

MATHEMATICS, Paper – I

(English version)

Parts A and B

Time : 2½ Hours]

[Maximum Marks : 50

Instructions :

1. Answer the questions under **Part-A** on a separate answer book.
2. Write the answers to the questions under **Part-B** on the question paper itself and attach it to the answer book of **Part-A**.

Part - A

Time : 2 Hours

Marks : 35

SECTION - I

(Marks : 5×2=10)

Note :

1. Answer **ANY FIVE** questions, choosing atleast **TWO** from each of the following Groups, i.e., **A** and **B**.
2. Each question carries **2** marks.

GROUP - A

(Real Numbers, Sets, Polynomials, Quadratic Equations)

1. Find L.C.M. and H.C.F. of 72 and 108 by the prime factorisation method.
2. If $V = \{a, e, i, o, u\}$ and $B = \{a, i, k, u\}$, then find $V - B$ and $B - V$. Are they equal?
3. Find a quadratic polynomial, the sum and product of whose zeroes are $\frac{1}{4}$, -1 respectively.
4. Find two numbers, whose sum is 27 and product is 182.

GROUP - B

(Pair of Linear Equations in Two Variables, Progressions,
Coordinate Geometry)

5. For what value of ' k ', the pair of equations $3x + 4y + 2 = 0$ and $9x + 12y + k = 0$ represent co-incident lines.
6. In a flower bed, there are 23 rose plants in the first row, 21 in the second row, 19 in the third row, and so on. There are 5 rose plants in the last row. How many rows are there in the flower bed?
7. Find the co-ordinates of a point A, where AB is the diameter of a circle, whose centre is $(2, -3)$ and B is $(1, 4)$.
8. Find the area of the triangle, whose vertices are $(-5, -1)$, $(3, -5)$, $(5, 2)$.

SECTION - II

(Marks : $4 \times 1 = 4$)

Note :

1. Answer **ANY FOUR** of the following **six** questions.
 2. Each question carries **1** mark.
9. Expand $\log 15$.
10. Write roster and set builder form of "The set of all natural numbers, which divide 42".
11. If $p(t) = t^3 - 1$, find the values of $p(1)$, $p(-2)$.
12. Formulate a pair of linear equations in two variables "5 pencils and 7 pens together cost ₹ 50, whereas 7 pencils and 5 pens together cost ₹ 46".

13. If $b^2 - 4ac \geq 0$, then write the roots of a quadratic equation $ax^2 + bx + c = 0$.

14. Write the formula for the sum of first 'n' positive integers.

SECTION - III

(Marks : $4 \times 4 = 16$)

Note :

1. Answer **ANY FOUR** questions, choosing atleast **TWO** from each of the following groups, i.e., **A** and **B**.
2. Each question carries 4 marks.

GROUP - A

(Real Numbers, Sets, Polynomials, Quadratic Equations)

15. Prove that $\sqrt{5}$ is irrational by the method of Contradiction.

16. If $A = \{3, 6, 9, 12, 15, 18, 21\}$; $B = \{4, 8, 12, 16, 20\}$;
 $C = \{2, 4, 6, 8, 10, 12, 14, 16\}$; $D = \{5, 10, 15, 20\}$; find

- (i) $A - B$, (ii) $B - A$, (iii) $C - A$, (iv) $D - A$,
(v) $B - C$, (vi) $B - D$, (vii) $C - B$, (viii) $D - B$

17. Verify that 1, -1 and -3 are the zeroes of the cubic polynomial $x^3 + 3x^2 - x - 3$ and check the relationship between zeroes and the co-efficients.

18. Find the roots of equation $2x^2 - x - 4 = 0$ by the method of completing the Square.

GROUP - B

(Pair of Linear Equations in Two Variables, Progressions and Coordinate Geometry)

19. Solve the equations :

$$\frac{5}{x-1} + \frac{1}{y-2} = 2 \quad \text{and} \quad \frac{6}{x-1} - \frac{3}{y-2} = 1$$

20. A fraction becomes $\frac{4}{5}$ if 1 is added to both numerator and denominator. If, however, 5 is subtracted from both numerator and denominator, the fraction becomes $\frac{1}{2}$. What is the fraction?
21. The sum of the 4th and 8th terms of an A.P. is 24 and the sum of the 6th and 10th terms is 44. Find the first three terms of the A.P.
22. Prove that the points $(-7, -3)$, $(5, 10)$, $(15, 8)$ and $(3, -5)$ taken in order are the vertices of a parallelogram.

SECTION - IV

(Marks : $1 \times 5 = 5$)

(Polynomials, Pair of Linear Equations in Two Variables)

Note :

1. Answer **ANY ONE** question from the following.
2. This question carries **5** marks.

23. Draw the graph of $y = x^2 - x - 6$ and find zeroes. Justify the answer.

24. Solve the pair of linear equations graphically.

$$2x + y - 6 = 0$$

$$4x - 2y - 4 = 0$$

B	B		
D	B	E	L
D	C	G	P
B	A	B	N
A	C	F	M
		A	J
		C	