



Class – X

## School Integrated Program

### ENTRANCE TEST CUM SCHOLARSHIP TEST

[Time: 2 Hours]

[Max Marks: 400]

#### **A. General:**

1. *This booklet is a Question Paper containing 100 questions.*
2. *Blank Papers, Clipboards, Log Tables, slide rules, calculators, cellular phones, pagers 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 +4 marks for correct answer and -1 mark for incorrect answer.*

## MAT

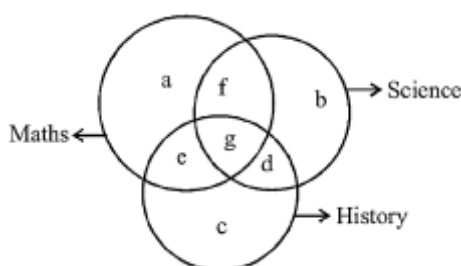
**Direction (Q. 1-3) :** Complete the series

1.  $\frac{1}{81}, \frac{1}{54}, \frac{1}{36}, \frac{1}{24}, ?$   
(a)  $\frac{1}{52}$  (b)  $\frac{1}{9}$  (c)  $\frac{1}{16}$  (d)  $\frac{1}{18}$
2. 3, 5, 5, 19, 7, 41, 9, ?  
(a) 71 (b) 61 (c) 72 (d) 69
3. Q1F, S2E, U6D, W21C?  
(a) Y 66 B (b) Y 88 B (c) Z 88 B (d) Y 44 B

**Direction (Q. 4-5) :** In each of the following questions, four terms/words have been given, out of which three are alike in some manner and one is different. Choose the odd one out.

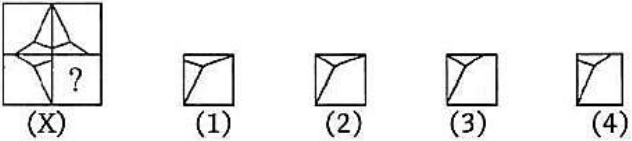
4. (a) Bottle : Wine (b) Cup : Tea (c) Pitcher : Water (d) Ball : Bat
5. (a) Atom : Electron (b) Train : Engine (c) House : Room (d) Curd : Milk
6. If in a certain code, HAT is 782, RABBIT is 681192. Then how will HABIT be coded as ?  
(a) 78139 (b) 78192 (c) 68192 (d) 78129
7. In a certain code, ELEPHANT is written as TNPEAHLE, the CROCODILE will be written as?  
(a) RCCOOIDEL (b) ELCOOIDRC  
(c) ELCIOODRC (d) ELCOIODRC
8. Ajay is the brother of Vijay. Mili is the sister of Ajay. Sanjay is the brother of Rahul and Mehul is the daughter of Vijay. Who is Sanjay's Uncle ?  
(a) Rahul (b) Ajay  
(c) Mehul (d) Data inadequate
9. If  $S - T$  means 'S' is the wife of 'T',  $S + T$  means 'S' is the daughter of 'T' and  $S \div T$  means 'S' is the son of 'T'. What will  $M + J \div K$  mean ?  
(a) 'K' is the father of 'M' (b) 'M' is the grand daughter of K  
(c) 'J' is wife of 'K' (d) 'K' and 'M' are brothers
10. A is the uncle of B, who is the daughter of C and C is the daughter-in-law of P. How is A related to P ?  
(a) Brother (b) Son  
(c) Son-in-law (d) Data inadequate
11. If  $\times$  stands for 'addition',  $<$  for 'subtraction',  $\div$  stands for 'division',  $>$  for 'multiplication',  $=$  stands for 'equal to',  $\div$  for 'greater than' and  $=$  stands for 'less than', then which of the following is true ?  
(a)  $3 \times 2 < 4 \div 16 > 2 + 4$  (b)  $5 > 2 + 2 = 10 < 4 \times 2$   
(c)  $3 \times 4 > 2 - 9 + 3 < 3$  (d)  $5 \times 3 < 7 \div 8 + 4 \times 1$
12. Divya journeys 10 km to east then 10 km to south-west. He turns again and journeys 10 km to North-West. Which direction is he in from the starting point?  
(a) South (b) North (c) West (d) East

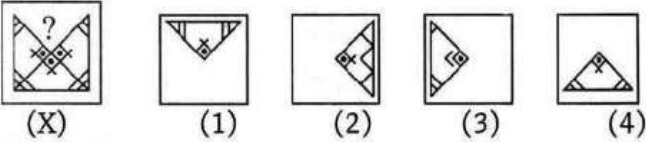
**Direction (Q. 13 to 15) :** Read the statements and choose the letter of the region which correctly represents the statement.



13. Students who took science but opted neither maths nor history:  
 (a) b (b) e (c) d (d) g
14. Students who took maths and history both but not science:  
 (a) c (b) a (c) e (d) g
15. Students who took all three subjects i.e. maths, history and science:  
 (a) f (b) g (c) e (d) d
16. The first republic day of India was celebrated on 26th January, 1950. It was on \_\_\_\_ of the week.  
 (a) Monday (b) Tuesday (c) Thursday (d) Friday
17. When the time by the watch is 20 minutes past 7, the angle between the hands of the watch is:  
 (a)  $100^\circ$  (b)  $90^\circ$  (c)  $80^\circ$  (d)  $95^\circ$

**Direction (Q. 18-19) :** In each of the following questions, select a figure from amongst the four alternatives, which when placed in the blank space of fig. (X) would complete the pattern.

18.   
 (a) 1 (b) 2 (c) 3 (d) 4

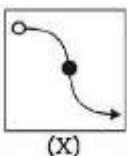
19.   
 (a) 1 (b) 2 (c) 3 (d) 4

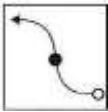
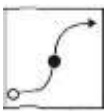
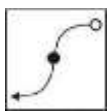
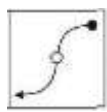
20. Find the correct option for the mirror image for the following question.

ANS 4 3 Q 1 2

- (1) AN24E Q 1 2 (2) 2 1 Q 4 E 2 NA  
 (3) 2 NA E 4 Q 1 2 (4) 1 2 Q 4 E AN 2

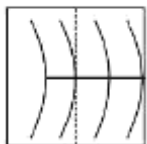
- (a) 1 (b) 2 (c) 3 (d) 4
21. Find the correct option for the mirror image for the following question.

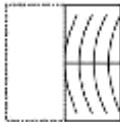
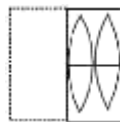
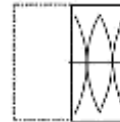


- (a)  (b)  (c)  (d) 

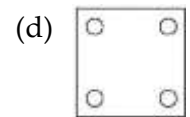
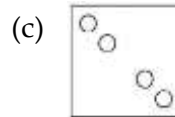
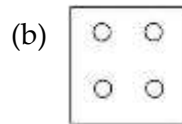
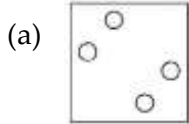
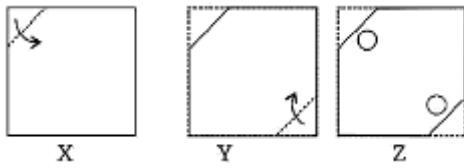
22. In the following question, find from amongst the four response figures, the one which resembles the pattern formed when the transparent sheet, carrying a design, is folded along the dotted line.

**Transparent Sheet**

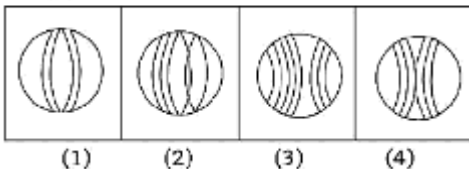
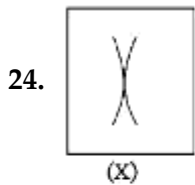


- (a)  (b)  (c)  (d) 

23. Consider the three figures, marked X, Y, and Z showing one fold in X, another in Y and the cut in Z. From amongst the four alternative figures a, b, c and d, select the one showing the unfolded position of Z.



**Direction (Q. 24-25) :** In each of the following questions, you are given a figure (X) followed by four alternative figures (a), (b), (c) and (d) such that fig. (X) is embedded in one of them. Trace out the alternative figure which contains fig. (X) as its part.

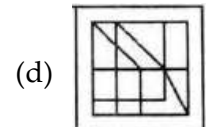
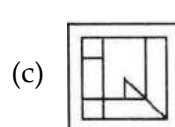
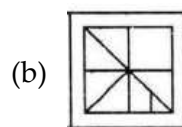
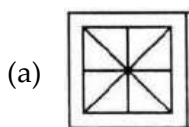
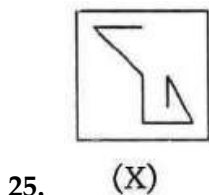


(a) 1

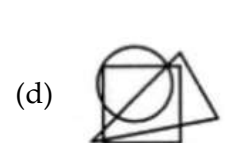
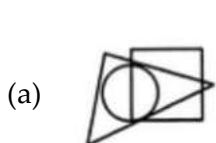
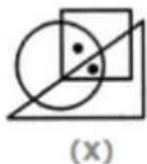
(b) 2

(c) 3

(d) 4



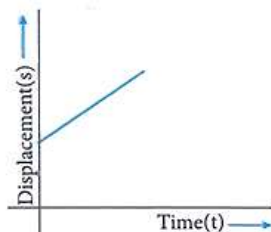
26. In the following question, there is a diagram marked (X), with one or more dots placed in it. The diagram is followed by four other figures, marked (a), (b), (c) and (d) only one of which is such as to make possible the placement of the dots satisfying the same conditions as in the figure (X). Find the correct answer figure.



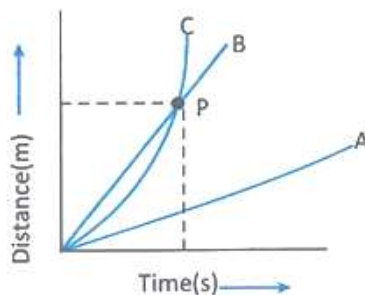
27. In the following question below are given 3 statements followed by three conclusions numbered I, II & III. You have to take the given statements to be true even if they seem to be at variance from the commonly known facts. Read all the conclusions and then decide which of the given conclusions logically follow from the given statements disregarding commonly known facts.



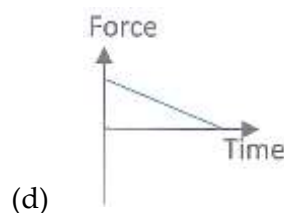
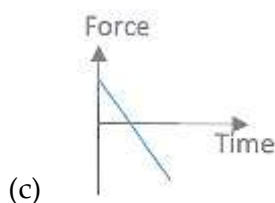
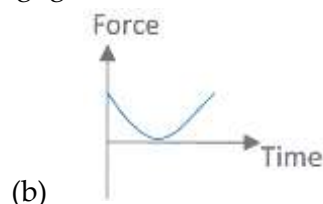
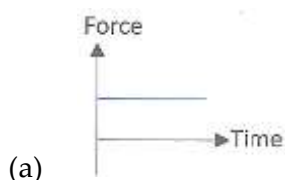
34. If the velocity of an object is proportional to time, then the object moves with
- (a) Constant velocity (b) Constant acceleration  
(c) Increasing retardation (d) Increasing acceleration
35. From the given displacement (s)-time (t) graph. It can be inferred that the object is



- (a) Constant velocity (b) At rest  
(c) Moving with increasing velocity (4) Moving with uniform acceleration
36. Suppose a girl is playing on a merry-go-round which is moving with a constant speed of  $15 \text{ ms}^{-1}$ . It implies that girl is
- (a) Moving with tangential acceleration (b) Moving due to centripetal acceleration  
(c) Moving with constant velocity (d) At rest
37. Three trucks A, B, and C are moving on a levelled road. Their distances versus time graphs are shown in figure choose the correct statement



- (a) Distances travelled by truck B and truck C are same at intersection point P  
(b) Truck C is overtaking the truck B at point P  
(c) Speed of truck B is greater than the speed of truck A  
(d) All of above
38. A man weighs  $80 \text{ kg}$ . He stands on a weighing scale in a lift which is moving downwards with a uniform acceleration of  $5 \text{ m/s}^2$ . What would be the reading on the scale? ( $g = 10 \text{ m/s}^2$ )
- (a) Zero (b)  $400 \text{ N}$  (c)  $800 \text{ N}$  (d)  $1200 \text{ N}$
39. A force is applied to a cart moving along a horizontal track in the positive  $x$  direction. If the cart speeds up and then slow down, then which of the following graphs best shows the variation of the force with time for the cart? Assume that friction is negligible.

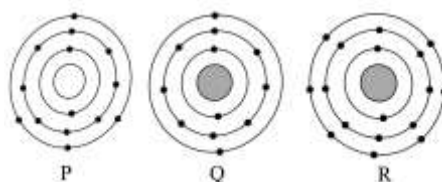


40. Which of the following statements are incorrect?
- I. When a batsman hits a cricket ball with his bat, the force applied by the batsman is muscular force.  
 II. In an electric bell, the hammer strikes the gong due to electrostatic force.  
 III. During dry weather, hair tends to attract the comb while combing and it is due to magnetic force of attraction.  
 IV. Walking on ice is difficult because of lack of frictional force.
- (a) I and II only (b) I and IV only  
 (c) II and III only (d) I, II and IV only
41. A particle of mass 2 kg is initially at rest. A force acts on it whose magnitude changes with time. The force-time graph is shown here. The velocity of the particle after 10 s is
- 
- (a)  $20 \text{ m s}^{-1}$  (b)  $10 \text{ m s}^{-1}$  (c)  $75 \text{ m s}^{-1}$  (d)  $50 \text{ m s}^{-1}$
42. Read the given statement and select the correct option.
- Statement I: It is difficult to drive a vehicle at high speed on a rainy day.  
 Statement II: Friction is independent of the area of contact between the surfaces.
- (a) Both statement I and II are true and statement II is the correct explanation of statement I  
 (b) Both statement I and II are true and statement II is not the correct explanation of statement I  
 (c) Statement I is true but statement II is false.  
 (d) Both statement I and II are false
43. A body starts slipping down on an incline with a small friction and moves half meter in half second. How long will it take to move the next half meter?
- (a) More than half second (b) Half second  
 (c) Less than half second (d) Data not sufficient
44. A rubber ball of mass 100 g falls from a height of 4.90 m and after hitting the ground it rebounds to a height of 2.45 m. The impulse imparted to the ball by the ground if they are in contact for 0.2 s is
- (a) 1.67 N s (b) 2.38 N s (c) 3.34 N s (d) 0.84 N s
45. Two balls, each of mass 0.25 kg, moving with 3 m/s and 1 m/s towards each other in a straight line, collide. The balls stick together after the collision. The magnitude of the final velocity of the combined mass is
- (a) 4 m/s (b) 2 m/s (c) 1 m/s (d)  $\left(\frac{1}{2}\right) \text{ m/s}$

### CHEMISTRY

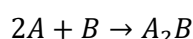
46. A brief information about two atoms *P* and *Q* is given below.
- P* : Atomic number = 8, Mass number = 16  
*Q* : Atomic number = 8, Mass number = 18
- Which of the following is correct about these two atoms?
- (a) Electronic configuration of *P* is 2,4,2 while that of *Q* is 2,6.  
 (b) Both *P* and *Q* contain same number of neutrons.  
 (c) *P* and *Q* both have 2 electron shell.  
 (d) Both *P* and *Q* have 4 valence electrons.

47. The distribution of electrons in the outermost shells of three elements  $P$ ,  $Q$  and  $R$  is shown in the given figure.



The formulae of compounds formed by  $P$  and  $Q$  with  $R$  are, respectively

- (a)  $PR_2$  and  $QR_3$  (b)  $PR$  and  $QR_3$   
 (c)  $PR_3$  and  $QR_2$  (d)  $P_2R$  and  $QR_3$
48. The number of electrons in an element  $X$  is 17 and the number of neutrons in  $X$  is 18. Which of the following is the correct representation of the element?
- (a)  $^{18}_{17}X$  (b)  $^{35}_{18}X$  (c)  $^{35}_{17}X$  (d)  $^{17}_{18}X$
49. The masses of an electron, a proton and a neutron, respectively, will be in the ratio
- (a) 1: 1838.15: 1840.54 (b) 1: 1856.15: 1858.68  
 (c) 1: 1834.15: 1836.68 (d) 1: 1846.15: 1848.68
50. Isotones of  $^{76}_{32}\text{Ge}$  is
- (a)  $^{72}_{32}\text{Ge}$  (b)  $^{77}_{33}\text{As}$  (c)  $^{77}_{34}\text{Se}$  (d)  $^{79}_{34}\text{Se}$
51. One atom of deuterium contains
- (a) One neutron and one positron (b) One neutron and one proton  
 (c) One neutron and two protons (d) Two neutrons and one proton
52. Which of the following contains the greatest number of atoms?
- (a) 0.3 mol of nitrogen gas (b) 0.5 mol of oxygen gas  
 (c) 0.4 mol of ozone gas (d) 0.2 mol of carbon dioxide gas
53. A solution which at a given temperature dissolves as much solute as it is capable of dissolving is said to be a
- (a) Saturated solution (b) Unsaturated solution  
 (c) Semi saturated solution (d) Super saturated solution.
54. Fog is an example of
- (a) Foam (b) Emulsion (c) Aerosol (d) Gel
55. Butter is a colloidal solution of
- (a) Liquid in liquid (b) Gas in liquid  
 (c) Solid in liquid (d) Solid in gas.
56. When a colloidal solution is kept in dark and is illuminated by a beam of light, then brightness appears at the right angle of direction of light. This effect is called
- (a) Tyndall effect (b) Brownian effect  
 (c) Hardy-Schulze effect. (d) None of these
57. Two substances,  $A$  and  $B$  were made to react to form a third substance,  $A_2B$  according to the following reaction



Which of the following statements concerning this reaction are incorrect?

- (i) The product  $A_2B$  shows the properties of substances  $A$  and  $B$ .  
 (ii) The product will always have a fixed composition.  
 (iii) The product so formed cannot be classified as a compound.  
 (iv) The product so formed is an element.
- (a) (i) (ii) (iii) (b) (iii) (iv) (c) (i) (iii) (iv) (d) (ii) (iii)

58.  $X$  and  $Y$  cannot be broken down into simpler substances by simple chemical reactions but they combine to give  $P$ . Which of the following statements about the concerning the species  $X, Y$  and  $P$  are correct?
- $P$  is a compound.
  - $X$  and  $Y$  are compounds.
  - $X$  and  $Y$  are elements.
  - $P$  had a fixed composition.
- (a) (i) (ii) (iii)                      (b) (iii) (iv)                      (c) (i) (iii) (iv)                      (d) (ii) (iii)
59. Which of the following statements are correct?
- Molecular mass of  $\text{CH}_3\text{OH}$  is 32 u .
  - In  $\text{NH}_3$ , the ratio of N and H by mass is 14: 3.
  - The formula mass of  $\text{CaCl}_2$  is 111 u .
  - Isotopes have same mass number.
- (a) (i) (ii) (iii)                      (b) (iii) (iv)                      (c) (i) (iii) (iv)                      (d) (ii) (iii)
60. Four different experiments were conducted in the following ways:
- 3 g of carbon was burnt in 8 g of oxygen to give 11 g of  $\text{CO}_2$ .
  - 1.2 g of carbon was burnt in air to give 4.2 g of  $\text{CO}_2$ .
  - 4.5 g of carbon was burnt in enough air to give 11 g of  $\text{CO}_2$ .
  - 4 g of carbon was burnt in oxygen to form 30.3 g of  $\text{CO}_2$ .
- Law of constant proportions is not illustrated in experiment(s)
- (a) i and iii only                      (b) iv only  
(c) ii, iii and iv only                      (d) i only

### BIOLOGY

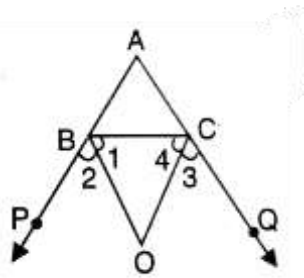
61. Which cell organelle is known as the 'suicide bag' of a cell due to its ability to digest the cell's own damaged components?
- (a) Mitochondrion                      (b) Golgi apparatus  
(c) Lysosome                      (d) Ribosome
62. Which of the following structural components provides rigidity and protection to a plant cell but is completely absent in animal cells?
- (a) Plasma membrane                      (b) Cell wall  
(c) Cytoplasm                      (d) Nucleus
63. The flexible and semi-permeable nature of the plasma membrane is primarily due to the arrangement of which two major biological molecules?
- (a) Cellulose and pectin                      (b) Lipids and proteins  
(c) Chitin and glycogen                      (d) Nucleic acids and carbohydrates
64. Which plant tissue is actively involved in increasing the girth (thickness) of the stem and roots as the plant matures?
- (a) Apical meristem                      (b) Lateral meristem  
(c) Intercalary meristem                      (d) Parenchyma
65. Which type of epithelial tissue forms an extremely thin and flat layer, lining regions like the alveoli and blood vessels where rapid transportation of substances occurs?
- (a) Simple squamous epithelium                      (b) Cuboidal epithelium  
(c) Columnar epithelium                      (d) Stratified squamous epithelium

66. Flexibility in herbaceous plants, which allows them to bend easily without breaking during heavy winds, is provided by which permanent tissue?
- (a) Sclerenchyma (b) Parenchyma  
(c) Collenchyma (d) Xylem
67. Which of the following options represents a specialized connective tissue characterized by a fluid extracellular matrix?
- (a) Bone (b) Blood  
(c) Cartilage (d) Tendon
68. During asexual reproduction, a mature Amoeba divides into two equal and independent daughter individuals. What is this specific mechanism called?
- (a) Binary fission (b) Budding  
(c) Fragmentation (d) Spore formation
69. In organisms like Hydra, reproduction occurs via a small cellular outgrowth that repeatedly divides to form a mini version of the parent before detaching. What is this method?
- (a) Regeneration (b) Budding  
(c) Vegetative propagation (d) Multiple fission
70. From an evolutionary perspective, what is the primary structural advantage of sexual reproduction over asexual reproduction?
- (a) It requires less energy and time from the parent organism.  
(b) It produces exact genetic clones of the parent.  
(c) It generates genetic variation within a population.  
(d) It eliminates the need for specialized reproductive organs.
71. Who proposed the highly accepted Five-Kingdom Classification system that divides living organisms based on cell structure, mode of nutrition, and body organization?
- (a) Carolus Linnaeus (b) Robert Whittaker  
(c) Carl Woese (d) Ernst Haeckel
72. Organisms classified under Kingdom Monera, such as bacteria and cyanobacteria, are universally characterized by which cellular organization?
- (a) Unicellular and prokaryotic (b) Unicellular and eukaryotic  
(c) Multicellular and eukaryotic (d) Multicellular and prokaryotic
73. Which specific group of plants is widely referred to as the 'amphibians of the plant kingdom' because they require water to complete their sexual lifecycle?
- (a) Thallophytes (b) Bryophytes  
(c) Pteridophytes (d) Gymnosperms
74. The production of 'naked seeds' without any protective fruit or ovarian covering is a definitive characteristic of which group of plants?
- (a) Gymnosperms (b) Angiosperms  
(c) Pteridophytes (d) Bryophytes
75. Which animal phylum is uniquely identified by the presence of a triploblastic body, radial symmetry in adults, and a distinct water vascular system used for locomotion and feeding?
- (a) Porifera (b) Arthropoda  
(c) Echinodermata (d) Coelenterata

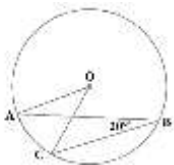
## MATHEMATICS

76. Convert the decimal  $0.\overline{148576}$  into  $\frac{p}{q}$  form.
- (a)  $\frac{1}{999999}$  (b)  $\frac{14857}{999}$  (c)  $\frac{148576}{9999}$  (d)  $\frac{148576}{999999}$
77.  $\sqrt{3 + \sqrt{5}} =$
- (a)  $\sqrt{\frac{5}{2} + \frac{1}{2}}$  (b)  $\frac{\sqrt{5}}{2} + 1$  (c)  $\sqrt{\frac{5}{2}} + \sqrt{\frac{1}{2}}$  (d)  $\sqrt{5} + \frac{1}{\sqrt{2}}$
78. If  $9^{x+2} = 240 + 9^x$ , find  $x$ .
- (a) 0.5 (b) 0.2 (c) 0.4 (d) 0.1
79. Find the value of  $\frac{(0.6)^0 - (0.1)^{-1}}{\left(\frac{3}{8}\right)^{-1} \left(\frac{3}{2}\right)^3 + \left(\frac{-1}{3}\right)^{-1}}$ .
- (a)  $-\frac{2}{3}$  (b)  $\frac{3}{2}$  (c)  $-\frac{3}{2}$  (d)  $\frac{2}{3}$
80. The polynomials  $ax^3 + 3x^2 - 3$  and  $2x^3 - 5x + a$ , when divided by  $(x - 4)$  leaves remainders  $R_1$  and  $R_2$  respectively, then value of  $a$ , if  $2R_1 - R_2 = 0$ , is
- (a)  $-\frac{18}{127}$  (b)  $\frac{18}{127}$  (c)  $\frac{17}{127}$  (d)  $-\frac{17}{31}$
81. Factorisation of  $a^{2x} - b^{2x}$  is
- (a)  $(a^x + b^x)(a^x - b^x)$  (b)  $(x + a)(x + a + c)$   
(c)  $(x + b)(x + a + c)$  (d)  $(x + b)(x + b + c)$
82. Factorise  $\frac{a^2}{b^2} + 2 + \frac{b^2}{a^2}$
- (a)  $\left(\frac{a}{b} + \frac{b}{a}\right)^2$  (b)  $\left(1 + \frac{a}{b}\right)^2$  (c)  $\left(1 - \frac{b}{a}\right)^2$  (d)  $\left(\frac{b}{a} - \frac{a}{b}\right)^2$
83. The degree of the polynomial  $7x^3y^{10}z^2$  is
- (a) 15 (b) 60 (c) 16 (d) None of these
84. The points  $(-5, 2)$  and  $(2, -5)$  lie in which of the following?
- (a) The same quadrants. (b) II and III quadrants respectively.  
(c) II and IV quadrants respectively. (d) IV and I quadrants respectively.
85. What is the distance of a point  $(0, -3)$  from the origin?
- (a) 0 units (b) -3 units  
(c) Cannot be determined (d) 3 units
86. Signs of the abscissa and ordinate of a point in the second quadrant are respectively
- (a)  $(+, +)$  (b)  $(-, -)$  (c)  $(-, +)$  (d)  $(+, -)$
87. Which of the following is a linear equation?
- (a)  $x^2 + 4x + 1$  (b)  $x + \frac{1}{x} = 1$  (c)  $3x + y = 4$  (d)  $x^2 + y^2 = 1$
88. Five times a number is equal to twice the number increased by 18, then the number is
- (a) 20 (b) 12 (c) 6 (d) 50
89. Which of the following is correct with respect to the line  $+1 = 0$ ?
- (a) It is parallel to  $y$ -axis. (b) It passes through  $(0, -1)$ .  
(c) It is parallel to  $x$ -axis. (d) It passes through  $(0, 0)$ .
90. The 4<sup>th</sup> term of a Geometric Progression (G.P.) is 54 and its 7<sup>th</sup> term is 1458. Find the common ratio of the G.P.
- (a) 2 (b) 3 (c) 4 (d) 9

91. In the given figure,  $BO$  and  $CO$  are angle bisectors of external angles of  $\triangle ABC$ . Find  $\angle BOC$ .



- (a)  $90^\circ - \frac{1}{2}\angle A$       (b)  $90^\circ + \frac{1}{2}\angle A$       (c)  $180^\circ - \frac{1}{2}\angle A$       (d)  $180^\circ + \frac{1}{2}\angle A$
92. If the  $n^{\text{th}}$  term of an arithmetic sequence is given by  $a_n = 5n - 2$ , what is the 15<sup>th</sup> term of this sequence?
- (a) 73      (b) 75      (c) 78      (d) 80
93. In Fig if  $\angle ABC = 20^\circ$ , then  $\angle AOC$  is equal to:



- (a)  $20^\circ$       (b)  $40^\circ$       (c)  $60^\circ$       (d)  $10^\circ$
94. ABCD is such a quadrilateral that A is the centre of the circle passing through B, C and D. Then,  $\angle CBD + \angle CDB =$
- (a)  $\angle BAD$       (b)  $\frac{2}{3}\angle BAD$       (c)  $\frac{1}{2}\angle BAD$       (d) None of these
95. Two fair dice are thrown simultaneously. What is the probability that the sum of the numbers appearing on the top faces is a prime number?
- (a)  $\frac{5}{12}$       (b)  $\frac{1}{2}$       (c)  $\frac{1}{3}$       (d)  $\frac{7}{12}$
96. What is the probability that a randomly selected non-leap year has exactly 53 Sundays?
- (a)  $\frac{1}{7}$       (b)  $\frac{2}{7}$       (c)  $\frac{3}{7}$       (d) 0
97. A parallelogram ABCD has an area of  $120 \text{ cm}^2$ . The perpendicular distance between its longer parallel sides (  $AB$  and  $CD$  ) is 8 cm , and the perpendicular distance between its shorter parallel sides (  $AD$  and  $BC$  ) is 12 cm . What is the total perimeter of this parallelogram?
- (a) 50 cm      (b) 25 cm      (c) 100 cm      (d) 120 cm
98. A circle has a radius of 15 cm. A chord is drawn. The distance from the centre of the circle to the chord is 9 cm. What is the length of the chord?
- (a) 24cm      (b) 12cm      (c) 36cm      (d) 48cm
99. A circular flower bed is surrounded by a path of uniform width. The ratio of the circumference of the outer edge of the path to the circumference of the inner edge of the path is 4: 3. If the total area of the path itself is  $112\pi \text{ m}^2$ , what is the exact radius of the inner flower bed?
- (a) 16 m      (b) 12 m      (c) 4 m      (d) 28 m
100. Let  $T_n$  denote the  $n^{\text{th}}$  triangular number, where  $T_n = \frac{n(n+1)}{2}$  and  $T_0 = 0$ . Evaluate the value of the following telescoping sum:

$$\frac{1}{20^3} \sum_{k=1}^{20} (T_k^2 - T_{k-1}^2)$$

- (a)  $\frac{441}{80}$       (b)  $\frac{400}{21}$       (c) 1      (d)  $\frac{441}{40}$