



RAN-2503000505053001

B.Sc. (Sem. -V) Examination October - 2025

Mathematics : Matrix Algebra (Minor - MH-ME-502)

Time: 1 Hour]
[Total Marks: 25
સૂચના : / Instructions

- (1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the above details on your answer book
- (2) All questions are compulsory
- (3) Figures to the right indicate marks of the questions.
- (4) Follow usual notations and conventions.

Seat No.:

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Student's Signature

Q. 1 Answer any FIVE from the following questions.
[5]

1. Define Square matrix.
2. Define symmetric matrix.
3. Write the definition of Characteristic Polynomial.
4. Give the example of singular matrix.
5. State the Cayley Hamilton Theorem.
6. Give the illustration of Hermitian Matrix.

Q. 2 Attempt any TWO.
[10]

1. Show that every square matrix can uniquely expressed as the sum of one symmetric and one skew symmetric matrix.
2. Calculate row reduced echelon form of a matrix $\begin{bmatrix} 2 & -2 & 0 & 6 \\ 4 & 2 & 0 & 2 \\ 1 & -1 & 0 & 3 \\ 1 & -2 & 1 & 2 \end{bmatrix}$
3. Solve the system of equations using row reduced echelon form
 $x + y + z = 8, -2y + 2z = 6, 3x + 5y - 7z = 14.$

Q. 3 Attempt any TWO.
[10]

1. Calculate eigen values and eigen vector for matrix $\begin{bmatrix} 1 & -3 & 3 \\ 3 & -5 & 3 \\ 6 & -6 & 4 \end{bmatrix}$
2. Give the characteristic equation for $\begin{bmatrix} 1 & 3 & 0 \\ 3 & -2 & -1 \\ 0 & -1 & 1 \end{bmatrix}$ using determinant and minor of given matrix
3. Find A^{-1} for matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$ using Cayley-Hamilton theorem.