ICSE 2024 EXAMINATION

MATHEMATICS

SAMPLE PAPER - 10

Time Allowed : 2½ hours ***Max. Marks : 80***

General Instructions :

Attempt all questions from Section A and any four questions from Section B.
All working, including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer.
Omission of essential working will result in loss of marks.
The intended marks for questions or parts of questions are given in brackets [ ]
Mathematical tables are provided.

SECTION - A (40 Marks)

(Attempt *all* questions from this Section)

Question 1 : Choose the correct answers to the questions from the given options: [15]

(i) A dealer in Mumbai sold a washing machine to a consumer in Mumbai for ₹18,000. If the rate of GST is 18%, then SGST is :

(a) ₹1620 (b) ₹3240 (c) nil (d) none of these

(ii) Roots of the equation $3x^2 - 2\sqrt{6}x + 2 = 0$ are:

(a) $\pm\sqrt{\frac{2}{3}}$ (b) $\sqrt{\frac{2}{3}}, \sqrt{\frac{2}{3}}$ (c) $-\sqrt{\frac{2}{3}}, -\sqrt{\frac{2}{3}}$ (d) $-\sqrt{\frac{2}{3}}, -\sqrt{\frac{3}{2}}$

(iii) If $(x - 2)$ is a factor of $x^2 - 7x + 2m$, then the value of m is :

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

(iv) The transpose of the matrix $\begin{bmatrix} 1 & 5 & 4 \\ -2 & 1 & 6 \end{bmatrix}$ is :

(a) $\begin{bmatrix} 1 & -2 \\ 5 & 1 \\ -2 & 6 \end{bmatrix}$ (b) $\begin{bmatrix} -2 & 1 & 6 \\ 1 & 5 & 4 \end{bmatrix}$ (c) $\begin{bmatrix} 1 & -2 \\ 5 & 1 \\ 4 & 6 \end{bmatrix}$ (d) $\begin{bmatrix} 4 & 5 & 1 \\ 6 & 1 & -2 \end{bmatrix}$

(v) 21% ₹100 shares at ₹140 gives rate of return as:

(a) 10% (b) 120% (c) 15% (d) 25%

(vi) The reflection of the point P (0, 3) in the y-axis is :

(a) (0, –3) (b) (3, 0) (c) (0, 3) (d) (0, 0)

(vii) In the figure, all dimensions are in cm.

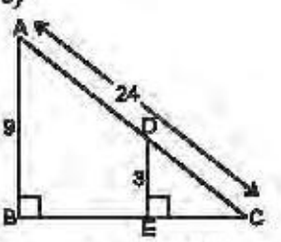
The length of AD is :

(a) 12 cm

(b) 14 cm

(c) 16 cm

(d) 18 cm



(viii) Richa attaches a conical attachment to one side of the coin. The radius of coin and conical attachment is same. Which of the following is the surface area of the combined solid?

(a) Coin base area + Coin CSA (b) Coin base area + Coin CSA + Cone CSA

(c) Total surface area of coin+total surface area of cone (d) Total surface area of cone.

(ix) Which term of the GP 18, 12, 8, ... is $\frac{512}{729}$?

(a) 9th (b) 10th (c) 11th (d) 12th

(x) If a coin is tossed 3 times, what is the probability of getting a tail each time?

(a) $\frac{1}{8}$ (b) $\frac{1}{4}$ (c) $\frac{1}{16}$ (d) $\frac{1}{6}$

(xi) Two similar jugs have heights of 4 cm and 6 cm respectively. If the capacity of the smaller jug is 48 cm^3, then the capacity of the larger jug is:

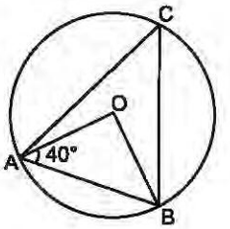
(a) 100 cm^3 (b) 130 cm^3 (c) 152 cm^3 (d) 162 cm^2

(xii) x-axis divides the line segment joining the points (2, –3) and (5, 6) in the ratio:

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

(xiii) In the given figure, O is the centre of the circle. If $\angle OAB = 40°$, then $\angle ACB$ is equal to :

(a) 50°
(b) 40°
(c) 60°
(d) 70°



(xiv) The sum of first 16 terms of the AP 10, 6, 2, ... is :

(a) –320 (b) 320 (c) –350 (d) –300

(xv) For the following distribution:

Class	0–5	5–10	10–15	15–20	20–25
Frequency	10	15	12	20	9

The sum of lower limits of the median calss and modal class is:

(a) 15 (b) 25 (c) 30 (d) 35

Question 2 :

(i) A conical tent is to accommodate 77 persons. Each person must have 16 m^3 of air to breathe. Given the radius of the tent as 7 m, find the height of the tent and also its curved surface area. [4]

(ii) Amit kumar invests ₹36,000 in buying ₹100 shares at ₹20 premium. The dividend is 15% per annum. Find: [4]

(a) the number of shares he buys (b) his yearly dividend

(c) the percentage return on his investment.

(iii) The sum of three numbers in GP is 35 and their product is 1000. Find the numbers. [4]

Question 3 :

(i) Pawan deposited ₹ 150 every month in a bank for 8 months under the recurring deposit scheme. Find the maturity value of his deposit, if the interest is calculated every month and the rate of interest is 8% per annum. [4]

(ii) Find the equation of a line passing through the point (–2, 3) and having the x-intercept of 4 units. [4]

(iii) Use graph paper to solve this question.

(a) Plot the points P (0, 3), Q, (3, –2) and O(0, 0).

(b) Plot R, the image of Q, when reflected in the y-axis and write its coordinates.

(c) What is the geometrical name of the figure PQOR? [5]

SECTION - B (40 Marks)

(Attempt *any four* questions from this Section)

Question 4 :

(i) A dealer in Patna (Bihar) supplies goods worth ₹15,000 to a dealer in Sonepat (Haryana). The dealer in Sonepat supplies the same goods to a dealer in Rohtak (Haryana) at a profit of ₹3000. If the rate of GST is 18%, calculate:

(a) The cost of goods to the dealer in Rohtak.

(b) Net GST paid by the dealer in Sonepat. [3]

(ii) Solve the equation $4x^2 - 5x - 3 = 0$ and give your answer correct to two decimal places. [3]

(iii) On a map drawn to a scale if 1 : 2,50,000, a triangular plot of land has the following measurements. AB = 3 cm, BC = 4 cm and $\angle ABC = 90°$. Calculate (a) the actual length of AB in km (b) the area of the plot in km^2. [4]

Question 5 :

(i) If $A = \begin{bmatrix} 0 & -1 \\ 2 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ 6 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 \\ -3 & -2 \end{bmatrix}$, find A (B + C). [3]

(ii) Two circles touch externally at P. A tangent touches the circles at A and B. Prove that the tangent at P bisects AB. [3]

(iii) The polynomials $(px^3 + 3x^2 - 3)$ and $(2x^3 - 5x + p)$ when divided by $(x - 4)$ leave the same remainder. Find the value of p. [4]

Question 6 :

(i) Find the coordinates of the points of trisection of the line segment joining the points A(5, –3), and B(2, –9) [3]

(ii) Prove that : $\cot A - \tan A = \dfrac{2\cos^2 A - 1}{\sin A \cos A}$. [3]

(iii) How many terms of the AP 72, 66, 60, ... must be taken to give the sum 0? [4]

Question 7 :

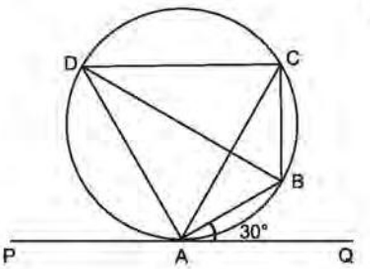
(i) In a lottery there are 5 prizes and 20 blanks. What is the probability of getting a prize? [3]

(ii) Construct a quadrilateral ABCD in which AB = 5 cm, BC = 4 cm, $\angle B = 60°$, AD = 5.5 cm and D is equidestant from AB and BC. [3]

(iii) In the given figure, PQ is a tangent to the circle at A. AB and AD are bisectors of $\angle CAQ$ and $\angle PAC$. If $\angle BAQ = 30°$, prove that : [4]

(a) BD is a diameter of the circle.

(b) ABC is an isosceles triangle.



Question 8 :

(i) Solve the following inequation and graph the solution set on the number line :

$$-\frac{1}{5} \le \frac{3x}{10} + 1 < \frac{2}{5},\ x \in R$$ [3]

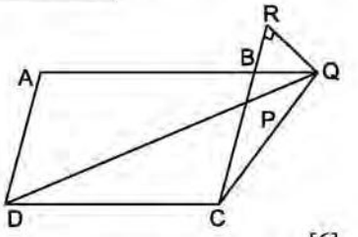
(ii) Calculate the mean of the following distribution using step deviation method. [3]

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Number of students	10	9	25	30	16	10

(iii) In the figure, ABCD is a parallelogram. P is a point on BC such that BP : PC = 1 : 2. DP produced meets AB produced at Q. Given $ar(\Delta CPQ)$ is 20 m^2, find. [4]

(a) ar(ΔDCP)

(b) ar(|| gm ABCD)



Question 9 :

(i) The daily wages of 80 workers in a project are given below. [6]

Wages in (₹)	400–450	450–500	500–550	550–600	600–650	650–700	700–750
Number of workers	2	6	12	18	24	13	5

Use a graph paper to draw an ogive for the above distribution. (Use a scale of 2 cm = ₹50 on x-axis and 2 cm = 10 workers on y-axis). Use your ogive to estimate :

(a) the median wage of the workers.

(b) the lower quartile wage of workers.

(c) the number of workers who earn more than ₹ 625 daily.

(ii) A bus covers a distance of 240 km at a uniform speed. Due to heavy rain its speed gets reduced by 10 km/h and as such it takes two hours longer to cover the total distance. Assuming the uniform speed to be x km/h, form an equation and solve it to evaluate x. [4]

Question 10 :

(i) Using properties of proportion, solve for x. Given that x is positive : $\frac{2x+\sqrt{4x^2-1}}{2x-\sqrt{4x^2-1}}=4$ [3]

(ii) Draw a circle with centre O and radius 3.1 cm. Take a point P outside the circle at a distance of 6.2 cm from its centre. Draw two tangents to the circle from the point P. [3]

(iii) An aeroplane at an altitude of 1500 metres finds that two ships are sailing towards it in the same direction. The angles of depression as observed from the aeroplane are 45° and 30° respectively. Find the distance between the two ships. [4]

ANSWERS

1. (i) (a) (ii) (b) (iii) (a) (iv) (c) (v) (c) (vi) (c) (vii) (c) (viii) (b) (ix) (a)
(x) (a) (xi) (d) (xii) (a) (xiii) (a) (xiv) (a) (xv) (b)

2. (i) 24 m, 550 m^2 (ii) (a) 300 (b) ₹4500 (c) 12.5% (iii) 20, 10, 5 or 5, 10, 20

3. (i) ₹1236 (ii) $x + 2y - 4 = 0$ (iii) (b) (–3, –2) (c) kite

4. (i) (a) ₹21,240 (b) ₹540 (ii) 1.69 or –0.44 (iii) (a) 7.5 km (b) 37.5 km^2

5. (i) $\begin{bmatrix} -3 & -2 \\ 19 & 16 \end{bmatrix}$ (iii) 1

6. (i) (4, –5), (3, –7) (iii) 25 **7.** (i) $\frac{1}{5}$

8. (i) $\{x : -4 \leq x < -2, x \in R\}$ (ii) 31.3 (iii) (a) 40 m^2 (b) 120 m^2

9. (i) (a) ₹600 (b) ₹550 (c) 29 (ii) $x^2 - 10x - 1200 = 0$, $x = 40$ **10.** (i) $\frac{5}{8}$ (iii) 1095 m