

RAN-2503000505053001
B.Sc. (Sem.-V) Examination March - 2026
Mathematics (Minor) Matrix Algebra
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.
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1. Define Diagonal matrix.
2. Define skew-symmetric matrix.
3. Write the definition of Eigen Value.
4. What is the necessary condition for a homogeneous system of linear equations to have a non-trivial solution?
5. State the Cayley Hamilton Theorem.
6. Give the illustration of Symmetric Matrix.

Q.2. Attempt any TWO.
10

1. Evaluate AB and BB^T for $A = [1 \ 2 \ 3]$ and $B = \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}$
2. Calculate row reduced echelon form of a matrix $\begin{bmatrix} 1 & 6 & -18 \\ -4 & 0 & 5 \\ -3 & 6 & -13 \end{bmatrix}$
3. Solve the system of equations using row reduced echelon form
 $x + 2y + 3z = 14$, $3x + y + 2z = 11$, $2x + 3y + z = 11$.

Q.3. Attempt any TWO.
10

1. Calculate eigen values and eigen vector for matrix $\begin{bmatrix} 1 & 3 & 0 \\ 3 & -2 & -1 \\ 0 & -1 & 1 \end{bmatrix}$
2. Varify Cayley-Hamilton theorem for the matrix

$$A = \begin{bmatrix} 1 & -1 & 3 \\ 1 & 3 & -3 \\ 5 & 3 & 3 \end{bmatrix}$$

3. Find A^{-1} for matrix $\begin{bmatrix} 2 & 3 & 4 \\ -5 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ using Cayley-Hamilton theorem.