

**Sample Paper 4**  
**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.
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**SECTION - A**

(Attempt all questions from this Section.)

**QUESTION 1.**

Choose the correct answers to the questions from the given options.

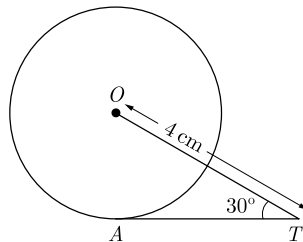
[15]

(Do not copy the questions, write the correct answer only.)

- (i) The taxable value of a toy is ₹900. Rate of GST is 18%. What is the price of the toy ?  
(a) ₹1,100 (b) ₹1,062  
(c) ₹981 (d) ₹1,900
- (ii) Eesha deposited ₹200 per month in a R.D. account of Canara Bank for 3 years. If the bank pays an interest of 11% per annum, then the matured value of this account is \_\_\_\_\_.  
(a) ₹ 8,421 (b) ₹8,124  
(c) ₹8,412 (d) ₹8,214
- (iii) The solution set for the inequation  $2x + 7 \leq 17$ ,  $x \in N$  is :  
(a) {1, 2, 3, 4, 5} (b) {0, 1, 2, 3, 4, 5}  
(c) {1, 2, 3, 4} (d) {0, 1, 2, 3, 4}
- (iv) If  $x = 2$  is a solution of the quadratic equation  $kx^2 + 2x - 3 = 0$ , then the value of  $k$  is:  
(a) -1 (b) -4  
(c)  $\frac{1}{4}$  (d)  $-\frac{1}{4}$

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- (v) If  $\frac{3x+5y}{3x-5y} = \frac{7}{3}$  then  $x : y$  is:
- (a) 25 : 6 (b) 7 : 3  
(c) 9 : 49 (d) 10 : 4
- (vi) What is the remainder when  $2x^3 - 7x^2 + 5x - 9$  is divided by  $2x - 3$  ?
- (a)  $-\frac{21}{2}$  (b)  $-\frac{21}{4}$   
(c)  $-\frac{129}{4}$  (d)  $-\frac{129}{2}$
- (vii) If  $A = \begin{bmatrix} 5 \\ 3 \end{bmatrix}$ ,  $B = \begin{bmatrix} 2 \\ 0 \end{bmatrix}$  and matrix  $C = 2A + B$ , then the matrix  $C$  is :
- (a)  $\begin{bmatrix} 12 \\ 6 \end{bmatrix}$  (b)  $\begin{bmatrix} 12 \\ 4 \end{bmatrix}$   
(c)  $\begin{bmatrix} 7 \\ 4 \end{bmatrix}$  (d)  $\begin{bmatrix} 8 \\ 8 \end{bmatrix}$
- (viii) In an AP, if  $d = -4$ ,  $n = 7$  and  $a_n = 4$ , then  $a$  is equal to
- (a) 6 (b) 7  
(c) 20 (d) 28
- (ix) If the point  $P(6, 2)$  divides the line segment joining  $A(6, 5)$  and  $B(4, y)$  in the ratio 3 : 1 then the value of  $y$  is
- (a) 4 (b) 3  
(c) 2 (d) 1
- (x) A line passes through  $(x_1, y_1)$  and  $(h, k)$ . If slope of the line is  $m$ , then
- (a)  $y_1 - k = m(h - x_1)$  (b)  $k - y_1 = m(h - x_1)$   
(c)  $h - x_1 = m(y_1 - k)$  (d)  $h - x_1 = m(k - y_1)$
- (xi) Which of the following statement is false?
- (a) All isosceles triangles are similar. (b) All quadrilateral are similar.  
(c) All circles are similar. (d) None of the above
- (xii) In figure,  $AT$  is a tangent to the circle with centre  $O$  such that  $OT = 4$  cm and  $\angle OTA = 30^\circ$ . Then,  $AT$  is equal to



- (a) 4 cm (b) 2 cm  
(c)  $2\sqrt{3}$  cm (d)  $4\sqrt{3}$  cm

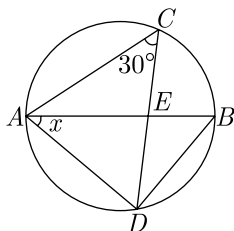
- (xiii) If the perimeter of one face of a cube is 20 cm, then its surface area is  
(a)  $120 \text{ cm}^2$  (b)  $150 \text{ cm}^2$   
(c)  $125 \text{ cm}^2$  (d)  $400 \text{ cm}^2$
- (xiv) Two chords  $AB$  and  $CD$  of a circle intersect at  $E$  such that  $AE = 2.4 \text{ cm}$ ,  $BE = 3.2 \text{ cm}$  and  $CE = 1.6 \text{ cm}$ . The length of  $DE$  is  
(a) 1.6 cm (b) 3.2 cm  
(c) 4.8 cm (d) 6.4 cm

**QUESTION 2.**

- (i) A well of diameter 6 m is dug 14 m deep.  $\frac{1}{15}$  of the earth taken out is spread evenly all around the well to form an embankment. [4]  
(a) Find the volume of the earth taken out.  
(b) If the height of embankment is 1.2 m, what is the width of the embankment ?
- (ii) Mr Rajinder has a recurring deposit in a bank for 3 years at 9% p.a. simple interest. if he gets ₹ 3996 as interest at the time of maturity, find: [4]  
(a) the monthly installment.  
(b) the amount of maturity.
- (iii) Prove that :  $\frac{\cot \theta + \operatorname{cosec} \theta - 1}{\cot \theta - \operatorname{cosec} \theta + 1} = \frac{1 + \cot \theta}{\sin \theta}$  [4]

**QUESTION 3.**

- (i) Sachin invests ₹ 8500 in 10%, ₹ 100 shares at ₹ 170. He sells the shares when the price of each share rises by ₹ 30. He invests the proceeds in 12% ₹ 100 shares at ₹ 125. [4]  
Find  
(a) the sale proceeds.  
(b) the number of ₹ 125 shares he buys.  
(c) the change in his annual income.
- (ii) In the given circle with diameter  $AB$ , find the value of  $x$ . [4]



- (iii) Marks obtained by 200 students in an examination are given below : [5]

Marks	Number of students
0-10	5
10-20	11
20-30	10
30-40	20
40-50	28
50-60	37
60-70	40
70-80	29
80-90	14
90-100	6

Draw an ogive for the given distribution taking 2 cm =10 marks on one axis and 2 cm =20 students on the other axis.

Using the graph, determine.

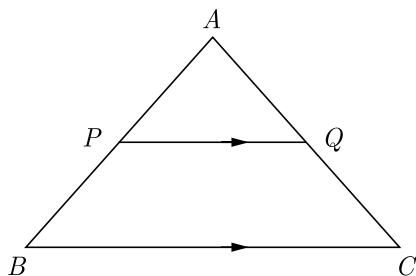
- the median marks.
- the number of students who failed, if minimum marks required to pass is 40.
- if scoring 85 and more marks is considered as grade on, find the number of students who secured grade one in the examination.

## SECTION - B

(Attempt any four questions.)

### QUESTION 4.

- Given  $A = \begin{bmatrix} x & 3 \\ y & 3 \end{bmatrix}$ . If  $A^2 = 3I$ , where  $I$  is the identity matrix of order 2, find  $x$  and  $y$ . [3]
- Construct a  $\triangle ABC$  with  $BC = 6.5$  cm,  $AB = 5.5$  cm and  $AC = 5$  cm. Construct the incircle of the triangle. Measure and record the radius of the incircle. [3]
- In given triangle  $\triangle ABC$ , line  $PQ$  and  $BC$  are parallel. If  $AP : PB = 2 : 3$ , find the : [4]
  - length of  $PQ$ , if  $BC = 7.5$  cm.
  - area of  $\triangle APQ$  : area of  $\triangle ABC$ .
  - area of  $\triangle APQ$  : area of  $PBCQ$ .

**QUESTION 5.**

- (i) The mean of the following frequency distribution is 18. The frequency  $f$  in the class interval 19-21 is missing. Determine  $f$ . [3]

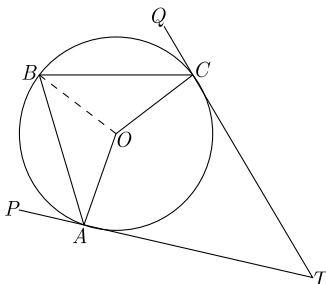
Class interval	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Frequency	3	6	9	13	$f$	5	4

- (ii) The following bill shows the GST rates and the marked Price of articles : [3]

S. No.	Articles	Marked Price	Rate of GST
(a)	Graphic Card	₹15500	18%
(b)	Laptop Adapter	₹1900	28%

Find the :

- Total GST paid.
  - Total bill amount including GST.
- (iii) In the given figure  $TP$  and  $TQ$  are two tangents to the circle with centre  $O$ , touching at  $A$  and  $C$ , respectively. If  $\angle BCQ = 55^\circ$  and  $\angle BAP = 60^\circ$ , find [4]
- $\angle OBA$  and  $\angle OBC$
  - $\angle AOC$
  - $\angle ATC$



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**QUESTION 6.**

- (i) If  $a^2 + 2$  and  $a^3 + 10$  are in G.P., then find the values(s) of  $a$ . [3]
- (ii) A thief runs with a uniform speed of 100 m/minute. After one minute a policeman runs after the thief to catch him. He goes with a speed of 100/minute in the first minute and increased his speed by 10 m/minute every succeeding minute. After how many minutes the policeman will catch the thief. [3]
- (iii) Using a graph paper to draw a histogram for the given distribution showing the number of runs scored by 50 batsman. Estimate the mode of the data. [4]

Runs Scored	Number of batsman
3000-4000	4
4000-5000	18
5000-6000	9
6000-7000	6
7000-8000	7
8000-9000	2
9000-10000	4

**QUESTION 7.**

- (i) The equation of a line is  $2x + 3y = 6$ . It intersects the  $y$ -axis at  $A$ . [5]  
(a) Write the co-ordinates of  $A$ .  
(b) Find the equation of a line through  $A$  and perpendicular to the given line.
- (ii) While doing some night fishing, Sarthak round a peninsula and a tall light house comes into view. Taking a sighting, Sarthak find the angle of elevation to the top of the lighthouse is  $30^\circ$ . If the lighthouse is known to be 25 m tall, how far from the lighthouse is Sarthak ? [5]



**QUESTION 8.**

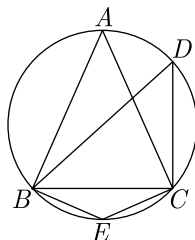
- (i) Solve the following inequation and write down the solution set. [3]

$$11x - 4 < 15x + 4 \leq 13x + 14, x \in W$$

Represent the solution on a real number line.

- (ii) In the given figure,  $\angle DBC = 58^\circ$ .  $BD$  is a diameter of the circle. Calculate [3]

- (a)  $\angle BDC$   
 (b)  $\angle BEC$   
 (c)  $\angle BAC$



- (iii) Determine the ratio in which the line  $2x + y = 4$  divides the line segment joining the points A(2, -2) and B(3, 7). [4]

**QUESTION 9.**

- (i) If 6 is the mean proportion between two numbers  $x$  and  $y$  and 48 is the third proportional to  $x$  and  $y$ , find the numbers. [3]
- (ii) Three consecutive positive integers are such that the sum of the square of the first and product of the other two is 46. Find the integers. [3]
- (iii) A straight line  $AB$  is 8 cm long. Locate by construction the locus of a point which is [4]  
 (a) equidistant from  $A$  and  $B$ .  
 (b) always 4 cm long from the line  $AB$ .  
 (c) Mark two points  $X$  and  $Y$ , which are 4 cm from  $AB$  equidistant from  $A$  and  $B$ . Name the figure  $AXBY$ .

**QUESTION 10.**

- (i) What must be added to the polynomial  $2x^3 - 3x^2 - 8x$  so that it leaves a remainder 10 when divided by  $2x + 1$ ? [3]

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- (ii) Hospital Stays : Hospital records indicated that maternity patients stayed in the hospital for the number of days shown in the distribution. [3]

Number of days stayed	Frequency
3	13
4	22
5	45
6	14
7	6
	100



Find these probabilities.

- A patient stayed exactly 5 days.
  - A patient stayed less than 6 days.
  - A patient stayed at most 4 days.
  - A patient stayed at least 5 days.
- (iii) Use graph paper for this question. Take 1 cm = 1 unit on both  $x$  and  $y$ -axes. [4]
- Plot the following points on your graph sheets :  $A(-4, 0)$ ,  $B(-3, 2)$ ,  $C(0, 4)$ ,  $D(4, 1)$  and  $E(7, 3)$
  - Reflect the points  $B$ ,  $C$ ,  $D$  and  $E$  on the  $X$ -axis and name them as  $B'$ ,  $C'$ ,  $D'$  and  $E'$ , respectively.
  - Join the points  $A$ ,  $B$ ,  $C$ ,  $D$ ,  $E$ ,  $E'$ ,  $D'$ ,  $C'$ ,  $B'$  and  $A'$  in order.
  - Name the closed figure formed.