1) If A = $\begin{bmatrix}1 & 2 & 3\\2 & 0 & 1\\3 & 1 & 0\end{bmatrix}$ and B = $\begin{bmatrix}2 & 1 & 0\\3 & 2 & 1\\1 & 0 & 1\end{bmatrix}$ then find rank of (A – B).

2) If A= $\begin{bmatrix}2 & 3\\-1 & 0\\0 & 1\end{bmatrix}$ and B= $\begin{bmatrix}0 & -1 & 4\\3 & 0 & 1\end{bmatrix}$ then Find $\rho\,(A.B)$

3) Reduce the following matrix into its normal form and hence find its rank $\begin{bmatrix}1 & 1 & 2\\1 & 2 & 3\\0 & -1 & -1\end{bmatrix}$

4) Reduce the following matrix into its normal form $\begin{bmatrix}1 & 1 & 3 & 3\\0 & 3 & 2 & 1\\-1 & -1 & -3 & 2\end{bmatrix}$

5) Find adjoint of A=$\begin{bmatrix}1 & 0 & 3\\2 & 1 & -1\\1 & -1 & 1\end{bmatrix}$.

6) Find inverse of $\begin{bmatrix}2 & 3 & 1\\1 & 2 & 3\\3 & 1 & 2\end{bmatrix}$

7) Investigate for consistency of the following system of equation and if possible find the solution :

- $x + y - z = 0\,; 2x + 5y + z = 0\,; 2x - y + 5z = 0$
- $2x - y + 3z = 0\,; 3x + 2y + z = 0\,; x - 4y + 5z = 0$
- $4x - 5y - 2z = 2; 5x - 4y + 2z = -2\,; 2x + 2y + 8z = 1$

8) Define unitary matrix. Let A= $\begin{bmatrix}2 & 1\\3 & -3\end{bmatrix}$ Show that $A^2 - 2A + 5I$

9) Define Skew – Hermitian matrix. & check whether A= $\begin{bmatrix}1 & 1+i & 2+3i\\1-i & 2 & -i\\2-3i & i & 0\end{bmatrix}$ is Hermitian matrix or not.

10) check whether A= $\frac{1}{3}\begin{bmatrix}2+i & 2i\\2i & 2-i\end{bmatrix}$ is unitary matrix or not.

---

11) Find Eigen value and Eigen vector of matrix $\begin{bmatrix} 7 & -2 \\ 3 & 0 \end{bmatrix}$

12) Verify Cayley Hamilton Theorem for matrix $A = \begin{bmatrix} 5 & -6 \\ -1 & 4 \end{bmatrix}$

13) If matrix $P = \begin{bmatrix} -2 & 1 \\ 1 & 1 \end{bmatrix}$ is modal matrix then check whether $A = \begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix}$ is diagonalizable?

14) Define similar matrix and check whether A and B are similar or not, where $A = \begin{bmatrix} 5 & 3 \\ 1 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 \\ 6 & 2 \end{bmatrix}$ with $P = \begin{bmatrix} -1 & 1 \\ 1 & 1 \end{bmatrix}$

15) Verify Cayley Hamilton Theorem for matrix $A = \begin{bmatrix} 1 & 1 \\ 2 & 3 \end{bmatrix}$ hence find A^{-1}

16) Define Skew – Hermitian matrix. & check whether $A = \begin{bmatrix} 1 & 1+i & 2+3i \\ 1-i & 2 & -i \\ 2-3i & i & 0 \end{bmatrix}$ is Hermitian matrix or not.