KARNATAKA ICSE SCHOOLS ASSOCIATION

ICSE STD. X Preparatory Examination 2025

Subject – Mathematics

Duration: 3 Hours **Maximum Marks: 80** **Date: 07.01.2025**

General Instructions

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

You will not be allowed to write during the 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

Instruction for the invigilator

Kindly read aloud the Instructions given above to all the candidates present in the Examination Hall.

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 73 is the n^{th} term of the arithmetic progression 3,8,13,18…then 'n' is

(a) 13

(b) 14

(c) 15

(d) 16

(ii) If $\frac{7m+2n}{7m-2n} = \frac{5}{3}$ then m: n is

(a) 7:8

(b) 2:7

(c) 1:8

(d) 8:7

(iii) A man invests ₹ 24,000 on ₹60 shares at a discount of 20%. If the dividend declared by the company is 10% then his annual income is

(a) ₹2880

(b) ₹1500

(c) ₹3000

(d) ₹5000

(iv) One of the following point is invariant with respect to the line $y = -4$

(a) (3, 4)

(b) (3, -4)

(c) (4, 3)

(d) (-3, 4)

(v) If $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ x Y $= \begin{bmatrix} p \\ q \end{bmatrix}$. The order of the matrix Y is

(a) 2 x 2

(b) 1 x 2

(c) 2 x 1

(d) 1 x 1

(vi) The sum of the probability of an event and its complementary is

(a) 0

(b) 1

(c) < 1

(d) > 1

(vii) In a recurring deposit account, Virat deposits ₹500 per month for 24 months,if the interest he earns is one-tenth of his total deposit, the rate of interest is

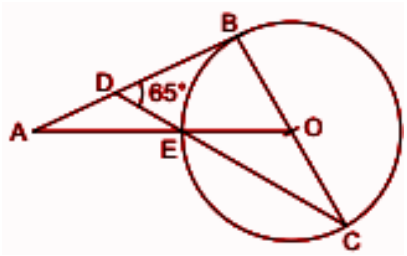
(a) 4.8%

(b) 9.6%

(c) 7.2%

(d) 3.2%

(viii) In the adjoining figure, O is the centre of the circle and AB is a tangent to it at point B. If ∠BDC = 65° then ∠BAO is



(a) 50°

(b) 25°

(c) 65°

(d) 40°

(ix) (sin θ + cos θ) (tan θ + cot θ) =

(a) sec θ + cosec θ

(b) sec θ + cos θ

(c) sec θ

(d) cosec θ

(x) The number of solid spheres, each of diameter 6 cm, that can be made by melting a solid metal cylinder of height 45 cm and diameter 4 cm, is

(a) 2

(b) 4

(c) 5

(d) 6

(xi) Quadrilateral ABCD is circumscribed to a circle. If AB=6 cm, BC=7 cm, and CD= 4 cm then the length of AD is

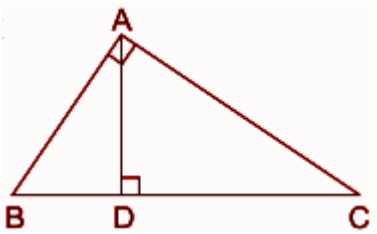
(a) 3cm

(b) 4cm

(c) 6cm

(d) 7cm

(xii) In the given figure, ∠BAC = 90° and AD⊥ BC. Then,



(a) $BC\ X\ CD = BC^2$

(b) $AB\ X\ AC = BC^2$

(c) $BD\ X\ CD = AD^2$

(d) $AB\ X\ AC = AD^2$

(xiii) Sourav purchases an article for ₹ 5,310 which includes a discount of 10% on the marked price and 18% GST on the selling price. The marked price of the article is

(a)₹ 4,200

(b)₹5,000

(c)₹5,500

(d)₹5,900

(xiv) When $2x^3 - 3x^2 + ax - 9$ is divided by (x+3), the remainder is 6, then the value of 'a' is

(a) 4

(b) -8

(c) -7

(d) -32

(xv) **Assertion(A):**Given two straight lines $3x - 2y = 5$ and $2x + ky + 7 = 0$ are perpendicular to each other when value of k =3

Reason(R): If AB and CD are two mutually perpendicular lines and their inclination be α and θ respectively then $\tan\theta = -\cot\alpha$

(a) Assertion(A) is true but reason(R) is false.

(b) Assertion (A) is false but reason(R) is true.

(c) Both assertion (A) and reason(R) are true and reason(R) is the correct explanation of assertion (A).

(d) Both assertion (A) and reason(R) are true and reason(R) is not the correct explanation of assertion (A).

Question 2

(i) Solve $x - \frac{1}{x} = 3 \neq 0$ and give your answer correct to two decimal places. [4]

(ii) Find the number of terms of a GP whose first term is $\frac{3}{4}$, common ratio is 2 and the last term is 384 and find their sum. [4]

(iii) Find the value of x, which satisfies the given inequation and graph the solution set on number line:

$$-1\frac{5}{6} < \frac{3}{2} - \frac{2x}{3} \leq 3, x \in W$$ [4]

Question 3

(i) A piggy bank contains hundred 50-p coins, fifty ₹1 coins, twenty ₹2 and ten ₹5 coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, find the probability the coin falling out will be

(a) a 50-p coin,

(b) of value more than ₹1,

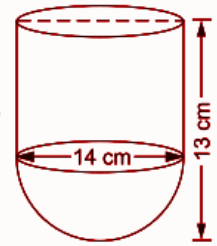
(c) of value less than ₹5

(d) a ₹1 or ₹2 coin. [4]

(ii) A vessel is in the form of a hemispherical bowl mounted by a hollow cylinder of negligible thickness. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find

(a) the capacity of the vessel.

(b) the inner surface area of the vessel. [4]



(iii) Plot points A(0,4),B(1,2),E(0,1),C(3,3),H(3,0) and reflect B,C,H in the Y axis to D,F,G respectively and reflect E in the X axis to J.Write the coordinates of reflected points. Join A,B,E,D,A and also E,C,H,J,G,F,E in order and name the geometrical figures separately. Take scale as 2 cm = 1 unit on both the axes. [5]

SECTION B

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

Question 4

(i) Find x and y if: $\begin{bmatrix} 5 & 4 \\ -2 & 6 \end{bmatrix}\begin{bmatrix} 4x \\ 3 \end{bmatrix}+2\begin{bmatrix} 5 \\ 7 \end{bmatrix}=6\begin{bmatrix} 7 \\ y \end{bmatrix}$ [3]

(ii) Rohit deposits a certain sum of money every month in a recurring deposit account for 2 years. If the bank pays interest at 10% p.a. and Rohit receives ₹66,250 as the maturity value of the account, what sum of money did he pay every month? [3]

(iii) Use ruler and compasses only for this question.

(a) Construct ΔABC, where AB = 3.5 cm, BC = 6 cm and $\angle ABC = 60°$.

(b) Construct the locus of points inside the triangle which are equidistant from BA and BC.

(c) Construct the locus of points inside the triangle which are equidistant from B and C.

(d) Mark the point P which is equidistant from AB, BC and also equidistant from B and C. Measure and record the length of PB. [4]

Question 5

(i) SGST on an AC is 14% and the price of the AC including GST is ₹ 57,600. What is the

(a) rate of GST?

(b) price of AC before GST?

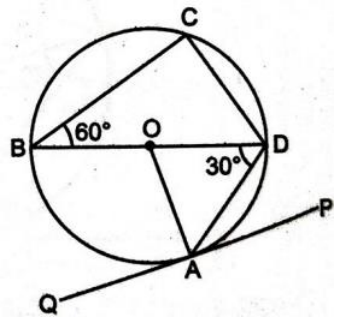
(c) amount of GST [3]

(ii) The distance between Mumbai and Pune is 192 km. Travelling by the Deccan Queen, it takes 48 minutes less than another train. Calculate the speed of the Deccan Queen if the speeds of the two trains differ by 20 km/hr. [3]

(iii) The horizontal distance between two towers is 120 m.The angle of elevation of the top and the angle of depression of the bottom of first tower as observed from the top of second tower are 30° and 24° respectively. Find the height of the two towers and give your answer to three significant figures. [4]

Question 6

(i) In the given figure, PQ is a tangent to the circle at A.
BD is a diameter and O is the centre.
If ∠ADB = 30° and ∠DBC = 60°, find :
(a) ∠QAB
(b) ∠PAD
(c) ∠CDB [3]



(ii) Find the sum of first n terms of an AP whose n^{th} term is (5n-1).Hence, find the sum of the first 20 terms. [3]

(iii) Use remainder theorem to factorise the expression $2x^3 + 9x^2 + 7x - 6$. Hence solve the equation $2x^3 + 9x^2 + 7x - 6 = 0$. [4]

Question 7

(i) Prove that $(\sin\theta + \text{cosec}\,\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$ [3]

(ii) If $\frac{\sqrt{x+2} + \sqrt{x-3}}{\sqrt{x+2} - \sqrt{x-3}} = 5$, Use the properties of proportion and solve for x. [3]

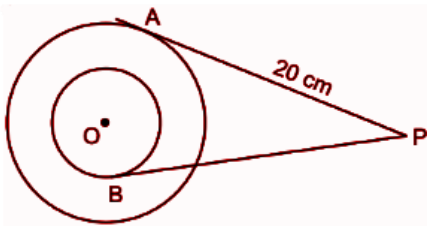
(iii) The weight of 50 apples were recorded as given below .Calculate the mean weight, to the nearest gram, by step deviation method.

Weight in grams	80-85	85-90	90-95	95-100	100-105	105-110	110-115
No.of apples	5	8	10	12	8	4	3

[4]

Question 8

(i) In the given figure, O is the centre of two concentric circles with radii 7 cm and 15 cm.
If AP and BP are tangents to the circles and AP = 20 cm, find the length of BP. [3]



(ii) The toy model of a truck and a real truck are in the ratio 1: 60.
(a) Calculate the length of the truck, in metres, if the length of the model is 25 cm.
(b) If the open area of loading of the truck is 90 m^2, find the same area of the model in cm^2.
(c) If the volume of the model is 7500 cm^3,find the volume of the truck in m^3. [3]

(iii) Points A and B have coordinates $(7, -3)$ and $(1,9)$ respectively.Find
(a) the slope of AB.
(b) the equation of the perpendicular bisector of the line segment AB.
(c) the value of $'p'$ if $(-2, p)$ lies on perpendicular bisector. [4]

Question 9

(i) Use graph paper for this question.

The marks obtained by 100 students in an English test are given below.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No.of students	5	9	12	14	20	16	11	6	4	3

Draw the ogive and estimate

(a) the median marks.

(b) the number of students who did not pass the test if the pass percentage was 50.

(c) the upper quartile marks.(Take 2 cm = 10 units on both the axes) [6]

(ii) Using ruler and compass construct a triangle ABC in which AB=6 cm,$\angle$ABC = 120° and BC=5 cm.Construct a circle passing through A,B and C.Measure and write down the radius of the circle. [4]

Question 10

(i) In ΔABC, DE $\parallel$ BC. If area of ΔADE**:** area of DBCE = 9: 16, find the ratio of AD: DB. [3]

(ii) Find the ratio in which the point (3, b) divides the segment joining the points A (7, 1) and B (0, 8). Find the value of b. [3]

(iii) Surya invests ₹4500 in 8%, ₹10 shares at ₹15.He sells the shares when the price rises to ₹30 and invests the proceeds in12% ₹100 shares at ₹125.Calculate

(a) the sale proceeds

(b) the number of ₹125 shares bought by Surya.

(c) the change in the annual income. [4]