All Branches Hinglish

Subject: Engineering Mathematics

DPP-05

Chapter: Linear Algebra

Topic : Rank of Matrix-II

1. If $\mathbf{A} = \begin{vmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{vmatrix}$, then adj. **A** is equal to

(a) **A** (b) $\boldsymbol{c}^T$

(c) $3\mathbf{A}^T$ (d) $3\,\mathbf{A}$

2. If the rank of the matrix, $\mathbf{A} = \begin{vmatrix} 2 & -1 & 3 \\ 4 & 7 & \lambda \\ 1 & 4 & 5 \end{vmatrix}$ is 2, then the value of λ is

(a) –13 (b) 13

(c) 3 (d) None of these

3. Let **A** and **B** be non-singular square matrices of the same order. Consider the following statements.

(I) $(\mathbf{AB})^T = \mathrm{A^T B^T}$

(II) $(\mathbf{AB})^{-1} = \mathbf{B}^{-1}\mathbf{A}^{-1}$

(III) adj(AB) = (adj.**A**) (adj.**B**)

(IV) $\rho(\mathbf{AB}) = \rho(\mathbf{A})\rho(\mathbf{B})$

(V) $|\mathbf{AB}| = |\mathrm{A}| \cdot |\mathbf{B}|$

Which of the following statements are false?

(a) I, III & IV (b) IV & V

(c) I & II (d) All the above

4. The rank of the matrix $\mathbf{A} = \begin{vmatrix} 2 & 1 & -1 \\ 0 & 3 & -2 \\ 2 & 4 & -3 \end{vmatrix}$ is

(a) 3 (b) 2

(c) 1 (d) None of these

5. If $\mathbf{A} = \begin{bmatrix} 2x & 0 \\ x & x \end{bmatrix}$ and $\mathbf{A}^{-1} = \begin{bmatrix} 1 & 0 \\ -1 & 2 \end{bmatrix}$, then the value of x is

(a) 1 (b) 2

(c) 1/2 (d) None of these

6. The rank of 3 × 3 matrix C = (AB), found by multiplying a non-zero column matrix A of size 3 × 1 and a non-zero row matrix B of size 1 × 3, is

(a) 0 (b) 1

(c) 2 (d) 3

7. Given matrix [A] = $\begin{bmatrix} 4 & 2 & 1 & 3 \\ 6 & 3 & 4 & 7 \\ 2 & 1 & 0 & 1 \end{bmatrix}$ the rank of the matrix is

(a) 4 (b) 3

(c) 2 (d) 1

8. The rank of the matrix $\begin{bmatrix} 6 & 0 & 4 & 4 \\ -2 & 14 & 8 & 18 \\ 14 & -14 & 0 & -10 \end{bmatrix}$ is ____ .

9. Let A = $[a_{ij}]$ $1 \le i, j \le n$ with $n \ge 3$ and $a_{ij} = i, j$ the rank of the A is

(a) 0 (b) 1

(c) $n - 1$ (d) n

10. The rank of the matrix M = $\begin{bmatrix} 5 & 10 & 10 \\ 1 & 0 & 2 \\ 3 & 6 & 6 \end{bmatrix}$ is

(a) 0 (b) 1

(c) 2 (d) 3

Answer Key

1. (c)
2. (b)
3. (a)
4. (b)
5. (c)
6. (b)
7. (c)
8. (2)
9. (b)
10. (c)