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Total No. of Pages : 02

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B.Sc. (Computer Science) (2013 & Onwards) (Sem.–1) ALGEBRA Subject Code : BCS-101 Paper ID : [A2181]

Time: 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

- 1. Write briefly :
 - (a) Find all the integral roots of $x^3 + x^2 2x 2 = 0$.
 - (b) Solve the equation $x^3 12x^2 + 44x 48 = 0$, given that roots are in A.P.

(c) Define Hermitian and skew-Hermitian matrix

- (d) Find the rank of $\begin{vmatrix} 2 & 4 & 8 \\ 3 & 6 & 12 \end{vmatrix}$
- (e) Given A and B two are orthogonal matrices of order n, and then prove that AB and BA are also orthogonal matrices.
- (f) The characteristic roots of a skew-Hermitian matrix are either zero or purely imaginary number.
- (g) Find the Eigen values of $\begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix}$.
- (h) State Cayley Hamilton theorem.
- (i) Define Linear independence and give an example.
- (j) Define minimal and characteristic equation of the matrix.



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SECTION-B

- Solve the equation $2x^3 9x^2 + 12x 4 = 0$, given that two of its roots are equal. 2.
- Solve the equation $x^4 + 8x^3 + 9x^2 8x 10 = 0$ by Descarte's method. 3.
- 4. Prove that every square matrix is uniquely expressible as the sum of the symmetric and a skew-symmetric matrix.
- 5. Solve x - y + 2z = 4, 3x + y + 4z = 6, x + y + z = 1.
- Find the Eigen values and Eigen vectors of $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$. 6.
- Find the Characteristic equation of A = $\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and verify that it is satisfied by A 7. www.FirstRanker.com

and hence find the inverse of A.