TIME 2:30 Hours   **MM: 80**

Note: Attempt All Questions from Section A and any Four Questions from Section B.
Section A (40 Marks)
(Attempt All Questions from this section)

Q.1 Choose the correct answer to the questions from the given options.   **[15]**
(Do not copy the question, write the correct answer only)

(i) The quadratic equation $2x^2 - \sqrt{5}x + 1 = 0$ has
a) two distinct real roots
b) two equal real roots
c) no real roots
d) more than two real roots

(ii) The probability that a non-leap year selected at random has 53 Sundays is
a) $\frac{2}{7}$ b) $\frac{1}{7}$ c) $\frac{7}{53}$ d) $\frac{1}{365}$

(iii) $\cot^2\theta - \frac{1}{\sin^2\theta}$ is equal to
a) 1
b) -1
c) $\sin^2\theta$
d) $\sec^2\theta$

(iv) If $\begin{bmatrix} x+3y & y \\ 7-x & 4 \end{bmatrix} = \begin{bmatrix} 4 & -1 \\ 0 & 4 \end{bmatrix}$, then the values of 'x' and 'y' are
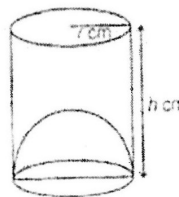a) 8, 1
b) 2, 5
c) 3, 4
d) 7, -1

(v) If the cost of an article is Rs 20,000 and GST paid by the owner is Rs 4,400, then the rate of CGST is
a) 12%
b) 13%
c) 11%
d) 22%

(vi) The capacity of a cylindrical vessel with a hemispherical portion raised upward at the bottom, as shown in the figure is
a) $\frac{1}{3}\pi r^2 [2h-3r]$
b) $\frac{2}{3}\pi r^2 [3h-2r]$
c) $\frac{1}{3}\pi r^2 [3h-2r]$
d) $\frac{2}{3}\pi r^2 [2h-3r]$

(vii) The median class for the given distribution is.

Class interval	0-10	10-20	20-30	30-40
Frequency	2	4	3	5

a) 0-10
b) 10-20
c) 20-30
d) 30-40

(viii) If a pole 6m high casts shadow $2\sqrt{3}$m long on the ground, then the sun's elevation is
a) 60^0
b) 45^0
c) 30^0
d) 90^0

(ix) **Assertion (A)** : A part of profit of the company which a share holder gets for his investment in shares from the company, is called dividend.
Reason (R) : The company gives a dividend on the face value (nominal value) of the share irrespective of the market value of the share.
a) A is False, R is ture
b) A is true, R is false
c) Both are true
d) Both are false
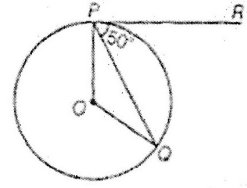
(x) The sum of some terms of a G.P. is 315 whose first term and common ratio are 5 and 2, respectively. Then, the last term of the G.P. is.
a) 140
b) 130
c) 120
d) 160

(xi) In the figure, if 'O' is the centre of the circle, PQ is a chord and the tangent PR at P makes an angle 50^0 with PQ, then $\angle$ POQ is equal to
a) 100^0
b) 80^0
c) 90^0
d) 75^0

(xii) In the formula $\bar{x} = a + \frac{\Sigma f i d i}{\Sigma f i}$ for finding the mean of the grouped data di's are deviations from 'a' (assumed mean) of
a) Lower limits of the classes
b) Upper limits of the classes
c) Mid points of the classes
d) Frequencies of the classes

(xiii) If the pair of lines 2x-ay+3=0 and 4x-7y+1=0 are perpendicular, then the value of 'a' is
a) 7/8
b) -8/7
c) 1/8
d) 4/7

(xiv) If x+1 is a factor of $3x^3+kx^2+7x+4$. then the value of 'k' is
a) -1
b) 0
c) 6
d) 10

(xv) The 17th term of an A.P. exceeds its 10th term by 7, the common difference is
a) 1
b) 4
c) 5
d) 7

Q.2 (i) The volume of a conical tent is 1232m^3 and the area of the base floor is 154m^2. Calculate the:
a) Radius of the floor
b) Height of the tent
c) Length of the canvass required to cover this conical tent, if its width is 2m.   [4]

(ii) Rohit deposits Rs. 1600 per month in a recurring deposit account for 3 years at the rate of 9% per annum simple interest. Find the amount he will get on maturity.
                                                                                    [4]

(iii) Prove the identity
$\frac{tan\theta}{1-cot\theta}+\frac{cot\theta}{1-tan\theta}= 1+ sec\theta.cosec\theta$ [4]
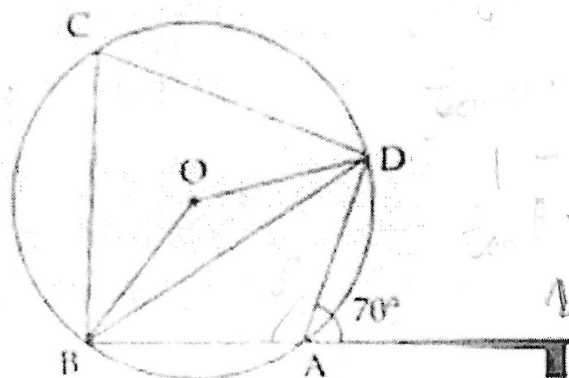
Q.3 (i) Using Compenendo & Dividendo
Find the value of x
$\frac{\sqrt{3x+4}+\sqrt{3x-5}}{\sqrt{3x+4}-\sqrt{3x-5}} = 9$ [4]
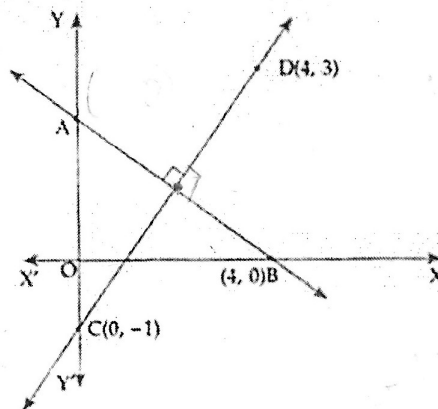
(ii) In the given figure, 'O' is the centre of the circle. If $\angle$ DAE=70^0. Find (giving suitable reasons) the measures of: [4]
a) $\angle$BCD   b) $\angle$BOD   c) $\angle$OBD

(iii) Line AB is perpendicular to the line CD. Coordinates of B, C and D are (4, 0), (0, -1) and (4, 3) respectively find.

a) the slope of CD

b) the equation of line AB

c) the equation of line CD

d) the coordinates of intersection of the line AB and CD

Section - B (40 Marks)
(Attempt any FOUR questions from this section)

Q.4 (i) If $\begin{bmatrix} 1 & 2 \\ 3 & 3 \end{bmatrix} \begin{bmatrix} x & 0 \\ 0 & y \end{bmatrix} = \begin{bmatrix} x & 0 \\ 9 & 0 \end{bmatrix}$, find the values of x and y. [3]

(ii) Solve the equation $2x^2-5x-4=0$ for 'x' and give your answer correct to two decimal places. [3]

(iii) On a map drawn to a scale of 1:40000, a rectangular plot of land, ABCD has the following measurements AB=6cm and BC=8cm. Calculate

a) The diagonal distance of the plot (in km).

b) The area of the plot (in km^2) [4]

Q.5 (i) Find the mean by step-deviation method.

| Class Interval	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Frequency	10	6	8	12	5	9	7

[3]

(ii) The marked price of goods is Rs 6000 and the rate of GST on it 18%. A shopkeeper buys the goods at a reduced price and sells it at its marked price. If the shopkeeper paid Rs 154 as CGST to the government, then find the amount (inclusive of GST) paid by the shopkeeper. [3]

(iii) In the given figure, XY is a diameter of the circle, PQ is a tangent to the circle at 'Y'. If $\angle AXB=50^0$ and $\angle ABX =70^0$. Find

a) $\angle BAY$

b) $\angle APY$ [4]
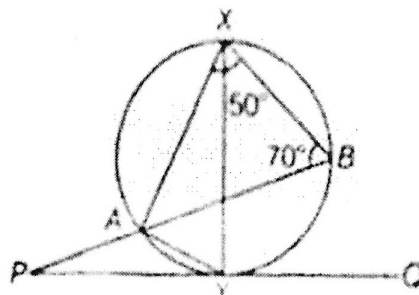
Q.6 (i) The sum of the first three terms of a G.P. is 16 and the sum of the next three terms is 128. Determine the first term and the common ratio. [3]

(ii) A solid cone of radius 5 cm and height 9 cm is melted and made into small cylinders of radius 0.5cm and height 1.5cm. Find the numbers of cylinders so formed. [3]

(iii) Use a graph paper for this question. The daily pocket expenses of 200 students in a school are given below.

Pocket expenses (in Rs)	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
No. of students (Frequency)	10	14	28	42	50	30	14	12

Draw a histogram representing the above distribution and estimate the mode from the graph. [4]

Q.7 (i) At the foot of a mountain the elevation of its summit is 45^0. After ascending 1000m toward the mountain up a slope of 30^0 inclination, the elevation is found to be 60^0. Find the height of the mountain. [5]

(ii) The monthly income of a group of 320 employees in a company is given below.

Monthly Income (in Rs)	Number of employees
6000-7000	20
7000-8000	45
8000-9000	65
9000-10000	95
10000-11000	60
11000-12000	30
12000-13000	5

Draw an ogive of the given distribution on a graph sheet, taking 1cm = Rs 1000 on one axis and 1cm = 50 employees on another axis. From the graph, determine

a) the median wage.

b) the number of employees, whose income is below Rs 8500.

c) the number of senior employees in the company, if the salary of a senior employees is above Rs 10500.
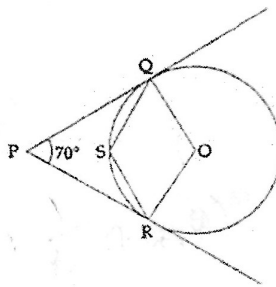
[5]

Q.8 (i) Solve the inequation
2x-3 < x+2 ≤ 3x+5. Represent it on a number line. Where $x \in I$. [3]

(ii) In the figure, O is the centre of the circle, PQ and PR are tangents and ∠QPR=70°. Calculate:

a) ∠QOR   b) ∠QSR   [3]

(iii) A (-1, 3), B (4, 2) and C (3, -2) are the vertices of a triangle. Find
a) the coordinates of the centroid 'G' of the triangle.
b) the slope of the line AC.
c) the equation of the line through G and parallel to AC.   [4]

Q.9 (i) If $\frac{x^2+y^2}{x^2-y^2} = \frac{41}{9}$, then find the value of

$\frac{x^3+y^3}{x^3-y^3}$ [3]

(ii) The restaurant's bill for a number of people for overnight stay is Rs 4800. If there were 4 more men, the bill each person had to pay would have reduced by Rs 200. Find the number of people staying overnight.   [3]

(iii) Construct a regular hexagon of side 5 cm. Construct a circle circumscribing the hexagon. All traces of construction must be clearly shown.   [4]

Q.10 (i) Use Remainder Theorem to factorise the polynomial completely.
$x^3+10x^2-37x+26$ [3]

(ii) Find the probability that a number selected at random from the given numbers.
1, 2, 3, 4, 5,………., 34, 35 is a
a) Prime number
b) Multiple of 7
c) Multiple of 3 or 5   [3]

(iii) Use a graph paper for this question. (Take 2cm=1unit on both axes)
a) Plot the points A (-4, 2) and B (2, 4)
b) A' is the image of A when reflected in the Y-axis. Plot it on the graph paper and write the coordinates of A'.
c) B' is the image of B when reflected in the line AA'. Write the coordinates of B'.
d) Write the geometric name of the figure ABA'B'.   [4]

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