



RAN - 1903000202030132

RAN-1903000202030132**F.Y.B.Sc. Sem-II Examination****March / April - 2019****Mathematics Paper: MCS-202
Theory of Matrices****Time: 2 Hours]****[Total Marks: 50****सूचना : / Instructions**

नीचे दृष्टावेव निशानीवाणी विगतो उत्तरवली पर अवश्य लपववी.

Fill up strictly the details of signs on your answer book

Name of the Examination:

F.Y.B.Sc. Sem-II

Name of the Subject :

Mathematics Paper: MCS-202 Theory of Matrices

Subject Code No.: 1903000202030132

Seat No.:

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Student's Signature

- (1) All questions are compulsory.
- (2) Figures to the right indicate marks of corresponding question.
- (3) Follow usual notations.
- (4) Use of non-programmable scientific calculator is allowed.

1. Answer of the following:**10**

1] Define Triangular matrix with illustration.

2] Prove that $A = \begin{bmatrix} i & 1-i \\ -1-i & 3i \end{bmatrix}$ is skew Hermitian matrix.3] If $A = [2 \ 3 \ 4 \ 5]$ and $B = \begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \end{bmatrix}$ then find B^T and A^T .4] Find row rank of the matrix $A = \begin{bmatrix} 2 & 3 & 4 \\ 4 & 10 & 18 \end{bmatrix}$

5] Define Row rank of a matrix.

Q-2] Answer [any two) of the following: [10]

- 1] For matrices A and B defined on C show that (i) $(-A) = -(\bar{A})$ and (ii) $(A+B)^0 = A^0 + B^0$

2] If $A = \begin{bmatrix} 2 & 5 & 7 \\ 2 & -1 & 0 \\ 3 & 4 & 8 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 4 & 9 \\ 3 & -2 & 4 \\ 5 & 6 & 8 \end{bmatrix}$ then show that $(AB)^T = B^T A^T$

- 3] For $A = \begin{bmatrix} i & 0 \\ 0 & -i \end{bmatrix}$, $B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$, $C = \begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$, Prove that $AB = -BA$ and $A^2 = B^2$

Q-3] Answer (any two) of the following: [10]

- 1] Prove the following:

- (a) For any matrix A, $A A^T$ is symmetric matrix. Also,
(b) If A is a Hermitian matrix, then $B^0 A B$ is also Hermitian.

2] Find inverse of $A = \begin{bmatrix} 2 & 4 & 3 & 2 \\ 3 & 6 & 5 & 2 \\ 2 & 5 & 2 & -3 \\ 4 & 5 & 14 & 14 \end{bmatrix}$ by elementary row operations.

3] If $\begin{bmatrix} 4 \\ 1 \\ 2 \end{bmatrix} A = \begin{bmatrix} -4 & 8 & 4 \\ -1 & 2 & 1 \\ -3 & 6 & 2 \end{bmatrix}$ then find A.

Q-4] Answer (any two) of the following: [10]

- 1] Examine whether the following system is consistent or not:

$$2x + 6y + 11 = 0$$

$$6x + 20y - 6z + 3 = 0$$

$$6y - 18z + 1 = 0$$

2] Obtain rank of $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 4 & 10 & 18 \end{bmatrix}$

- 3] If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$ And $C = \begin{bmatrix} 5 & 1 \\ 7 & 4 \end{bmatrix}$, Verify that $(A + B) C = AC + BC$

Q-5] Answer (any two) of the following:

[10]

1] Solve the following homogeneous system of equations:

$$x + 2y - 5z + 9 = 0, \quad 3x - y + 2z - 5 = 0,$$

$$2x + 3y - z - 3 = 0, \quad 4x - 5y + z + 3 = 0$$

2] Solve: $x + 2y + 3z = 0$, $3x + 4y + 4z = 0$, $7x - 10y + 12z = 0$

3] Solve: $x + y + z = 6$, $2x - y + z = 3$, $x + 3y - z = 4$
