Preparatory Examination 2022-23

Class: 10 ICSE **Subject: Mathematics** **Marks: 80**

Section A (40) marks

(Attempt all question from this section)

Question-1

Choose the correct answer to the question from the given option.

1. If the goods are purchased by a dealer in Jodhpur (Rajasthan) from a manufacture in other city of Rajasthan, the type of tax applicable will be
   a) GST
   b) SGST only
   c) CGST only
   d) IGST
2. If $x = \sqrt{2}$ is a solution of $px^2 + \sqrt{2}x - 4 = 0$, then the value of p is
   a) 2
   b) $\sqrt{2}$
   c) 1
   d) 0
3. If x+1 is a factor of the polynomial $2x^2 + 5x + P$, then the value of P is
   a) 2
   b) 5
   c) 1
   d) 3
4. If A=$[a_{ij}]_{2\times2}$; wher a_{ij}=2i+j, then a_{22} is
   a) 4 b) 6 c) 3 d) 8
5. If $K-1, K+3 \text{ and } 3K-1$ are in AP, then K is equal to
   a) 8 b) 4 c) –4 d) 6
6. The reflection of a point $A(x, y)$ in the original maps on to the point A'(7,-11). The coordinates of the point A are
   a) $(-7,11)$
   b) $(7,-11)$
   c) $(-7,-11)$
   d) (7,11)
7. If the median of the observations 8,11,13,x+1,x+7,23,30,35 is 18, the value of x is
   a) 13 b) 23 c) 21 d) 14
8. If the replacement set of the inequation $2x + 3 \leq \frac{15}{2}$ is {0,1,2,3,4,5,6,7,8,9}, the solution set is
   a) {0,1} b) {0,2} c) {1,2} d) {2,3,4}
9. The outer surface area of a metallic sphere is$616\ cm^2$. The radiusof the sphere is
   a) 6cm
   b) $6\sqrt{2}$ cm
   c) $7cm$
   d) 14cm
10. If the ratio of sides of two similar triangle Δ ABC & Δ PQR is 4:3, then ratio of the altitudes of ΔABC and ΔPQR is
    a) 3:4 b) 9:16 c) 16:9 d) 4:3
11. A survey of 100 families shows the following results.

No of children in a family	1	2	3	4
No. of family	35	32	23	10

When one family is chosen at random, the probability that the chosen family has 2 children is

a) $\frac{7}{20}$ b) $\frac{1}{10}$ c) $\frac{23}{50}$ d) $\frac{8}{25}$

12. For the matrix multiplication $[2,3]\begin{bmatrix}2x\\5\end{bmatrix}=[25]$, the value of x is

a) 3 b) 2 c) 2.5 d) 5

13. If 19^{th} term of an AP exceeds its 10^{th} term by 9, the common difference is

a) 1 b) 2 c) -2 d) 4

14. If the coordinates of two ends of a diameter of a circle are (–2,–3) and (–2,0), then coordinates of the centre of the circle are

a) (–2,–1.5) b) (–2,0) c) (–2,2) d) (2,3)

15. If angle between two tangents drawn from a point P to a circle is 50^0, then the angle between the two radii (draw at the point of contact) is

a) 110^0 b) 90^0 c) 120^0 d) 130^0

Question-2

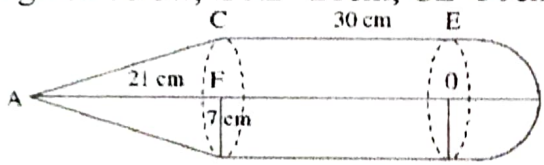
a) Mr. Jacob has a two years recurring deposit account in State bank of India and deposits ₹ 1,500 per month. If he recevies ₹ 37,875 at the time of maturity, find the rate of interest. [4]

b) Find x from the following equation using properties of proportion. $\frac{x^2-x+1}{x^2+x+1}=\frac{14(x-1)}{13(x-1)}$ [4]

c) If $\text{cosec}\theta - sin\theta = m^3 and\ \sec\theta - cos\theta = n^3$, then prove that $m^4n^2 + m^2n^4 = 1$. [4]

Question-3

a) In the diagram given below, if AF=21cm, CE=30cm and FB=7cm, find the volume of figure. [4]



b) In what ratio the line joining the points (2,-3) and (5, 6) is divided by x-axis? Also, find the coordinates of the point of division. [4]

c) A point P(a,b) is reflected in the y-axis to p' (-3,1). Find the value of a and b. P''(-3,1). Find the value of a and b.
P'' is the image of P when reflected in the x-axis. Write down the coordinates of P''.
P''' is the image of P when reflected in the line x=5. Write down the coordinates of P'''. [5]

Section B (40) Marks
(Attempt any four questions from this Section)

Question-4

a) Mrs. Achariya buys goods worth ₹ 7500 from Easy day store. She gets a rebate of 10% on ₹ 6000 as a member and a flat discount of ₹50 on the remaining. If the GST is charged @ 18%, find the total amount she has to pay for the goods. [3]

b) Solve the following quadratic equation for x and give your answer correct to three significant figures: $2x^2 - 4x - 3 = 0$ [3]

c) Using graph paper, find the mode of the distribution given below by drawing a histogram. [4]

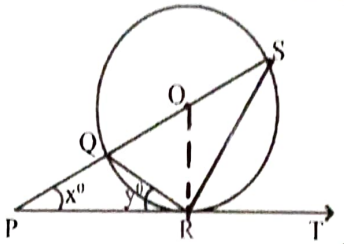
Classes	Frequency
0-20	15
20-40	6

40-60	18
60-80	10
80-100	12
100-120	10
120-140	8

Question-5

a) If $\begin{bmatrix}2 & 4\\6 & 2\end{bmatrix}\begin{bmatrix}3x\\2\end{bmatrix}+2\begin{bmatrix}3\\4\end{bmatrix}=5\begin{bmatrix}4\\y\end{bmatrix}$, find the values of x and Y. [3]

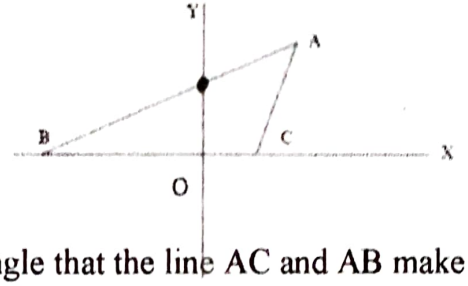
b) In this given figure, PT touches the circle with centre O at R. diameter SQ when produced meets PT at P. If $\angle SPR = x^0$ and $\angle QRP = y^0$, show that $x + 2y = 90^0$ [3]



c) Find the value of the coefficients a and b, if (x-2) and (x+3) are the factors of the expression $x^3 + ax^2 + bx - 12$. [4]

Question-6

a) In the diagram given below, equation of the line AB is $x - \sqrt{3}y + 1 = 0$ and that of AC is $x - y - 2 = 0$. [4]



i. Write down the angle that the line AC and AB make with the positive direction of x-axis.

ii. Find $B\hat{A}C$. [3]

b) Prove that : $\frac{1}{secx-tanx}+\frac{1}{\sec x+\tan x}=\frac{2}{cosx}$ [3]

c) If the ratio of the sum of first n terms of two A.P.s is 7n+1:4n+27, find the ratio of their pth terms. [4]

Question 7

a) A fair dice is rolled. Find the probability of getting:

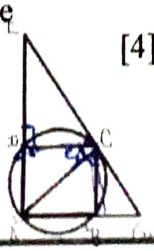
i. 3 on the face of the dice.

ii. An odd number on the face of the dice.

iii. A number greater than 1 on the face of the dice. [3]

b) Radius of a solid metallic sphere is 8 cm. It is melted and recast into 8 rings of metallic plate each of external radius $\frac{20}{3}cm$ and thickness 3cm. Determine the internal radius of each ring. [3]

c) In diagram, $\angle EDC = 90^0$.the tangent draw to the circle at C makes an angle of $50^0$with AB produced. Find the measure of $\angle ACB$. [4]



Question 8

a) Given: A= $\{x: 3 < 2x - 1 < 9, x \in R\}, B = \{x: 11 \leq 3x + 2, \leq 23, x \in\}$, where R is set of real numbers.

i. Represents A and B on number Lines.

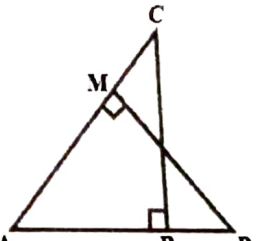
ii. On the number line, also marks A∩B. [3]

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

Marks	0-10	10-20	20-30	30-40	40-50
Number of students	7	13	15	12	3

c) In the given figure, ABC and AMP are right triangle right –angle at B and M respectively.

Given :AC =10cm, AP =15cm and PM =12cm.



i. Prove $\Delta ABC \sim \Delta AMP$

ii. Find AB and BC.

Question 9

a) Two water taps together can fill a tank in $9\frac{3}{8}h$. The tap of larger diameter takes 10h less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank. [4]

b) The following table shows the distribution of the heights of a group of student:

Height (cm)	**Number of students**
140-145	8
145-150	12
150-155	18
155-160	22
160-165	26
165-170	10
170-175	4

Use a graph sheet to draw an O give for the distribution.

Use the O give to find:

i. The inter quartile range.

ii. The number of students, whose height is more than 168cm.

iii. The number of students, whose height is less than 148 cm. [6]

Question 10

a) Solve for x: $\frac{\sqrt{5}-\sqrt{5-x}}{\sqrt{5}+\sqrt{5-x}} = 3$ [3]

b) Construct a triangle ABC, given that AB =6cm, BC =8cm and median AD =5cm.construct an incircle to triangle ABC and Measure its radius. [3]

c) The angle of elevation of an aeroplane from a point P on the ground is 60^0. After 12 seconds from the same points P, the angle of elevation of the same plane changes to 30^0. If the plane is flying horizontally at a speed of $600\sqrt{3}$ km/h, find the height at which the plane is flying. [4]