Sample Paper 8

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.

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) Shailja invests ₹9620 on ₹100 shares at ₹80. If the company pays her 18% dividend then her total dividend is :

(a) 2420 (b) 2200
(c) 2120 (d) 2160

(ii) Raghav deposited ₹400 per month in a recurring deposit account for 18 months. If the rate of interest is 9% per annum, then the interest earned by him during this period is:

(a) ₹3,856.50 (b) ₹3,343.50
(c) ₹330 (d) ₹256.50

(iii) If $\frac{x}{2} - 5 \leq \frac{x}{3} - 4$ and x is a natural even number, then the solution set of x is:

(a) $\{-6, -4, -2\}$ (b) $\{6, -4, -2, 2, 4, 6\}$
(c) $\{2, 4, 6\}$ (d) $\{2, 4, 6, 8\}$

(iv) One root of the quadratic equation $3x^2 - 4x - 4 = 0$ is:

(a) 3/2 (b) 2
(c) 2/3 (d) 6

(v) If $x:y=2:9$ and $y:z=3:5$, then $x:z$ is:

(a) 2 : 15 (b) 4 : 15

(c) 6 : 5 (d) 2 : 5

(vi) What is the remainder on dividing $2x^3+6x^2-17x-4$ by $2x+1$?:

(a) $\frac{39}{4}$ (b) $\frac{123}{4}$

(c) $\frac{23}{4}$ (d) $\frac{139}{4}$

(vii) If $A=\begin{bmatrix}2 & 3\\7 & 5\end{bmatrix}$ then A^2 will be

(a) $\begin{bmatrix}14 & 9\\48 & 25\end{bmatrix}$ (b) $\begin{bmatrix}25 & 21\\49 & 46\end{bmatrix}$

(c) $\begin{bmatrix}14 & 25\\48 & 9\end{bmatrix}$ (d) $\begin{bmatrix}25 & 49\\15 & 46\end{bmatrix}$

(viii) Which term of an AP, 21, 42, 63, 84, ... is 210?

(a) 9th (b) 10th

(c) 11th (d) 12th

(ix) x-axis divides the line segment joining $A(2,-3)$ and $B(5,6)$ in the ratio

(a) 2 : 3 (b) 3 : 5

(c) 1 : 2 (d) 2 : 1

(x) Which of the following is the slope of the line passing through the points (7, 7) and (5, 1)

(a) 2 (b) 3

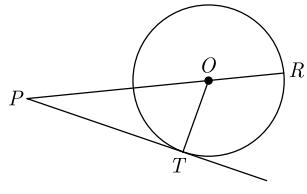
(c) 4 (d) -3

(xi) The areas of two similar triangles ABC and PQR are in the ratio $9:16$. If $BC=4.5$ cm , then the length of QR is

(a) 4 cm (b) 4.5 cm

(c) 3 cm (d) 6 cm

(xii) In figure, on a circle of radius 7 cm, tangent $PT$is drawn from a point P such that PT = 24 cm. If O is the centre of the circle, then the length of PR is



(a) 30 cm (b) 28 cm

(c) 32 cm (d) 25 cm

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(xiii) The diameter of a sphere is 6 cm. It is melted and drawn into a wire of diameter 2 mm. The length of the wire is

(a) 12 m (b) 18 m

(c) 36 m (d) 66 m

(xiv) If $\cos 9\alpha = \sin \alpha$ and $9\alpha < 90^\circ$, then the value of $\tan 5\alpha$ is

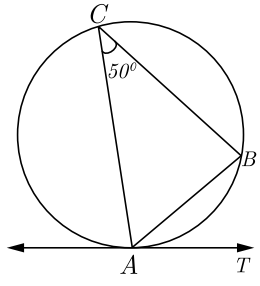
(a) $\frac{1}{\sqrt{3}}$ (b) $\sqrt{3}$

(c) 1 (d) 0

(xv) 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 a equal to

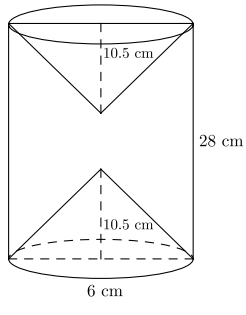
(a) 65^o (b) 60^o

(c) 50^o (d) 40^o



QUESTION 2.

(i) From a solid wooden cylinder of height 28 cm and diameter 6 cm, two conical cavities are hollowed out. The diameter of the cones are also of 6 cm and height 10.5 cm. Taking $\pi = \frac{22}{7}$ find the volume of the remaining solid. [4]



(ii) Sonia has a Recurring Deposit Account in a bank and deposited ₹600 per month for $2\frac{1}{2}$ year. If the rate of intersect was 10% per annum, find the maturity value of this account. [4]

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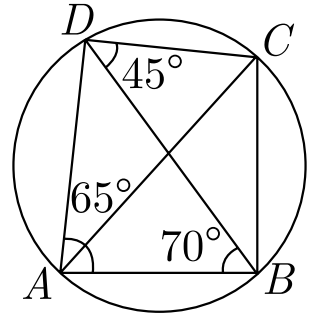
(iii) Prove that $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$ [4]

QUESTION 3.

(i) How much should a man invest in ₹50 shares selling at ₹60 to obtain an income of ₹450, if the rate of dividend declared is 10%. Also, find his yield percent, to the nearest whole number. [4]

(ii) In the given figure, $\angle BAD = 65^\circ$, $\angle ABD = 70^\circ$, $\angle BDC = 45^\circ$. [4]
(a) Prove that AC is a diameter of the circle.
(b) Find $\angle ACB$.



(iii) Use graph paper for this question. A survey regarding height (in cm) of 60 boys belonging to class 10 of a school was conducted. The following data was recorded. [5]

Heights (in cm)	Number of boys
135-140	4
140-145	8
145-150	20
150-155	14
155-160	7
160-165	6
165-170	1

Taking 2 cm = height of 10 cm along one axis and 2 cm = 10 boys along the other axis draw an ogive of the above distribution. Use the graph of estimate the following
(a) the median
(b) lower quartile
(c) If above 158 cm is considered as the tall boys of the class, find the number of boys in the class who are tall.

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SECTION - B

(Attempt any four questions.)

QUESTION 4.

(i) If $A = \begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 4 \\ -1 & 7 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 \\ -1 & 4 \end{bmatrix}$, find $AC + B^2 - 10C$. [3]

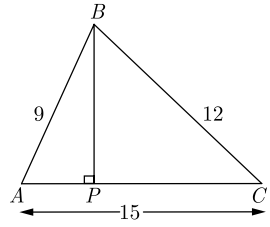
(ii) Using a ruler, construct a ΔABC with $BC = 6.4$ cm, $CA = 5.8$ cm and $\angle ABC = 60°$. Draw its incircle. Measure and record the radius of the circle. [3]

(iii) In the given figure, $AB = 9$ cm, $BC = 12$ cm and $AC = 15$ cm. $BP \perp AC$. [4]

(a) What is the measure of $\angle ABC$?

(b) Prove that $\Delta APB \sim \Delta ABC$

(c) Find the lengths of BP and AP.



QUESTION 5.

(i) The mean of the following distribution is 314. Determine the missing frequency x. [3]

Class	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	5	x	10	12	7	8

(ii) A computer mechanic in Delhi charges repairing cost from three different persons Amar, Akbar, and Anthony with certain discounts. The repairing costs and the corresponding discounts are as given below : [3]

S. No.	Name of the Person	Repairing Cost	Discount
(a)	Amar	₹11000	30%
(b)	Akbar	₹12000	40%
(c)	Anthony	₹9000	30%

If the rate of GST is 18%, Find the :

(a) Total GST paid.

(b) Total bill amount including GST paid by Akbar.

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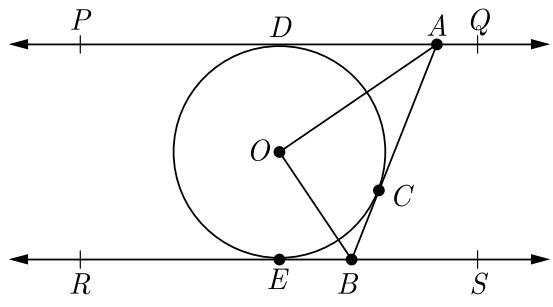
(iii) In Figure, PQ and RS are two parallel tangents to a circle with centre O and another

tangent AB with point of contact C intersecting PQ at A and RS at B. Prove that $\angle AOB = 90^\circ$. [4]



QUESTION 6.

(i) The sum of first three terms of a G.P. is $\frac{39}{10}$ and their product is 1. Find the common ratio and the terms. [3]

(ii) In a garden bed, there are 23 rose plants in the first row, 21 are in the 2^{nd}, 19 in 3^{rd} row and so on. There are 5 plants in the last row. How many rows are there of rose plants> also find the total number of roes plants in the garden. [3]

(iii) A Mathematics aptitude test of 50 students as follows : [4]

Marks	50-60	60-70	70-80	80-90	90-100
Number of students	4	8	14	19	5

Draw a histogram for the above data using a graph paper and locate the mode.

QUESTION 7.

(i) Line $4x - 5y = 20$ meets x-axis at A. Find the equation of a line passing through A and perpendicular to line $2x + 3y = 6$. [5]

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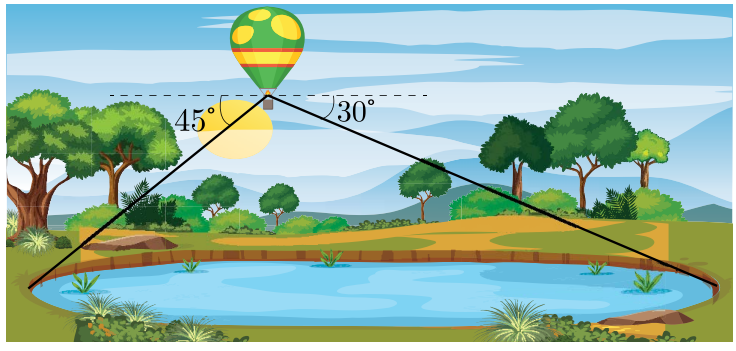
(ii) The angle of depression to one side of a lake, measured from a balloon 300 meter above the lake as shown in the accompanying figure, is 45°. The angle of depression to the opposite side of the lake is 30°. [5]

(a) Find the width of the lake.

(b) Find the ground distance of balloon from sides of lake.



QUESTION 8.

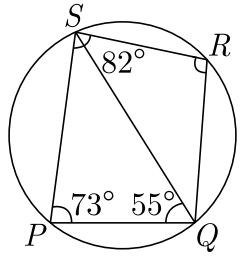
(i) If $x \in Z$, solve the inequation $2 + 5x < 3x - 5 \leq 4x$. Also, represent its solution set on a number line. [3]

(ii) $PQRS$ is a cyclic quadrilateral. Given $\angle QPS = 73^\circ$, $\angle PQS = 55^\circ$ and $\angle PSR = 82^\circ$, calculate [3]

(a) $\angle QRS$

(b) $\angle RQS$

(c) $\angle PRQ$.



(iii) If (a, b) is the mid-point of the line segment joining the points A $(10, -6)$ and B$(k, 4)$ and $a - 2b = 18$, find the value of k and the distance AB. [4]

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QUESTION 9.

(i) The numbers $K+3$, $K+2$, $3K-7$ and $2K-3$ are in proportion. Find K. [3]

(ii) If the price of a book is reduced by ₹ 5, a person can by 4 more books for ₹ 600. Find the original price of the book. [3]

(iii) Construct a ΔBCP with $AB = 5.5$ cm $AC = 6$ cm and $\angle BAC = 105^\circ$. Hence : [4]
- (a) Construct the locus of points equidistant from BA and BC.
- (b) Construct the locus of points equidistant from B and C.
- (c) Mark the point which satisfies the above two loci as P. Measure and write the length of PC.

QUESTION 10.

(i) If $(x+2)$ and $(x+3)$ are factors of x^3+ax+b, find the values of a and b. [3]

(ii) A bag contains 25 cards, numbered through 1 to 25. A card is drawn at random. What is the probability that the number on the card drawn is: [3]
- (a) multiple of 5
- (b) a perfect square
- (c) a prime number?

(iii) Using graph paper, plot the point $A(6,4)$ and $B(0,4)$. [4]
- (a) Reflect A and B in the origin to get the images A' and B'.
- (b) Write the coordinates of A' and B'.
- (c) State the geometrical name for the figure $ABA'B'$.
- (d) Find its perimeter.

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