

Full Marks – 80

(Two Hours and a 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.

This paper is divided into sections

Attempt all questions from **Section A** and **any** four from **Section B**.

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

SECTION A (40 Marks)

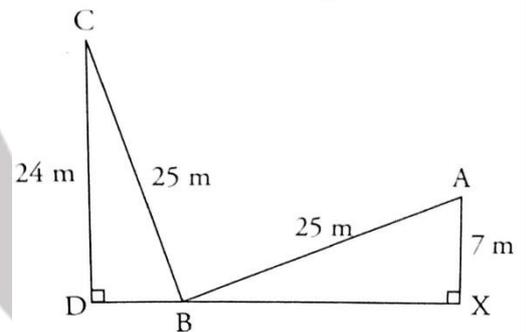
Attempt **all** questions

Question 1

- The compound interest on a certain sum of money at 5% per annum for two years is ₹246. Calculate the simple interest on the same sum of for three years at 6% per annum. [4]
- Ms Chawla goes to a shop to buy a leather coat which costs ₹735. The rate of sales tax 5%. She tells the shopkeeper to reduce the price of the coat, such that she has to pay only ₹735 inclusive of sales tax. Find the reduction needed in the price of coat. [3]
- Given $A = \begin{bmatrix} 2 & -1 \\ 2 & 0 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$, find the matrix X such that $A+X = 2B+C$ [3]

Question 2

- KM is a straight line of 13 units. If K has the coordinates (2, 5) and M has the coordinates (x, -7), find the possible values of x. [4]
- In the figure given, $AB = BC = 25$ m. If $AE = 7$ m and $CD = 24$ m, find the length of DE. [3]
- Use factor theorem to factorize $x^3 + x^2 - 4x - 4$ completely. [3]



Question 3

- Use graph paper for this question, $A(1, 1)$, $B(5, 1)$, $C(4, 2)$ and $D(2, 2)$ are the vertices of a quadrilateral ABCD. A, B, C and D are reflected in the origin onto A' , B' , C' and D' respectively. Locate A' , B' , C' and D' on the graph sheet and write their coordinates. Are D, A, A' and D' collinear? [5]
- What number should be subtracted from each of the following numbers 23, 30, 57 and 78 so that remainders are in proportion? [3]
- Calculate the distance between the points $P(2, 2)$, $Q(5, 6)$. [2]

Question 4

- Without using tables, find the values of: [3]
 $14 \sin 30^\circ + 6 \cos 60^\circ - 5 \tan 45^\circ$
- For the following set of numbers, find the median: [3]
10, 75, 3, 81, 17, 27, 4, 48, 12, 47, 9, 15.
- If $x \in I$, solve $2x - 3 \leq 5x + 3 < 2x + 3$. [4]

SECTION B(60 Marks)

Answer **any four** questions from this Section

Question 5

- The entries in a savings bank passbook are as given below: [5]

Date	Particular	Withdrawal in ₹	Deposit in ₹	Balance in ₹
1-1-13	B/F		.....	14,000
1-2-13	By cash	.....	11,500	25,500
12-2-13	To cheque	5,000	.....	20,500
5-4-13	By cash	.....	3,750	24,250
15-4-13	To Cheque	4,250	.....	20,000
9-5-13	By Cash	.....	1,500	21,500
4-6-13	By Cash	.....	1,500	23,000

Calculate the interest for six months (January to June) at 4% per annum on the minimum balance on or after the tenth day of each month.

2. P and Q are centres of circles of radii 9cm and 2cm respectively. $PQ = 17$ cm. R is the centre of a circle of radius x cm which touches the above circles externally. Given that $\angle PRQ = 90^\circ$, write an equation in x and solve it. [5]

Question 6

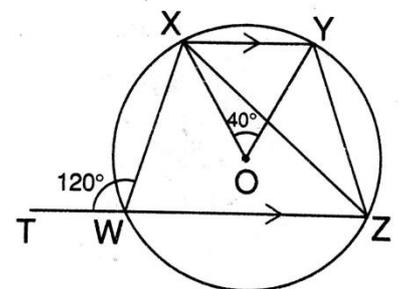
- A bag contains 7 red, 5 black and 3 white balls. A ball is drawn from the bag at random. Find the probability that the ball drawn is:
 - white
 - red or white
 - neither red nor white
- Manufacturer A sells a washing machine to a trader B for ₹12,500. Trader B sells it to a trader C at a profit of ₹800 and trader C sells it to a consumer at a profit of ₹1300. If the rate of VAT is 8% find:
 - the amount of tax received by the government on the sale of this machine.
 - The amount that the consumer pays for the machine.
- Mr Ravi Ayer invested ₹24,000 in 8% ₹100 shares, selling at a discount of 20%. After a year, he sold these shares at ₹72 each and invested the sale amount in 12% ₹100 shares selling at a discount of 10%. Calculate:
 - his original income
 - his new income
 - the increase in percentage return on his original investment

Question 7

- The line $2x - 3y + 6 = 0$ meets the y -axis at B. Write down the co-ordinates of B. Also find the equation of the line passing through B and perpendicular to the given line. [3]
- Prove that: $(\sin A - \operatorname{cosec} A)(\cos A - \sec A)(\tan A + \cot A) = 1$ [3]
- Using only compass and pencil draw a triangle ABC such that $AB = 7$ cm, $BC = 5$ cm and $\angle ABC = 60^\circ$. Draw and incircle to this triangle. [4]

Question 8

- Find two numbers such that the mean proportional between them is 12 and the third proportion to them is 324. [3]
- In the adjoining figure, O is the center of the circle. $\angle XOY = 40^\circ$, $\angle TWX = 120^\circ$ and XY is parallel to TZ. Find, giving reasons:
 - $\angle XZY$
 - $\angle YXZ$
 - $\angle TZY$
- Find the value of p so that the quadratic equation $(4 + p)x^2 + (p + 1)x + 1 = 0$ has equal roots. [4]



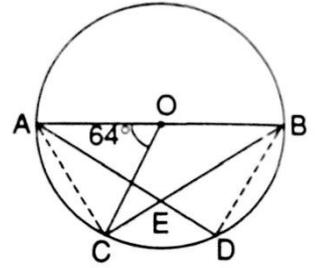
Question 9

- The angle of elevation of a jet plane from a point A on the ground is 60° . After a flight of 15 seconds, the angle of elevation changes to 30° . If the jet is flying at a constant height of $1500\sqrt{3}$ metres, find the speed of the jet plane. [4]
- If the interest is compounded half-yearly, calculate the amount and the compound interest when the principal is ₹3,750, the rate of interest is 8% and the duration is one year. [3]

3. Prove that $\frac{\sqrt{2a+1} + \sqrt{2a-1}}{\sqrt{2a+1} - \sqrt{2a-1}}$, prove that $x^2 - 4ax + 1 = 0$
 [3]

Question 10

1. In the adjoining figure, O is the centre of the circle and AB is a diameter. Chords BC and AD intersect at E. If AC = BD and $\angle AOC = 64^\circ$, find $\angle AEC$. [3]



2. Without using trigonometrical tables, evaluate:

$$\frac{\sec^2(90 - \theta) - \cot^2 \theta}{2(\sin^2 25^\circ + \cos^2 65^\circ)} + \frac{2 \cos^2 60^\circ \tan^2 28^\circ \tan^2 62^\circ}{3(\sec^2 43^\circ - \cot^2 47^\circ)}$$

[3]

3. Marks scored by 400 students in the examinations are:

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100
No of Students	10	20	22	40	55	75	80	58	28	12

Draw the cumulative frequency graph and find the median of the following distribution. [4]

All the best