9/26

PT2 / MID TERM EXAMINATION : 2024-25

CLASS : IX

SUBJECT : MATHEMATICS

Time Allowed : 3 Hours **Max. Marks : 80**

General Instructions:

i) This Question Paper has 5 Sections A, B, C, D, and E.

ii) Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.

iii) Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.

iv) Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.

v) Section D has 4 Long Answer (LA) type questions carrying 5 marks each.

vi) Section E has 3 Case Based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.

vii) All Questions are compulsory. However, an internal choice in 2 Qs of 2 marks, 2 Qs of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.

SECTION A

Section A consists of 20 questions of 1 mark each.

MULTIPLE CHOICE QUESTIONS

1. The graph of linear equation $x + 2y = 2$, cuts the y-axis at: **1**

a) (2, 0) b) (0, 2)

c) (0, 1) d) (1, 1)

2. Irrational number between 1.011243 ... and 1.012243 ... is **1**

a) 1.011143 ... b) 1.012343 ...

c) 1.01152243 ... d) 1.013243 ...

3. The sides of a triangle are 12 cm, 16 cm and 20 cm. Its area is **1**

a) 48 cm^2 b) 96 cm^2

c) 120 cm^2 d) 160 cm^2

4. Two angles are supplementary. One of them is an acute angle. Which of these could be the measure of the other angle ? **1**

a) 60° b) 90°

c) 120° d) 180°

5. Which of the following is a rational number ? 1

a) $\sqrt{3}+1$ b) π

c) $2\sqrt{3}$ d) 0

6. In between any two numbers, there are/is : 1

a) Only one rational number b) Two rational numbers

c) Infinite rational numbers d) No rational number

7. If the coordinates of a point are $(0, -4)$, then it lies : 1

a) On x-axis b) On y-axis

c) At origin d) Between x-axis and y-axis

8. The section formed by horizontal and vertical lines determining the position of the point in a cartesian plane is called: 1

a) x-axis b) y-axis

c) origin d) quadrant

9. In ΔABC, $\angle A = \angle C$ and BC = 4 cm and AC = 3 cm. The length of side AB is: 1

a) 2 cm b) 4 cm

c) 3 cm d) 2.5 cm

10. The perpendicular distance of the point P(2, 5) from the y-axis is : 1

a) 2 units b) 4 units

c) 5 units d) 7 units

11. In triangle ABC, if AC = BC and $\angle C = 80°$, $\angle A$ will be : 1

a) 70° b) 100°

c) 50° d) 130°

12. The zero of polynomial $(x + 3)$ is 1

a) 0 b) 3

c) -3 d) 1

13. The coefficient of x in the expansion of $(x + 3)^3$ is : 1

a) 1 b) 9

c) -18 d) 27

14. The perimeter of an equilateral triangle is 180 m. The area is 1

a) $100\sqrt{3}\ m^2$ b) $150\sqrt{3}\ m^2$

c) $200\sqrt{3}\ m^2$ d) $900\sqrt{3}\ m^2$

15. Which of the following needs a proof ? 1

a) Definition b) Postulate

c) Theorem d) Axiom

16. Euclid stated that the whole is greater than a part in the form of 1

a) Definition b) Proof

c) Postulate d) Axiom

17. Two angles whose sum is equal to 90° are called: 1

a) Vertically opposite angles b) Complementary angles

c) Adjacent angles d) Supplementary angles

18. For two triangles, if two angles and the included side of one triangle are equal to two angles and the included side of another triangle. Then the congruency rule is: 1

a) SSS b) ASA

c) SAS d) RHS

ASSERTION-REASON QUESTIONS

The following question consist of two statements-Assertion(A) and Reason(R)

Answer these questions selecting the appropriate option given below :

(a) Both A and R are true and R is the correct explanation for A.

(b) Both A and R are true and R is not the correct explanation for A.

(c) A is true but R is false.

(d) A is false but R is true.

19. **Assertion (A) :** $(-11, -13)$ lies in IV quadrant. 1

Reason (R) : Abscissa and ordinate are negative in III quadrant.

20. **Assertion (A) :** If $x = y$ and $z = y$, then $x = z$ 1

Reason (R) : The whole is greater than a part.

SECTION B

Section B consists of 5 questions of 2 marks each.

21. Two angles measure $a - 60°$ and $123° - 2a$. If each one is opposite to equal sides of an isosceles triangle, then find the value of 'a'. **2**

22. In the given figure, if AC = BD, then prove that AB = CD. **2**

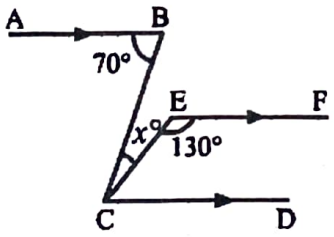
23. If $3^{x-1} = 9$; $4^{y+2} = 64$, find $\frac{x}{y}$. **2**

OR

Express 0.3222222 .... in the form of $\frac{p}{q}$.

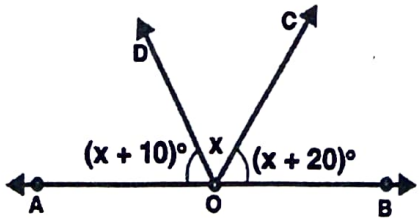
24. The base of an isosceles triangle is 16 cm and length of equal sides is 10 cm. Find the area of the triangle using Heron's formula. **2**

25. In the given figure, AB ∥ CD ∥ EF. Find the value of x. **2**



OR

In the given figure, find the value of x, hence find ∠AOC.



SECTION C

Section C consists of 6 questions of 3 marks each.

26. Simplify : $2\sqrt[5]{32} + 4\sqrt[3]{64} - 3\sqrt{289} + 4\sqrt[5]{243}$ **3**

27. The polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + 3a - 7$ when divided by $x + 1$ leaves remainder 19. Find the value of 'a', and then write the new polynomial formed. **3**

OR

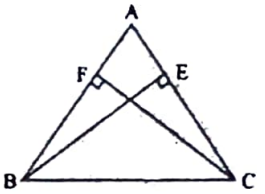
If $p(x) = x^2 + 3x - 5$, evaluate $p(-1) - p(2) + p\left(\frac{1}{2}\right)$

28. The sides of a triangular plot are in the ratio 5 : 4 : 3 and its perimeter is 96 *m*. Find the area of plot, and calculate the altitude of triangular plot corresponding to its shortest side. **3**

29. ABC is a triangle in which altitudes BE and CF to sides AC and AB are equal (as shown in fig). Show that

i) $\Delta ABE \cong \Delta ACF$

ii) AB = AC, i.e. ABC is an isosceles triangle. **3**



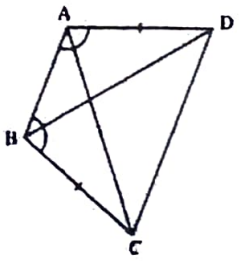
OR

In the given figure ABCD is a quadrilateral in which AD = BC and $\angle DAB = \angle CBA$, prove that

i) $\Delta ABD \cong \Delta BAC$

ii) BD = AC

iii) $\angle ABD = \angle BAC$.



30. Write the coordinates of the points :

i) whose ordinate is – 5 and lies on *y*-axis.

ii) which lies on *x* and *y* axes both. (0, 0)

iii) whose abscissa is – 3 and which lies on *x*-axis. **3**

31. For what value of p ; $x = 2$, $y = 3$ is a solution of $(p + 1)x - (2p + 3)y - 1 = 0$? Write the equation and check whether line passes through the origin. **3**

SECTION D

Section D consists of 4 questions of 5 marks each.

32. If $x = 7 - 4\sqrt{3}$, then find the value of $\sqrt{x} + \frac{1}{\sqrt{x}}$ **5**

OR

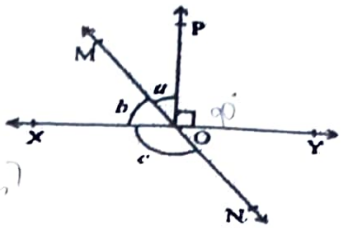
Simplify : $\frac{1}{\sqrt{2}+1} + \frac{1}{\sqrt{3}+\sqrt{2}} + \frac{1}{\sqrt{4}+\sqrt{3}} + \frac{1}{\sqrt{5}+\sqrt{4}}$

33. Prove that the vertically opposite angles of intersecting lines are always equal. Further, if AB and CD are lines intersecting at O and $\angle AOC = 55°$, then find $\angle BOD$. **4+1**

OR

a) In the given Figure lines XY and MN intersect at O. If $\angle POY = 90°$ and a : b = 2 : 3, find c. **4+1**

b) If the supplement of an angle is three times of its complement, then find the angle.



34. Factorise: i) $x^2 + 2\sqrt{3}x - 24$ **2.5**

ii) $16x^2 + 4y^2 + 9z^2 - 16xy - 12yz + 24xz$ **2.5**

35. Draw the graph of linear equation $3x + 2y = 18$. By using the graph, find the points where it meets on x-axis and y-axis. **4+1**

SECTION E

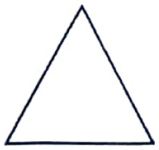
Case study-based questions are compulsory.

36. Case Study 1.

To beautify the city, City Municipal Corporation decided to make triangular boards. The dimensions of a triangular boards are 8m × 15m × 17m.

Based on the information, answers the following questions :

i) If each triangular board is to be fenced with wire then find the length of the wire used. **1**



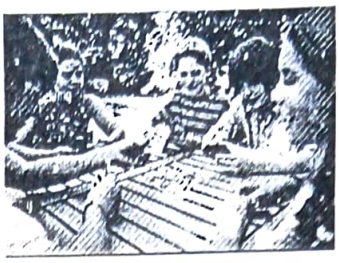
ii) If each triangular board is an equilateral triangle of side 8m, then find the area of this board. **1**

iii) Find the area of each board with sides 8m, 15m and 17m. **2**

OR

Find the area of right triangular board with base 8m and hypotenuse 10m. **2**

37. Case Study 2 :



In the auditorium of a school, five children Arjun, Nakul, Seema, Bhavit and Tanya are playing a game using cards (Rectangular). They have prepared five cards and written the algebraic expressions on cards. They have shown cards to each other. The card which Arjun contains have following expression $4x^3 + 2x^2 + 3x + 1$.

When the expression is multiplied by 2, that information is written on Nakul's card and when it is divided by 2, that expression is written on Seema's card. Bhavit and Tanya have written $7x^3 + \sqrt{5}$ and $2x + 7$ on their cards respectively.

Now answer the following questions :

i) Classify the polynomial $4x^3 + 2x^2 + 3x + 1$ by its degree. **1**

ii) What are the degrees of polynomials $7x^3 + \sqrt{5}$ and $2x + 7$ on Bhavit's and Tanya's card? **1**

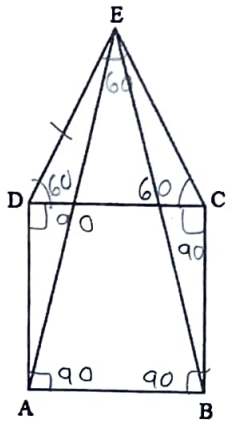
iii) What would be the expression on Nakul's card and find its value for $x = -1$? **2**

OR

What would be the expression on Seema's card and find its value for $x = 1$? **2**

38. Case Study 3 :

In a housing society complex a Central Park has to be developed. The shape of the Central Park as shown in the figure is a square ABCD and CDE is an equilateral triangle on the side CD of the square ABCD. AEBA is a walking track in the form of the triangle ABE.



Based on the above information and the given figure answer the following questions :

i) What is the measure of $\angle ADE$? **1**

ii) What is the measure of $\angle BCE$? **1**

iii) In the given figure prove that AE = BE. **2**

OR

In the given figure prove that $\angle DAE = 15°$. **2**