All Branches Hinglish

Subject: Engineering Mathematics

DPP-04

Chapter: Linear Algebra

Topic : Rank of Matrix-I

1. The rank of ($m \times n$) matrix (where $m < n$) cannot be more than

(a) m (b) n

(c) mn (d) None

2. The rank of the following $(n + 1) \times (n + 1)$ matrix, where 'a' is a real number is

$$\begin{bmatrix} 1 & a & a^2 & \dots & a^n \\ 1 & a & a^2 & \dots & a^n \\ \vdots & & & & \\ 1 & a & a^2 & \dots & a^n \end{bmatrix}$$

(a) 1 (b) 2

(c) n (d) depends on value of a

3. The rank of the matrix $\begin{bmatrix} 1 & 4 & 8 & 7 \\ 0 & 0 & 3 & 0 \\ 4 & 2 & 3 & 1 \\ 3 & 12 & 24 & 2 \end{bmatrix}$

(a) 3 (b) 1

(c) 2 (d) 4

4. Two matrices A and B are given below:

$$A = \begin{bmatrix} p & q \\ r & s \end{bmatrix} \quad B = \begin{bmatrix} p^2 + q^2 & pr + qs \\ pr + qs & r^2 + s^2 \end{bmatrix}$$

If the rank of matrix A is N, then the rank of matrix B is

(a) $\frac{N}{2}$ (b) $N - 1$

(c) N (d) $2N$

5. Let A be a 4×3 real matrix with rank 2. Which one of the following statement is TRUE?

(a) Rank of $A^T A$ is less than 2.

(b) Rank of $A^T A$ is equal to 2.

(c) Rank of $A^T A$ is greater than 2.

(d) Rank of $A^T A$ can be any number between 1 and 3.

6. If v is a non-zero vector of dimension 3×1, then the matrix $A = vv^T$ has a rank _____ .

7. If for a matrix, rank equals both the number of rows and number of columns, then the matrix is called

(a) non-singular

(b) singular

(c) transpose

(d) minor

8. The rank of matrix $\begin{vmatrix} 0 & 0 & -3 \\ 9 & 3 & 5 \\ 3 & 1 & 1 \end{vmatrix}$

(a) 0 (b) 1

(c) 2 (d) 3

Answer Key

1. **(a)**
2. **(a)**
3. **(d)**
4. **(c)**
5. **(b)**
6. **(1)**
7. **(a)**
8. **(c)**