



Class – IX

School Integrated Program

ENTRANCE TEST CUM SCHOLARSHIP TEST

[Time: 3 Hours]

[Max Marks: 300]

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 +3 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 $M + J \div K$ means ?

(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', $+$ stands for 'division', $>$ for 'multiplication', $=$ stands for 'equal to', $\div$ for 'greater than' and $\neq$ 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?

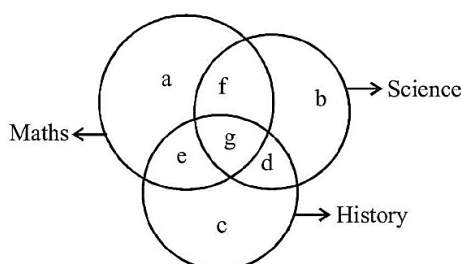
(a) South

(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

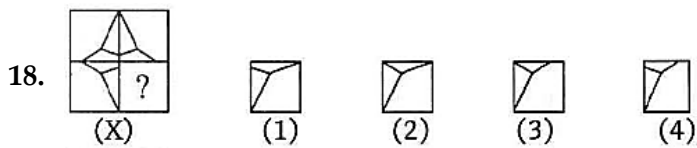
16. The first republic day of India was celebrated on 26th January, 1950. It was on ____ of the week.

- (a) Monday (b) Tuesday (c) Thursday (d) Friday

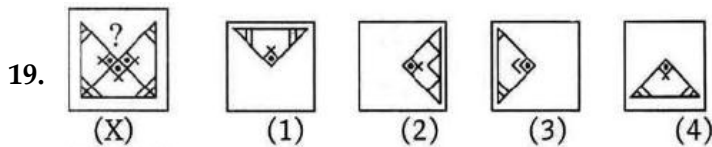
17. When the time by the watch is 20 minutes past 7, the angle between the hands of the watch is:

- (a) 100° (b) 90° (c) 80° (d) 95°

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.



- (a) 1 (b) 2 (c) 3 (d) 4



- (a) 1 (b) 2 (c) 3 (d) 4

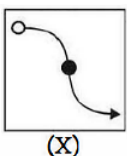
20. Find the correct option for the mirror image for the following question.

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

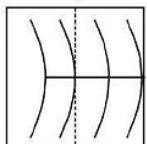
21. Find the correct option for the mirror image for the following question.



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

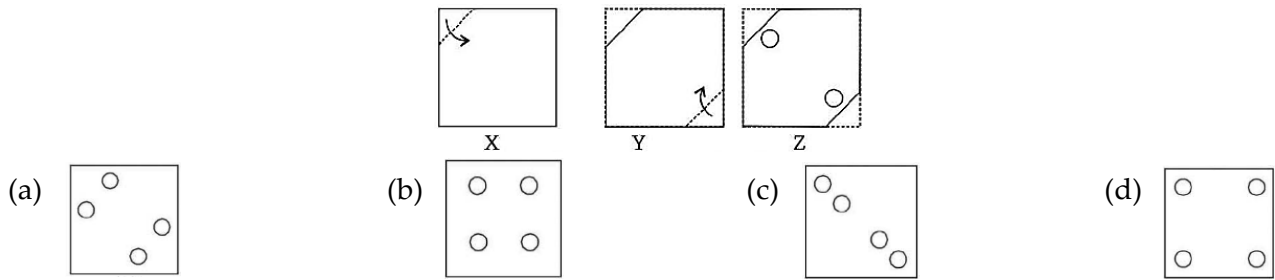
22. In the following question, find from amongst the four response figures, the one which resembles the pattern formed when the transparent sheet, carrying a design, is folded along the dotted line.

Transparent Sheet

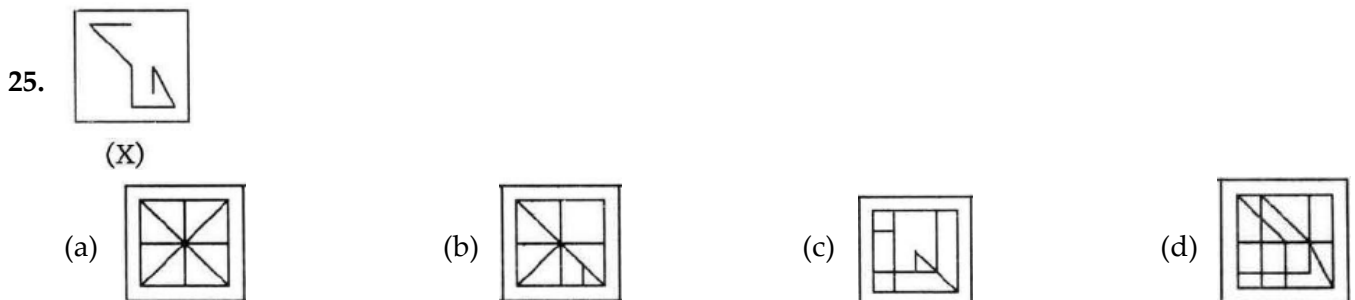
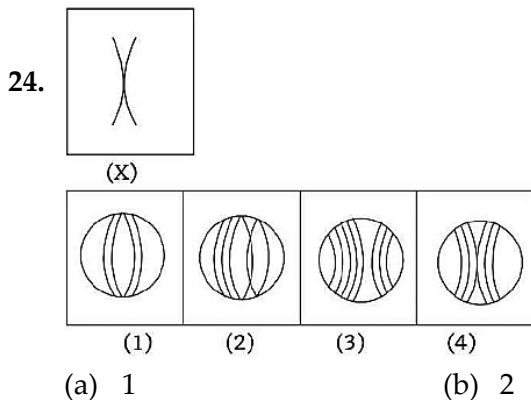


- (a) (b) (c) (d)

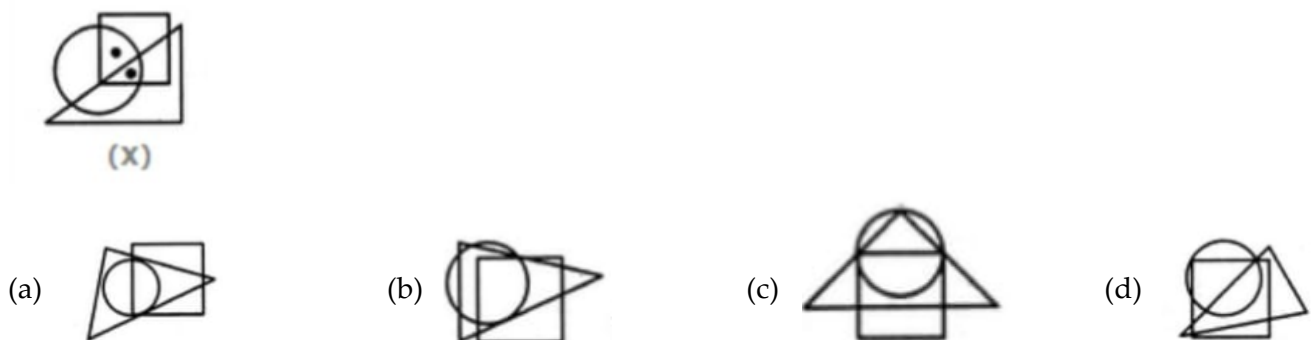
23. Consider the three figures, marked X, Y, and Z showing one fold in X, another in Y and the cut in Z. From amongst the four alternative figures a, b, c and d, select the one showing the unfolded position of Z.



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.



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.

Statements : All fruits are vegetables. All pens are vegetables.

All vegetables are rains.

Conclusions:

- I. All fruits are rains.
- II. All pens are rains.
- III. Some rains are vegetables.

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

Directions (Q.-28-30): Study the information given below carefully and answer the following questions:

When a machine is given an input which includes a line of words and numbers, the output received is arranged in a particular manner. Given below is an illustration of input along with the steps followed to get its output

Input: 34 lights ink 56 78 online defeat 99 orange range 87 22

Step I: 22 34 lights ink 56 78 online 99 orange range 87 defeat

Step II: 34 22 lights 56 78 online 99 orange range 87 defeat ink

Step III: 56 34 22 78 online 99 orange range 87 defeat ink lights

Step IV: 78 56 34 22 99 orange range 87 defeat ink lights online

Step V: 87 78 56 34 22 99 range defeat ink lights online orange

Step VI: 99 87 78 56 34 22 defeat ink lights online orange range

And step VI is the final step of the above input. Now, based on the same pattern, find the output for the input given below.

Input: 67 54 thankful message listing 23 45 known booklist 90 quit 88

28. How many steps will be required to get the final output?

- (a) Three (b) Eight (c) Seven (d) Six

29. Which of these will be the 3rd step?

- (a) 54 45 23 67 thankful message 90 quit 88 booklist known listing
- (b) 45 23 54 67 thankful message 90 quit known listling booklist 88
- (c) 23 67 54 thankful message listing 45 known 90 quit 88 booklist
- (d) 23 67 54 thankful message listing 45 known 90 quit booklist 88

30. What will be the 4th element from left in the 2nd step of the output?

- (a) Thankful (b) 45 (c) 54 (d) Quit

PHYSICS

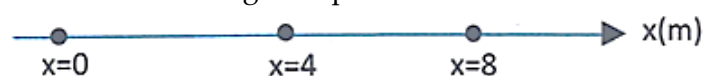
31. A particle is moving on a circular track of radius R. Find the displacement of the particle when its position subtends an angle of 60° at the center of the circle.

- (a) Zero (b) R (c) 2R (d) $2\pi R$

32. A body is thrown vertically upward with velocity u at time $t = 0$. The height reached by the body in $\left(\frac{1}{3}\right)^{\text{rd}}$ of its time of flight.

- (a) $\frac{2u^2}{g}$ (b) $\frac{u^2}{3g}$ (c) $\frac{2u^2}{3g}$ (d) $\frac{4u^2}{9g}$

33. The numerical ratio of final position to the distance covered for an object which starts its motion at $x = 0$ and reaches the position at $x = 4$ through the position $x = 8$ is

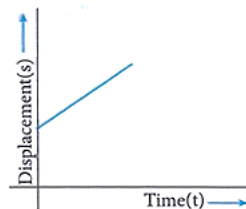


- (a) 2:3 (b) 1:3 (c) 3:4 (d) 2:1

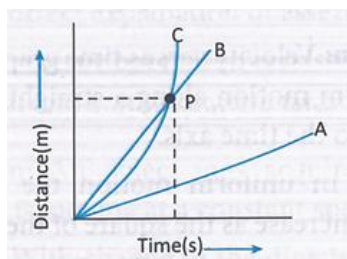
34. If the velocity of an object is proportional to time, then the object moves with

- (a) Constant velocity (b) Constant acceleration
- (c) Increasing retardation (d) Increasing acceleration

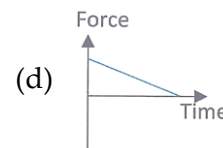
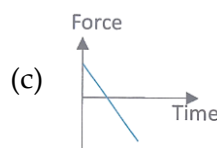
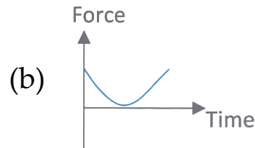
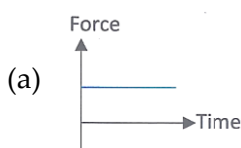
35. From the given displacement (s)-time (t) graph. It can be inferred that the object is



- (a) Constant velocity (b) At rest
(c) Moving with increasing velocity (d) Moving with uniform acceleration
36. Suppose a girl is playing on a merry - go - round which is moving with a constant speed of 15 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

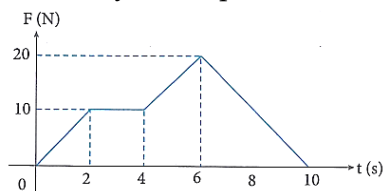


- (a) Distances travelled by truck B and truck C are same at intersection point P
(b) Truck C is overtaking the truck B at point P
(c) Speed of truck B is greater than the speed of truck A
(d) All of above
38. A man weighs 80 kg . He stands on a weighing scale in a lift which is moving downwards with a uniform acceleration of 5 m/s^2 . What would be the reading on the scale ? ($g = 10 \text{ m/s}^2$)
- (a) Zero (b) 400 N (c) 800 N (d) 1200 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 statement 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 tend 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 m/s (b) 10 m/s (c) 75 m/s (d) 50 m/s
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 ($g = 10 \text{ m/s}^2$)
- (a) 1.67 N s (b) 2.38 N s (c) 3.34 N s (d) 0.84 N s
45. A car starts from rest and moves with constant acceleration. The ratio of distances covered by the car in n^{th} second to that covered in n second is
- (a) $\frac{2n-1}{2n^2}$ (b) $\frac{n^2}{2n-1}$ (c) $\frac{2n-1}{n^2}$ (d) 1:n

CHEMISTRY

46. An unknown element X has two isotopes, $^{(A)}X$ and $^{(A+2)}X$. If the average atomic mass of X is $A + 0.5$, what is the natural abundance of the heavier isotope?
- (a) 25% (b) 50% (c) 75% (d) 10%
47. In a hypothetical atom, the rules for filling electron shells are modified such that the maximum capacity of shell 'n' is n^2 (not $2n^2$). Based on this new rule, what would be the atomic number of the first 'noble gas' (completely filled outer shell) after Hydrogen (if Hydrogen has 1 electron)?
- (a) 2 (b) 5 (c) 14 (d) 4
48. A 0.9% (m/v) saline solution used in medical IV drips implies that:
- (a) 0.9 g of NaCl is present in 100 g of water.
 (b) 0.9 g of NaCl is present in 100 mL of solution.
 (c) 9 g of NaCl is present in 1 L of water.
 (d) 0.9 mL of NaCl is present in 100 mL of solution.
49. Assertion (A): Blood is classified as a colloid rather than a true suspension.
 Reason (R): The cellular components of blood settle down rapidly due to gravity when left undisturbed.
- (a) Both A and R are true, and R is the correct explanation of A.
 (b) Both A and R are true, but R is not the correct explanation of A.

- (c) A is true, but R is false.
 (d) A is false, but R is true.
50. Which separation technique was traditionally used in Kannauj to extract fragrances from flowers to make 'Mitti ka Ittar'?
- (a) Centrifugation (b) Fractional distillation
 (c) Deg - Bhapka method (d) Paper chromatography
51. In paper chromatography, what happens to the most soluble component in the mixture?
- (a) It stays at the bottom near the starting line.
 (b) It travels the farthest up the paper.
 (c) It evaporates completely.
 (d) It chemically reacts with the paper.
52. In a municipal wastewater treatment facility, the water remains cloudy even after passing through fine filters because the suspended particles are too small and carry similar electrical charges, preventing them from settling. Which combined approach is most effective here?
- (a) Adding a coagulant (like alum) to neutralize charges and clump particles, followed by sedimentation.
 (b) Rapid heating to boil off the water, leaving the colloidal particles behind.
 (c) Passing the water through a separating funnel to decant the cloudy layer.
 (d) Subjecting the water to extreme centrifugal force without adding any chemicals
53. Molarity of 10.6%(w/v)Na₂CO₃ solution
- (a) 2 M (b) 0.5 M (c) 1.5 M (d) 1 M
54. A 40%v/v alcohol solution is used as an antiseptic. How much water (in mL) is present in 200 mL of this solution?
- (a) 40 mL (b) 80 mL (c) 120 mL (d) 160 mL
55. 8 μ g of lead is dissolved in 1 kg of water. The concentration in ppb is:
- (a) 0.008 ppb (b) 0.8 ppb (c) 8 ppb (d) 8000 ppb
56. According to Bohr's rules for electron distribution, what is the maximum number of electrons that can be accommodated in the M-shell (n=3)?
- (a) 8 (b) 18 (c) 32 (d) 50
57. The valency of an element with the electronic configuration 2, 8, 7 is:
- (a) 1 (b) 7 (c) 8 (d) 2
58. The 'Bhabha Atomic Research Centre (BARC)' is known for advanced experiments using reactors like 'Dhruva'. What type of scattering experiments do they primarily lead?
- (a) Alpha scattering (b) Electron scattering
 (c) Neutron scattering (d) Photon scattering
59. If an atom has 3 protons and 4 neutrons, its valency will be:
- (a) 3 (b) 7 (c) 1 (d) 4
60. What is the relative charge of a neutron?
- (a) +1 (b) -1 (c) 0 (d) +2

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

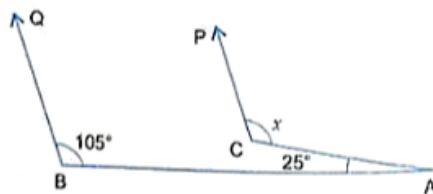
62. Which of the following structural components provides rigidity and protection to a plant cell but is completely absent in animal cells?
- (a) Plasma membrane (b) Cell wall
(c) Cytoplasm (d) Nucleus
63. The flexible and semi-permeable nature of the plasma membrane is primarily due to the arrangement 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. What is the perpendicular distance of the point $P(3,4)$ from the x-axis?
- (a) 3 (b) 4 (c) 5 (d) 7
77. What is the distance of the point $(5,0)$ from the origin?
- (a) 0 (b) 5 (c) 25 (d) -5
78. Three vertices of a rectangle are $(0,0)$, $(5,0)$, and $(0,4)$. What is the fourth vertex?
- (a) $(4,5)$ (b) $(5,4)$ (c) $(5,5)$ (d) $(-5, -4)$
79. Find the area of the triangle bounded by the lines $x = 0$, $y = 0$, and $2x + 3y = 6$.
- (a) 6 sq units (b) 3 sq units (c) 2 sq units (d) 1.5 sq units
80. What is the degree of a linear polynomial?
- (a) 0 (b) 1 (c) 2 (d) 3
81. The general form of a linear relationship between two variables is:
- (a) $y = ax^2 + b$ (b) $y = \frac{a}{x} + b$ (c) $y = ax + b$ (d) $y = ab^x$
82. A train travels 60 km/h. How long will it take to travel a distance of 150 km?
- (a) 2.5 hours (b) 2 hours (c) 3 hours (d) 1.5 hours
83. A linear function $f(x) = ax + b$ satisfies $f(1) = 3$ and $f(2) = 5$. What is the value of $f(5)$?
- (a) 8 (b) 9 (c) 11 (d) 13
84. The decimal expansion of an irrational number is:
- (a) Terminating (b) Non-terminating repeating
(c) Non-terminating non-repeating (d) Purely repeating
85. If $x = 2 + \sqrt{3}$, find the value of $x^2 + 1/x^2$.
- (a) 12 (b) 14 (c) 16 (d) 8
86. Evaluate: $(256)^{0.16} \times (256)^{0.09}$
- (a) 4 (b) 16 (c) 64 (d) 256
87. If $x = \frac{\sqrt{5}+1}{\sqrt{5}-1}$ and $y = \frac{\sqrt{5}-1}{\sqrt{5}+1}$, find the value of $x^2 + xy + y^2$.
- (a) 7 (b) 8 (c) 9 (d) 15
88. How many terms are in the expansion of $(a + b + c)^2$?
- (a) 3 (b) 4 (c) 5 (d) 6
89. In the expansion of $(x + y)^3$, what is the coefficient of x^2y ?
- (a) 1 (b) 2 (c) 3 (d) 4
90. Factorize: $x^4 + x^2y^2 + y^4$
- (a) $(x^2 + xy + y^2)(x^2 - xy + y^2)$ (b) $(x^2 + y^2)^2$
(c) $(x^2 - y^2)^2$ (d) $(x^2 + xy - y^2)(x^2 - xy - y^2)$

91. If $a + b + c = 6$ and $ab + bc + ca = 11$, find the value of $a^3 + b^3 + c^3 - 3abc$.
 (a) 18 (b) 36 (c) 24 (d) 27
92. The perpendicular drawn from the centre of a circle to a chord:
 (a) Bisects the chord (b) Is parallel to the chord
 (c) Doubles the chord (d) Is equal to the chord
93. The sum of the opposite angles of a cyclic quadrilateral is:
 (a) 90° (b) 180° (c) 270° (d) 360°
94. Two concentric circles are of radii 5 cm and 3 cm. The length of the chord of the larger circle which touches the smaller circle is:
 (a) 4 cm (b) 8 cm (c) 6 cm (d) 10 cm
95. In a cyclic quadrilateral $ABCD$, if the exterior angle at C is 75° , what is the measure of the interior opposite angle $\angle A$?
 (a) 105° (b) 75° (c) 150° (d) 180°
96. Brahmagupta's formula is used to find the area of which geometric figure?
 (a) Triangle (b) Parallelogram
 (c) Cyclic quadrilateral (d) Regular hexagon
97. What is the area of an isosceles triangle with a perimeter of 32 cm and a base of 12 cm?
 (a) 48 sq cm (b) 60 sq cm (c) 64 sq cm (d) 40 sq cm
98. If the radius of a circle is increased by 50%, by what percentage does its area increase?
 (a) 50% (b) 100% (c) 125% (d) 150%
99. A wire bent into the form of a circle of radius 28 cm is straightened and re-bent into a square. What is the difference between the area of the circle and the area of the square? (Use $\pi = \frac{22}{7}$)
 (a) 528 sq cm (b) 484 sq cm (c) 616 sq cm (d) 0 sq cm
100. In Fig., if $CP \parallel BQ$, then the measure of x is



- (a) 130° (b) 105° (c) 175° (d) 125°