Subject Name : Applied Mathematics 1

Time: 01Hr   **Maximum marks: 20 [5x4]**

Note: Attempt any four questions out of five.

1. Find the rank of the following matrix $\begin{bmatrix} -1 & 2 & 3 & -2 \\ 2 & -5 & 1 & 2 \\ 3 & -8 & 5 & 2 \\ 5 & -12 & -1 & 6 \end{bmatrix}$

2. If $A = \begin{bmatrix} -1 & 2 & 1 \\ 3 & -1 & 2 \\ 0 & 1 & \lambda \end{bmatrix}$

   Find the values of λ, for which $AX=0$ has (i) a unique solution (ii) infinite solutions. Take $X=[x, y, z]^T$.

3. Find all the Eigen values and Eigen vectors of the matrix

$$A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$$

4. If $A = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$, then express $A^5 - 4A^4 - 7A^3 + 11A^2 - A - 10I$ in terms of A.

5. Discuss the consistency of the following equations

   $2x + 2y - 3z = 1, 4x + 4y + z = 6x + 6y - z = 3.$

   If found consistent, solve it.