

Pre-Board Examination : 2022-23

Class - X

Mathematics

Time allowed : 2.30 Hours

Maximum Marks : 80

*(Candidates are allowed additional 15 minutes for only reading the paper.
They must not start writing during this time.)*

*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 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 and graph papers are provided.

Section – (A)

(Answer all questions from this section.)

Question 1.

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

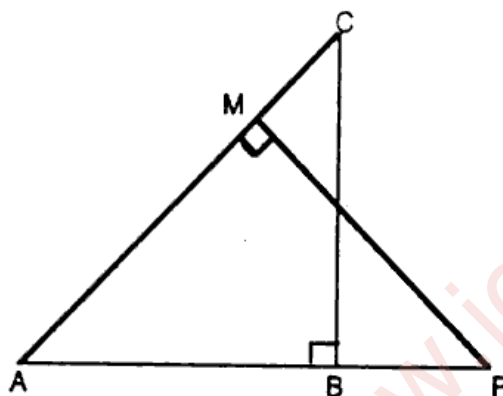
- (a) The roots of the quadratic equation $3x^2 + 4x - 3$ are :
(i) Not real (ii) Real and equal
(iii) Real and unequal (iv) Irrational
- (b) Taxes that are levied on any Intra-State purchase are ?
(i) IGST (ii) ~~CGST and SGST~~
(iii) SGST (iv) CGST
- (c) When $f(x) = x^2 - 5x + 1$ is divided by $(x + 1)$, then the remainder is :
(i) ~~7~~ (ii) -7 (iii) -2 (iv) 4
- (d) If $M \times \begin{bmatrix} 1 & 1 \\ 0 & 2 \end{bmatrix} = [1 \ 2]$, order of matrix M :
(i) 2×1 (ii) 1×2 (iii) 2×2 (iv) 3×1
- (e) If 84 is the n^{th} term of the arithmetic progression 21, 28, 35, 42
then 'n' is.
(i) 11 (ii) 14 (iii) 9 (iv) ~~10~~
- (f) The reflection of the point P (6, -2) in the origin is :
(i) ~~(-6, 2)~~ (ii) (6, 2) (iii) (-6, -2) (iv) (-2, -6)

P.T.O.

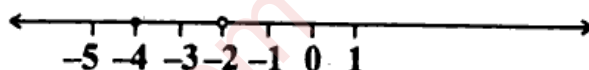
- (g) A bag contains 3 red balls and 4 black balls. A ball is drawn at random from bag, find probability that the ball drawn is black :

- (i) $\frac{3}{7}$ (ii) $\frac{4}{3}$ (iii) $\frac{4}{7}$ (iv) $\frac{3}{4}$

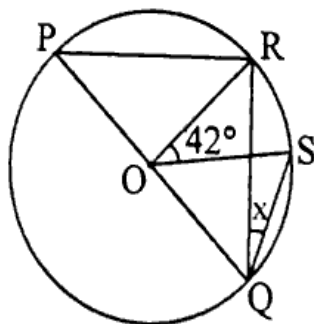
- (h) In the given figure, ABC and AMP are right angled at B and M respectively. If AC = 10 cm, AP = 15 cm and PM = 12 cm ; value of BC :



- (i) 18 cm (ii) 6 cm (iii) 7 cm (iv) 8 cm
- (i) Choose the correct solution set of the following number line :



- (i) $\{x : x \in \mathbb{R}; -5 < x < -1\}$ (ii) $\{x : x \in \mathbb{R}; -5 \leq x < -1\}$
 (iii) $\{x : x \in \mathbb{R}; -4 \leq x < -2\}$ (iv) $\{x : x \in \mathbb{R}; -4 \leq x \leq -2\}$
- (j) If vertices of a triangle be $(-4, 1), (3, -4), (1, 3)$ then centroid is :
 (i) $(2, 3)$ (ii) $(-2, -3)$ (iii) $(0, 0)$ (iv) $(-2, 3)$
- (k) In the figure PQ is a diameter of the circle whose centre is O. Given $\angle ROS = 42^\circ$ then x is equal to :



- (i) 42° (ii) 90° (iii) 69° (iv) 21°

Section – (B)

(Answer any FOUR questions from this section.)

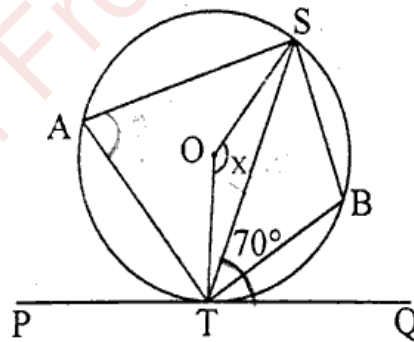
Question 4.

- (a) A manufacturer in Delhi manufactures a machine and marks it at ₹ 60,000. He sells the machine to a wholesaler (in Patna) at a discount of 20%. The wholesaler sells the machine to a dealer (in Agra) at a discount of 10% on the marked price. If the rate of GST is 28%, find the tax paid by the wholesaler to the central government. [3]
- (b) Solve the quadratic equation $x^2 - 3(x + 3) = 0$, give your answer correct to two significant figures. [3]
- (c) Find mode of the following distribution using its histogram : [4]

Class Intervals	200-300	300-400	400-500	500-600	600-700
Frequency	6	18	22	10	15

Question 5.

- (a) Let $A = \begin{bmatrix} 4 & -2 \\ 6 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 2 \\ 1 & -1 \end{bmatrix}$ & $C = \begin{bmatrix} -2 & 3 \\ 1 & -1 \end{bmatrix}$. Find $A^2 - A + BC$. [3]
- (b) PQ is tangent that touches circle at T. Find $\angle SOT$ if $\angle STQ = 70^\circ$. [3]



- (c) If $(x - 2)$ is a factor of the expression $2x^3 + ax^2 + bx - 14$ and when the expression is divided by $(x + 3)$, it leaves a remainder 52, find the values of a and b . [4]

Question 6.

- (a) If two opposite vertices of square are $(7, -3)$ and $(-1, 11)$ then find equations of its diagonals. [3]

-(b) Prove that : $\tan\theta - \cot\theta = \frac{2\sin^2\theta - 1}{\sin\theta\cos\theta}$ [4]

(c) The sum of three numbers in A.P. is 15 and the sum of the squares of the extreme terms is 58. Find the numbers. [3]

Question 7.

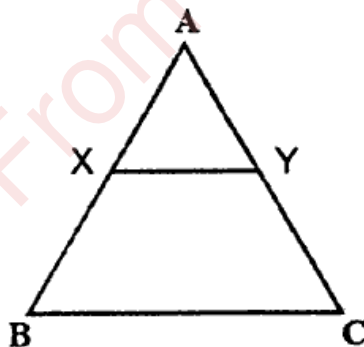
(a) Solve the following inequation, write the solution set and represent it on the number line :

$$-\frac{1}{5} \leq \frac{3x}{10} + 1 < \frac{2}{5}; x \in \mathbb{R}. \quad [3]$$

(b) The mean of following frequency table is 50 but frequencies are missing, find the missing frequencies : [4]

Class Intervals	0-20	20-40	40-60	60-80	80-100	Total
Frequency	17	f_1	32	f_2	19	120

(c) In the given figure $\Delta ABC \sim \Delta AXY$. If $AY : YC = 4 : 7$ and $XY = 6.6$ cm, find BC. If 'x' be the length of the perpendicular from A to XY, find the length of the perpendicular from A to BC in terms of 'x'. [3]



Question 8.

(a) A hotel bill for a number of people for overnight stay is ₹ 4,800. If there were 4 people more, the bill each person had to pay, would have reduced by ₹ 200. Find the number of people staying overnight. [4]

(b) The weight of 200 students in kg are given below :

Weight	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
Frequency	5	17	22	45	51	31	20	9

Use a graph paper to draw an ogive for the above distribution.

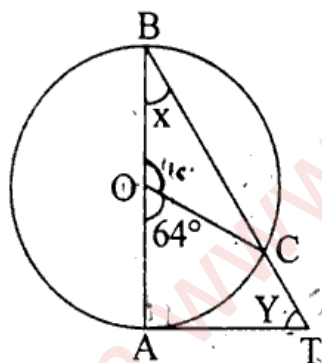
Use your ogive to estimate the following :

[6]

- (i) Find median
- (ii) The percentage of students weighing 55 kg or more,
- (iii) The weight above which the heaviest 30% of the students fall,
- (iv) The number of students who are under weight and over weight, if 55.70 kg is considered as standard weight ?

Question 9.

- (a) A joker's cap is in the form of a right circular cone of base radius 7 cm and height 24 cm. Find the area of the sheet required to make 10 such caps. [3]
- (b) AT is a tangent, AB is a diameter with centre O. If $\angle AOC = 64^\circ$, calculate $\angle ABC$ and $\angle ATC$. [3]



- (c) Using a ruler and a compass, construct a triangle ABC in which $AB = 6$ cm, $\angle ABC = 90^\circ$ and $BC = 7.2$ cm and BD is perpendicular to side AC. Draw circumcircle of triangle BDC and then state the length of the radius of this circumcircle drawn. [4]

Question 10.

- (a) Using component and dividend, find the value of x: $\frac{2x + \sqrt{4x^2 - 1}}{2x - \sqrt{4x^2 - 1}} = 4$ [3]
- (b) An observer on the top of a cliff; 200 m above the sea level, observes the angles of depression of the two ships, on the same side of the cliff, to be 45° and 30° respectively. Find the distance between the ships. [4]
- (c) Cards marked with numbers 1, 2, 3, 4 30 are well shuffled and a card is drawn at random. What is the probability that the number on the card is : [3]
 - (i) A prime number (ii) Divisible by 3 (iii) A perfect square