



Class – IX

## ENTRANCE TEST CUM SCHOLARSHIP (SAMPLE PAPER-1)

[Time: 3 Hours]

[Max Marks: 450]

A. General:

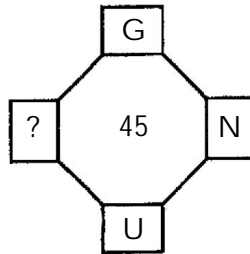
1. This booklet is a Question Paper containing 150 questions.
2. Blank Papers, Clipboards, Log Tables, slide rules, calculators, cellular phones and electronic gadgets in any form are not allowed to be carried inside the examination hall.
3. The answer sheet, a machine-readable optical mark recognition sheet (OMR Sheet), is provided separately.
4. DO NOT TAMPER WITH THE OMR OR THE BOOKLET.
5. Please fill your roll number correctly in the OMR sheet (answer sheet).
6. Both Question Paper and OMR Answer Sheet will be submitted after completion of this examination.

B. Question Paper Format and marking scheme:

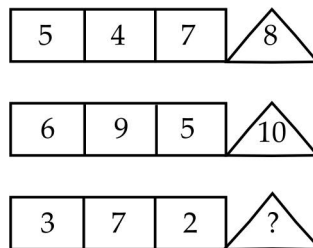
1. The Question Paper consists of five parts (Part I: MAT, Part II: Physics, Part III: Chemistry, Part IV: Biology, Part V: Mathematics).
2. Each Question carries +3 marks for correct answer and -1 mark for incorrect answer.

# MAT

1. Which group of letter is different from others?  
 (a) LAZO                      (b) HCXS                      (c) GHIJ                      (d) FEVU
2. If in a certain code language 'POEM' is written as 'OQNPDFLN', how would 'WIND' be written as same code?  
 (a) VXHJMOCE              (b) ECDFGJLA              (c) LMNOPABC              (d) ECOMJHXV
3. Some words are translated from an artificial language below  
 'goh rat pee' is 'my school bag'.  
 'nie jee goh' is 'black colour bag'  
 'pee jee goh' is 'my black bag'  
 Which word could possibly mean 'colour'?  
 (a) Pee                      (b) Nie                      (c) Jee                      (d) Goh
4. Find the missing character in the following figure.



- (a) A                      (b) D                      (c) B                      (d) C
5. Find the next number in the given sequence.  
 1000, 100, 729, 81, 512, 64, 343, ?  
 a. 25                      (b) 49                      (c) 64                      (d) 36
  6. Which alternative will replace the 'question mark'?

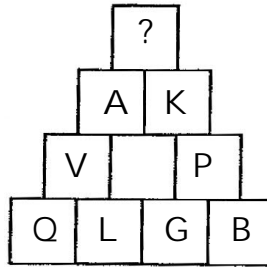


- (a) 6                      (b) 12                      (c) 8                      (d) 10
7. Find out the number in the position of 'question mark'.

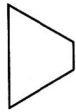
A <sub>2</sub>	C <sub>4</sub>	E <sub>6</sub>
G <sub>3</sub>	I <sub>5</sub>	?
M <sub>5</sub>	O <sub>9</sub>	Q <sub>14</sub>

- (a) K<sub>5</sub>                      (b) K<sub>12</sub>                      (c) K<sub>7</sub>                      (d) K<sub>8</sub>

8. Find the next number in the series.  
 1, 2, 6, 15, 31, 56, 92, ?  
 (a) 49 (b) 56 (c) 92 (d) 141
9. Which number will replace the question mark?



- (a) G (b) H (c) F (d) E
10. In the question, if  $5 + 3 + 2 = 30$  and  $4 + 7 + 5 = 140$ , then how  $13 + 5 + 2 = ?$   
 (a) 130 (b) 140 (c) 135 (d) 125
11. Identify which among the pieces given below will not be required to complete the square.



(p)

(a) p



(q)

(b) q



(r)

(c) r

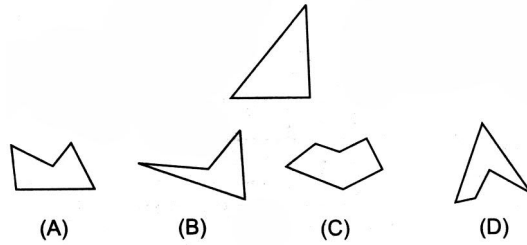


(s)

(d) s

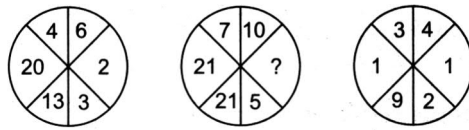
12. Sara lives in a large city on the East coast. Her younger cousin Marlee lives in the mid-West in a small town with fewer than 1000 residents. Marlee has visited Sara several times during the past 5 yrs. In the same period of time, Sara has visited Marlee only once. Find the correct statement from given alternatives, according to the passage.
- (a) Marlee likes Sara better than Sara likes Marlee  
 (b) Sara thinks small towns are boring  
 (c) Sara is older than Marlee  
 (d) Marlee wants to move to the East coast
13. The pacific yew is an evergreen tree that grows in the pacific North-West. The pacific yew has a fleshy, poisonous fruit. Recently, taxol, a substance found in the bark of the pacific yew, was discovered to be a promising new anti-cancer drug. Find the correct statement from given alternatives, according to the passage.
- (a) Taxol is poisonous when taken by healthy people  
 (b) Taxol has cured people from various diseases  
 (c) People should not eat the fruit of the pacific yew  
 (d) The pacific yew was considered worthless until taxol was discovered

14. Identify which would among the pieces given will not be required to complete the triangular pattern shown below.



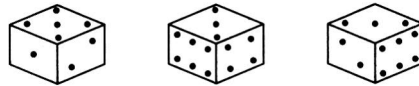
- (a) A                      (b) B                      (c) C                      (d) D

15. Identify which alternate replace the question mark?



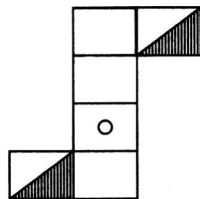
- (a) 5                      (b) 3                      (c) 6                      (d) 4

16. On the basis of the three positions of a dice, which number will appear on the face opposite the four dots?



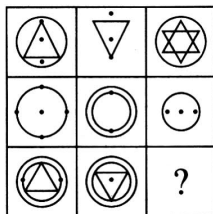
- (a) 1                      (b) 5                      (c) 3                      (d) 2

17. Choose the box that is similar to the box formed from the given figure of paper.



- (a)                       (b)                       (c)                       (d) 

18. Select a suitable figure from the four alternatives that would complete the figure matrix.



- (a)                       (b)                       (c)                       (d) 

19. Which of the following diagrams indicates the best relation between earning, dividend and bonus?



20. Which of the following diagrams indicates the best relation between author, lawyer and singer?



21. Pointing to Diwaker, Karuna says, "I am the daughter of only son of his grandfather". How Karuna is related to Diwaker?

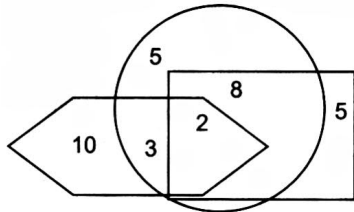
- (a) Aunt (b) Uncle (c) Brother (d) sister

22. 1. B5D means B is the father of D.  
 2. B9D means B is the sister of D.  
 3. B4D means B is the brother of D.  
 4. B3D means B is the wife of D.

Which of the following means F is the mother of K?

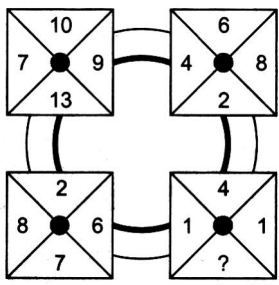
- (a) F3M5K (b) F5M3K (c) F9M4N3K (d) F3M5N3K

23. In the given figure, the circle represents jobs, the square represents candidates and hexagon represents company. How many candidates are doing job but not in a company?



- (a) 2 (b) 10 (c) 5 (d) 8

24. Which number replaces the question mark?

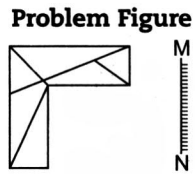


- (a) 2 (b) 3 (c) 4 (d) 5

25. The age of Tushar is less than Vishal but more than Suraj. Suraj is younger than Saroj but elder than only Sandeep. Vishal is younger than Saroj. Among them who is eldest?

- (a) Sandeep (b) Suraj (c) Saroj (d) Vishal

26. What is the mirror image of the given figure?



Directions (Q. Nos. 27 – 31) Study the following information carefully and answer the questions given below.

There are six friends named as D, E, F, G, H and I sitting around a circular table in a canteen but not necessary in the same order.

'I' sits between H and F but third to the left E. H is second to the right of E but third to the left of D. G sits between H and E.

27. What is the position of G with respect to D?  
 (a) Second to the left (b) Second to the right  
 (c) Fourth to the right (d) Third to the left
28. Who sits between F and E?  
 (a) D (b) G (c) I (d) H
29. How many persons sit between G and D?  
 (a) 3 (b) 2 (c) 1 (d) 4
30. If G and D interchange their position then, who are the neighbours of E?  
 (a) G and H (b) G and F (c) H and F (d) G and D
31. What is the position of 'I' in respect of 'H'?  
 (a) Immediate right (b) Immediate left  
 (c) Second to the right (d) Second to the left

Directions (Q. Nos. 32-33) Read the statements and mark the appropriate conclusion as per the given options.

- (a) I and II follow (b) II and III follow (c) Only III follows (d) None follow

32. Statements

All trees are green.

Some green are yellow.

All yellow are mango.

Conclusions

I. Some trees are yellow.

II. Some mangoes are trees,

III. No yellow is tree

33. Statements

Some peanuts are almonds.

Some almonds are expensive.

No expensive is luxurious.

Conclusions

I. Some luxurious is expensive.

II. No peanuts is luxurious.

III. Some almonds are peanuts and expensive.

34. Complete the given sequence.

A, Y, C, W, E, U, G, ?

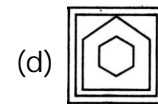
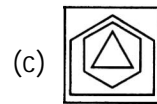
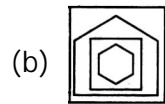
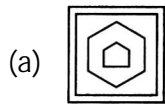
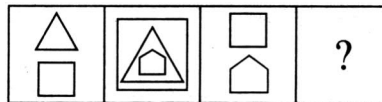
(a) T

(b) S

(c) H

(d) V

35. Find the figure which is having same relation with third figure as relation between first and two figures.



Directions (Q. Nos. 36-38) Read the following information carefully and answer the questions given below.

- A goldsmith has five gold articles named V, W, X, Y and Z each having a different weight.
- V weighs twice as much as W.
- W weighs four and half time as much as x.
- X weighs half as much as Y.
- Y weighs half as much as Z.
- Z weighs less than a but more than X.

36. Which of the following article is heaviest in weight?

(a) Z

(b) W

(c) V

(d) X

37. Z is heavier than which of two articles?

(a) X and Y

(b) V and W

(c) W and X

(d) Y and V

38. How many articles are less heavy in weight from W?

(a) 4

(b) 3

(c) 2

(d) 1

39. Reema wants to go near to her mom, read the given points and find in which direction her mother is from her present position.

- Firstly she will have to go 6 km in East.
- From there turn left and walk 8 km.
- After that a turn right then left and walk 6 km and 4 km, respectively.

(a) North-West

(b) North-East

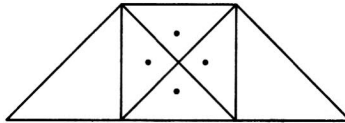
(c) South-East

(d) South-West

40. There are 6 flats on a floor of a building named P, Q, R, S, T and U. Half of them facing North and the remaining facing South.
- 'Q' is North facing flat but not neighbour of 'S' flat.
  - 'S' and 'P' are opposite to each other.
  - R is next to U and facing South.
  - T is North facing flat and opposite to R.

In the given alternatives, which flats are the North facing flats?

- (a) STQ                      (b) PRU                      (c) PRQ                      (d) SQR
41. How many triangles are in the figure?



- (a) 10                      (b) 9                      (c) 12                      (d) 13
42. A man covered a certain distance at some speed. Had he moved 3 km/h faster, he would have taken 40 min less. If he had moved 2 km/h slower, he would have taken 40 min more. The distance (in Km) is

- (a) 38                      (b)  $37\frac{1}{2}$                       (c) 36                      (d) 40

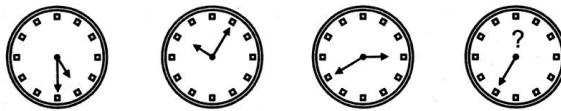
43. Mac has £ 3 more than Ken but, then Ken wins on the horses and thrice his money, so that he now has £ 2 more than the original amount of money that the two boys had between them. How much money did Mac and Ken have between them before Ken's win?

- (a) £9                      (b) £11                      (c) £13                      (d) £ 15

44. In a game of billiards, A can give B 15 points in 60 and A can give C to 20 points in 60. How many points can B give C in a game of 90?

- (a) 10 points                      (b) 30 points                      (c) 20 points                      (d) 45 points

45. Where should the missing hour hand point to on the bottom clock?

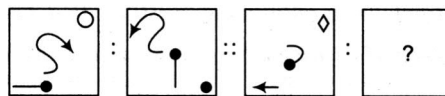


- (a) To the 2                      (b) To the 5                      (c) To the 6                      (d) To the 7

46. Neeraj is facing North-West. He moves 180° in clockwise direction and 45° in the anti-clockwise direction, which direction Neeraj is facing now?

- (a) North                      (b) South                      (c) East                      (d) West

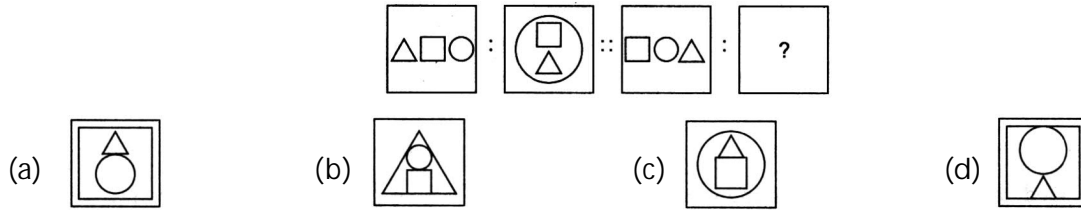
47. Question Figures



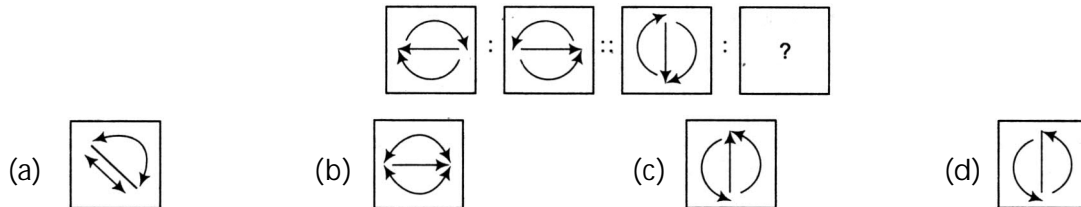
- (a)                      (b)                      (c)                      (d)



48. Question Figures



49. Question Figures



Direction (Q. No. 50) Read the following information carefully to answer the question given below.

X, Y, Z and P are sitting around a circular table and discussing their trades.

- I. X, sits opposite to cook.
- II. Y, sits right to the barber.
- III. The washerman is on the left of the tailor.
- IV. P, sits opposite Z.

50. What are the trades of X and Y?

- (a) Tailor and Barber
- (b) Barber and Cook
- (c) Tailor and Cook
- (d) Tailor and Washerman

51. Six person A, B, C, D, E and F are standing in a circle. B is between F and C, A is between E and D, F is to the left of D.

Who is between A and F?

- (a) B
- (b) C
- (c) D
- (d) E

52. Six students are sitting in a row. K is sitting between V and R. V is sitting next to M. M is sitting next to B, who is sitting on the extreme left and Q is sitting next to R. Who are sitting adjacent to V?

- (a) R and Q
- (b) B and M
- (c) K and R
- (d) M and K

Directions (Q. Nos. 53-56) : Read the following information carefully to answer the questions that follow.

The six faces of a cube are painted in a manner that on two adjacent faces have the same colour. The three colours used in painting are red, blue and green. The cube is then cut into 36 smaller cubes in such a manner that 32 cubes are of one size and the rest of a bigger size and each of the bigger cubes has no red side.

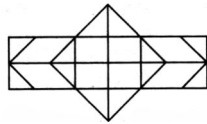
53. How many cubes in all have a red side?

- (a) 16
- (b) 32
- (c) 8
- (d) 20

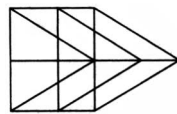
54. How many cubes in all have only one side coloured?

- (a) 20
- (b) 16
- (c) 0
- (d) 8

55. How many cubes are coloured on three sides?  
 (a) 20 (b) 16 (c) 8 (d) 0
56. How many cubes are there which have two or more sides painted?  
 (a) 36 (b) 28 (c) 20 (d) 32
57. If  $PET = 4$ ,  $LET = 3$  and  $JEY = 2$ . Then, what is the value of  $XET$ ?  
 (a) 1 (b) 5 (c) 6 (d) 8
58. In a coded language if  $HOME = 2541$ ,  $SHOP = 8256$  and  $WORK = 9573$ , then code for  $SMOKE$  will be  
 (a) 85431 (b) 84531 (c) 83451 (d) 84351
59. What will be the number of hexagonals in the following figure?



- (a) 2 (b) 4 (c) 5 (d) 6
60. What will be the number of parallelograms in the following figure?

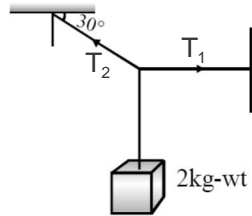


- (a) 15 (b) 17 (c) 13 (d) 16

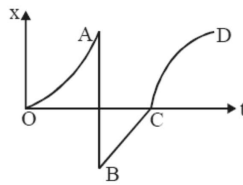
## PHYSICS

61. The position of a particle moving along X-axis depends on time according to equation  $x = at^2 + bt^3$ , where  $x$  is in meters and  $t$  is in seconds. What are the units of  $a$  and  $b$ ?  
 (a)  $ms^{-2}$ ,  $m$  (b)  $ms^{-2}$ ,  $ms^{-3}$  (c)  $m$ ,  $m^2$  (d) No units
62. A wheel is rotating at 900 rpm about its axis when the power is cut off. It comes to rest in one minute. The angular retardation (assuming it to be uniform) in  $\text{radian}/\text{sec}^2$  is:  
 (a)  $\pi/2$  (b)  $\pi/4$  (c)  $\pi/6$  (d)  $\pi/8$
63. An electron starting from rest, has a velocity  $v$  that increases linearly with time  $t$  so that  $v = kt$ , where  $k = 2\text{m}/\text{s}^2$ . Find the distance covered by it in the first three seconds.  
 (a) 18 m (b) 9 m (c) 6 m (d) 4 m
64. A tap can be operated easily using two fingers because :  
 (a) the force by one finger overcomes friction and other finger provides the force for operation  
 (b) the rotational effect is caused by the couple formed  
 (c) the force available for the operation will be more  
 (d) this helps application of angular forces
65. A car starting from rest has a speed of 30 km/hr at any one instant. Two seconds later, its speed is 36 km/hr and 2 seconds after that it is 42 km/hr. What is the acceleration in  $\text{m}/\text{s}^2$ ?  
 (a)  $\frac{5}{6} \text{m}/\text{s}^2$  (b)  $3 \text{m}/\text{s}^2$  (c)  $10 \text{m}/\text{s}^2$  (d)  $6 \text{m}/\text{s}^2$

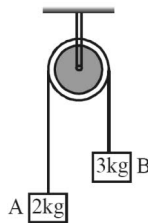
66. A lift is coming from 8<sup>th</sup> floor and is just about to stop 4<sup>th</sup> floor. Taking ground as origin and positive direction upwards for all quantities, which one of the following is correct?  
 (a) Velocity (-), Acceleration (+)                      (b) Velocity (-), Acceleration (-)  
 (c) Velocity (+), Acceleration (+)                      (d) Velocity (+), Acceleration (-)
67. A body of weight 2 kg is suspended as shown in the figure. The tension  $T_1$  in the horizontal string (in kg wt) is :-



- (a)  $2/\sqrt{3}$                       (b)  $\sqrt{3}/2$                       (c)  $2\sqrt{3}$                       (d) 2
68. The kinetic energy of a body is decreased by 19% what is the percentage loss in momentum :-  
 (a) 10 %                      (b) 20 %                      (c) 30 %                      (d) None
69. The displacement-time graph of a body is shown in figure. The body is accelerated along the path :-



- (a) OA only                      (b) BC only                      (c) CD only                      (d) OA and CD both
70. An engine develops 10 KW of power. How much time will it take to lift a mass of 200 kg to a height of 40 m ?  
 (a) 4 sec.                      (b) 5 sec.                      (c) 8 sec.                      (d) 10 sec.
71. A 500 kg car takes a round turn of radius 50 m with a velocity of 36 km/hr. How much centripetal force is required?  
 (a) 100 N                      (b) 1000 N                      (c) 500 N                      (d) 200 N
72. If shown system is released from rest, find the work done by tension force on block B in first one second. ( $g = 10 \text{ m/s}^2$ )



- (a)  $\frac{200}{9} \text{ J}$                       (b) 16 J                      (c) 24 J                      (d) 36 J
73. A ball is dropped from the top of a very high building. Estimate the magnitude of the acceleration of the ball right after its collision with the ground in  $\text{m/s}^2$ . (Assume collision is perfectly elastic and  $g = 9.8 \text{ m/s}^2$ )  
 (a)  $9.8 \text{ m/s}^2$                       (b) zero                      (c)  $19.6 \text{ m/s}^2$                       (d) None

74. If the potential energy between electron and proton at a distance  $r$  is given by  $U = -\left(\frac{ke^2}{3r^3}\right)$  the law of force is

- (a)  $F = \frac{ke^2}{r^2}$                       (b)  $F = \frac{-3 ke^2}{4 r^5}$                       (c)  $F = -\frac{ke^2}{r^4}$                       (d)  $F = \frac{ke^2}{r}$

75. A river is flowing due east with a speed 3m/s. A swimmer can swim in still water at a speed of 4m/s. If swimmer swims due north, what will be his resultant velocity (magnitude)?

- (a) 1 m/s                      (b) 7 m/s                      (c) 4 m/s                      (d) 5 m/s

76. A car of mass 'm' is driven with acceleration 'a' along a straight level road against a constant external resistive force 'R'. When the velocity of the car is 'V', the rate at which the engine of the car is doing work will be-

- (a)  $RV$                       (b)  $maV$                       (c)  $(R + ma) V$                       (d)  $(ma - R)V$

77. The wheel of an automobile is rotating with 4 rotations per sec. Find its angular velocity?

- (a)  $8 \pi$  rad/sec                      (b) 25.12 rad/sec                      (c)  $\frac{32}{4} \pi$  rad / s                      (d) All of above

78. If the time of flight of a projectile is doubled, what happens to the maximum height attained?

- (a) halved                      (b) Remains unchanged  
(c) Doubled                      (d) Becomes four times

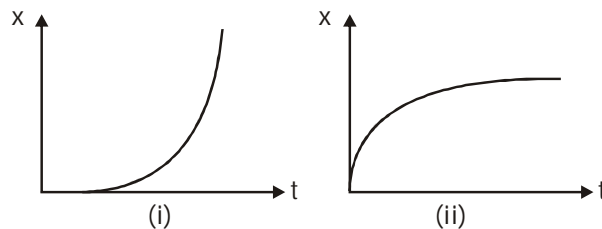
79. A boy of mass 30 kg while running at a constant velocity has a momentum of 180 Ns. The constant velocity of the boy is :

- (a)  $3 \text{ ms}^{-1}$                       (b)  $6 \text{ ms}^{-1}$                       (c)  $18 \text{ ms}^{-1}$                       (d)  $12 \text{ ms}^{-1}$

80. A bullet of mass 0.01 kg is fired from a rifle. The bullet takes 0.003 s to move through the barrel and leaves with a velocity of  $300 \text{ ms}^{-1}$ . The acceleration acting on the bullet is :

- (a)  $10,000 \text{ ms}^{-2}$                       (b)  $100,000 \text{ ms}^{-2}$                       (c)  $1000,000 \text{ ms}^{-2}$                       (d)  $1000 \text{ ms}^{-2}$

81. Figures (i) and (ii) below show the displacement-time graphs of two particles moving along the x-axis. We can say that



- (a) Both the particles are having a uniformly accelerated motion  
(b) Both the particles are having a uniformly retarded motion  
(c) Particle (i) is having a uniformly accelerated motion while particle (ii) is having a uniformly retarded motion  
(d) Particle (i) is having a uniformly retarded motion while particle (ii) is having a uniformly accelerated motion

82. A body of mass  $m$  collides against a wall with a velocity  $v$  and retraces its path with the same speed. The change in momentum is

- (a) zero                      (b)  $2 mv$                       (c)  $mv$                       (d)  $-mv$

83. S.I. unit of weight is  
 (a) kg (b) quintal (c) N (d) tonnes
84. How much below from the surface of the earth does  $g$  become half of its value at the earth's surface? (Assume earth to be a homogeneous sphere of radius  $R$  meter)  
 (a)  $R$  (b)  $\frac{R}{2}$  (c)  $2R$  (d)  $\frac{R}{4}$
85. When a spaceship is at a distance equal to twice the earth's radii from the centre of the earth, its gravitational acceleration is :  
 (a)  $19.6 \text{ m/sec}^2$  (b)  $9.8 \text{ m/sec}^2$  (c)  $4.9 \text{ m/sec}^2$  (d)  $2.45 \text{ m/sec}^2$

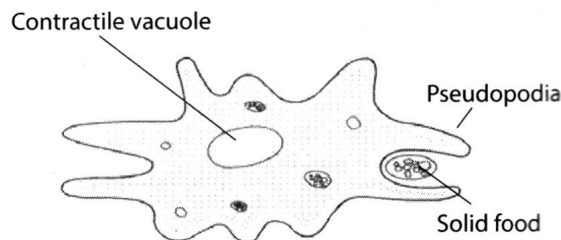
## CHEMISTRY

86. Which of the following particles is largely responsible for the chemical behaviour of elements?  
 (a) Proton (b) Electron (c) Neutron (d) Positron
87.  ${}^{16}_8\text{X}$  and  ${}^{17}_8\text{X}$  represent \_\_\_\_\_.  
 (a) isotones (b) isobars (c) isotopes (d) None of these
88. The isotope with zero neutron is \_\_\_\_\_.  
 (a) protium (b) deuterium (c) tritium (d) None of these
89. Two elements X and Y have 6 and 7 electrons in their N and M shells respectively. Find the ratio of atomic numbers of X and Y.  
 (a) 3 : 4 (b) 1 : 2 (c) 2 : 1 (d) 6 : 7
90. The number of valence electrons in  ${}_4\text{X}^8$  atom is :  
 (a) 1 (b) 2 (c) 3 (d) 4
91. Which of the following metals is used to galvanise iron sheets?  
 (a) Copper (b) Aluminium (c) Tin (d) Zinc
92. Iron possesses good casting properties when compared with copper because :  
 (a) iron contracts on solidification  
 (b) iron expands on solidification  
 (c) copper expands on solidification  
 (d) copper neither contracts nor expands on solidification
93. With the increase in pressure, the boiling point of the liquid \_\_\_\_\_.  
 (a) decreases (b) increases  
 (c) does not change (d) depends on the nature of liquid
94. \_\_\_\_\_ is used for making photographic films.  
 (a)  $\text{AgNO}_3$  (b)  $\text{KNO}_2$  (c)  $\text{AgO}$  (d)  $\text{AgCl}$
95. Silver tarnishes due to the formation of \_\_\_\_\_.  
 (a) oxide layer (b) sulphide layer (c) nitride layer (d) hydride layer
96. In Darjeeling, distilled water boils at a temperature :  
 (a) above 373 K (b) above 473 K (c) below 373 K (d) at 373 K

97. At melting point :
- kinetic energy remains constant and potential energy increases.
  - kinetic energy increases and potential energy remains constant.
  - both potential energy and kinetic energy increase.
  - potential energy increases with a decrease in kinetic energy.
98. Which is the best effective technique to separate sugar from sugar solution?
- Crystallization
  - Evaporation
  - Distillation
  - All of these
99. Which among the following is not a homogeneous mixture?
- Solder
  - Aqueous solution of NaCl
  - Tincture of iodine
  - Sulphur in water
100. Gunpowder is a \_\_\_\_\_
- solid – liquid homogeneous mixture
  - solid – liquid heterogeneous mixture
  - solid – solid homogeneous mixture
  - solid – solid heterogeneous mixture
101. The number of atoms present in 16 g of  $O_2$  is \_\_\_\_\_.
- $6.023 \times 10^{23}$
  - $3.011 \times 10^{23}$
  - $12.046 \times 10^{23}$
  - $3.011 \times 10^{22}$
102. The ratio of phosphorus atoms present in Calcium phosphide and Magnesium phosphate is :
- 1 : 2
  - 2 : 1
  - 1 : 3
  - 1 : 1
103. In which of the following cases, the empirical formula is same as the molecular formula?
- $C_{12}H_{22}O_{11}$
  - $C_6H_6$
  - $C_3H_5COOH$
  - $C_6H_{12}O_6$
104. The number of molecules present in 2.8 g of nitrogen gas is :
- $6.023 \times 10^{23}$
  - $6.023 \times 10^{22}$
  - $6.023 \times 10^{21}$
  - $6.023 \times 10^{20}$
105. A mixture of benzene and water can easily be separated by using a :
- fractionating column
  - filter paper
  - separating funnel
  - distillation apparatus.
106. In the purification of drinking water in water works, water is disinfected by \_\_\_\_\_ .
- the addition of alum
  - the addition of chlorine
  - filtration through gravel and fine sand
  - sedimentation in a tank
107. Which of the following is not a matter?
- Water
  - Heat
  - Steel
  - Kerosene
108. The interparticle forces are strongest in :
- oil
  - Iron
  - Oxygen
  - Water
109. The zig-zag movement of pollen grains in water is known as\_\_\_\_\_.
- Brownian motion
  - Diffusion
  - Osmosis
  - All of these
110. The rate of evaporation increases with\_\_\_\_\_.
- Increase in temperature
  - Increase in wind speed
  - Increase in surface area
  - All of these

## BIOLOGY

111. If you are provided with root-tips of onion in your class and are asked to count the chromosomes, which of the following stages can you most conveniently look into?  
(a) Metaphase            (b) Telophase            (c) Anaphase            (d) Prophase
112. Autonomic genome system is present in \_\_\_\_\_ .  
(a) Golgi body and Mitochondria            (b) Mitochondria and Chloroplast  
(c) Mitochondria and Ribosome            (d) Ribosomes and Chloroplast
113. The sedimentation constant of ribosome in prokaryotes is generally 70S. It breaks up into two subunits whose sedimentation constants are \_\_\_\_\_ .  
(a) 50S and 20S            (b) 40S and 30S            (c) 60S and 10S            (d) 50S and 30S
114. The fingers of a human embryo are at first webbed but later free from one another. Which organelle helps in this?  
(a) Endoplasmic reticulum            (b) Golgi Apparatus  
(c) Mitochondria            (d) Lysosome
115. In the diagram, which of the following process is shown in Amoeba?



- (a) Exocytosis            (b) Endocytosis            (c) Pinocytosis            (d) Apoptosis
116. There is a garden which requires water supply. Here is a pipe which is folded in nature. This pipe is inside the water which contain salts. This pipe is connected to the centralised tank from which the water is supplied.  
(i) What does the folded pipe refer to ?  
(ii) What does the water with ions refer to?  
(iii) What does the centralised tank refer to?  
(a) (i)—Nucleus; (ii)—Golgi bodies; (iii)—Endoplasmic Reticulum;  
(b) (i)—Endoplasmic Reticulum; (ii)—Cytoplasm; (iii)—Chloroplast  
(c) (i)—Endoplasmic Reticulum; (ii)—Cytoplasm; (iii)—Nucleus  
(d) (i)—Mitochondria; (ii)—Vacuole; (iii)—Endoplasmic Reticulum
117. Smooth muscle cells are \_\_\_\_\_ .  
(a) non-striated and under voluntary control  
(b) striated and not under voluntary control  
(c) non-striated and not under voluntary control  
(d) striated and under voluntary control

118. Nerve impulses are conducted towards the cell body by \_\_\_\_\_ .  
 (a) axon (b) ganglia (c) dendrites (d) neuron
119. Which of the following is a living tissue in plants that provides flexibility to the plant body?  
 (a) Collenchyma (b) Sclerenchyma  
 (c) Parenchyma (d) Xylem tissue
120. Lateral meristem is responsible for \_\_\_\_\_ .  
 (a) growth in parenchyma (b) growth in thickness  
 (c) growth in cortex (d) growth in length

## MATHEMATICS

121. Arrange in ascending order  $\sqrt[6]{7}, \sqrt[4]{3}, \sqrt[12]{48}$   
 (a)  $\sqrt[4]{3}, \sqrt[12]{48}, \sqrt[6]{7}$  (b)  $\sqrt[12]{48}, \sqrt[4]{3}, \sqrt[6]{7}$  (c)  $\sqrt[4]{7}, \sqrt[12]{48}, \sqrt[4]{3}$  (d) None of these
122. If  $pqr = 1$ , then  
 $\frac{1}{1+p+q^{-1}} + \frac{1}{1+q+r^{-1}} + \frac{1}{1+r+p^{-1}}$  is equal to  
 (a) 0 (b)  $\frac{1}{pq}$  (c)  $pq$  (d) 1
123. The arithmetical fraction that exceeds its square by the greatest quantity is :  
 (a)  $\frac{1}{4}$  (b)  $\frac{1}{2}$  (c)  $\frac{3}{4}$  (d)  $\frac{2}{5}$
124. The total number of divisors of 10500 except 1 and itself is :  
 (a) 48 (b) 50 (c) 46 (d) 56
125. If  $\left(x + \frac{1}{x}\right) = 4$ , then  $\left(x^4 + \frac{1}{x^4}\right)$  is equal to  
 (a) 196 (b) 194 (c) 192 (d) 190
126. If  $2^x - 2^{x-1} = 16$ , then the value of  $x^2$  is  
 (a) 4 (b) 9 (c) 16 (d) 25
127. If  $f$  and  $g$  are two polynomials of degrees 3 and 4 respectively, then what is the degree of  $f - g$ ?  
 (a) 1 (b) 3 (c) 4 (d) Cannot be determined
128. The remainders obtained when the polynomial  $x^3 + x^2 - 9x - 9$  divided by  $x$ ,  $x + 1$  and  $x + 2$  respectively are \_\_\_\_\_ .  
 (a)  $-9, 0, -15$  (b)  $-9, -16, 5$  (c)  $0, 0, 5$  (d)  $-9, 0, 5$
129. Find the quadrant in which the lines  $2x + 3y - 1 = 0$  and  $3x + y - 5 = 0$  intersect each other.  
 (a) 1st quadrant (b) 2nd quadrant (c) 3rd quadrant (d) 4th quadrant
130. The equation of the diagonal AC of a square ABCD is  $3x + 4y + 12 = 0$ . Find the equation of BD, where D is  $(2, -3)$ .  
 (a)  $4x - 3y - 8 = 0$  (b)  $4x - 3y - 17 = 0$  (c)  $4x - 3y + 17 = 0$  (d)  $4x + 3y - 17 = 0$



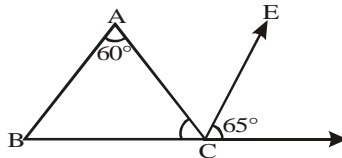
131. The points  $(a, a)$ ,  $(-a, -a)$  and  $(-\sqrt{3}a, \sqrt{3}a)$  form the vertices of an :

- (a) Scalene triangle (b) Right angled triangle  
 (c) Isosceles Right angled triangle (d) Equilateral triangle

132. If points  $(t, 2t)$ ,  $(-2, 6)$  and  $(3, 1)$  are collinear, then  $t =$

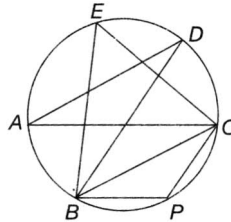
- (a)  $\frac{3}{4}$  (b)  $\frac{4}{3}$  (c)  $\frac{5}{3}$  (d)  $\frac{3}{5}$

133. In the adjoining figure, it is given that  $\angle A = 60^\circ$ ,  $CE \parallel BA$  and  $\angle ECD = 65^\circ$  then  $\angle ACB =$  \_\_\_\_\_.



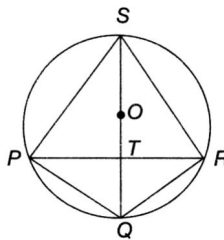
- (a)  $60^\circ$  (b)  $55^\circ$  (c)  $70^\circ$  (d)  $90^\circ$

134. In the given figure (not to scale),  $AC$  is the diameter of the circle and  $\angle ADB = 20^\circ$ , then find  $\angle BPC$ .



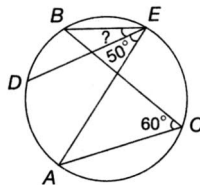
- (a)  $50^\circ$  (b)  $70^\circ$  (c)  $90^\circ$  (d)  $110^\circ$

135. In the given figure,  $P, Q, R$  and  $S$  are concyclic points, and  $O$  is the mid-point of the diameter  $QS$ . If  $\angle QPR = 25^\circ$ , then find  $\angle SOR$ .



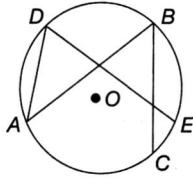
- (a)  $130^\circ$  (b)  $120^\circ$  (c)  $75^\circ$  (d)  $100^\circ$

136. In the given figure,  $A, D, B, E$  and  $C$  are concyclic. If  $\angle ACB = 60^\circ$  and  $\angle AED = 50^\circ$ , then find  $\angle DEB$ .



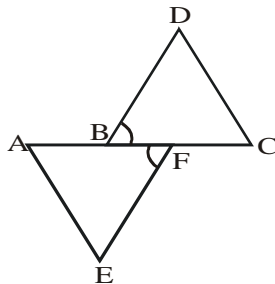
- (a)  $15^\circ$  (b)  $10^\circ$  (c)  $20^\circ$  (d)  $5^\circ$

137. In the given figure, the angles  $\angle ADE$  and  $\angle ABC$  differ by  $15^\circ$ . Find  $\angle CAE$ .



- (a)  $10^\circ$                       (b)  $7\frac{1}{2}^\circ$                       (c)  $15^\circ$                       (d)  $30^\circ$

138. In the given figure it is given that  $AB = CF$ ,  $EF = BD$  and  $\angle AFE = \angle DBC$ . Then  $\triangle AFE$  is congruent to  $\triangle CBD$  by which criterion ?

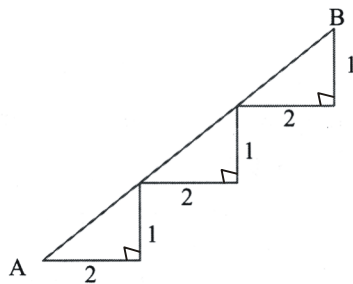


- (a) SAS                      (b) SSS                      (c) ASA                      (d) None of these

139. Sum of any two sides of a triangle is always \_\_\_\_\_ third side in a triangle :-

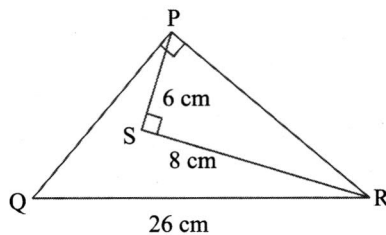
- (a) Less than                      (b) Equal to                      (c) Greater than                      (d) None of these

140. The straight line distance between A and B is



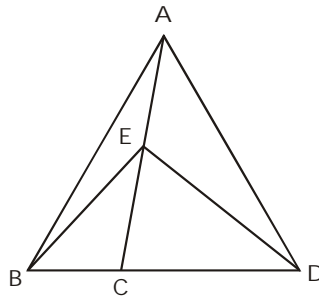
- (a)  $3\sqrt{5}$                       (b)  $5\sqrt{3}$  units                      (c) 5 units                      (d)  $5\sqrt{2}$  units

141. The area of  $\triangle PQR$  is

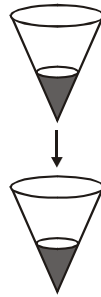


- (a)  $100 \text{ cm}^2$                       (b)  $50 \text{ cm}^2$                       (c)  $120 \text{ cm}^2$                       (d) None

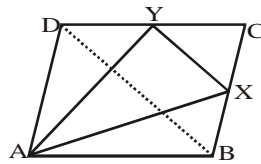
142. If  $BC : CD = 2 : 3$ ,  $AE : EC = 3 : 4$  and  $BC : AE = 2 : 3$ , then find the ratio of the area of  $\triangle ECD$  to the area of  $\triangle AEB$ .



- (a) 2 : 1                      (b) 2 : 3                      (c) 3 : 5                      (d) 4 : 3
143. Two identical right circular cones each of height 2 cm are placed as shown in diagram (each is vertical, apex downward). At the start, the upper cone is full of water and lower cone is empty. Then water drips down through a hole in the apex of upper cone into the lower cone. The height of water in the lower cone at the moment when height of water in upper cone is 1 cm is :



- (a) 1 cm                      (b)  $\sqrt{\frac{1}{2}}$  cm                      (c)  $\sqrt[3]{\frac{1}{4}}$  cm                      (d)  $\sqrt[3]{7}$  cm
144. The largest sphere is cut off from a cube of side 5 cm. The volume of the sphere will be :
- (a)  $27 \pi \text{ cm}^3$                       (b)  $30 \pi \text{ cm}^3$                       (c)  $108 \pi \text{ cm}^3$                       (d)  $\frac{125 \pi}{6} \text{ cm}^3$
145. BCD is a parallelogram X and Y are the mid points of BC and CD respectively. Then, ar(parallelogram ABCD) is



- (a)  $4 \times \text{ar}(\triangle AXY)$                       (b)  $2 \times \text{ar}(\triangle AXY)$                       (c)  $\frac{8}{3} \times \text{ar}(\triangle AXY)$                       (d) None of these
146. One cubic metre piece of copper is melted and recasted into a square cross-section bar that is 36 m long. An exact cube is cut off from this bar. If cubic metre of copper cost Rs. 108, then the cost of this cube is :
- (a) 50 paisa                      (b) 75 paisa                      (c) One rupee                      (d) 1.50 rupee

147. A river 3 m deep and 60 m wide is flowing at the rate of 2.4 km/h. The amount of water running into the sea per minute is:
- (a) 6000 m<sup>3</sup>                      (b) 6400 m<sup>3</sup>                      (c) 6800 m<sup>3</sup>                      (d) 7200 m<sup>3</sup>
148. In a shower of 10 cm of rain fall, the volume of water that falls on 1.5 hectares of ground is :
- (a) 1500 m<sup>3</sup>                      (b) 1400 m<sup>3</sup>                      (c) 1200 m<sup>3</sup>                      (d) 1000 m<sup>3</sup>
149. A cone and a hemisphere have equal base diameters and equal volumes. The ratio of their heights is :
- (a) 3 : 1                      (b) 2 : 1                      (c) 1 : 2                      (d) 1 : 3
150. A cylinder circumscribes a sphere. The ratio of their volumes is :
- (a) 1 : 2                      (b) 3 : 2                      (c) 4 : 3                      (d) 5 : 6