Class – IX

School Accelerated Program

ENTRANCE TEST CUM SCHOLARSHIP TEST (Sample Paper-2)

[Time: 1 Hour 50 Min] **[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 (Qs. 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 (Qs. 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 ' is $S + T$ means ' S ' is the daughter of ' T ' and $S \div T$ means ' S ' is the son of ' T ' What will M + J ÷ 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 × stands for' addition', < for 'substraction', + stands for 'division', > for 'multiplication', - stands for 'equal to', ÷ for 'greater than' and = stands for 'less than', then which of the following is true ?

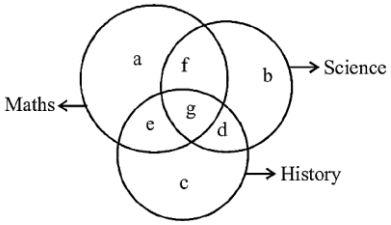
(a) $3 \times 2 < 4 \div 16 > 2 + 4$ (b) $5 > 2 + 2 = 10 < 4 \times 2$

(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

DIRECTIONS (Qs. 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:

(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 -

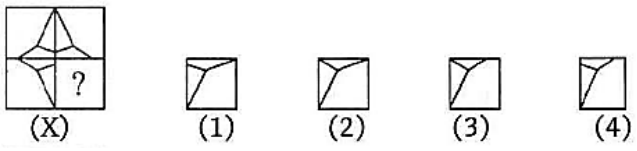
(a) Monday (b) Tuesday (c) Thursday (d) Friday

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°

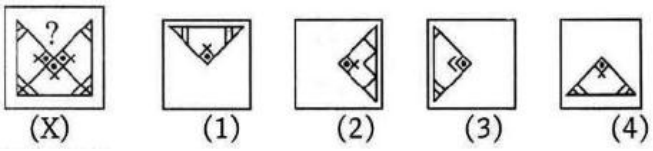
DIRECTIONS (Qs. 18-19) : In each of the following questions, select a figure from amongst the four alternatives, which when placed in the blank space of fig. (X) would complete the pattern.

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.

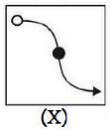
ANS43Q12

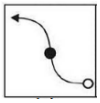
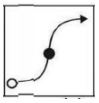
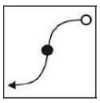
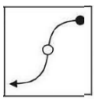
(1) AИS4ƎQ IS (2) S I QƎ4SИA

(3) SИAƎ4Q S I (4) I S Q4Ǝ AИS

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

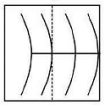
21. Find the correct option for the mirror image for the following question.

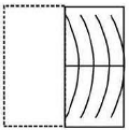
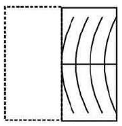
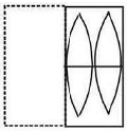
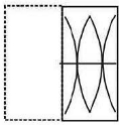


(a)  (b)  (c)  (d) 

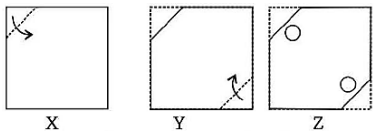
22. In the following question, find from amongst the four response figures, the one which resembles the pattern formed when the transparent sheet, carrying a design, is folded along the dotted line.

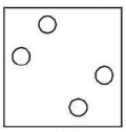
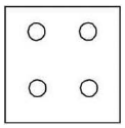
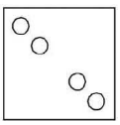
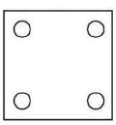
Transparent Sheet



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

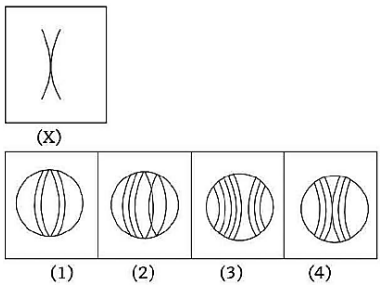
23. Consider the three figures, marked *X*, *Y*, and *Z* showing one fold in *X*, another in *Y* and the cut in *Z*. From amongst the four alternative figures a, b, c and d, select the one showing the unfolded position of **Z**.



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

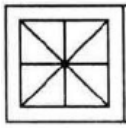
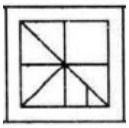
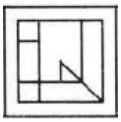
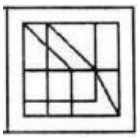
DIRECTION (Qs. 24-25) : In each of the following questions, you are given a figure (X) followed by four alternative figures (a), (b), (c) and (d) such that fig. (X) is embedded in one of them. Trace out the alternative figure which contains fig. (X) as its part.

24.

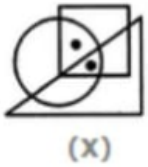


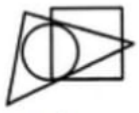
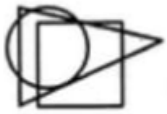
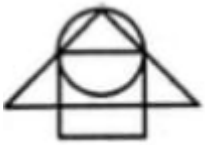
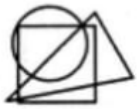
(a) 1 (b) 2 (c) 3 (d) 4

25.

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

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 alternative in each these.



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

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 in 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 listing 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 88 booklist

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

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

PHYSICS

31. Consider a porter standing on a platform with a suitcase which presses his head with a force of 200N. If this force is taken to be the action, from where is the reaction force exerted and to where is it directed?

(a) The head, on the suitcase (b) The earth, on the suitcase

(c) The earth, on the porter (d) The suitcase, on the earth

32. A car starts from rest and attains a speed of 8 m/sec in 2 seconds. It travels with uniform speed for the next 3 seconds. The total displacement of the car in 5 sec is:

(a) 4 m (b) 8 m (c) 16 m (d) 32 m

33. Two particles are placed at some distance. If the mass of each of the two particles is doubled, keeping the distance between them unchanged, the value of gravitational force between them will be

(a) $\frac{1}{4}$ times (b) 4 times (c) $\frac{1}{2}$ times (d) unchanged

34. Two cars of masses m_1 and m_2 are moving along the circular path of radius r_1 and r_2. They take one round in the same time. The ratio of angular velocity of the two cars will be:

(a) $m_1 : m_2$ (b) $r_1 : r_2$ (c) $1 : 1$ (d) $m_1 r_1 : m_2 r_2$

35. Where will it be profitable to purchase one kilogram sugar?

(a) At the poles (b) At the equator

(c) At 45° latitude (d) At 40° latitude

36. A stone is dropped from the top of the tower and travels 24.5 m in the last second of its journey. The height of the tower is:

(a) 44.1 m (b) 49 m (c) 78.4 m (d) 72 m

37. A body of mass m is taken to the bottom of a deep mine. Then:

(a) its mass increases. (b) its mass decreases.

(c) its weight increases. (d) its weight decreases.

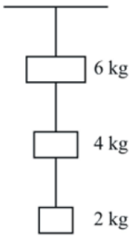
38. Newton's second law gives the measure of:

(a) Acceleration (b) Force

(c) Momentum (d) Angular momentum

39. A man is at rest in the middle of a pond on perfectly smooth ice. He can get himself to the shore by making use of Newton's:
(a) First law (b) Second law (c) Third law (d) All the laws

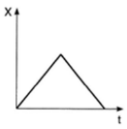
40. Three masses of 6 kg, 4 kg and 2 kg are attached to a rigid support as shown in figure. If the string attached to the support breaks and the system falls freely then the tension in the string connecting 4 kg and 2 kg mass is:

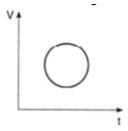


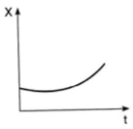
(a) Zero (b) 8 kg wt (c) 12 kg wt (d) 6 kg wt

41. When a train stops suddenly, passengers in the running train feel an instant jerk in the forward direction because:
(a) the back of seat suddenly pushes the passengers forward.
(b) inertia of rest stops the train and takes the body forward.
(c) upper part of the body continues to be in the state of motion whereas the lower part of the body in contact with seat comes at rest.
(d) nothing can be said due to insufficient data.

42. A person travels along a straight road for the first half length with velocity v_1 and the second half length with a velocity v_2. Then the mean velocity v is given by:
(a) $v = \frac{v_1+v_2}{2}$ (b) $\frac{2}{v} = \frac{1}{v_1} + \frac{1}{v_2}$ (c) $v = \sqrt{(v_1 v_2)}$ (d) $V = \sqrt{\left(\frac{V_2}{V_1}\right)}$

43. Which one of the following curves do not represent motion in one dimension?
(a) 

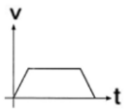
(b) 

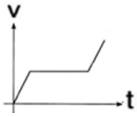
(c) 

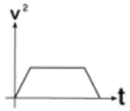
(d) 

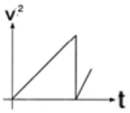
44. A rifle bullet loses $1/20^{th}$ of its velocity in passing through a plank. The least number of such planks required just to stop the bullet is:
(a) 5 (b) 10 (c) 11 (d) 20

45. Which of the following represents the v − t graph corresponding to the a − t graph shown in figure?

(a) 

(b) 

(c) 

(d) 

CHEMISTRY

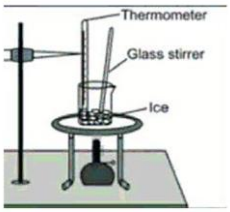
46. Match column I with column II and choose the correct option from the given codes.

Column I		Column II	
(P)	Hot tea poured in saucer gets cooled faster	**(i)**	Evaporation increases with increases in temperature
(Q)	We feel more cold after a hot water bath than a cold water bath.	**(ii)**	Evaporation increases with decrease in humidity.

(R)	Water is cool in earthen pitcher during dry hot day.	**(iii)**	Evaporation increases with increase in wind speed.
(S)	We feel comfortable under a moving Fan.	**(iv)**	Evaporation increases with increase in surface area.

(a) P - (ii), Q - (i), R - (iii), S - (iv)
(b) P - (iii), Q - (iv), R - (ii), S - (i)
(c) P - (iv), Q - (i), R - (ii), S - (iii)
(d) P - (iv), Q - (ii), R - (iii), S - (i)

47. Sneha set up the experiment for melting of ice in a beaker and noted down the temperature throughout the process. What do you think she observed when the ice was melting?



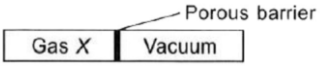
(a) The temperature in the thermometer kept increasing till the whole ice melted.
(b) Once the melting process started, the temperature in thermometer remained constant though the heating was on.
(c) There was no change in temperature throughout the experiment.
(d) Ice did not melt on heating. It was converted to vapours.

48. A brief information about three substances is given in the table.

Substance	Melting point	Boiling point
P	23°C	60°C
Q	10°C	20°C
R	65°C	110°C

Which of the following is incorrect about these substances?
(a) At room temperature, substance P will have fixed volume but no fixed shape.
(b) At room temperature substance Q will have maximum space between the particles.
(c) At room temperature substance R will have strongest interparticle forces.
(d) None of these

49. The given apparatus is used to study the diffusion of a number of gases at the same temperature and pressure.



Which of the following pairs of gases would diffuse into the vacuum at the same speed? [Given : Atomic mass of $H = 1\text{u}, C = 12\text{u}, N = 14\text{u}, S = 32\text{u}, O = 16\text{u}$]
(a) NH_3 and H_2 (b) CO and SO_2 (c) CO and N_2 (d) NH_3 and N_2

50. During summer, water kept in an earthen pot becomes cool because of the phenomenon of
(a) Diffusion (b) Transpiration (c) Osmosis (d) Evaporation

51. A few substances are arranged in the increasing order of 'forces of attraction' between their particles. Which one of the following represents a correct arrangement?
(a) Water, air, wind (b) Air, sugar, oil (c) Oxygen, water, sugar (d) Salt, juice, air

52. On converting 25°C, 38°C and 66°C to Kelvin scale, the correct sequence of temperature will be
(a) 298 K, 311 K and 339 K
(b) 298 K, 300 K and 338 K
(c) 273 K, 278 K and 543 K
(d) 298 K, 310 K and 338 K

53. Which among the following is an example of a solid solution?
(a) Copper dissolved in gold
(b) Ethanol dissolved in water
(c) Glucose dissolved in water
(d) Sodium chloride dissolved in water

54. What will be the mass by mass percentage of a solution containing 30 g of common salt in 220 g of water?
(a) 0.03% (b) 1.2% (c) 12% (d) 22%

55. A mixture of starch and hot water is
(a) heterogeneous and shows Tyndall effect
(b) homogeneous and shows Tyndall effect
(c) heterogeneous and does not show Tyndall effect
(d) homogeneous and does not show Tyndall effect

56. Rusting of an article made up of iron is called
(a) Corrosion and it is a physical change
(b) Dissolution and it is a physical change
(c) Corrosion and it is a chemical change
(d) Dissolution and it is a chemical change

57. Tincture of iodine has antiseptic properties. This solution is made by dissolving
(a) Iodine in potassium iodide
(b) Iodine in Vaseline
(c) Iodine in water
(d) Iodine in ethanol

58. How many grams of NaOH would need to be dissolved in 250.0 mL of solution to produce a 1.25 M solution?
(a) 12.5 g (b) 20.4 g (c) 40.00 g (d) 1.25 g

59. Which of the following is an example of a solid-in-gas mixture?
(a) Soil (b) Smoke (c) Moisture (d) Dew

60. Which of the following cannot be a pure substance?
(a) Mercury (b) Sugar (c) Blood (d) Glucose

BIOLOGY

61. Which part of the plant cell is dead?
(a) Cell wall (b) Cell membrane (c) Plastid (d) Vacuole

62. Plasmolysis in plant cells occurs due to
(a) Exosmosis (b) Endosmosis (c) Absorption (d) Pinocytosis

63. Organisms lacking defined nucleus and membrane bound organelle are
(a) Diploids (b) Prokaryotes (c) Haploids (d) Eukaryotes

64. The cell wall is chiefly made up of
(a) Pectin (b) Cellulose (c) Hemi cellulose (d) Lignin

65. Who discovered the nucleus?
(a) Robert Hooke (b) A.V. Leeuwenhoek (c) Robert Brown (d) R. Virchow

66. Cell wall possesses many small pores through which adjacent cells remain connected.
(a) Nuclear Pore (b) Plasmodesmata (c) Vacuoles (d) None of these

67. Which cell organelle is called the director of the cell?
(a) Endoplasmic Reticulum (b) Mitochondria (c) Nucleus (d) Nucleolus

68. Colourless plastids are known as
(a) Leucoplasts (b) Chromoplasts (c) Chloroplasts (d) None of these

69. Which of the following possesses a double membrane?
(a) Mitochondrion (b) Nucleus (c) Chloroplast (d) All of these

70. Ribosomes are the site for
(a) Photosynthesis
(b) Protein Synthesis
(c) Respiration
(d) Energy Production

71. Transpiration and exchange of gases are functions of
(a) stomata
(b) xylem
(c) both (a) and (b)
(d) neither (a) nor (b)

72. Phloem in the plants performs the function of
(a) conduction of food (b) conduction of water
(c) providing support (d) photosynthesis

73. Guard cells are present in
(a) Cork (b) Cortex
(c) Stomata (d) Vascular bundle

74. Xylem and phloem occur in
(a) Conjunctive tissue (b) Vascular bundle (c) Periderm (d) Cortex

75. The growth in plants is
(a) Caused by each cell of the body (b) Uniform
(c) Caused by non-dividing regions (d) Limited to certain regions

MATHEMATICS

76. $0.3\overline{2}$ when expressed in the form $\frac{p}{q}(p, q$ are integers $q \neq 0$), is
(a) $\frac{8}{25}$ (b) $\frac{29}{90}$ (c) $\frac{32}{99}$ (d) $\frac{32}{199}$

77. An irrational number between 2 and 2.5 is
(a) $\sqrt{11}$ (b) $\sqrt{5}$ (c) $\sqrt{22.5}$ (d) $\sqrt{12.5}$

78. The value of $\left\{8^{\frac{-4}{3}} \div 2^{-2}\right\}^{\frac{1}{2}}$ is
(a) $\frac{1}{2}$ (b) 2 (c) $\frac{1}{4}$ (d) 4

79. If $x + \sqrt{15} = 4$, then $x + \frac{1}{x} =$
(a) 2 (b) 4 (c) 8 (d) 1

80. $(x - y)(x + y)(x^2 + y^2)(x^4 + y^4)$ is equal to
(a) $x^{16} - y^{16}$ (b) $x^8 - y^8$ (c) $x^8 + y^8$ (d) $x^{16} + y^{16}$

81. If $a^{\frac{1}{3}} + b^{\frac{1}{3}} + c^{\frac{1}{3}} = 0$, then
(a) $a + b + c = 0$ (b) $(a + b + c)^3 = 27abc$
(c) $a + b + c = 3abc$ (d) $a^3 + b^3 + c^3 = 0$

82. The value of
$\frac{(2.3)^3 - 0.027}{(2.3)^2 + 0.69 + 0.09}$ is
(a) 2 (b) 3 (c) 2.327 (d) 2.273

83. If $x^3 + 6x^2 + 4x + k$ is exactly divisible by $x + 2$, then k =
(a) -6 (b) -7 (c) -8 (d) -10

84. One factor of $x^4 + x^2 - 20$ is $x^2 + 5$, the other is
(a) $x^2 - 4$ (b) $x - 4$ (c) $x^2 - 5$ (d) $x + 4$

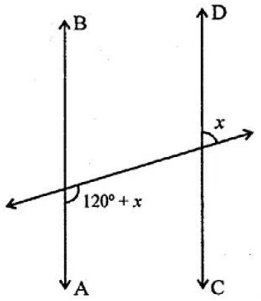
85. The area of the triangle formed by the points $A(2,0), B(6,0)$ and $C(4,6)$ is
(a) 24 sq. units (b) 12 sq. units
(c) 10 sq. units (d) none of these

86. The distance of the point $P(4,3)$ from the origin is
(a) 4 (b) 3 (c) 5 (d) 7

87. $x = 2, y = -1$ is a solution of the linear equation
(a) $x + 2y = 0$ (b) $x + 2y = 4$ (c) $2x + y = 0$ (d) $2x + y = 5$

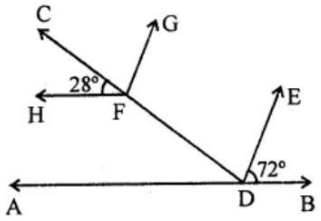
88. If $(2k - 1, k)$ is a solution of the equation $10x - 9y = 12$, then k =
(a) 1 (b) 2 (c) 3 (d) 4

89. In the figure, if $AB \parallel CD$, then the value of x is



(a) 20° (b) 30° (c) 45° (d) 60°

90. In the figure, if $AB \parallel HF$ and $DE \parallel FG$, then the measure of $\angle FDE$ is



(a) 108° (b) 80° (c) 100° (d) 90°

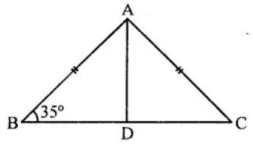
91. Two complementary angles are such that two times the measure of one is equal to three times the measure of the other. The measure of the smaller angle is

(a) 45° (b) 30°
(c) 36° (d) none of these

92. Side BC of a triangle ABC has been produced to a point D such that $\angle ACD = 120°$. If $\angle B = \frac{1}{2}\angle A$, then $\angle A$ is equal to

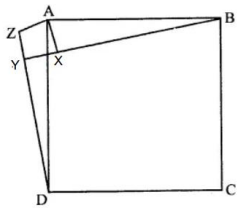
(a) 80° (b) 75° (c) 60° (d) 90°

93. ABC is an isosceles triangle such that $AB = AC$ and AD is the median to base BC. Then, $\angle BAD =$



(a) 55° (b) 70° (c) 35° (d) 110°

94. In the figure, X is a point in the interior of square $ABCD$. $AXYZ$ is also a square. If $DY = 3$ cm and AZ = 2 cm, then $BY =$



(a) 5 cm (b) 6 cm (c) 7 cm (d) 8 cm

95. If Δ ABC ≅ Δ PQR then which of the following is not true?

(a) $BC = PQ$ (b) $AC = PR$ (c) $BC = QR$ (d) $AB = PQ$

96. In Δ PQR, ∠R = ∠P and QR = 4 cm and PR = 5 cm. Then the length of PQ is

(a) 5 cm (b) 4 cm (c) 10 cm (d) 8 cm

97. 1f the area of an isosceles right triangle is 8 cm^2 what is the perimeter of the triangle?

(a) $8 + \sqrt{2}$ cm (b) $8 + 4\sqrt{2}$ cm (c) $4 + 8\sqrt{2}$ cm (b) $12\sqrt{2}$ cm

98. The length of the sides of $\triangle ABC$ are consecutive integers. If $\triangle ABC$ has the same perimeter as an equilateral triangle with a side of length 9 cm, what is the length of the shortest side of $\triangle ABC$?

(a) 4 cm (b) 6 cm (c) 8 cm (d) 10 cm

99. If the length of a median of an equilateral triangle is x cm, then its area is

(a) x^2 (b) $\frac{\sqrt{3}}{2}x^2$ (c) $\frac{x^2}{\sqrt{3}}$ (d) $\frac{x^2}{2}$

100. If every side of a triangle is doubled, then increase in the area of the triangle is

(a) $100\sqrt{2}\%$ (b) 200% (c) 300% (d) 400%