

Sample Paper 9
ICSE 2024 EXAMINATION
MATHEMATICS

Time: Two and half hours

Max. Marks: 80

General Instructions:

1. Answer to this paper must be written on the paper provided separately.
 2. You will not be allowed to write during first 15 minutes.
 3. This time is to be spent in reading the question paper.
 4. The time given at the head of this Paper is the time allowed for writing the answers.
 5. Attempt all questions from Section A and any four questions from Section B.
 6. All working, including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer.
 7. Omission of essential working will result in loss of marks.
 8. The intended marks for questions or parts of questions are given in brackets [].
 9. Mathematical tables are provided.
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SECTION - A

(Attempt all questions from this Section.)

QUESTION 1.

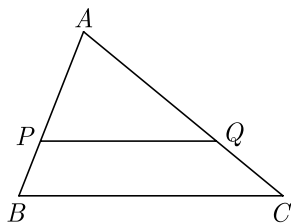
Choose the correct answers to the questions from the given options.

[15]

(Do not copy the questions, write the correct answer only.)

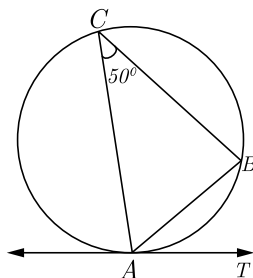
- (i) Sachin buys 1120 shares at ₹52 per share and gets dividend of ₹1456 then rate of return is :
(a) 1.5% (b) 5%
(c) 2.5% (d) 2%
- (ii) Vimla had a recurring deposit account in ICICI bank and deposited ₹1000 per month for $2\frac{1}{2}$ years. If the rate of interest was 10% p.a., then the matured value of this account is:
(a) ₹32,775 (b) ₹33,875
(c) ₹23,775 (d) ₹34,975
- (iii) If $\frac{x}{2} - 5 \leq \frac{x}{3} - 4$ and x is a natural odd number, then the solution set of x is:
(a) $\{-6, -4, -2\}$ (b) $\{6, -4, -2, 2, 4, 6\}$
(c) $\{0, 1, 3, 5\}$ (d) $\{1, 3, 5\}$
- (iv) If a is a natural number and one of the roots of the equation $3x^2 - 14x + 8 = 0$, then the value of a is:
(a) 4 (b) $\frac{2}{3}$
(c) 8 (d) 6

- (v) If $a : b = 3 : 2$, then $(a + b)^2 : (a - b)^2$ is:
(a) $9 : 4$ (b) $1 : 25$
(c) $25 : 1$ (d) $4 : 9$
- (vi) If the sum of remainders obtained on dividing $x^3 + (kx + 8)x + k$ by $x + 1$ and $x - 2$ is 1, then the value of k is:
(a) 2 (b) 1
(c) -1 (d) -2
- (vii) If $\begin{bmatrix} 1 & 2 \\ 2 & 9 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 \\ 9 \end{bmatrix}$, then the values of x and y are :
(a) $x = 10, y = 0$ (b) $x = 5, y = 4$
(c) $x = 0, y = 10$ (d) $x = 4, y = 5$
- (viii) If the common difference of an AP is 5, then what is $a_{18} - a_{13}$?
(a) 5 (b) 20
(c) 25 (d) 30
- (ix) The point which divides the line segment joining the points $(8, -9)$ and $(2, 3)$ in the ratio $1 : 2$ internally lies in the
(a) I quadrant (b) II quadrant
(c) III quadrant (d) IV quadrant
- (x) Which of the following is the slope of the line passing through the points $(-4, 3)$ and $(5, -6)$?
(a) -1 (b) 3
(c) 4 (d) -3
- (xi) In the given figure, P and Q are points on the sides AB and AC respectively of a triangle ABC . PQ is parallel to BC and divides the triangle ABC into 2 parts, equal in area. The ratio of $PA : AB =$



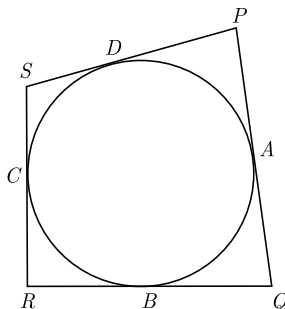
- (a) $1 : 1$ (b) $(\sqrt{2} - 1) : \sqrt{2}$
(c) $1 : \sqrt{2}$ (d) $(\sqrt{2} - 1) : 1$

- (xii) In the given figure AB is a chord of the circle such that $\angle ACB = 50^\circ$. If AT is tangent to the circle at point A , then $\angle BAT$ is equal to
- (a) 65° (b) 60°
 (c) 50° (d) 40°



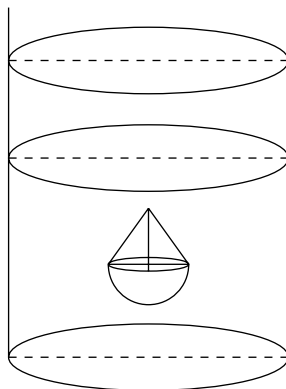
- (xiii) From a solid circular cylinder with height 10 cm and radius of the base 6 cm, a right circular cone of the same height and same base is removed, then the volume of remaining solid is
- (a) $280 \pi \text{cm}^3$ (b) $330 \pi \text{cm}^3$
 (c) $240 \pi \text{cm}^3$ (d) $440 \pi \text{cm}^3$
- (xiv) If ΔABC is right angled at C , then the value of $\cos(A + B)$ is
- (a) 0 (b) 1
 (c) $\frac{1}{2}$ (d) $\frac{\sqrt{3}}{2}$

- (xv) In the given figure if sides PQ , QR , RS and SP of a quadrilateral $PQRS$ touch a circle at point A , B , C and D respectively, then $PD + BQ$ is equal to
- (a) PQ (b) QR
 (c) PS (d) SR



QUESTION 2.

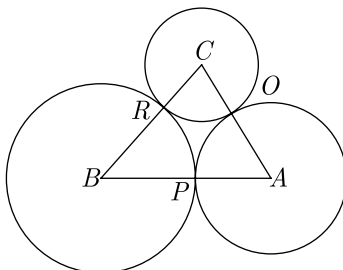
- (i) A solid is in the shape of a hemisphere of radius 7 cm, surmounted by a cone of height 4 cm. The solid is immersed completely in a cylindrical container filled with water to a certain height. If the radius of the cylinder is 14 cm, find the rise in the water level. [4]



- (ii) Mr Rohit saves ₹ 20 daily and deposit ₹ 600 monthly in his R.D. account in S.B.P. for 3 years. If the rate of interest is $r\%$ per annum, then he can get ₹ 24430.50 on maturity. Find the value of r . [4]
- (iii) Prove that : [4]
- $$(\sin A + \sec A)^2 + (\cos A + \operatorname{cosec} A)^2 = (1 + \sec A \operatorname{cosec} A)^2$$

QUESTION 3.

- (i) ₹ 100 shares of a company are sold at 15 % discount. If the return on investment is 20 %, find the rate of dividend declared. [4]
- (ii) ABC is a triangle with $AB = 10$ cm, $BC = 8$ cm and $AC = 6$ cm (not down to scale). Three circles are drawn touching each other with the vertices as their centres. Find the radii of the three circles. [4]



- (iii) The daily wages of 80 workers in project are given below :

[5]

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

Use a graph paper to draw an ogive for the above distribution.

(Use a scale of 2 cm = Rs. 50 on x -axis and 2 cm = 10 workers on y -axis).

Use your ogive to estimate :

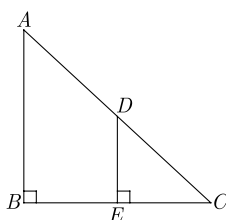
- the median wage of the workers.
- the lower quartile wage of workers.
- the number of workers who earn more than Rs. 625 daily.

SECTION - B

(Attempt any four questions.)

QUESTION 4.

- If $A = \begin{bmatrix} 2 & -2 \\ 5 & -5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 4 \\ 3 & 4 \end{bmatrix}$, compute AB and BA . What conclusions can you draw? [3]
- Construct a $\triangle ABC$ in which base $BC = 6$ cm, $AB = 5.5$ cm and $\angle ABC = 120^\circ$. [3]
 - Construct a circle circumscribing the $\triangle ABC$.
 - Draw a cyclic quadrilateral $ABCD$ so that D is equidistance from B and C .
- In the given figure, AB and DE are perpendicular to BC . [3]
 - Prove that $\triangle ABC \sim \triangle DEC$.
 - If $AB = 6$ cm, $DE = 4$ cm and $AC = 15$ cm, then calculate CD .
 - Find the ratio of the area of $\triangle ABC$: area of $\triangle DEC$.



QUESTION 5.

- (i) Calculate the mean of the following frequency distribution : [3]

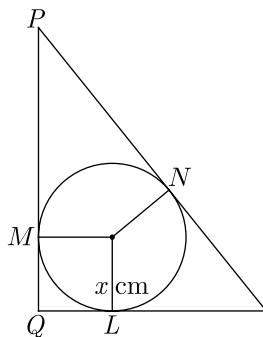
| Class | 10-30 | 30-50 | 50-70 | 70-90 | 90-110 |
|-----------|-------|-------|-------|-------|--------|
| Frequency | 15 | 18 | 25 | 10 | 2 |

- (ii) Jatin bought a Desktop Computer and other computer accessories from Satyam Computers, Delhi as given below : [3]

| S. No. | Item | Price | Rate of GST | Discount |
|--------|-----------|--------|-------------|----------|
| (a) | Desktop | ₹40000 | 18% | ₹4000 |
| (b) | Mouse | ₹800 | 18% | - |
| (c) | Key Board | ₹2400 | 18% | ₹600 |
| (d) | Pen Drive | ₹900 | 18% | - |

Find the :

- (a) Total GST paid.
 (b) Total bill amount including GST.
- (iii) In $\triangle PQR$, $PQ = 24$ cm, $QR = 7$ cm and $\angle PQR = 90^\circ$. Find the radius of the inscribed circle [4]

**QUESTION 6.**

- (i) If a, b, c are in A.P. as well in G.P., prove that $a = b = c$. [3]
- (ii) A sum of Rs. 1890 is to be used to give seven cash prizes to students of a school for their overall academic performance. If each prize is Rs. 50 less than its preceding prize, find the value of each of the prizes. [3]

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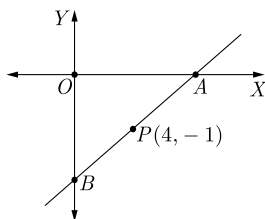
- (iii) For the following frequency distribution draw a histogram. [4]

| | | | | | | |
|-----------|-----|------|-------|-------|-------|-------|
| Class | 0-5 | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 |
| Frequency | 2 | 7 | 18 | 10 | 8 | 5 |

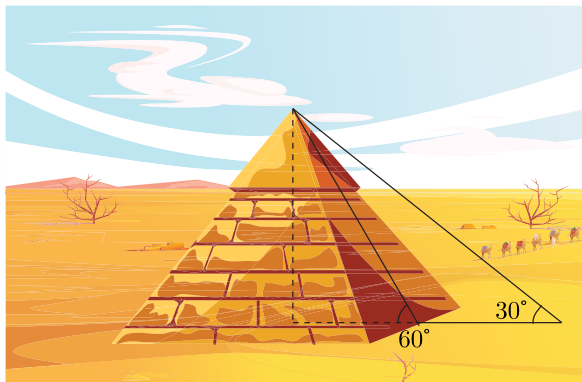
Hence, calculate the mode.

QUESTION 7.

- (i) A line AB meets x -axis at A and y -axis at B , $P(4, -1)$ divides AB in the ratio $1 : 2$.
 (a) Find the coordinates of A and B . [5]
 (b) Find the equation of the line through P and perpendicular to AB .



- (ii) The angle of elevation to the top of the Egyptian pyramid of Cheops is 30° measured from a point 50 meter from the base of the pyramid. The angle of elevation from the base of a face of the pyramid is 60° . [5]



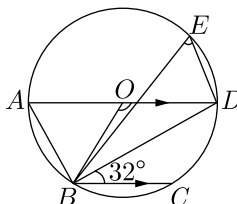
- (a) Find the height of the Cheops pyramid.
 (b) Find the side of base of pyramid.

QUESTION 8.

- (i) If $x \in \mathbb{Z}$, solve the inequation $3 + 5x < 3x - 5 \leq 4x + 1$. Also, represent its solution set on a number line. [3]

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- (ii) In the figure given below, AD is a diameter and O is the centre of the circle. AD is parallel to BC and $\angle CBD = 32^\circ$. Find [3]
- (a) $\angle OBD$ (b) $\angle AOB$ (c) $\angle BED$



- (iii) Prove that the points $(-2, -1)$, $(1, 0)$, $(4, 3)$ and $(1, 2)$ are the vertices of a parallelogram. Is it a rectangle? [4]

QUESTION 9.

- (i) Using properties of proportion solve for x , given $\frac{\sqrt{5x} + \sqrt{2x-6}}{\sqrt{5x} - \sqrt{2x-6}} = 4$. [3]
- (ii) A person on tour has ₹ 4200 for his expenses. If he extends his tour for 3 days, he has to cut down his daily expenses by ₹ 70. Find the original duration of the tour. [3]
- (iii) Using only a ruler and compass, construct $\angle ABC = 120^\circ$, where $AB = BC = 5$ cm. [4]
- (a) Mark two points D and E , which satisfy the condition that they are equidistant from both BA and BC .
- (b) In the above figure, join AE and EC . Describe the figures.
- (a) $ABCD$
- (b) ABD
- (c) ABE

QUESTION 10.

- (i) Use Remainder theorem to factorize the polynomial $2x^3 + 3x^2 - 9x - 10$. [3]
- (ii) A bag contains cards numbered 1 to 49. Find the probability that the number on the drawn card is : [3]
- (a) an odd number
- (b) a multiple of 5
- (c) Even prime
- (iii) Use graph paper for this question. [4]
- (a) Plot the points $A(-4, 4)$, $B(2, 2)$.
- (b) Reflect A and B in the origin to get the images A' and B' respectively. Write the coordinates of A' and B' .
- (c) Give geometrical name of the figure $ABA'B'$.
- (d) Draw and name its lines of symmetry.