Central University of Haryana
Internal Assessment-1 (Jan-2023)
Branch: B. Tech (Computer Science and Engineering)

Course Code: BT MAT 111B
Course Title: Mathematics-I

Max Time: 1 Hour
Max Marks: 20

Q 1. (a) If $-2, -3, 4, 5$ are eigenvalues of a square matrix A of order four, then $\det A$ is? **[1]**

(b) The inverse of the matrix $A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix}$? **[1]**

(c) If λ be an eigenvalue of A, then the eigenvalue of A^6 is ? **[1]**

(d) In a vector space V, $a.\alpha = \theta$ implies (where a is scalar and $\alpha \in V$)

(a) $a = 0$ (b) $\alpha = \theta$ (c) $a = 0$ or $\alpha = \theta$ (d) none of these

Q 2. Find the rank of the matrix $\begin{bmatrix} 0 & 1 & 3 & -2 \\ 0 & 4 & -1 & 3 \\ 0 & 0 & 2 & 1 \\ 0 & 5 & -3 & 4 \end{bmatrix}$ **[4]**

Q 3. Find the values of a and b for which the system has (i) no solution (ii) unique solution (iii) infinitely many solutions for: $\begin{matrix} x + y + z = 6 \\ x + 2y + 3z = 10 \\ x + 2y + az = b \end{matrix}$. **[4]**

Q 4. Diagonalise, if possible; the matrix $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ and find the matrix P which diagonalise it. **[4]**

Q 5. Let S be a subset of $\mathbb{R}^3$ defined by $S = \{(x, y, 0) \in \mathbb{R}^3 : x, y \in \mathbb{R}\}$, then show that S is a subspace of $\mathbb{R}^3$. **[4]**