

ICSE Class 10 Mathematics

Practice Paper

(Based on the Latest Exam Pattern and Previous Year Trends)

Maximum Marks: 80

Time Allowed: Two and a half hours

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.*

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SECTION A (40 Marks)

(Attempt all questions from this Section)

Question 1

- (a) Find the values of x and y if:

$$2 \begin{bmatrix} x & 5 \\ 7 & y-3 \end{bmatrix} + \begin{bmatrix} 3 & -4 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 7 & 6 \\ 15 & 14 \end{bmatrix}$$

[3]

- (b) Using the Remainder and Factor Theorem, factorise the following polynomial completely:

$$x^3 + 10x^2 - 37x + 26$$

[3]

- (c) A box contains 25 cards numbered from 1 to 25. A card is drawn at random from the box. Find the probability that the number on the card is:

- (i) a prime number.

- (ii) a multiple of 5.
- (iii) a perfect square.

[4]

Question 2

- (a) Mr. Sharma opened a Recurring Deposit Account in a bank. He deposited Rs. 2500 per month for two years. At the time of maturity, he received Rs. 67,500. Find the rate of interest per annum. [3]
- (b) Solve the following inequation and represent the solution set on the number line:

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

[3]

- (c) The marks obtained by 120 students in a mathematics 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	2	8	12	15	25	20	16	10	8	4

Calculate the mean marks correct to one decimal place using the step-deviation method. [4]

Question 3

- (a) Prove the following trigonometric identity:

$$\frac{\sin A}{1 + \cos A} + \frac{1 + \cos A}{\sin A} = 2 \csc A$$

[3]

- (b) A solid metallic sphere of radius 6 cm is melted and recast into a solid cylinder of radius 4 cm. Find the height of the cylinder and the curved surface area of the cylinder. (Take $\pi = 3.14$) [3]
- (c) In the given figure, O is the centre of the circle. $\angle AOB = 110^\circ$ and $\angle BDC = 65^\circ$. Find:

- (i) $\angle ACB$
- (ii) $\angle OAC$
- (iii) $\angle OCB$

(Assume a standard cyclic quadrilateral configuration where A, B, C, D lie on the circle). [4]

Question 4

- (a) The 4th term of an Arithmetic Progression (A.P.) is 22 and the 15th term is 66. Find the first term and the common difference. Hence, find the sum of the first 8 terms of the A.P. [3]

- (b) If $\frac{a}{b} = \frac{c}{d}$, prove that:

$$\frac{5a + 7b}{5a - 7b} = \frac{5c + 7d}{5c - 7d}$$

[3]

- (c) Use graph paper for this question. Take 2 cm = 1 unit on both axes.

- (i) Plot the points $A(-2, 0)$, $B(4, 0)$, and $C(1, 4)$.
- (ii) Reflect C in the x-axis to C' .
- (iii) Write the coordinates of C' .
- (iv) Name the geometrical figure $ACBC'$ and find its area.

[4]

SECTION B (40 Marks)

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

Question 5

- (a) A shopkeeper bought an article for Rs. 3450. He marks the price of the article 16% above the cost price. The rate of GST charged is 18%. Find:
- (i) The marked price of the article.
 - (ii) The total amount paid by a consumer to buy the article.

[3]

- (b) Solve the following quadratic equation for x and give your answer correct to two decimal places:

$$2x^2 - 5x - 4 = 0$$

[3]

- (c) The line segment joining $A(2, 3)$ and $B(6, -5)$ is intersected by the x-axis at the point K . Write down the ordinate of the point K . Hence, find the ratio in which K divides AB . Also, find the coordinates of the point K .

[4]

Question 6

- (a) Let $A = \begin{bmatrix} 2 & 1 \\ 0 & -2 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 1 \\ -3 & -2 \end{bmatrix}$, and $C = \begin{bmatrix} -3 & 2 \\ -1 & 4 \end{bmatrix}$. Find $A^2 + BC$. [3]
- (b) In $\triangle ABC$, D and E are points on the sides AB and AC respectively such that $DE \parallel BC$. If $AD = 2.4$ cm, $DB = 3.6$ cm, and $AC = 5$ cm, find the length of AE . Also, find the ratio of the areas of $\triangle ADE$ and $\triangle ABC$. [3]
- (c) From the top of a cliff 90 m high, the angles of depression of the top and bottom of a tower are observed to be 30° and 60° respectively. Find the height of the tower. (Take $\sqrt{3} = 1.732$) [4]

Question 7

- (a) A man invests Rs. 22,500 in Rs. 50 shares available at a 10% discount. If the dividend paid by the company is 12%, calculate:
- (i) The number of shares purchased.
 - (ii) The annual dividend received.
 - (iii) The rate of return on his investment.

[3]

- (b) Construct a regular hexagon of side 4 cm. Construct a circle circumscribing the hexagon. (Show all construction lines clearly). [3]

- (c) The following table shows the distribution of the heights of a group of students:

Height (cm)	140-145	145-150	150-155	155-160	160-165	165-170
No. of Students	8	12	18	22	26	14

Use a graph sheet to draw an Ogive for the distribution. Use the Ogive to estimate:

- The median height.
- The number of students whose height is more than 162 cm.

[4]

Question 8

- If the 3rd term of a Geometric Progression (G.P.) is 12 and the 6th term is 96, find the first term and the common ratio. [3]
- Find the equation of a line passing through the point $(2, -3)$ and parallel to the line $3x - 4y + 5 = 0$. [3]
- Draw a histogram for the following frequency distribution and estimate the mode:

Class Interval	10-20	20-30	30-40	40-50	50-60
Frequency	5	12	18	10	4

[4]

Question 9

- A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. [3]
- Prove that:

$$\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \csc \theta$$

[3]
- The vertices of a triangle are $P(4, 2)$, $Q(-2, 6)$, and $R(0, -4)$. Find the equation of the median passing through the vertex P . [4]

Question 10

- If $x = \frac{\sqrt{a+b} + \sqrt{a-b}}{\sqrt{a+b} - \sqrt{a-b}}$, prove that $bx^2 - 2ax + b = 0$. [3]
- A two-digit number is such that the product of its digits is 14. If 45 is added to the number, the digits interchange their places. Find the number. [3]
- In a circle with centre O , a chord AB is drawn. Tangents are drawn at points A and B which intersect at P . If $\angle APB = 60^\circ$ and the radius of the circle is 5 cm, find the length of the chord AB and the distance OP . [4]

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