I- PRE BOARD EXAMINATION
MATHEMATICS

(Maximum Marks: 80)
(Time allowed: Two and half hours)

Answer 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.

The intended marks for questions or parts of questions are given in brackets [ ].

SECTION – A [40 Marks]

(Attempt all questions from this Section)

Question 1

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

(i) A dealer in Mumbai sold a washing machine to a consumer in Mumbai for ₹ 18,000. If the rate of GST is 18%, then SGST is :

(a) ₹ 1620 (b) ₹ 3240

(c) nil (d) none of these

(ii) The quadratic equation $kx^2 - 6x - 1 = 0$ has real and equal roots, then the value of k is :

(a) - 3 (b) 1

(c) - 9 (d) 2

(iii) If $(x - 2)$ is a factor of $x^2 + 5x + p$, then the value of p is :

(a) 10 (b) 12

(c) - 13 (d) - 14

(iv) If $3[4 \quad x] + 2[y \quad -3] = [10 \quad 0]$, then

(a) $x = 1, y = 0$ (b) $x = -1, y = -2$

(c) $x = 2, y = -1$ (d) $x = -2, y = 1$

(v) 57, 54, 51, 48, ... are in A.P. The value of the 8th term is :

(a) 36 (b) 78

(c) - 36 (d) - 78

(vi) The reflection of the point P(– 2 , 3) in the x-axis is :

(a) (2, 3)

(b) (2, –3)

(c) (– 2, – 3)

(d) invariant point to the x-axis

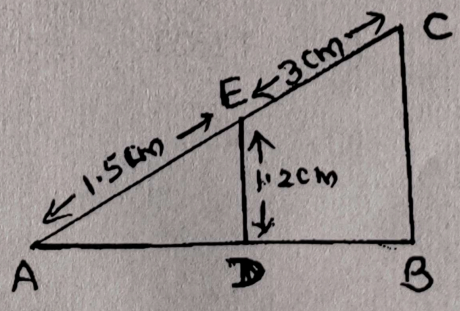
(vii) In the given figure, if $\Delta ABC \sim \Delta ADE$, then BC is equal to

(a) 4.5 cm

(b) 3 cm

(c) 3.6 cm

(d) 2.4 cm



(viii) Volume of a cylinder is 330 cm^3. The volume of the cone having same radius and height as that of the given cylinder, is :

(a) 330 cm^3 (b) 165 cm3

(c) 110 cm^3 (d) 220 cm^3

(ix) If $8-x \leq 4x-2$, $x \in N$, then the solution set is :

(a) {2, 3, 4, ...}

(b) {3, 4, 5, ...}

(c) {0, 1, 2}

(d) {2, 3, 4, 5, 6}

(x) If the probability of a player winning a game is 0.56, then the probability of his losing this game is :

(a) 0.56 (b) 1

(c) 0.44 (d) 0

(xi) Given $\begin{bmatrix} a & b \end{bmatrix} \times X = \begin{bmatrix} p & q \end{bmatrix}$. The order of matrix X is :

(a) 2×2 (b) 1×2

(c) 2×1 (d) 1×1

(xii) If the lines $7y = ax + 4$ and $2y = 3 - x$ are parallel to each other, then the value of a is :

(a) -1 (b) $\frac{-7}{2}$

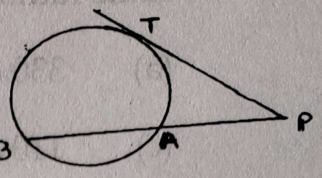
(c) $\frac{-2}{7}$ (d) 14

(xiii) If the vertices of a triangle are (1, 3), (2, –4) and (–3, 1). Then the coordinates of its centroid are :

(a) (0, 0) (b) (0, 1)

(c) (1, 0) (d) (1, 1)

(xiv) In the figure, PT is a tangent and PB is a secant. If PA = 9 cm, AB = 7 cm, then the length of tangent PT is :



(a) 10 cm (b) 11 cm

(c) 12 cm (d) 13 cm

(xv) The median of a grouped frequency distribution is found graphically by drawing :

(a) a linear graph (b) a histogram

(c) a frequency polygon

(d) a cumulative frequency curve

Question 2

(i) Satyam has a recurring deposit account in a bank of ₹ 600 per month. If the bank pays 7% p.a. and he gets ₹ 15450 as maturity amount. Find the total time for which the account was held. [4]

(ii) If $x=\frac{\sqrt{a+1}+\sqrt{a-1}}{\sqrt{a+1}-\sqrt{a-1}}$, then using the properties of proportion, show that $x^2 - 2ax + 1 = 0$ [4]

(iii) Prove that : [4]

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

Question 3

(i) The volume of a right circular cone is 1232 cm^3. If the radius of its base is 14 cm, find its curved surface area. [4]

(ii) Given a line segment AB joining the points A(– 4, 6) and B(8, –3), find : [4]

(a) the ratio in which AB is divided by the y-axis.

(b) the coordinates of the point of intersection

(iii) Using a graph paper, plot points A (6, 4) and B(0, 4) : [5]

(a) Reflect A and B in the origin to get images A′ and B′

(b) Write the coordinates of A′ and B′

(c) State the geometrical name for the figure AB A′B′

(d) Find its perimeter.

SECTION – B

(Attempt any four questions from this section.)

Question 4

(i) Mr. Bedi visits the market and buys the following articles : [3]

Medicines costings ₹ 950, GST @ 18%

A pair of shoes costing ₹ 3000, GST @ 5% .

A laptop bag costing ₹ 1000 with a discount 30%, GST @ 18%.

Calculate the total amount of GST paid.

(ii) Solve the equation $3x^2-x-7=0$ using the quadratic formula and give your answer correct to 2 decimal places. [3]

(iii) Find the mean of the following distribution by step deviation method : [4]

Class interval	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	10	6	8	12	5	9

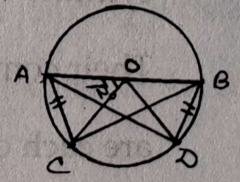
Question 5

(i) If $A=\begin{bmatrix}3 & 0\\ 5 & 1\end{bmatrix}$ and $B=\begin{bmatrix}-4 & 2\\ 1 & 0\end{bmatrix}$. Find $A^2 - 2AB$. [3]

(ii) In the adjoining figure, O is the centre of the circle and AB is a diameter . If AC= BC and ∠AOC = 72°, find :

(a) ∠ABC (b) ∠BAD

(c) ∠ABD



(iii) Factorise the given polynomial completely using Remainder Theorem : [4]

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

Question 6

(i) Points A and B have coordinates (7, –3) and (1, 9) respectively. Find : [3]

(a) the slope of AB

(b) the equation of the perpendicular bisector of line segment AB.

(ii) Prove that : $\sec^4 A (1 - \sin^4 A) - 2\tan^2 A = 1$ [3]

(iii) The 4th term of an A.P. is 22 and 15th term is 66. Find the first term and the common difference . Hence find the sum of the first 20 terms. [4]

Question 7

(i) There are 25 discs numbered 1 to 25. They are put in a closed box and shaken thoroughly. A disc is drawn at random from the box. Find the probability that the number on the disc is : [3]

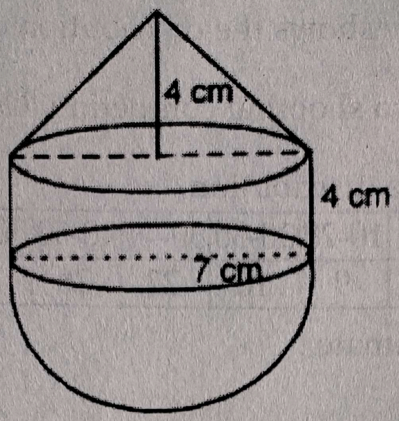
(a) an odd number

(b) divisible by 2 and 3 both

(c) a number less than 16

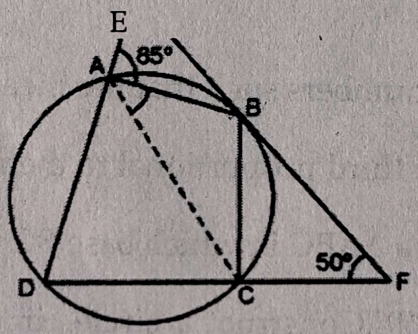
(ii) Solve the following inequation $-\frac{1}{5} \leq \frac{3x}{10} + 1 < \frac{2}{5}$, $x \in R$. Graph the solution set on the number line. [3]

(iii) The following figure represents a solid consisting of a right circular cylinder with hemisphere at one end and a cone at the other end. Their common base radius 7 cm. The height of cylinder and cone are each of 4 cm. Find the volume of this solid. [4]



Question 8

(i) In the figure ABCD is a cyclic quadrilateral . The tangent to circle at B meets DC produced at F. If $\angle EAB = 85^\circ$ and $\angle BFC = 50^\circ$ find $\angle CAB$. [3]



(ii) In the adjoining figure, $\angle A = 90^\circ$ and $AD \perp BC$. If BD = 2 cm and CD = 8 cm, find AD. [3]

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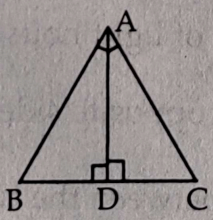

(iii) Use graph paper to find the mode of following table. [4]

Marks	10-20	20-30	30-40	40-50	50-60
No. of students	2	6	10	9	7

Question 9

(i) A car covers a distance of 400 km at certain speed. Had the speed been 12 km/hr more, the time taken for the journey would have been 1 hour 40 minutes less. Find the original speed of the car. [4]

(ii) The table below shows the distribution of the scores obtained by 120 shooters in a shooting competion. Using a graph sheet, draw an ogive for the distribution. [6]

Scores	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of shooters	5	9	16	22	26	18	11	6	4	3

Use your ogive to estimate :

(a) the median

(b) the interquartile range

(c) the number of shooters who obtained more than 75% score.

Question 10

(i) Find two numbers such that the mean proportional between then is 28 and the third proportional to them is 224. [3]

(ii) Construct a ΔABC in which base BC = 6 cm, AB = 5.5 cm and $\angle ABC = 60°$. Construct a circle circumscribing to this triangle ABC. [3]

(iii) From the top of light house 100 m high the angles of depression of two ships on opposite sides of it are 60° and 30° respectively. Find the distance between the two ships to the nearest metre. [4]

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