MATRICES

1 MARK QUESTIONS

1. If A and B are symmetric matrices of the same order, then (AB′−BA) is a
(A) symmetric matrix
(B) null matrix
(C) diagonal matrix
(D) skew symmetric matrix

[March, 2025]

2. If matrix A = $\begin{bmatrix} a & b & -5 \\ c & d & 0 \\ 5 & 0 & 0 \end{bmatrix}$ is skew-symmetric, then value of 2a + b + c – 3d is
(A) 1 (B) –1
(C) 0 (D) 2

[SQP, 2021-22]

3. If A = $\begin{bmatrix} 1 & 0 \\ -2 & 1 \end{bmatrix}$ and B = $\begin{bmatrix} -5 & 10 \\ -10 & -5 \end{bmatrix}$, then AB is:
(A) $\begin{bmatrix} -5 & -10 \\ 0 & -5 \end{bmatrix}$ (B) $\begin{bmatrix} 0 & -5 \\ 25 & 10 \end{bmatrix}$
(C) $\begin{bmatrix} 10 & -25 \\ -5 & 0 \end{bmatrix}$ (D) $\begin{bmatrix} -5 & 10 \\ 0 & -25 \end{bmatrix}$

[March, 2023]

4. If $\begin{bmatrix} x+y & x+2 \\ 2x-y & 16 \end{bmatrix} = \begin{bmatrix} 8 & 5 \\ 1 & 3y+1 \end{bmatrix}$, then the values of x and y are:
(A) x = 3, y = 5 (B) x = 5, y = 3
(C) x = 2, y = 7 (D) x = 7, y = 2

[March, 2023]

5. If $P = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}, Q = \begin{bmatrix} x & 0 \\ 1 & 1 \end{bmatrix}$ and P = Q^2, then x equals
(A) ±1 (B) –1
(C) 1 (D) 2

[July, 2025]

6. **Assertion (A):** Matrix A = $\begin{bmatrix} 0 & -6 & 7 \\ 6 & 5 & -1 \\ -7 & 1 & 0 \end{bmatrix}$ is a skew-symmetric matrix.
Reason (R): A matrix A is skew-symmetric if A′ = –A.

[July, 2025]

7. If A = $\begin{bmatrix} 4 & 1 \\ 3 & 2 \end{bmatrix}$ and I = $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then $(A^2 - 6A)$ is equal to:
(A) 3I (B) –5I
(C) 5I (D) –3I

[July, 2024]

8. If A and B are two matrices such that AB = A and BA = B, then B^2 is equal to :
(a) B (b) A
(c) I (d) O

[July, 2023]

9. If A = $\begin{bmatrix} 5 & x \\ y & 0 \end{bmatrix}$ is a symmetric matrix, then
(A) x = 0, y = 5 (B)x = 5, y = 0
(C) x = y (D) x + y = 0

[July, 2023]

10. Let A = $\begin{bmatrix} 0 & 0 & -1 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ The only correct statement about the matrix A is:
(A) $A^2 = I$ (B) $A' = -I$
(C) $|A| = 0$ (D) A is a scalar matrix

[SQP, 2025-26]

11. If A and B are two square matrices such that $B = -A^{-1}BA$, then $(A + B)^2$ is equal to
(A) O (B) $A^2 + B^2$
(C) $A^2 + B^2 + 2AB$ (D) $A^2 + B^2 - 2AB$

[SQP, 2025-26]

12. For two matrices P = $\begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{bmatrix}$ & $Q^T = \begin{bmatrix} -1 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$; (Where Q^T is the transpose of the matrix Q), P – Q is
(A) $\begin{bmatrix} 2 & 3 \\ -3 & 0 \\ 0 & -3 \end{bmatrix}$ (B) $\begin{bmatrix} 4 & 3 \\ -3 & 0 \\ -1 & -2 \end{bmatrix}$
(C) $\begin{bmatrix} 4 & 3 \\ 0 & -3 \\ -1 & -2 \end{bmatrix}$ (D) $\begin{bmatrix} 2 & 3 \\ 0 & -3 \\ 0 & -3 \end{bmatrix}$

[SQP, 2024-25]

13. **Assertion(A):** $A = [aij] = \begin{cases} m; & i = j \\ 0; & i \neq j \end{cases}$ where m is a scalar, is an identity matrix if $m = 1$
Reason (R): Every identity matrix is not a scalar matrix.

[SQP, 2024-25]

14. If AB = A and BA = B, then $(B^2 + B)$ equals :
(A) 2A (B) O
(C) 2I (D) 2B

[March, 2024]

2 MARKS QUESTIONS

15. If A = $\begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$, find the value of k such that $A^2 - 8A + kI = O$.

[2M, March, 2024]

16. Given $A = \begin{bmatrix} 2 & 0 & 1 \\ 3 & 4 & 5 \\ 0 & 2 & 3 \end{bmatrix}$ and B = $\begin{bmatrix} 1 & 1 & -5 \\ -5 & 1 & -5 \\ 1 & -2 & 4 \end{bmatrix}$, find BA.

[2M,March, 2025]

17. If $\begin{bmatrix} x-y & 2x+z \\ 2x-y & 3z+w \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$, find the value of x, y, z and w.

[2M,March, 2024]

18. Write the matrix $\begin{bmatrix} 7 & -3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$ as a sum of a symmetric and a skew symmetric matrix.

[2M,July, 2023]

19. If A = $\begin{bmatrix} \alpha & 0 \\ 1 & 1 \end{bmatrix}$ and B = $\begin{bmatrix} 1 & 0 \\ 5 & 1 \end{bmatrix}$, then find the value of α (if exists) for which $A^2 = B$.

[2M,SQP, 2024-25]

20. If A is a square matrix $\begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$ such that $A^2 = pA$, then find the value of p.

[2M,SQP, 2023-24]

21. If $\begin{bmatrix} 0 & a & 3 \\ 2 & b & -1 \\ c & 1 & 0 \end{bmatrix}$ is skew-symmetric matrix, then find value of a + b + c.

[2M,SQP, 2023-24]

22. Find the value of 2x + 3b – c , if A = $\begin{bmatrix} 0 & -1 & 28 \\ a-8 & 0 & 3b \\ -c+2 & 2 & 0 \end{bmatrix}$ is skew-symmetric matrix.

[2M,SQP, 2022-23]

3 MARKS QUESTIONS

23. Two badminton teams A and B are staying in the same hotel. Team A has 2 male and 3 female players accompanied by 1 coach. Team B comprises of 1 male, 2 female players and 2 coaches. The daily diet requirement (calories and protein) for each person is as given below:

	Calories	Protein
Male Player	2500	65g
Female Player	1900	50g
Coach	2000	54g

Use matrix algebra to calculate the total diet requirement of calories and protein for each team.

[3M,SQP, 2022-23]