

**ICSE 2023 EXAMINATION,  
FINAL PRACTICE PAPER-2  
MATHEMATICS**

**Time: Two and half hours**

**Maximum Marks: 80**

---

*Answer 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 time allowed for writing the answers.*

---

*Attempt all questions form 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 indented marks for questions or parts question are given in brackets [ ].  
Mathematical tables are provided.*

---

**Section A**

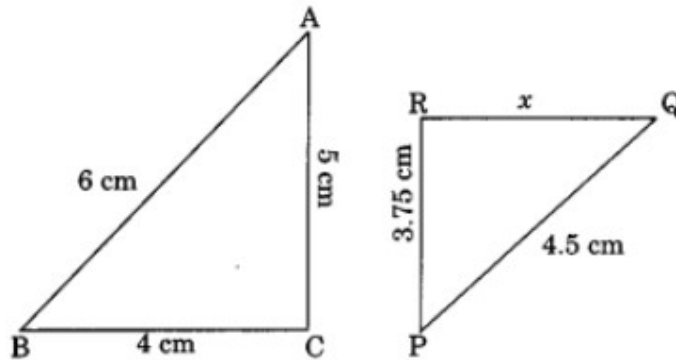
*(Attempt all questions from this Section)*

**Question: 1**

Choose the correct answers to the questions from the given options. [15]

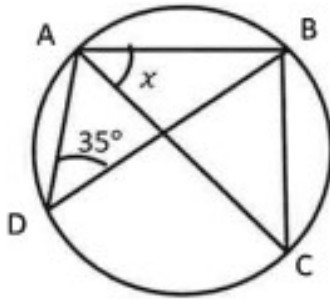
- (i) The cost of some financial services is given below in the same city. Cost of services: ₹500, ₹700, ₹1200, ₹600. If the rate of GST is 12%, then the amount of GST on the above services
- (a) Rs 180 (b) Rs 360  
(c) Rs 3360 (d) Rs 540
- (ii) If  $-\frac{2}{3}$  is a root of the equation  $kx^2 - 13x - 10 = 0$ , the value of  $k$  is
- (a) 1 (b) 2  
(c) 3 (d) 4
- (iii) Which of the following quadratic equations has no real roots?
- (a)  $x^2 + 2x + 1 = 0$  (b)  $2x^2 - 3x - 5 = 0$   
(c)  $-3x^2 + 2x + 1 = 0$  (d)  $x^2 - 5x + 7 = 0$
- (iv) Given  $\begin{bmatrix} a & b \\ c & d \end{bmatrix} \times B = \begin{bmatrix} p \\ q \end{bmatrix}$ . The order of matrix B is:
- (a)  $2 \times 2$  (b)  $2 \times 1$   
(c)  $1 \times 2$  (d)  $1 \times 1$

- (v) If the 15th term of an arithmetic progression is 47, and the common difference is 3, what is the first term of the progression?
- (a) 2 (b) 5  
(c) 8 (d) 11
- (vi) What is the image of the point  $(-5, 2)$  under reflection in the y-axis?
- (a)  $(5, 2)$  (b)  $(-5, -2)$   
(c)  $(5, -2)$  (d)  $(-5, 2)$
- (vii) In the given figure  $\Delta ABC \sim \Delta PQR$ . The value of  $x$  is:



- (a) 2.5 cm (b) 3.5 cm  
(c) 2.75 cm (d) 3 cm
- (viii) The radii of two cylinders are in the ratio  $2 : 3$  and their heights are in the ratio  $5 : 3$ . The ratio of their volumes is:
- (a)  $27 : 20$  (b)  $20 : 27$   
(c)  $9 : 4$  (d)  $4 : 9$
- (ix) The solution set of the following inequation is  $2 \leq 3x + 5 < 13$  when  $x \in Z$
- (a)  $\{-1, 0, 1, 2, 3\}$  (b)  $\{0, 1, 2, 3\}$   
(c)  $\{0, 1, 2\}$  (d)  $\{-1, 0, 1, 2\}$
- (x) A fair die is thrown once. The probability of getting a composite number is:
- (a)  $\frac{1}{3}$  (b)  $\frac{1}{6}$   
(c)  $\frac{1}{2}$  (d)  $\frac{5}{6}$
- (xi) If  $A = \begin{bmatrix} -2 & 3 \\ 4 & 5 \end{bmatrix}$ ,  $B = \begin{bmatrix} 5 & 2 \\ -7 & 3 \end{bmatrix}$ , then the value of  $(A + B)^T$  is:
- (a)  $\begin{bmatrix} 3 & 5 \\ -3 & 8 \end{bmatrix}$  (b)  $\begin{bmatrix} 3 & -3 \\ 5 & 8 \end{bmatrix}$   
(c)  $\begin{bmatrix} 3 & 8 \\ -3 & 5 \end{bmatrix}$  (d)  $\begin{bmatrix} 3 & 5 \\ -8 & 3 \end{bmatrix}$

- (xii) If the mid-point of the line segment joining the points  $A(a, b - 2)$  and  $B(-2, 4)$  is  $C(2, -3)$  then the values of  $a$  and  $b$  are:
- (a)  $a = 4, b = -5$  (b)  $a = 6, b = -8$   
(c)  $a = -6, b = 8$  (d)  $a = -6, b = -8$
- (xiii) In the given diagram  $AC$  is a diameter of the circle and  $\angle ADB = 35^\circ$ . The degree measure of  $x$  is:



- (a)  $55^\circ$  (b)  $35^\circ$   
(c)  $45^\circ$  (d)  $70^\circ$
- (xiv) The A.P. whose  $k^{th}$  term is  $7 - 3k$  is:
- (a)  $-1, 2, 5, 8 \dots$  (b)  $4, 1, -2, -5, \dots$   
(c)  $-2, -1, 0, 1 \dots$  (d)  $1, 3, 5, 7 \dots$
- (xv) The mode of a given frequency distribution is found graphically with the help of:
- (a) Histogram (b) Frequency Curve  
(c) Frequency polygon (d) Ogive

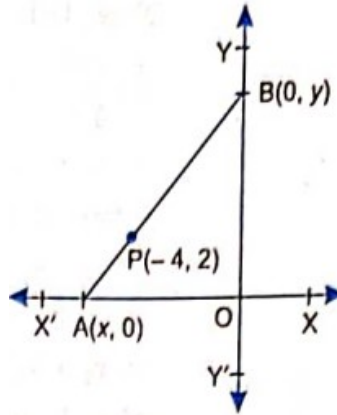
### Question: 2

- (i) Amit deposited Rs. 800 per month in a Recurring Deposit at the rate of 10% per annum.. If he received Rs10120 at the time of maturity, find the time for which the account was held in the bank. [4]
- (ii) If  $a, b, c$  are in continued proportion, prove that:  $\frac{pa^2+qab+r^2}{pb^2+qbc+rc^2} = \frac{a}{c}$ . [4]
- (iii) Prove that:  $\frac{1}{\sec A - \tan A} + \frac{1}{\sec A + \tan A} = \frac{2}{\cos A}$  [4]

### Question: 3

- (i) A hollow sphere of internal and external diameters 4 cm and 8 cm respectively is melted into a cone of base diameter 8 cm. Find the height of the cone. [4]

- (ii) In the given figure, line APB meets the x-axis at A and y-axis at B and P(-4, 2) is a point such that  $AP : AB = 1 : 3$ . Write down the co-ordinates of A and B. [4]



- (iii) Use graph paper for this question:  
The point P (5, 3) was reflected in the origin to get the image F.
- Write down the co-ordinates of P'.
  - If M is the foot of the perpendicular from P to the X-axis, find the co-ordinates of M.
  - If N is the foot of the perpendicular from P' to the X-axis, find the co-ordinates of N.
  - Name the figure PMP'N.
  - Find the area of the figure PMP'N. [5]

### Section-B [40 Marks]

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

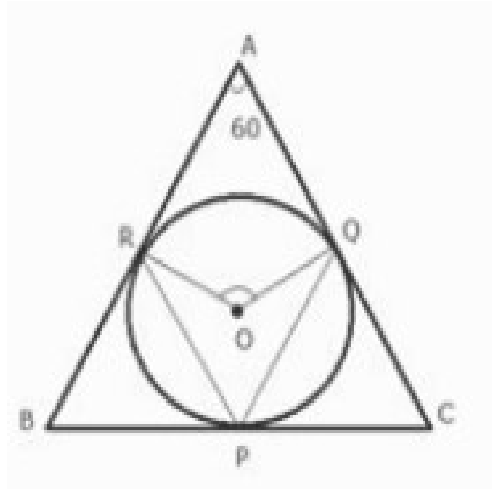
#### Question: 4

- A manufacturer sells a T.V to a dealer for Rs.18000 and the dealer sells it to a consumer at a profit of Rs 1500. If the sales are intra state and the rate of G.S.T is 12 %, Find:
  - The amount of GST paid by the dealer to the State Government.
  - The amount of GST received by the Central Government.
  - The amount that the consumer pays for the TV. [3]
- Solve the quadratic equation  $(x - 1)^2 - 3x + 4 = 0$ . Write your answer correct to 2 significant figures. [3]
- Use graph sheet for this question. Draw a histogram for the following data, and use it to find mode. [4]

<i>Class</i>	0-5	5-10	10-15	15-20	20-25	25-30
<i>Frequency</i>	2	5	18	14	8	5

**Question: 5**

- (i) Given  $A = \begin{bmatrix} 3 & -2 \\ -1 & 4 \end{bmatrix}$ ,  $B = \begin{bmatrix} 6 \\ 1 \end{bmatrix}$  and  $C = \begin{bmatrix} -4 \\ 5 \end{bmatrix}$ , find the values of  $AB - 5C$ . [3]
- (ii) In a triangle ABC, given that  $\angle A = 60^\circ$ , the In-circle (with centre O) touches BC, CA and AB at points P, Q and R respectively. Calculate:  $\angle QOR$  and  $\angle QPR$ . [3]



- (iii) Factorise the given polynomial completely, using Remainder Theorem.  
 $x^3 + 10x^2 - 37x + 26$ . [4]

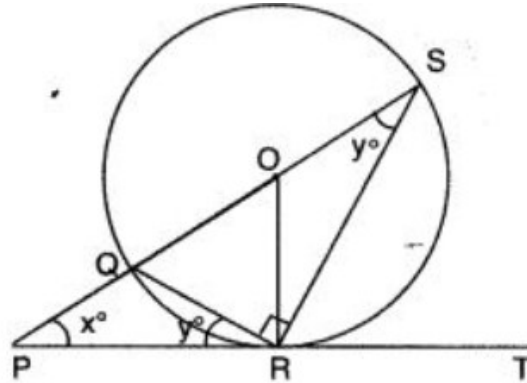
**Question: 6**

- (i) Given a line segment AB joining the points  $A(-4, 6)$  and  $B(8, -3)$  find  
(a) the ratio in which AB is divided by the y-axis.  
(b) find the coordinates of the point of intersection,  
(c) the length of AB. [3]
- (ii) Prove that:  $\frac{1}{\sin A + \cos A} + \frac{1}{\sin A - \cos A} = \frac{2 \sin A}{1 - 2 \cos^2 A}$  [3]
- (iii) How many terms are there in the AP whose first term and fifth terms are  $-14$  and  $2$  respectively and the sum of all the terms is  $40$ . [4]

**Question: 7**

- (i) A box contains some black balls and 30 white balls. If the probability of drawing a black ball is two-fifths of a white ball, find the number of black balls in the box. [3]
- (ii) If a solid circular cylinder of iron whose diameter is 15 cm and height 10 cm is melted and recasted into a sphere, then what is the radius of the sphere? [3]

- (iii) In the given figure, PT touches a circle with centre O at R. Diameter SQ when produced meets PT at P. If  $\angle SPR = x^\circ$  and  $\angle QRP = y^\circ$ , show that  $x^\circ + 2y^\circ = 90^\circ$ . [4]



**Question: 8**

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

$$4x - 19 < \frac{3x}{5} - 2 \leq -\frac{2}{5} + x, x \in R.$$

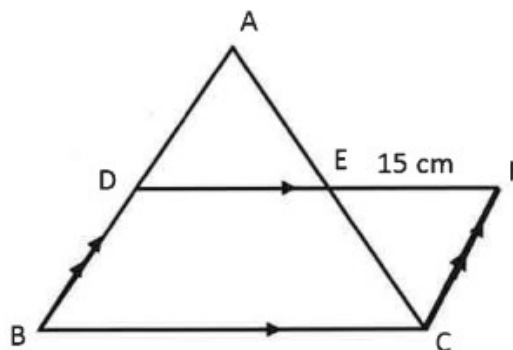
- (ii) Calculate the arithmetic mean, correct to one decimal place, for the following frequency distribution of marks obtained in a Geometry test. [3]

Marks	0-10	10-20	20-30	30-40	40-50
No. of students	7	13	15	12	3

- (iii) In the given diagram, ABC is a triangle and BCFD is a parallelogram [4]  
 $AD : DB = 4 : 5$  and  $EF = 15$  cm.

Find:

- (a)  $AE : EC$   
 (b)  $DE$   
 (c)  $BC$



**Question: 9**

- (i) Amit takes 12 days less than the days taken by Sumit to complete a certain work. If both working together, takes 8 days to complete the work find the number of days taken by Sumit to complete the work, working alone. [4]

- (ii) The following distribution represents the heights of a group of students: [6]

Height (in cm)	140-145	145-150	150-155	155-160	160-165	165-170	170-175
No of students	8	12	18	22	26	10	4

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

- (a) the inter quartile range
- (b) the number of students whose height is more than 168 cm
- (c) the number of students whose height is less than 148 cm.

**Question: 10**

- (i) Find  $x$  from the following equation using properties of proportion: [3]

$$\frac{\sqrt{2+x} + \sqrt{3-x}}{\sqrt{2+x} - \sqrt{3-x}} = 3$$

- (ii) Draw a circle of radius 4.5 cm and mark a point P at a distance of 11 cm from the centre O of the circle. Draw two tangents from P to circle PA, PB, and measure the tangents. [3]

- (iii) An observer on top of a cliff: 200 m above the sea level, observes the angles of depression of depression of the two ships to be  $45^{\circ}$ , and  $30^{\circ}$  respectively.

Find the distance between the ships, if the ships are:

- (a) on the same side of the cliff,
- (b) on the opposite sides of the cliff. [4]