SECTION - A : PHYSICS

This section contains **15 Multiple Choice Questions**. Each question has four choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

1. Few small wax pieces are fixed on the rod as shown in figure below. When flame is brought in contact with rod, it is observed that the wax pieces begin to fall one by one. The method of heat transfer involved here is:
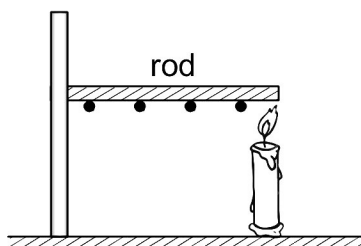
    (1) conduction   (2) convection   (3) radiation   (4) None of these

2. Consider a container filled with water. Choose the correct option showing the correct relation of pressures at points A, B, C and D. Points B and C are at same horizontal level.
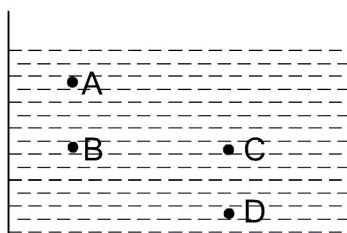

    (1) $P_A = P_B = P_C = P_D$ (2) $P_A < P_B = P_C < P_D$

    (3) $P_D < P_B = P_C < P_A$ (4) $P_A = P_B < P_C = P_D$

3. The picture shows Raj and his friends playing with a string-telephone. Rita is speaking. Raj and Ravi are trying to listen. Which of them can hear her speak?
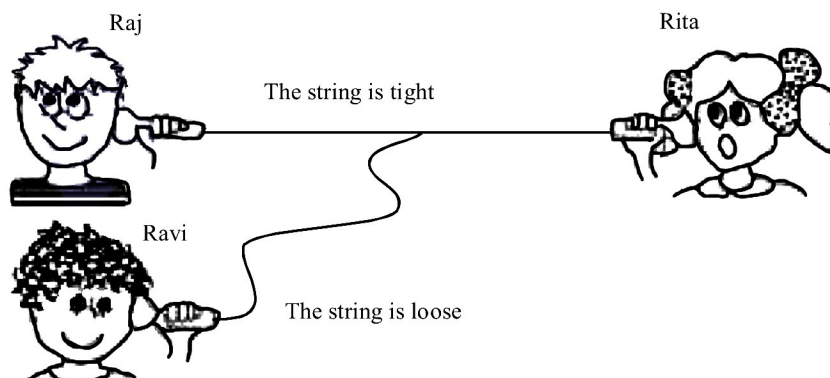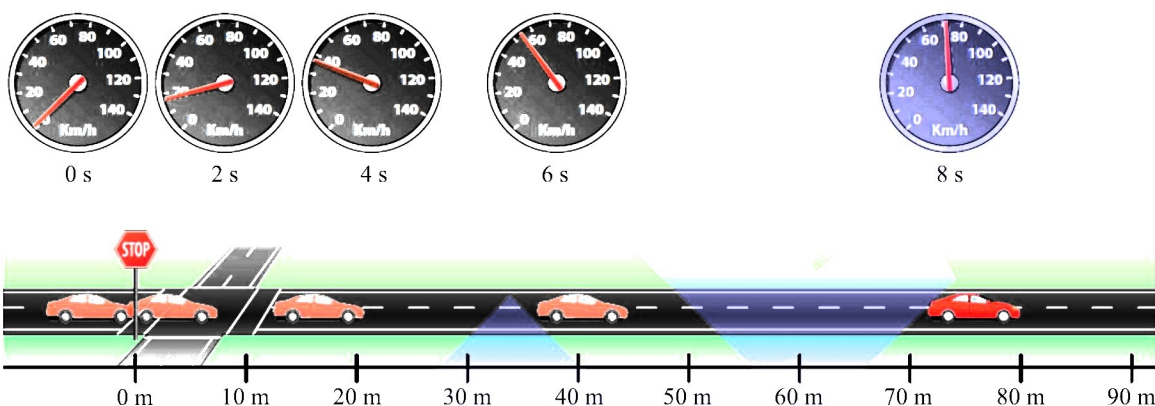

    (1) Both of them can hear equally clearly.   (2) Neither of them can hear.

    (3) Only Ravi can hear clearly.   (4) Only Raj can hear clearly.

4. Two plane mirrors are inclined at an angle 60°. A ray of light falls on one mirror parallel to another. The angle of incidence formed by ray in mirror M_2 is :
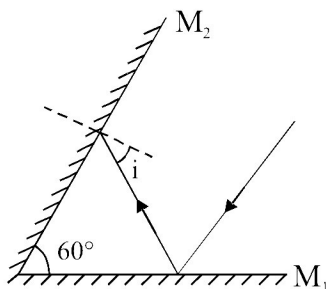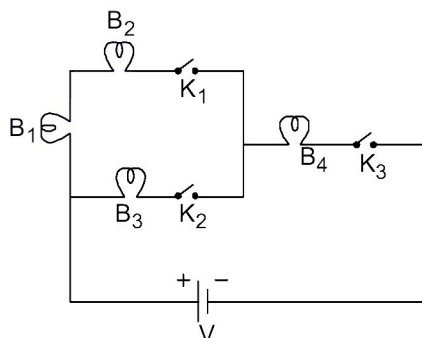

(1) 60°   (2) 15°   (3) 45°   (4) 30°

5. The car's speed changes as it leaves the stop sign.


The above figure shows that the body

(1) covers equal distance in equal interval of time.

(2) covers equal displacement in equal interval of time.

(3) exhibits non-uniform motion.

(4) exhibits uniform motion.

6. Consider the circuit shown below :

Which of the following bulb(s) will glow when switches K_2 and K_3 are closed ?

(1) only B_3 and B_4 (2) only B_1, B_3 and B_4 (3) all bulbs   (4) only B_2 and B_3

7. Peristence of vision is defined as

(1) Ability of the eye to change the focal length of the eye lens.

(2) Nerve ending which are sensitive to bright light.

(3) Nerve ending which are sensitive to dim light.

(4) Ability of an eye to continue to see an image for a short duration even after the removal of the object.

8. Two empty metal cans, one black and one white, were placed outside on a hot day. Both cans were the same size and were left in the Sun for 3 hours. Compared to the white can, the black can would most likely be

   (1) Cooler, because it absorbs less sunlight.

   (2) Cooler, because it absorbs more sunlight.

   (3) Warmer, because it absorbs less sunlight.

   (4) Warmer, because it absorbs more sunlight.

9. The relation between S.I. and C.G.S. unit of force is :

   (1) $1N = 10^3$ dyne   (2) $1N = 10^{-5}$ dyne

   (3) $1N = 10^5$ dyne   (4) $1N = 10^{-3}$ dyne

10. Loudness of sound depends on _____ of sound while pitch of sound depends on _____ of sound.

    (1) frequency, amplitude   (2) amplitude, frequency

    (3) speed, amplitude   (4) speed, frequency

11. Vinegar is

    (1) Electrolyte   (2) Non–electrolyte   (3) Electrode   (4) None of these

12. Sam made some electrical circuits using identical lamps and batteries. Assist Sam to determine which circuit has the smallest current and which circuit has the brightest lamps respectively.
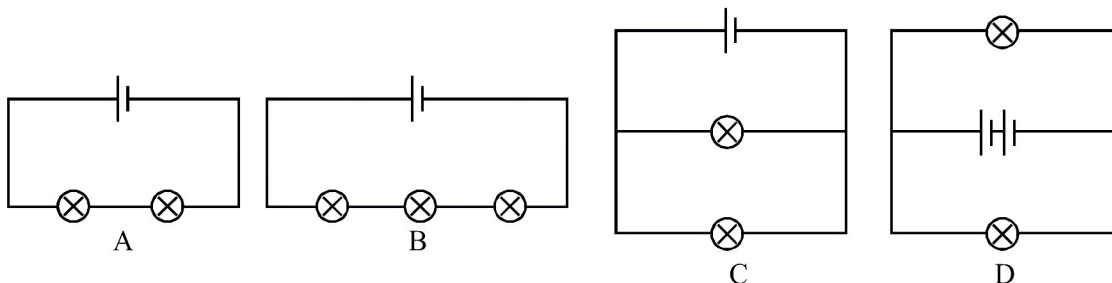
    (1) A and D   (2) B and D   (3) A and B   (4) C and D

13. A toy car is placed 50 cm in front of a plane mirror M. If the mirror is now moved 0.50 m away from the toy car, where is the image of the toy car formed from plane mirror?

    (1) 100 m away   (2) 0.1 cm away

    (3) 100 cm away   (4) 0.1 m away

14. If mass of an object doubles, the friction force acting on it –

    (1) gets half   (2) becomes $\dfrac{1}{4}$ (3) doubles   (4) remains same

15. Time period of simple pendulum is 1.2 seconds. What is the time taken by the pendulum to complete 30 oscillations?

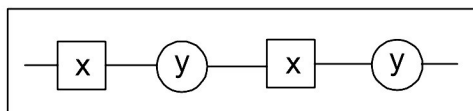   (1) 25 s   (2) 30 s   (3) 36 s   (4) 40 s

SECTION-B : CHEMISTRY

This section contains **15 Multiple Choice Questions.** Each question has four choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

16. Nitric acid turns the colour of blue litmus

(1) Orange   (2) Yellow   (3) Red   (4) Green

17. The structure of a fabric with, its component units x and y linked is given below

(1) Polythene   (2) Polystyrene   (3) Polycot   (4) PVC

18. Which of the following is not a characteristic property of gold ?

(1) Malleability   (2) Brittleness   (3) Ductility   (4) Sonority

19. A brief description of four substances is given as

W: It can react with both acids and bases, used to make aircrafts.

X: It reacts with boiled water and not with cold water.

Y: It does not react with acids and water, used to make computer chips. It is a metalloid.

Z: It can displace silver from silver nitrate solution but it can not react even with steam.

W, X , Y and Z respectively.

(1) Zn, Mg, Si, C   (2) Fe, Cu, Si, Al   (3) Al, Mg, Si, C   (4) Al, Mg, Si, Cu

20. A change in which the original substance can be obtained back by change of condition is called

(1) Reversible change   (2) Physical change   (3) Chemical change   (4) Both (1) & (2)

21. Water evaporates from plant by a process known as

(1) Transpiration   (2) Transportation   (3) Infiltration   (4) None of these

22. Expansion on heating & contraction on cooling of metal is a

(1) Chemical change   (2) Physical change   (3) Irreversible change   (4) None of these

23. Consider the following table:

From the above data, the decreasing order of reactivity of metals is

Metal	$ZnSO_4$(aq)	$FeSO_4$(aq)	$CuSO_4$(aq)	$Al_2(SO_4)_3$(aq)
Zn	—	Displaced	Displaced	No reaction
Fe	No reaction	—	Displaced	No reaction
Cu	No reaction	No reaction	—	No reaction
Al	Displaced	Displaced	Displaced	—

(1) Al > Cu > Fe > Zn   (2) Al > Zn > Fe > Cu   (3) Al > Zn > Cu > Fe   (4) Al > Fe > Cu > Zn.

24. X is the base which is soluble in water. Then the metal present in the base is

(1) aluminium   (2) sodium   (3) copper   (4) iron

25. People obtain ground water through _____ and _____ .

(1) rain, well   (2) handpump, lake   (3) river, lake   (4) well, tubewell

26. Which property is wrong for acrylic ?

(1) It is hard and strong.

(2) It resembles wool in its properties.

(3) Acrylic yarn can be easily knitted.

(4) They are available in variety of colours.

27. Adding salt to water makes it salty. Which of the following statement is true regarding this change?

(1) It is a chemical change because a new substance is formed.

(2) It is a physical change because the original substance can be recovered.

(3) It is a chemical change because there is exchange of heat.

(4) It is a chemical change because there is a slight change in colour.

28. P : PET is familiar form. It is made of repeating units of ester.

Q : A thread which is stronger than steel wire.

R : It is cheaper than silk fibre. It is mixed with cotton to make bedsheets.

Identify P, Q and R.

	P	**Q**	**R**
(1)	Polyethene	Nylon	Rayon
(2)	Polyester	Rayon	Nylon
(3)	Polyester	Nylon	Rayon
(4)	Polystyrene	Rayon	Nylon

29. Which among the following is true regarding aqueous solution of sulphur trioxide and sodium oxide?

(1) Both solutions turn blue litmus to red.

(2) Both solutions turn red litmus to blue.

(3) Aqueous solutions of SO_3 and Na_2O turn blue litmus to red and red litmus to blue respectively.

(4) Aqueous solutions of SO_3 and Na_2O turn red litmus to blue and blue litmus to red respectively.

30. Which of the following is/are incorrectly matched?

	Items	**Plastics**
(1)	Electric switches	Bakelite
(2)	Kitchenware	Melamine
(3)	Grocery bags	Polyethene
(4)	Toys	Acrylic

SECTION-C : BIOLOGY

This section contains **15 Multiple Choice Questions**. Each question has four choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

31. Which type of bacteria are represented by P, Q, R & S?

(1) P–Coccus, Q–Bacillus, R–Vibrio, S–Spirillum

(2) P–Bacillus, Q–Coccus, R–Spirillum, S–Vibrio

(3) P–Bacillus, Q–Vibrio, R–Coccus, S–Spirillum

(4) P–Bacillus, Q–Spirillum, R–Vibrio, S–Coccus

32. What will be the effect of large amount of moisture present in food grains during storage?

(1) The organism present in the food grains will not be able to grow.

(2) The enzymes present in food grains may dissolve.

(3) The food grains can be stored for a long time.

(4) It will increase the rate of decay of food materials.

33. Match the column–I with column–II & select the correct option from the codes given below.

Column I		Column II	
(a)	Artery	(i)	Haemoglobin
(b)	Vein	(ii)	Carries mainly oxygenated blood
(c)	RBC	(iii)	Exchange of materials
(d)	Capillaries	(iv)	Carries mainly deoxygenated blood

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

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

34. When Meena's class visited a farm to observe the process of agriculture, she saw some labourers removing some plants from the main crop in the field. Her teacher has explained about weeding in the class. She was surprised why they are removing the plants from the field. The best possible reason would be ____ .

Statement 1 : They wanted to prevent overcrowding of plants in the fields.

Statement 2 : Overcrowding makes the plants grow unhealthy as they do not get enough sunlight, water and nutrients

(1) Only statement 1 is correct

(2) Both statements are correct and statement 2 is the correct explanation of statement 1

(3) Both statements are correct but statement 2 is the incorrect explanation of statement 1

(4) Only statement 2 is correct

35. The respiratory and circulatory systems provide the tissues of your body with the oxygen they need to function. At which location is the oxygen used to make energy?

(1) Cells   (2) Capillaries   (3) Heart   (4) Lungs

36. Few roles of forests are listed below. Which of the following is incorrect?

(1) They regulate earth's temperature.

(2) They increase soil erosion by water and wind.

(3) They save hill slopes from landslides.

(4) They control noise pollution.

37. Quinine, a useful medicine for malaria is obtained from _____

(1) pine tree   (2) cinchona tree   (3) neem tree   (4) eucalyptus tree

38. Earthworms and frogs breathe through their skin as skin of both the organisms is

(1) Moist and rough   (2) Dry and rough

(3) Dry and slimy   (4) Moist and slimy

39. What do a bacterial cell, a plant cell, and a nerve cell have in common?

(1) Cell wall and mitochondria   (2) Cytoplasm and ribosomes

(3) Nucleus and cell membrane   (4) Flagella and chloroplasts

40. When breakdown of glucose occurs with the use of oxygen, it is called

(1) anaerobic respiration   (2) aerobic respiration   (3) regular respiration

(4) all of these

41. Proteins embedded in the cell membrane function to

(1) Transport material in and out of the cell   (2) Carry genetic information

(3) Store excess water   (4) Produce energy for the cell

42. If a plant did not get enough water, the likely result would be wilting and_____.

(1) an increase in the size of the leaves.

(2) an increase in the length of the stem.

(3) a decrease in the rate of photosynthesis.

(4) a reduction in the rate of CO_2 production.

43. Which among the following sentence is not correct about cell organelles?

(1) They are found in all eukaryotic cells.

(2) They are found in both unicellular and multicellular organisms.

(3) They coordinate to perform various functions of cell.

(4) All the organelles are bounded by single membrane.

44. Some farmers were seen adding a type of organism to barren field to support crop growth. Which organism could they be using?

(1) Blue green algae   (2) Red algae   (3) Virus   (4) Protozoa

45. Which of the following reproduces only inside a host cell?

(1) Bacteria   (2) Virus   (3) Amoeba   (4) Fungus

SECTION-D : MATHEMATICS

This section contains **15 Multiple Choice Questions.** Each question has four choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

46. Which of the following shows the maximum rise in temperature?

(1) 23° to 32°   (2) –10° to +1°   (3) –18° to –11°   (4) –5° to +5°

47. An art teacher had $\frac{2}{3}$ gallon of paint to pour into containers. If he poured $\frac{1}{8}$ gallon of paint into each container until he ran out of paint, how many containers had paint in them, including the one that was partially filled?

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

48. Which of the following cannot be true for a polyhedron?

(1) V = 6, F = 4, E = 8   (2) V = 4, F = 4, E = 6   (3) V = 4, F = 4, E = 4   (4) V = 8, F = 6, E = 12

49. If ΔABC is congruent to ΔDEF by SSS congruence rule, then which of the following is true ?

(1) ∠C < ∠F   (2) ∠B < ∠E

(3) ∠A < ∠D   (4) ∠A = ∠D, ∠B = ∠E, ∠C = ∠F

50. Bert draw an angle that has the characteristics listed below.

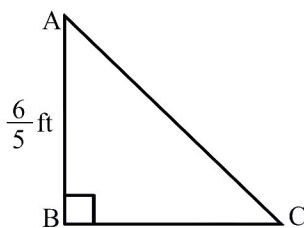- It has a measure greater than 88.5°.

- It is an obtuse angle.

Which of the following could be the angle Bert drew?

(1) 92.5°   (2) 90°   (3) 89.5°   (4) 88°
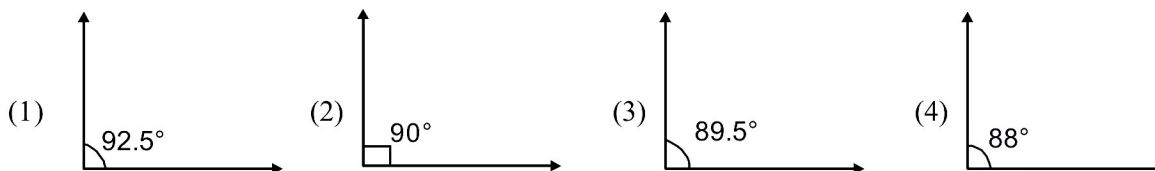
51. Simplify : $\dfrac{3.2^n - 4.2^n}{2^n - 2^{n-1}} + \left\{ \dfrac{a^{p-q}}{\sqrt[q]{a^{q^2-pq}}} \times a^{-2(p-q)} \right\}^n$

(1) 0   (2) 1   (3) –1   (4) 2

52. The area of the triangle given is $\dfrac{2}{5}$ ft^2. What is the length of hypotenuse?

$\dfrac{6}{5}$ ft

(1) $\dfrac{2}{3}$ ft   (2) $\dfrac{2\sqrt{106}}{15}$ ft   (3) 2 ft   (4) $\dfrac{\sqrt{106}}{15}$ ft

53. Find the number of faces of an octagonal pyramid.

(1) 8   (2) 7   (3) 6   (4) 9

54. In the given figure, ABCD is a rhombus with ∠ABC = 56°. Determine ∠ACD.
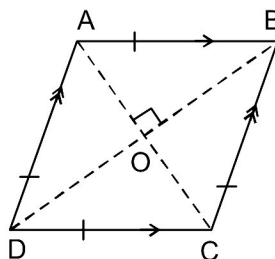
(1) 31°   (2) 45°   (3) 62°   (4) 90°

55. The least number which must be subtracted from 18265 to make it a perfect square is

(1) 20   (2) 30   (3) 40   (4) 50

56. The sum of the digits of a two digit number is 15. If the number formed by reversing the digits is less than the original number by 27, find the original number.

(1) 39   (2) 69   (3) 96   (4) 93

57. This number line shows different places that Evan can visit along a 1-kilometer trail from the school to Williard Pond. (Marking marked at equal intervals)
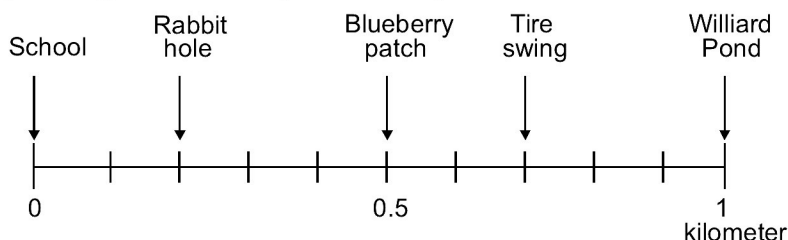
Evan walked from the school to the tire swing and then from the tire swing to the blueberry patch. What is the total distance Evan walked (In km.)?

(1) 0.6   (2) $\dfrac{5}{10}$ (3) $\dfrac{7}{10}$ (4) 0.9

58. Three numbers are in the ratio of 2 : 3 : 4. The sum of their cubes is 33957. Find the numbers.

(1) 7, 14, 21   (2) 8, 16, 24   (3) 14, 21, 28   (4) 16, 24, 32

59. Solve for x : $\dfrac{x+3}{x+7} = \dfrac{9}{11}$

(1) 6   (2) 3   (3) 15   (4) 10

60. If the length and area of a rectangle are 1.68 cm and 3.4944 cm^2 respectively, find the area of the circle whose radius is equal to the breadth of the above mentioned rectangle. (Take π = 3.14)

(1) 10.786 cm^2 (2) 15.065 cm^2 (3) 13.585 cm^2 (4) 11.785 cm^2

SECTION-E : MENTAL ABILITY

This section contains **20 Multiple Choice Questions.** Each question has four choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

61. If + means ÷ , − means × , ÷ means − and × means +, then

6 + 2 − 4 ÷ 2 × 5 = ?

(1) 30   (2) –2   (3) 15   (4) 10

62. Sachin walks 12 km towards East and turns to his right and walks 8 km. Then he again took right turn and walks 6 km. In which direction is Sachin going at the end?

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

63. If ARUNI is written as '37542' and LEBRAM is written as '168739' then how will 'BALMANI' be written in that language ?

(1) 8319432   (2) 8319342   (3) 8319724   (4) None of the above

64. Ritika was playing hide and seek with her sister Rima. Ritika went 20 meters towards her left then she turned right and ran for 15 meters to find her sister. If she found her sister then how far was Rima from Ritika initially?

(1) 25 meters   (2) 30 meters   (3) 40 meters   (4) 42 meters

65. Find the next term in the given series.

66, 66, 33, 11, $\dfrac{11}{4}$?

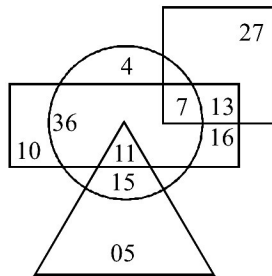(1) $\dfrac{11}{20}$ (2) $\dfrac{11}{21}$ (3) 2   (4) $\dfrac{1}{2}$

66. Find the missing number from following options.

7	49	343
11	121	?
20	400	8000

(1) 1200   (2) 1331   (3) 1444   (4) 668

67. Study the information given in the diagram and answer the questions given below.

(i) Rectangle represents females.   (ii) Triangle represents uneducated person.

(iii) Circle represents rural.   (iv) Square represents private servants.

In different regions in the diagram some numbers are indicated which corresponds to the persons. How many persons are uneducated female?

(1) 4   (2) 11   (3) 16   (4) 13

68. Pointing to Raju, Smita said "His Mother's Brother is the Father of my Son Aashu" How is Raju related to Smita?

(1) Brother in law   (2) Nephew   (3) Uncle   (4) Aunt

69. In a certain code language 'CHAT' is written as SUZBGIBD. How will 'APT' be coded in that language?

(1) SUOBZQ   (2) SUOZQB   (3) SUOQBZ   (4) SUOQZB

70. Choose the correct mirror image of the following question figure.

Question Figure
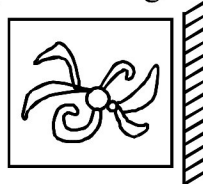
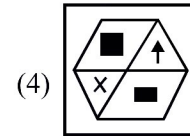(1)   (2)   (3)   (4)

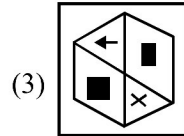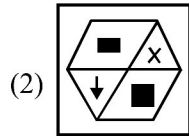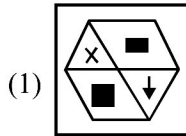**71.** Find the next term in the given series.
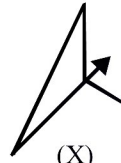
8, 14, 30, 58, 118, 234, ?

(1) 471   (2) 476   (3) 470   (4) 488

72. Find the water image of the given figure (X).
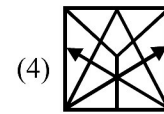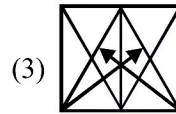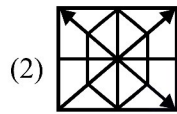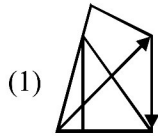
(X)

(1)   (2)   (3)   (4)
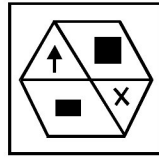
73. In the following question, choose the alternative figure in which the question figure (X) is embedded.
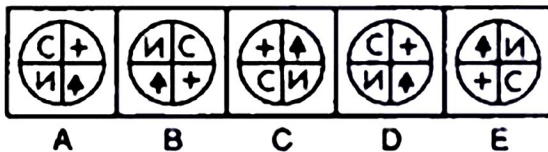
(X)

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

74. Select a figure from amongst the answer figures which will continue the same series as established by the five problem figures.

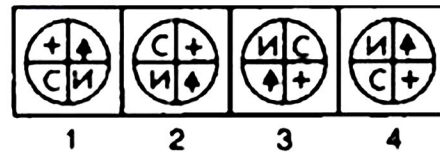Problem figures   Answer figures
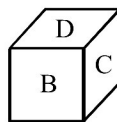
A   B   C   D   E   1   2   3   4

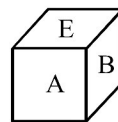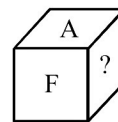**75.** From the following figures of dice, find which letter will come in place of '?'.

(i)   (ii)   (iii)

(1) D   (2) B   (3) E   (4) C
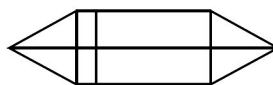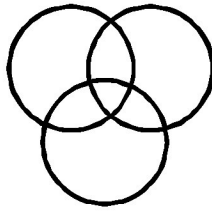
76. How many rectangles are there in the following figure?

(1) 7   (2) 8   (3) 9   (4) 10

77. Choose the correct choice representing the Venn diagram.

(1) Mango, Grass, Salt   (2) Hen, Dog, Cat

(3) River, Well, Pond   (4) Illiterate people, unemployed, poor people.

78. The following question is based on the information given below:

1. All the faces of a big cube are painted with blue colour.

2. The cube is cut into 64 small and equal size cubes.

How many small cubes are there whose atleast two faces are coloured?

(1) 28   (2) 32   (3) 24   (4) 30

79. Fifty students were there in tenth class who took the mental ability test. Six of the students did not qualify, out of the remaining Ramesh ranked 14th from the last.What was his rank from top ?

(1) 32nd (2) 30th (3) 31st (4) None of above

80. A's son B is married with C, whose sister D is married to E, the brother of B. How D is related to A?

(1) Sister   (2) Daughter-in-law   (3) Sister-in-law   (4) Cousin

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	1	2	4	4	3	1	4	4	3	2	1	2	3	3	3
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	3	3	2	4	4	1	2	2	2	4	1	2	3	3	4
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	2	4	3	2	1	2	2	4	2	2	1	3	4	1	2
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	2	4	3	4	1	3	2	4	3	3	3	4	3	3	3
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	3	2	2	1	1	2	2	2	4	1	3	2	3	1	4
Que.	76	77	78	79	80										
Ans.	3	4	2	3	2										