All Branches Hinglish

Subject: Engineering Mathematics

DPP-03

Chapter: Linear Algebra

Topic : Special Types of Matrices

1. If $A^T = A^{-1}$, where A is a real matrix, then A is

(a) Normal (b) Symmetric

(c) Hermitian (d) Orthogonal

2. Match the items in columns I and II.

	Column I		Column II
P.	Singular Matrix	1.	Determinant is not defined
Q.	Non-square matrix	2.	Determinant is always one
R.	Real symmetric	3.	Determinant is zero
S.	Orthogonal matrix	4.	Eigenvalues are always real
		5.	Eigenvalue are not defined

(a) P – 3, Q – 1, R – 4, S – 2

(b) P – 2, Q – 3, R – 4, S – 1

(c) P – 3, Q – 2, R – 5, S – 4

(d) P – 3, Q – 4, R – 2, S – 1

3. [A] is a square matrix which is neither symmetric nor skew-symmetric and $[A]^T$ is its transpose. The sum and difference of these matrices are defined as $[S] = [A] + [A]^T$ and $[D] = [A] - [A]^T$, respectively. Which of the following statements is true?

(a) Both [S] and [D] are symmetric

(b) Both [S] and [D] are skew-symmetric

(c) [S] is skew-symmetric and [D] is symmetric

(d) [S] is symmetric and [D] is skew-symmetric

4. If A and B are square matrices of the same order such that AB = A and BA = B, then A and B are both

(a) Singular (b) Idempotent

(c) Involutory (d) None of these

5. The matrix, $A = \begin{bmatrix} -5 & -8 & 0 \\ 3 & 5 & 0 \\ 1 & 2 & -1 \end{bmatrix}$ is

(a) Idempotent (b) Involutory

(c) Singular (d) None of these

6. Every diagonal element of a Skew- Hermitian matrix is

(a) purely real (b) 0

(c) purely imaginary (d) 1

7. If A is Hermitian, then iA is

(a) symmetric (b) Skew-symmetric

(c) Hermitian (d) Skew-Hermitian

8. Every diagonal element of a Skew- symmetric matrix is

(a) 1

(b) 0

(c) Purely real

(d) None of these

9. The matrix, $A = \begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{i}{\sqrt{2}} \\ -\frac{i}{\sqrt{2}} & -\frac{1}{\sqrt{2}} \end{bmatrix}$ is

(a) Orthogonal (b) Idempotent

(c) Unitary (d) None of these

10. If A and B are non zero square matrices, then AB = 0 implies

(a) A and B are orthogonal

(b) A and B are singular

(c) B is singular

(d) A is singular

Answer Key

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