

SECTION – I

2. Write short answers to any EIGHT (8) questions :

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- (i) Name the property used in : $4 \times (5 \times 8) = (4 \times 5) \times 8$
- (ii) Prove that $\bar{z} = z$ iff z is real.
- (iii) Verify distributivity of union over intersection for the sets A, B and C
 $A = \{1, 2, 3, 4\}$, $B = \{3, 4, 5, 6, 7, 8\}$, $C = \{5, 6, 7, 9, 10\}$
- (iv) Write the converse and contrapositive of the conditional : $q \rightarrow p$
- (v) For $A = \{1, 2, 3, 4\}$, find the relation in A. $R = \{(x, y) | x + y < 5\}$
- (vi) Define semi-group.
- (vii) Solve the system of linear equations : $3x - 5y = 1$; $-2x + y = -3$
- (viii) If $A = \begin{bmatrix} 3 & 2 & -1 \\ 2 & 1 & 3 \end{bmatrix}$, find the value of $|AA^t|$
- (ix) If A and B are symmetric and $AB = BA$, show that AB is symmetric?
- (x) Solve the equation by completing square : $x^2 - 2x - 899 = 0$
- (xi) If α , β are roots of $3x^2 - 2x + 4 = 0$, find the value of $\frac{1}{\alpha^3} + \frac{1}{\beta^3}$
- (xii) Solve the system of equations : $2x - y = 4$; $2x^2 - 4xy - y^2 = 6$

3. Write short answers to any EIGHT (8) questions :

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- (i) Resolve into partial fraction $\frac{6x^3 + 5x^2 - 7}{2x^2 - x - 1}$
- (ii) Resolve into partial fraction $\frac{x}{(x-a)(x-b)(x-c)}$
- (iii) Which term of the A.P. $-2, 4, 10, \dots$ is 148.
- (iv) If a, b, c, d in G.P. , prove that $a - b, b - c, c - d$, are in G.P?
- (v) If 5 is the H.M. between 2 and b, find b?
- (vi) Find the value of n , ${}^n P_4 : {}^{n-1} P_3 = 9 : 1$
- (vii) Find the value of n , ${}^n C_{12} = {}^n C_6$
- (viii) If a die is rolled , what is the probability that the dots on the top are greater than 4?
- (ix) A card is drawn from a deck of 52 playing cards. What is the probability that it is a diamond card or an ace?
- (x) Use mathematical induction prove \forall +ve integer of n
 $1 + 4 + 7 + \dots + (3n - 2) = \frac{n(3n - 1)}{2}$
- (xi) Determine the middle term in the expansion of $\left(\frac{1}{x} - \frac{x^2}{2}\right)^{12}$
- (xii) Expand upto 4 terms $(2 - 3x)^{-2}$

(Turn Over)