

Note: - Section B is compulsory. Attempt any **Three** questions from section C.

SECTION - B

2. Write short answers to any Eight parts.

(8 x 2 = 16)

- Simplify by justifying each step
$$1 - \frac{1}{a} - \frac{1}{b}$$
 - Separate into real and imaginary parts
$$\frac{2-7i}{4+5i}$$
 - Express the complex number $1+i\sqrt{3}$ in polar form.
 - Using Venn Diagram, verify that $(A-B)^c \cap B = B$
 - Construct the truth table $\sim(p \rightarrow q) \leftrightarrow (P \wedge \sim q)$
 - Define Groupoid and Monoid.
 - Solve the System
$$\begin{cases} 4x_1 + 3x_2 = 5 \\ 3x_1 - x_2 = 7 \end{cases}$$
 - Without expansion verify that
$$\begin{vmatrix} bc & ca & ab \\ 1 & 1 & 1 \\ a & b & c \end{vmatrix} = 0$$
 - If $A = \begin{bmatrix} -1 & 2 \\ 1 & 4 \\ 2 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 3 \\ -2 & 1 \end{bmatrix}$ Find $B^t A^t$
 - Find three cube roots of 64.
 - State and prove Factor Theorem.
 - Find the condition that one root of $x^2 + px + q = 0$ is double of the other.
3. Write short answers to any Eight parts.
- (8 x 2 = 16)
- Resolve $\frac{7x+25}{(x+3)(x+4)}$ into partial fraction.
 - Write only Partial Fraction Form of $\frac{x^2}{(x-2)(x-1)^2}$, not find the values of Constants.
 - Find the general term of A.P Whose first term and common difference are 2 and -3 respectively
 - If 5,8 are two A.M's between a and b, Find a and b
 - Find G.M between -2 and 8.
 - If $y = \frac{x}{2} + \frac{1}{4}x^2 + \frac{1}{8}x^3 + \dots$ and if $0 < x < 2$, then prove that $x = \frac{2y}{1+y}$
 - Find the n th term of the H.P $\frac{1}{2}, \frac{1}{5}, \frac{1}{8}, \dots$
 - Find the value of n when ${}^n p_4 : {}^{n-1} p_3 = 9 : 1$
 - Find the number of diagonals of a 8-sided figure.
 - Prove that the Formula $1 + \frac{1}{2} + \frac{1}{4} + \dots + \frac{1}{2^{n-1}} = 2 \left[1 - \frac{1}{2^n} \right]$ is true for $n = 1, 2$.
 - State any two points of observation in the expansion of $(a+x)^n$
 - Using binomial theorem. Find the value of $\sqrt{99}$ to three places of decimals.

(Turn Over)