KARNATAKA ICSE SCHOOLS ASSOCIATION

ICSE STD. X Preparatory Examination 2024

Subject: Mathematics

Maximum Marks: 80 **Times Allowed: 2 hr. 30 Min.** **Date: 16-01-2024**

Answers to this Paper must be written on the paper provided separately.

You will not be allowed to write during first 15 minutes.

This time is to be spent in reading the question paper.

The time given at the head of this Paper is the time allowed for writing the answers.

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
(Attempt all questions from this section)

Question 1

Choose the correct answer to the questions from the given options: [15]

(Do not copy the question, write the correct answers only.)

(i) If 2x, x+10 and 3x+2 are in AP, then x =

(a) 0

(b) 2

(c) 4

(d) 6

(ii) If $\begin{bmatrix} x+2y & 3y \\ 4x & 2 \end{bmatrix} = \begin{bmatrix} 0 & -3 \\ 8 & 2 \end{bmatrix}$,then the value of x-y =

(a) -3

(b) 1

(c) 3

(d) 5

(iii) If the lines 2y = 3x+2 and y= ax+5 are perpendicular to each other, then a is

(a) $\frac{3}{2}$

(b) $\frac{2}{3}$

(c) $\frac{-2}{3}$

(d) $\frac{-3}{2}$

(iv) (secA+tanA) (1-sinA) =

(a) sinA

(b) cosA

(c) secA

(d) cosecA

(v) For the following distribution,

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

the sum of the lower limits of the median and modal class is

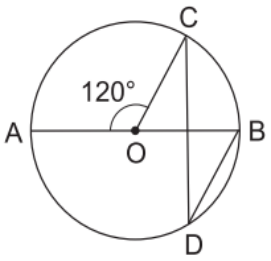
(a) 15

(b) 25

(c) 30

(d) 35

(vi) In the given figure, O is the centre of a circle and $\angle AOC = 120^0$. Then, $\angle BDC$ =



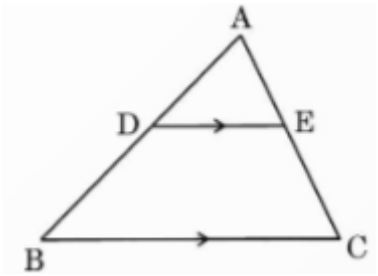
(a) 30º

(b) 45º

(c) 60º

(d) 15º

(vii) In ΔABC, DE ∥ BC. If AD: DB = 2:3, then DE: BC equal to



(a) 2: 3

(b) 3: 5

(c) 2: 5

(d) 3: 2

(viii) The selling price of a shirt including GST is ₹896. If the rate of GST is 12% then the price of the shirt is

(a) ₹704

(b) ₹96

(c) ₹800

(d) ₹848

(ix) The ratio of radii of two cylinders is 2:3 and the ratio of their heights is 5:3. The ratio of their volumes is

(a) 10:17

(b) 20:27

(c) 17:27

(d) None of these

(x) Money required to buy 400 shares of ₹ 12.50 each at a premium of ₹1 is

(a) ₹5000

(b) ₹4600

(c) ₹6250

(d) ₹5400

(xi) The point (-2, 3) is invariant under the reflection of the line

(a) $x=-2$

(b) $y = 3$

(c) none of (a) and (b)

(d) both of (a) and (b)

(xii) If $x: y = 3:4$, then $(7x+3y): (7x-3y)$ is equal to

(a) 5:2

(b) 4:3

(c) 11:3

(d) 37:19

(xiii) The solution set for $5-3x \geq -2x+2$, $x \in W$ is

(a) {0, 1, 2, 3}

(b) {0, 1, 2}

(c) {1, 2, 3……..}

(d) {-3,-2,-1, 0, 1, 2, 3}

(xiv) The midpoint of the line joining A (3, 5) and B(x, y) is (2, 3), then B(x, y) is

(a) (5, 2)

(b) (1, 1)

(c) (-2,-2)

(d) (2, 3)

(xv) **Assertion (A) :** From a point P, 10 cm away from the centre of a circle, a tangent PT of length 8 cm is drawn, then the radius of the circle is 5 cm.

Reason (R) : A line drawn through the end of a radius and perpendicular to it is a tangent to the circle.

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

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(c) (A) is true but (R) is false

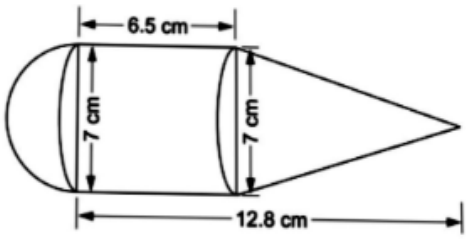
(d) (A) is false but (R) is true

Question 2

(i) Prove that $\frac{\text{cosec}\,\theta}{(\text{cosec}\,\theta-1)}+\frac{\text{cosec}\,\theta}{(\text{cosec}\,\theta+1)}=2\text{sec}^2\,\theta$ [4]

(ii) Mr. Mehta deposits a certain sum of money each month in a Recurring Deposit Account of a bank. If the rate of interest is of 8% per annum and Mr. Mehta gets ₹ 8088 from the bank after 3 years, find the value of his monthly instalment. [4]

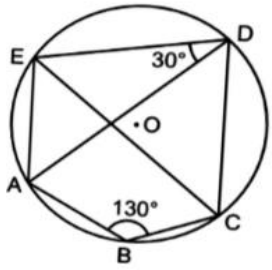
(iii) The given figure represents a solid consisting of a cylinder surmounted by a cone at one end and a hemisphere at the other. Find the volume of the solid [4]



Question 3

(i) If $x=\frac{\sqrt{a+2b}+\sqrt{a-2b}}{\sqrt{a+2b}-\sqrt{a-2b}}$,using the properties of proportion show that $bx^2-ax+b=0$ [4]

(ii) A, B, C, D and E are points on the circle. O is the centre, ∠ADE = 30°, ∠ABC = 130°. Calculate ∠ACE, ∠AEC and ∠EOC. [4]



(iii) Draw an ogive for the following data taking 2 cm = 10 marks on one axis and 2 cm = 10 students on the other. From your graph determine:
(a) The median.
(b) The inter-quartile range.
(c) The no. of students who scored more than 45. [5]

Marks	0–10	10–20	20–30	30–40	40–50	50–60	60–70
No. of students	6	10	15	13	20	9	7

SECTION B

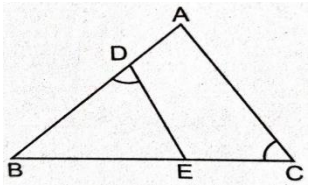
(*Attempt **any four** questions from this Section.*)

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) Solve the given equation and give your answer till two significant digits: $x-\frac{18}{x}=6$ [3]

(iii) In the given figure, ABC is a triangle with $\angle EDB = \angle ACB$.
Prove that $\Delta ABC \sim \Delta EBD$. If BE =6 cm, EC=4 cm, BD = 5 cm and the area of ΔBED =9 cm^2, calculate:
(a) Length of AB
(b) Area of ΔABC [4]



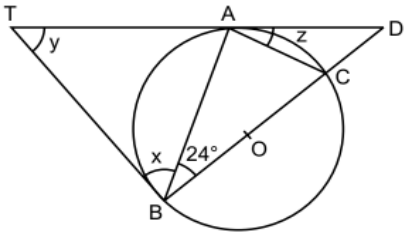
Question 5

(i) A manufacturer sells a camera for ₹10000 to a dealer. The dealer sells it a customer at a profit of 12%. If all transactions are within the state and the rate of GST is 28%, calculate
(a) the GST paid by the dealer to the State Government.
(b) the total tax received by the Central Government.
(c) the price paid by the customer. [3]

(ii) Find the mode of the following distribution by drawing a histogram. [3]

Wages in ₹	40–50	50–60	60–70	70–80	80–90	90–100
No. of workers	3	8	12	6	4	2

(iii) The tangents TA and TB are drawn to the circle with centre O. The diameter BC and tangent TA, when produced, meet at D. Given that $\angle ABC = 24°$, calculate the values of x, y and z. [4]



Question 6

(i) How many terms of the G.P. 1, 4, 16 … must be taken to have their sum equal to 341? [3]

(ii) Calculate the mean of the following distribution by short-cut method. [3]

Marks	0–10	10–20	20–30	30–40	40–50	50–60	60–70	70–80
No. of students	3	8	12	14	10	6	5	2

(iii) The surface area of a solid metallic sphere is 1256 cm^2. It is melted and recast into solid right circular cones of radius 2.5 cm and height 8 cm. Calculate:
(a) the radius of the solid sphere,
(b) the number of cones recast. (Take π = 3.14) [4]

Question 7

(i) Find the equation of a line, which has the y intercept 4, and is parallel to the line $2x - 3y = 7$. Find the coordinates of the point, where it cuts the x-axis. [3]

(ii) Use the Remainder Theorem to factorise the given expression completely:
$2x^3 + x^2 - 13x + 6$ [3]

(iii) Construct a regular hexagon of side 4 cm. Construct a circle circumscribing the hexagon mention the circumradius. [4]

Question 8

(i) Solve the given inequation and graph the solution on the number line: [3]

$$-3 < -\frac{1}{2} - \frac{2x}{3} \leq \frac{5}{6}, x \in R$$

(ii) Using ruler and compasses construct
(a) ΔABC in which AB = 5.5 cm, BC =3.4 cm and CA = 4.9 cm
(b) The locus of point equidistant from A and C and draw a circle passing through A and C. [3]

(iii) Use graph paper for this question. Plot P (2, 4), Q (–2, 1) and R (5, 0). Reflect points P and Q in x-axis to get P'and Q'. Take scale as 2cm=1 unit on both the axis.
(a) Write their co-ordinates.
(b) Give a geometrical name to the figure formed by joining the points PQQ'P'R. [4]

Question 9

(i) A company with 4000 shares of nominal value of ₹110 each declares an annual dividend of 15%. Calculate: (a) The total amount of dividend paid by the company.
(b) The annual income of Virat who holds 88 shares in the company.
(c) If he received only 10% on his investment, find the price Virat paid for each share. [3]

(ii) By increasing the speed of a car by 10 km/h, the time of journey for a distance of 72 km is reduced by 36 minutes. Find the original speed of the car. [3]

(iii) Cards numbered 11 to 60 are kept in a box. If a card is drawn at random from the box, find the probability that the number on the drawn card is
(a) an odd number.
(b) a perfect square number.
(c) a number divisible by 5.
(d) a prime number less than 20 [4]

Question 10

(i) Point P divides the line segment joining the points A (2, 1) and B (5, -8) such that AP: AB = 1:3. If P lies on the line 2x-y+k=0, find the value of k. [3]

(ii) The sum of 4th and 8th terms of an AP is 24 and the sum of its 6^{th} and 10^{th} terms is 44. Find the sum of first ten terms of the AP. [3]

(iii) As observed from the top of a 80 m tall light house, the angles of depression of two ships on the same side of the light house in horizontal line with its base are 30° and 40° respectively. Find the distance between the two ships. Give your answer correct to the nearest metre. [4]
(Use mathematical tables for this question)