

SECTION-I

2. Write short answers to any EIGHT questions:

(2 x 8 = 16)

- Check the closure property with respect to multiplication on the set $\{-1, 1\}$
- Simplify the complex numbers $(5, -4) (-3, -2)$
- Write down the descriptive and tabular form of $\{x | x \in P \wedge x < 12\}$
- Verify commutative property of union and intersection for sets $A = \{1, 2, 3, 4, 5\}$, $B = \{4, 6, 8, 10\}$
- Write down the inverse and contrapositive of the conditional $\sim p \rightarrow q$
- Find x and y if $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix} = \begin{bmatrix} y & 1 \\ -3 & 2x \end{bmatrix}$
- If A and B are non-singular matrices. Then show that $(AB)^{-1} = B^{-1}A^{-1}$
- Without expansion show that $\begin{vmatrix} \alpha & \beta+\gamma & 1 \\ \beta & \gamma+\alpha & 1 \\ \gamma & \alpha+\beta & 1 \end{vmatrix} = 0$
- Solve the equation $x^2 - 7x + 10 = 0$ by factorization.
- Reduce $2x^4 - 3x^3 - x^2 - 3x + 2 = 0$ into quadratic form.
- Solve the equation $x^{1/2} - x^{1/4} - 6 = 0$
- Define reciprocal equation.

3. Write short answers to any EIGHT questions:

(2 x 8 = 16)

- Resolve into partial fractions of $\frac{x^2+1}{(x-1)(x+1)}$ without finding values of constants.
- Write down next two terms of sequence $-1, 2, 12, 40, \dots$
- Insert two G.Ms. between 1 and 8
- Find n^{th} term of $\frac{1}{2}, \frac{1}{5}, \frac{1}{8}, \dots$
- Prove that $\sum_{k=1}^n k^2 = \frac{n(n+1)(2n+1)}{6}$
- If 5, 8 are two A.Ms. between a and b . Find a and b .
- Find the value of n^{-1} when ${}^nP_4 : {}^{n-1}P_3 = 9:1$
- How many arrangements of letters of word PAKPATTAN, taken all together, can be made?
- Two dice are thrown twice. What is probability that sum of dots shown in first throw is 7 and that of second throw is 11?
- Show that in-equality $4^n > 3^n + 4$ holds for $n = 2, n = 3$
- Using binomial theorem, expand $(a+2b)^5$
- Expand up to 4 terms, taking the value of x such that expansion is valid: $(8-2x)^{-1}$

4. Write short answers to any NINE questions:

(2 x 9 = 18)

- What is the length of the arc intercepted on a circle of radius 14cm by the arms of central angle of 45° ?
- Verify that $\sin^2 \frac{\pi}{6} : \sin^2 \frac{\pi}{4} : \sin^2 \frac{\pi}{3} : \sin^2 \frac{\pi}{2} = 1 : 2 : 3 : 4$
- Prove that $\frac{\sin \theta}{1 + \cos \theta} + \cot \theta = \operatorname{cosec} \theta$
- Without using table, find the value of $\tan(-135^\circ)$

(Turn Over)

