rights is also known as 'the heart and soul of our constitution'?
(A) Right to freedom of religion (B) Right to family
(C) Right against exploitation (D) Right to constitutional remedies
20. When was the National Humans Rights Commission was set up in India?
(A) 1992 (B) 1993
(C) 1994 (D) 1996
21. Which was the umbrella organisation that led the struggle in South Africa?
(A) Congress of Africa (B) African National Congress
(C) African Congress (D) Republic of Africa
22. By whom was the Constitution of India adopted?
(A) The British Parliament (B) The Constituent Assembly
(C) Parliament of India (D) The Governor General
23. When was the Constitution for India drafted first?
(A) 1926 (B) 1927
(C) 1928 (D) 1929
24. How many members were there in the constituent assembly that wrote constitution of India?
(A) 388 (B) 299
(C) 324 (D) 264
25. The pre announced price, paid to farmer is known as ____
(A) Support payment (B) Issue price
(C) Minimum support price (D) None of these
26. Which scheme was launched for the benefit of indigent senior citizens?
(A) AAY (B) APS
(C) ICDS (D) None of these
27. What is the literacy rate of India according to Census of 2011?
(A) 74.04% (B) 78.04%
(C) 70.20% (D) 68.24%
28. Which Indian state has lowest Infant Mortality Rate?
(A) Kerala (B) Andhra Pradesh
(C) Bihar (D) Uttar Pradesh

29. Children of which age group are being targeted under 'Sarva Shiksha Abhiyan'?
- (A) 5 – 12 year (B) 4 – 14 year
(C) 6 -14 year (D) 6 – 15 year
30. Which income was fixed as a poverty line in rural India in 2011 – 12?
- (A) Rs 854/person (B) Rs 916/person
(C) Rs 864/person (D) Rs 816/person
31. Which is the most vulnerable group of poverty?
- (A) Agricultural labourers (B) Schedule tribes
(C) Casual labourers (D) Schedule castes
32. Which Indian state get a large portion of its rainfall during October and November?
- (A) Himachal Pradesh (B) Meghalaya
(C) Tamil Nadu (D) Asom
33. Which of the following is not an element of weather and climate?
- (A) Atmospheric pressure (B) Temperature
(C) Humidity (D) Altitude
34. Mango showers occur in which one of the following group of two states?
- (A) Bihar and West Bengal (B) Tamilnadu and Kerala
(C) Karnataka and Kerala (D) Maharashtra and Andhra Pradesh
35. Silver fir is found in the following type of vegetation zone
- (A) Mangrove forest (B) Montane forest
(C) Thorn forest (D) Deciduous forests
36. Cinchona, Rubber, Mahagony, Ebony are important tree of
- (A) Mangrove forests (B) Tropical deciduous forest
(C) Tropical rainforest (D) Montane forest
37. In which of the following states is the Simlipal Bio – reserve locates?
- (A) Punjab (B) Delhi
(C) Orissa (D) West Bengal
38. Name the country of the world, that has both, tigers and lions?
- (A) Sri Lanka (B) Brazil
(C) Argentina (D) India
39. What is the average tenure of the Cabinet set by Weimar Republic?
- (A) 239 days (B) 332 days
(C) 311 days (D) 339 days
40. When was the period of Great Economic Depression?
- (A) 1924 – 27 (B) 1925 – 28
(C) 1920 – 23 (D) 1929 – 33

Space For Rough Work

FIITJEE INTERNAL TEST

BATCHES: Four Year CRP428 (R & W)

PHASE TEST – III + IV

(MAT & SAT)

QP CODE: 100857

Answers

SECTION – I (MAT)

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

SECTION – II (Physics)

- | | | | |
|-------|-------|-------|-------|
| 1. C | 2. A | 3. B | 4. D |
| 5. B | 6. C | 7. B | 8. C |
| 9. B | 10. D | 11. A | 12. B |
| 13. D | | | |

SECTION – III (Chemistry)

- | | | | |
|-------|-------|-------|-------|
| 1. B | 2. B | 3. D | 4. B |
| 5. C | 6. D | 7. B | 8. A |
| 9. C | 10. A | 11. B | 12. A |
| 13. D | | | |

SECTION – IV (Biology)

- | | | | |
|-------|-------|-------|-------|
| 1. D | 2. C | 3. A | 4. A |
| 5. A | 6. A | 7. D | 8. A |
| 9. B | 10. C | 11. C | 12. B |
| 13. C | 14. B | | |

SECTION – V (Mathematics)

- | | | | |
|-------|-------|-------|-------|
| 1. C | 2. B | 3. B | 4. C |
| 5. A | 6. C | 7. A | 8. B |
| 9. C | 10. C | 11. B | 12. C |
| 13. D | 14. C | 15. D | 16. D |
| 17. C | 18. C | 19. C | 20. A |

SECTION – VI (Social Science)

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

Answers & Solutions

Part – I (MAT)

SECTION – I

1. D
Sol. By observation.
2. A
Sol. By observation.
3. B
Sol. By observation.
4. D
Sol. By observation.
5. D
Sol. By observation.
6. B
Sol. By observation.
7. B
Sol. As per observation.
8. A
Sol. As per observation.
9. C
Sol. As per observation.
10. C
Sol. As per observation.
11. C
Sol. As per observation.
12. A
Sol. By observation.
13. A
Sol. By observation.
14. B
Sol. By observation.
15. B
Sol. By observation.
16. C
Sol. By observation.
17. B
Sol. By observation.
18. C
Sol. As per observation.

19. C

Sol. As per observation.

20. D

Sol. D is the correct image by visualization.

21. A

Sol. In each row, there are three types of arrows – an arrow with a single head and without any base, an arrow with double head having a circle at its base, an arrow with triple head having a rectangle at its base. Also, in each row, the arrows point in three directions – upwards, downwards and towards the right.

22. A

Sol. Row wise mirror image.

23. B

Sol. In each row (and column), the superimposition of all the three figures results in a darkened circle.

24. D

Sol. By observation.

25. C

Sol. The second figure is obtained from the first figure by moving the line segment to the opposite side of the square boundary and replacing it with two similar LINE SEGMENTS. Also, the element in the lower – left corner gets replaced by two similar elements – one placed in the upper left and the other placed in the lower right corner

26. A

Sol. In each row, the second figure is obtained from the first figure by reversing the direction to the RHS arrow and the third figure is obtained for the second figure by reversing the direction of both the arrows.

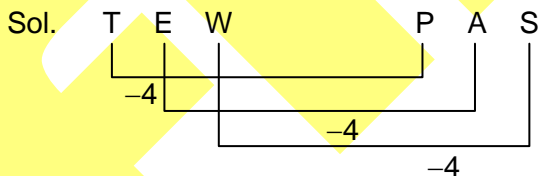
27. B

Sol. In each row, the first figure is rotated through 90° CW to obtain the second figure and the second figure is rotated through 90° CW to obtain the third figure.

28. D

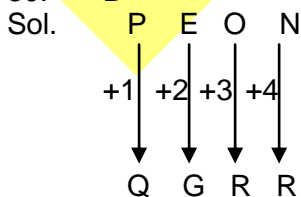
Sol. In each row, The second figure forms the innermost and the outermost elements of the third figure and the first figure forms the middle element of the third figure.

29. C



Same for IVX → ERT

30. B



Same for RUDE → SWGI

31. B
Sol. Second is the food of the first.
32. C
Sol. Antonyms of each other.
33. D
Sol. Moving clockwise through 135° from West, we get North-East direction. Similarly, moving clockwise through 135° from South, we get North-West direction.
34. C
Sol. First is Airport and second is city related to airport.
35. A
Sol. $6 : (6)^2 \times 3 :: 11 : (11)^2 \times 3$
36. B
Sol. $7 \times 2 : 14 :: 8 \times 9 : 72$
37. B
Sol. $1 + 6 + 7 \rightarrow 14 :: 2 + 4 + 5 \rightarrow 11$
38. D
Sol. $5 \times 7(\text{next prime number}) = 35$
Similarly, $7 \times 11(\text{next prime number}) = 77$
39. B
Sol. In all other pairs, second is the antonyms of the first.
40. B
Sol. In all other pairs, first is the material used to make the second.
41. B
Sol. Ornithology is the study of Birds.
Similarly, Cytology is a study of Cell
42. B
Sol. Push is antonym of Pull
Similarly, Throw is antonym of Pick.
43. D
Sol. Needle is a tool used by the Tailor
Similarly, Pen is a tool used by Author.
44. D
Sol.
- | | | | | | |
|------|------|------|------|------|------|
| $+9$ | $+9$ | $+9$ | $+9$ | $+9$ | $+8$ |
| C | L | U | H | Q | Z |
| A | J | S | O | X | F |
45. D
Sol.
- | | | | | | | |
|------|------|------|------|------|------|------|
| -1 | -1 | -1 | -1 | -1 | $+1$ | $+1$ |
| T | S | R | Q | P | O | L |
| A | B | C | | | | |
46. D
Sol. Except EAT, all other groups end with 'ET'

47. D

Sol. All other groups consist of alternate letters

48. B

Sol. Except KOO, in all other groups, the vowel is followed by a consonant two times.

49. B

Sol. Addition of first and last digit equal to the middle digit.

$$176 \Rightarrow 1 + 6 = 7$$

$$132 \Rightarrow 1 + 2 = 3$$

$$297 \Rightarrow 2 + 7 = 9$$

50. D

$$\text{Sol. } 7 \times 6 = 42$$

$$4 \times 5 = 20$$

$$3 \times 9 = 27$$

$$\text{So, } 5 \times 8 = 40$$

51. D

Sol. Except 144, all others are perfect cube.

52. D

Sol. Except 63, all others are prime numbers.

53. C

Sol. Sum of digits:

$$7 + 2 + 0 + 2 = 11$$

$$6 + 0 + 2 + 3 = 11$$

$$5 + 0 + 6 + 1 = 12$$

$$4 + 3 + 0 + 4 = 11$$

54. C

Sol. According to the graph, Cricket

55. B

Sol. According to the graph Hockey and Football

56. B

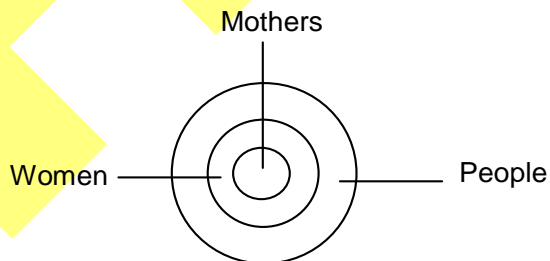
$$\text{Sol. } 15/15 \Rightarrow 1 : 1$$

57. D

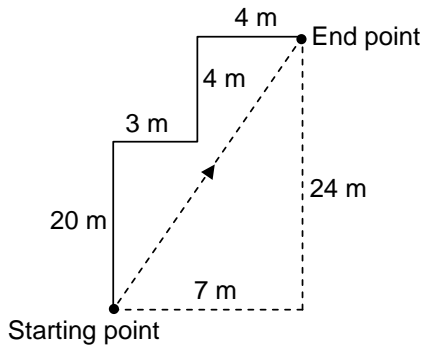
$$\text{Sol. } 12\frac{1}{2}\% \text{ of } 12000000 \Rightarrow \frac{12000000}{8} = 1500000$$

58. B

Sol.

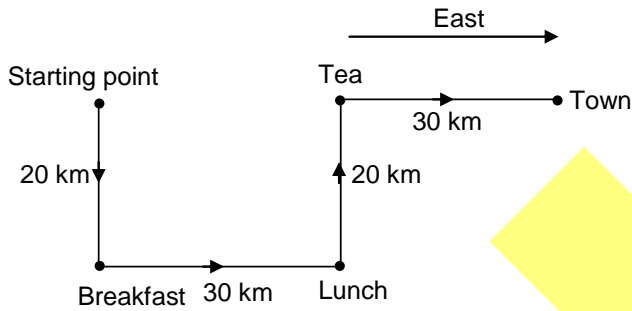


59. B
Sol.

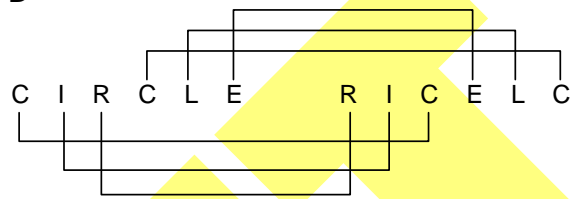


$$= \sqrt{(24)^2 + (7)^2} = \sqrt{625} = 25 \text{ m (North-east)}$$

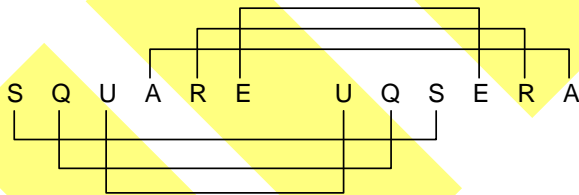
60. B
Sol.



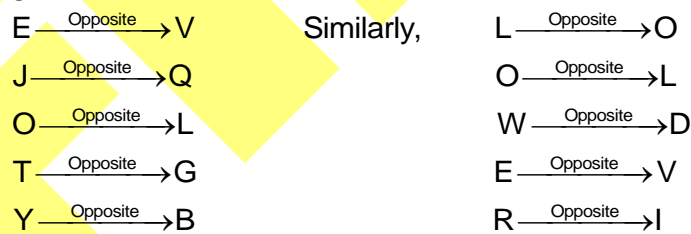
61. D
Sol.



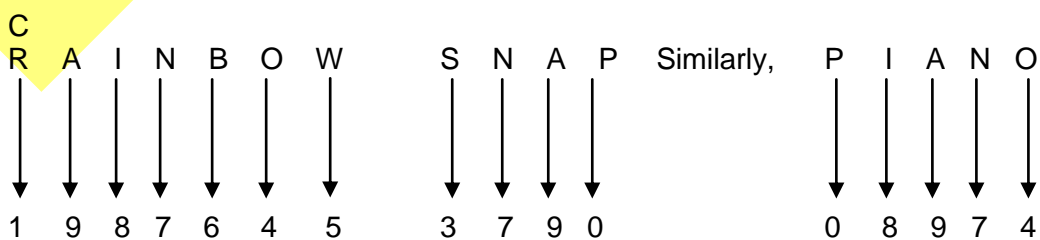
Similarly,

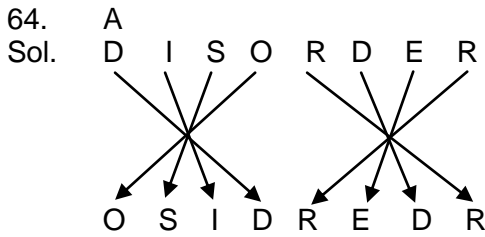


62. C
Sol.

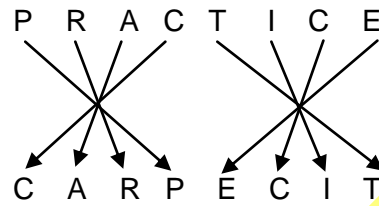


63. C
Sol.





Similarly,



65. D
Sol. Pitiful, Pitiless, Plague, Plankton, Plaque

66. C
Sol. A D J E C T I V E
B C I F B S J U F
There is only two vowel.

67. C
Sol. Initially, Gitika's rank from the left end = 9th.
Gitika's rank after shifting to successive odd-numbered = 11th from the left end.
So, Gitika's rank from right end = $(19 - 11) + 1 = 9^{\text{th}}$ from the right end.

68. B
Sol. Before Interchanging:
Amit's rank from the left end = 7th
Prakash's rank from the right end = 9th
After Interchanging:
Amit's rank from the left end = 11th
Prakash's initial rank from the right end = 9th
So, total no. of people = $(11 + 9) - 1 = 19$

69. D
Sol. In option (A), (B) and (C) gender of M is not given. So, answer is option (D).
 $N^- - K$
↓
 $M^+ - T$

70. D
Sol. T is mother of D.
 H^+
↓
 T^-
↓
 $R^- - D$

71. C
Sol. In option (A) and (B), gender of F is not given. So, answer is option (C).
 W^+
↓
 $R^+ - F^- - T$

72. A
Sol. The area common to triangle, circle and square but not with rectangle.

73. D
Sol. The area of square not common to any other and area of rectangle not common to any other
 $= 5 + 9 = 14$

74. A

Sol. Difference of consecutive prime numbers = 2, 3, 5, 7, 11, 13

75. B

Sol. Double difference

76. D

Sol. 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
 5th letter to the right of F is K. Fourth letter to the left of K is G.

77. D

Sol. The letter which is 8th, to the right of P is X. The 6th letter to the left of X is R.

78. B

Sol. Nothing about the relation between political freedom and democracy is mentioned in the statement. So, I does not follow. But II directly follows from the given statement.

79. D

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.

80. C

Sol. Total number of boys after 2 new boys joined = 47
 Since, the rank of the boy dropped by 1, it became 21st 20th
 \therefore His new rank from the end = $47 - 21 + 1 = 27^{\text{th}}$

81. C

Sol. $\underline{7} \underline{8} \underline{6}$ means study very hard
 $\underline{9} \underline{5} \underline{8}$ means hard work pays
 $\underline{6} \underline{4} \underline{5}$ means study and work
 Code of study = 6
 Code of hard = 8
 Hence code of very will be 7.

82. B

Sol. C & R are not present in IMMEDIATELY so, DIALECT, DIAMETER & DICTATE can not be formed.

83. A

Sol. As per observation.

84. D

Sol. As per observation.

85. B

Sol. As per observation.

86. D

Sol. A number is divisible by 9 when the sum of its digit is divisible by 9.
 So, $(3 + 8 + 1 + A) =$ must be divisible by 9;
 Thus, smallest natural number be 6.
 or $(3 + 8 + 1 + 6) = 18$, this is divisible by 9.

87. C

Sol. $55^{725} \rightarrow$ Unit digit always 5 ... (i) $73^{5810} \rightarrow \frac{5810}{4} \rightarrow$ Remainder 2, so $(3)^2 \rightarrow$ unit digit 9 ... (ii) $22^{853} \rightarrow \frac{853}{4} \rightarrow$ Remainder 1, so $(2)^1 \rightarrow$ unit digit 2 ... (iii)

(i) + (ii) + (iii)

$$5 + 9 + 2 = 16$$

So, unit digit \rightarrow 6.

88. A

Sol. $\frac{275}{5} \rightarrow 55$

$$\frac{55}{5} \rightarrow 11$$

$$\frac{11}{5} \rightarrow 2$$

So, $55 + 11 + 2 = 68$ zeroes

89. A

Sol. $87^{474} \rightarrow \frac{474}{4} \rightarrow$ Remainder 2So, $(7)^2 \rightarrow$ Unit digit 9

90. B

Sol.

A	E
↓	↓
10	14
(1010)	(1110)

91. D

Sol. Let the speeds of two trains be $7x$ and $8x$ km/hr

$$\text{Then, } 8x = \frac{400}{4} = 100 \Rightarrow x = \left(\frac{100}{8}\right) = 12.5$$

$$\therefore \text{Speed of first train} = (7 \times 12.5) \text{ km/hr} = 87.5 \text{ km/hr}$$

92. B

Sol. Let total population \rightarrow 100

$$\text{No. of females} \rightarrow 100 \times \frac{1}{5} = 20$$

$$\text{No. of males} \rightarrow 80$$

$$\text{No. of uneducated females} = 20 \times \frac{40}{100} = 8$$

$$\text{No. of uneducated males} = 80 \times \frac{5}{100} = 4$$

$$\text{Total uneducated} = 12$$

$$\text{Total educated} = 100 - 12 = 88$$

$$\% \text{ of educated} = \frac{88}{100} \times 100 = 88\%$$

93. C

Sol. Let total number of students \rightarrow 100

$$\text{No. of students Allotted to Group A} = 100 \times \frac{40}{100} = 40$$

$$\text{No. of students Allotted to Group B} = (100 - 40) \times \frac{75}{100} = 45$$

$$\text{No. of students in group C} = 100 - 40 - 45 = 15$$

$$15 \text{ unit} \rightarrow 12$$

$$1 \text{ unit} \rightarrow \frac{12}{15}$$

$$100 \text{ unit} \rightarrow \frac{12}{15} \times 100 = 80$$

94. B

Sol. Let monthly salary be 100

$$\text{On Food} = 100 \times \frac{40}{100} = 40$$

$$\text{On transport} = (100 - 40) \times \frac{1}{3} = 20$$

$$\text{Food + transport} = 60$$

$$\text{Remaining} = 40$$

$$\frac{1}{2} \times 40 \text{ unit} \rightarrow 4500$$

$$20 \text{ unit} \rightarrow 225$$

$$100 \text{ unit} \rightarrow \text{Rs. } 22,500$$

95. A

Sol. Let total no. of voters = 100

$$\text{Valid votes} = \frac{80}{100} \times 100 = 80$$

$$\text{Votes of winner} = 80 \times \frac{70}{100} = 56$$

$$\text{Votes of looser} = 80 - 56 = 24$$

$$\text{Difference} = 56 - 24 = 32$$

$$32 \text{ unit} \rightarrow 9600 \text{ votes}$$

$$1 \text{ unit} \rightarrow 300 \text{ votes}$$

$$100 \text{ unit} \rightarrow 30,000 \text{ votes}$$

96. B

$$\text{Sol. } 150 = \frac{P \times R \times T}{100}$$

$$150 = \frac{P \times 4 \times 1}{2 \times 100}$$

$$P = \frac{150 \times 200}{4} = 7500$$

97. C

$$\text{Sol. We can conclude, } 2P = \frac{P \times R \times 8}{100} = 25\%$$

Now Interest in 20 years.

$$= \frac{P \times 25 \times 20}{100} = 5P$$

$$\text{Amount} = P + 5P = 6P$$

Hence, sum become 6 times in 20 years.

98. B

Sol. Year Sum
 10 2P
 $10 \times 2 \rightarrow (2) \times 2P = 4P$
 Hence, required time = 20 years

99. A

Sol. $A = P \left(1 + \frac{r}{100} \right)^n$

$$r = 20$$

for half yearly, $r = 10$

$$1331 = 1000 \left(1 + \frac{10}{100} \right)^n$$

$$\frac{1331}{1000} = \left(\frac{11}{10} \right)^n$$

$$\left(\frac{11}{10} \right)^3 = \left(\frac{11}{10} \right)^n$$

$$n = 3$$

Number of year = $\frac{n}{2} = \frac{3}{2}$ (because interest compounded half yearly)

100. A

Sol. Let the length of train be x m, then

$$\frac{x}{10} = \frac{120 + x}{18}$$

$$\Rightarrow x = 150 \text{ m}$$

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

1. C

Sol. Work done = $mgh = 25 \times 10 \times 80 = 20 \text{ kJ}$

2. A

Sol. Energy produced by 24 kg fuels = $1250 \times 24000 = 30,000,000 \text{ kJ}$

$$\text{Power} = \frac{\text{Energy}}{\text{Time}} = 150 \text{ MW}$$

3. B

Sol. Work done = Loss of kinetic energy

$$\frac{1}{2} \times 50 \times 10^{-3} \times 3.75 \times 10^4 = 937.5 \text{ J}$$

4. D

Sol. Work done on a body = Change in its K.E.

5. B

Sol. When a spring is compressed, the work done during compression is stored in the spring in the form of elastic potential energy.

6. C

Sol. A cube of ice floats in a beaker of water when the ice melts, the level of water in beaker remains the same.

7. B

Sol. Pascal's law is related to transmission of fluid pressure.

8. C

$$\text{Sol. } \frac{F_1}{F_2} = \frac{1}{100} \Rightarrow \frac{88}{A} = \frac{F}{100A} \Rightarrow F = 8800 \text{ N}$$

9. B

Sol. The distance between a crest and the next trough in a periodic wave is $\frac{\lambda}{2}$.

10. D

Sol. Weight = Buoyant force
 $900 v.g = 1000 (v - v') g$
 $\frac{v'}{v} \times 100 = 10\%$

11. A

$$\text{Sol. } v = f\lambda \Rightarrow \lambda = \frac{344}{12 \times 10^4} = 2.86 \text{ mm}$$

12. B

Sol. Distance = velocity \times time = $340 \times 2 = 680 \text{ m}$

13. D

$$\text{Sol. } v = f\lambda ; \frac{f_1}{f_2} = \frac{\lambda_2}{\lambda_1} = 3$$

SECTION – III (Chemistry)

1. B
Sol. The weight ratio of S and O in SO_3 is 32 : 48 i.e. 2 : 3
2. B
Sol. 32 g of S is present in 98 g of H_2SO_4 .
3. D
Sol. 1g CH_4 contains maximum number of atoms.
4. B
Sol. Percentage of Aluminium in $\text{Al}_2(\text{SO}_4)_3$ will be 15.7%
5. C
Sol. The existence of a nucleus in an atom was proposed by Rutherford.
6. D
Sol. All the given statements are correct.
7. B
Sol. The probable molecular formula of acid will be CH_2O_2
8. A
Sol.
- $$\begin{array}{c} \text{A} \quad \text{B} \\ \swarrow \quad \searrow \\ 4 \quad 3 \end{array} \Rightarrow \text{A}_3\text{B}_4$$
9. C
Sol. Increasing order of specific charge will be $n < \alpha < p < e$.
10. A
Sol. Atoms of different elements can have same mass number is not a postulate of Daltons atomic theory.
11. B
Sol. Amorphous solids are those which have no fixed regular geometry.
12. A
Sol. C_6^{12} Number of neutrons = 6
 Si_{14}^{30} Number of neutrons = 16
So, the ratio is 6 : 16 i.e. 3 : 8

13. D
Sol. Bohr's model of an atom explains hydrogen atomic spectrum.

SECTION – IV (Biology)

1. D
Sol. **Compound epithelium cells** are cemented to one another, forming an irregular layer.
2. C
Sol. Competing for various resources of plants causing low availability of nutrients.
3. A
Sol. In the five – kingdom system of classification developed by Robert Whittaker, members of the Kingdom Plantae are autotrophic, enkaryotic and multicellular.

4. **A**
Sol. Depletion of ozone molecules in the stratosphere is due to **chlorine compound**.
5. **A**
Sol. A biological process of nitrogen fixing bacteria present in soil.
6. **A**
Sol. The group of similar plants which breed freely among themselves constitute a species.
7. **D**
Sol. Diarrhea, cholera, typhoid are the diseases that have one thing in common that is all of them are caused by bacteria, transmitted by contaminated food and water and are cured by antibiotics.
8. **A**
Sol. The correct sequence of taxonomic categories is **Species → Genus → Order → Phylum**
9. **B**
Sol. As per the Fluid Mosaic model, plasma membrane is composed of **phospholipids, extrinsic proteins, and intrinsic proteins**.
10. **C**
Sol. **Manganese and Magnesium** do not come under the category of macronutrients.
11. **C**
Sol. The use of fertilizer in farming is an example **of high cost production**.
12. **B**
Sol. Nitrogen, Phosphorus, and Potassium are examples of Macronutrients.
13. **C**
Sol. Apis cerana indica, **the Indian honey bee**, is a subspecies of Asiatic honey bee.
14. **B**
Sol. Pesticides can eliminate some animals essential food source causing the animals to relocate, change their diet or starve.

SECTION – V (Mathematics)

1. **C**
Sol. Clearly,
 $\angle ODB = \angle OAC = 50^\circ$ [\because Angles in the same segment]
 Also, $OB = OD$ [Radii of same circle]
 $\Rightarrow \angle OBD = \angle ODB$ [\because Angles opposite to equal sides of a triangle are equal]
 $\therefore \angle OBD = 50^\circ = x^\circ \Rightarrow x = 50$
2. **B**
Sol. Let radius = $4x$ and height = $3x$
 Now Area of base = $\frac{22}{7} \times 4x \times 4x = 154$
 $\Rightarrow x = \frac{7}{4}$
 Radius = 7 cm height = $\frac{21}{4}$ cm $\Rightarrow l = \sqrt{(7)^2 + \left(\frac{21}{4}\right)^2} = 8.75$ cm
 CSA = $\frac{22}{7} \times 7 \times 8.75 = 192.5$ cm²

3. B

Sol. Since ABCD is a parallelogram.

$$\therefore \angle A = \angle C = 50^\circ \quad \dots\dots(i)$$

[Opposite angles of a parallelogram are equal]

Also, AEFG is a parallelogram [Given]

$$\therefore \angle A = \angle F = 50^\circ \quad \text{[From (i)]}$$

[Opposite angles of a parallelogram are equal]

4. C

Sol. Mode = 3 median – 2 mean

$$\Rightarrow \text{median} = 20$$

5. A

Sol. Let each type of balls = x

$$\Rightarrow \text{total balls} = 3x$$

$$\text{Probability} = \frac{x}{3x} = \frac{1}{3}$$

6. C

Sol. $90^\circ - x = 3x$

$$\Rightarrow x = 22.5^\circ$$

7. A

Sol. $\frac{4}{3}\pi r^3 = \pi R^2 \times 36R$

$$\frac{r^3}{R^3} = \frac{27}{1} \Rightarrow \frac{r}{R} = 3:1$$

8. B

Sol. Area = 4.2 cm^2 Height = $280 \text{ cm} = 2.8 \text{ m}$

$$b_1 + b_2 = \frac{2 \times A}{h} = \frac{2 \times 4.2}{2.8} = 3 \text{ m}$$

9. C

Sol. Sum of squares of first n natural numbers = $\frac{n(n+1)(2n+1)}{6}$

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

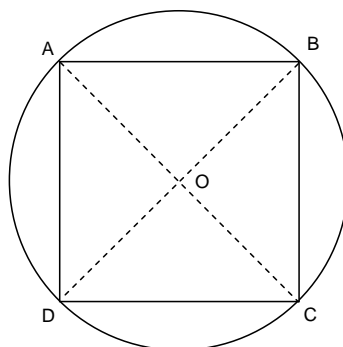
10. C

Sol. Let Radius = x $\Rightarrow \frac{4}{3}\pi x^3 = \frac{4}{3}\pi(6^3 + 8^3 + 10^3)$

$$\Rightarrow x^3 = 6^3 + 8^3 + 10^3 \Rightarrow x^3 = 1728 \Rightarrow x = 12 \text{ cm}$$

11. B

Sol. Since ABCD is a cyclic quadrilateral
 \Rightarrow ABCD is a square and its diagonal intersect each other at right angles
 $\angle AOB = 90^\circ$



12. C

Sol. Let each type of balls = x
 \Rightarrow total balls = $3x$
 Total Red and White balls = $2x$
 Probability = $\frac{2x}{3x} = \frac{2}{3}$

13. D

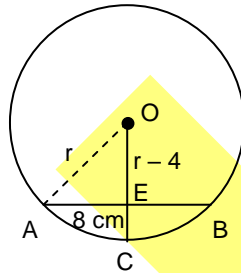
Sol. Mean = $\frac{-1+0+1+2+3+5+5+6+8+10+11}{11} = \frac{50}{11}$

Median = $\left(\frac{11+1}{2}\right)^{\text{th}}$ term = 6^{th} term = 5

Mode = 5
 Mode = Median

14. C

Sol. Let radius = r cm
 then in $\triangle OAE$
 $(r-4)^2 + (8)^2 = r^2$
 $\Rightarrow r^2 + 16 - 8r + 64 = r^2$
 $\Rightarrow r = 10$ cm



15. D

Sol. In rectangle ABCD, $OB = OD = \frac{BD}{2} = \frac{AC}{2} = 18$
 $\Rightarrow 2x + 4y = 18$ (i)
 and $4x - y = 18$ (ii)
 solve equation (i) and (ii), we get $x = 5$ and $y = 2$
 $\therefore x + y = 5 + 2 = 7$ cm

16. D

Sol. Sum of observations = $20 \times 15.5 = 310$
 24 was misread as 42
 It means, Sum should be decreased by $(42 - 24)$
 i.e. 18
 Hence New Sum = $310 - 18 = 292$
 Mean = $\frac{292}{20} = 14.6$

17. C

Sol. Ascending order :- 15, 20, 23, 23, 25, 25, 27, 40
 Number of terms = 9
 Median = $\left(\frac{9+1}{2}\right)^{\text{th}}$ term = 5^{th} term = 25

18. C

Sol. $a, ax, ax^2, ax^3, \dots, ax^n$
 As there are odd number of terms, the median is:

$$\left(\frac{(n+1)+1}{2}\right)^{\text{th}} \text{ term is } \left(\frac{n+2}{2}\right)^{\text{th}} \text{ term}$$

$$\text{Median} = a \left(x^{\frac{n+2}{2}-1}\right) = a \cdot x^{\frac{n}{2}}$$

19. C

Sol. In rhombus ABCD, AE = EC

$$\Rightarrow \frac{2}{3}x = x - 10$$

$$\Rightarrow x = 30$$

20. A

Sol. Area of a rhombus = $\frac{1}{2} \times D_1 \times D_2$