# CUET (UG) – MATHEMATICS

Chapter Test - Unit II: Algebra - Matrices

**General Instructions**

1. Total Questions: **20**
2. Duration: **60 Minutes**
3. All questions are compulsory.
4. Each question carries **5 marks**.
5. For each correct answer: **+5 marks**.
6. For each incorrect answer: **-1 mark**.
7. No negative marking for unanswered questions.
8. Use of calculator or electronic devices is strictly prohibited.
9. Choose the most appropriate answer from the given options.

1. If $A$ is a square matrix such that $A^2 = I$, then $(A - I)^3 + (A + I)^3 - 7A$ is equal to:
   (A) $A$
   (B) $I - A$
   (C) $I + A$
   (D) $-A$

2. If $A = [a_{ij}]$ is a $2 \times 3$ matrix whose elements are given by $a_{ij} = \frac{(i+2j)^2}{2}$, then the element $a_{23}$ is:
   (A) 32
   (B) 16
   (C) 24
   (D) 8

3. If $A$ is a square matrix, then $A - A'$ is always a:
   (A) Symmetric matrix
   (B) Skew-symmetric matrix
   (C) Identity matrix
   (D) Zero matrix

4. If $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, then $A^4$ is equal to:
   (A) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$
   (B) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
   (C) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$
   (D) $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$

5. If $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ and $f(x) = x^2 - 2x - 3$, then $f(A)$ is:
   (A) $I$
   (B) $O$
   (C) $A$
   (D) $2I$

6. If the matrix $A$ is both symmetric and skew-symmetric, then:
   (A) $A$ is a diagonal matrix
   (B) $A$ is a zero matrix
   (C) $A$ is a scalar matrix
   (D) $A$ is a unit matrix

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

(D) $\begin{bmatrix} 3 & 2 \\ 0 & 1 \end{bmatrix}$

8. Let $A$ and $B$ be two matrices such that $AB = A$ and $BA = B$. Then $A^2 + B^2$ is:
   (A) $A + B$
   (B) $AB$
   (C) $I$
   (D) $2(A + B)$

9. The number of all possible matrices of order $2 \times 3$ with each entry 1, 2 or 3 is:
   (A) $3^6$
   (B) $6^3$
   (C) $2^3$
   (D) $3^2$

10. If $A = \begin{bmatrix} 3 & x-1 \\ 2x+3 & x+2 \end{bmatrix}$ is a symmetric matrix, then $x$ is:
    (A) 4
    (B) $-3$
    (C) $-4$
    (D) 7

11. If $A$ and $B$ are square matrices of order 3 such that $A$ is symmetric and $B$ is skew-symmetric, then the matrix $(AB - BA)$ is:
    (A) Symmetric
    (B) Skew-symmetric
    (C) Diagonal
    (D) Identity

12. If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ such that $ad - bc \neq 0$, then $A^{-1}$ is:
    (A) $\frac{1}{ad-bc} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$
    (B) $\frac{1}{ad-bc} \begin{bmatrix} a & c \\ b & d \end{bmatrix}$
    (C) $\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$
    (D) $\frac{1}{ad-bc} \begin{bmatrix} -d & b \\ c & -a \end{bmatrix}$

13. If $A = \begin{bmatrix} 0 & 5 \\ -5 & 0 \end{bmatrix}$, then $A$ is a:
    (A) Scalar matrix
    (B) Symmetric matrix
    (C) Skew-symmetric matrix
    (D) Identity matrix

14. If $A$ is a matrix of order $3 \times 4$, then each row of $A$ contains:
    (A) 3 elements
    (B) 4 elements
    (C) 12 elements
    (D) 7 elements

15. If $A = \begin{bmatrix} 1 & 3 \\ 3 & 4 \end{bmatrix}$ and $A^2 - kA - 5I = O$, then $k$ is:
    (A) 5
    (B) 3
    (C) 7
    (D) 4

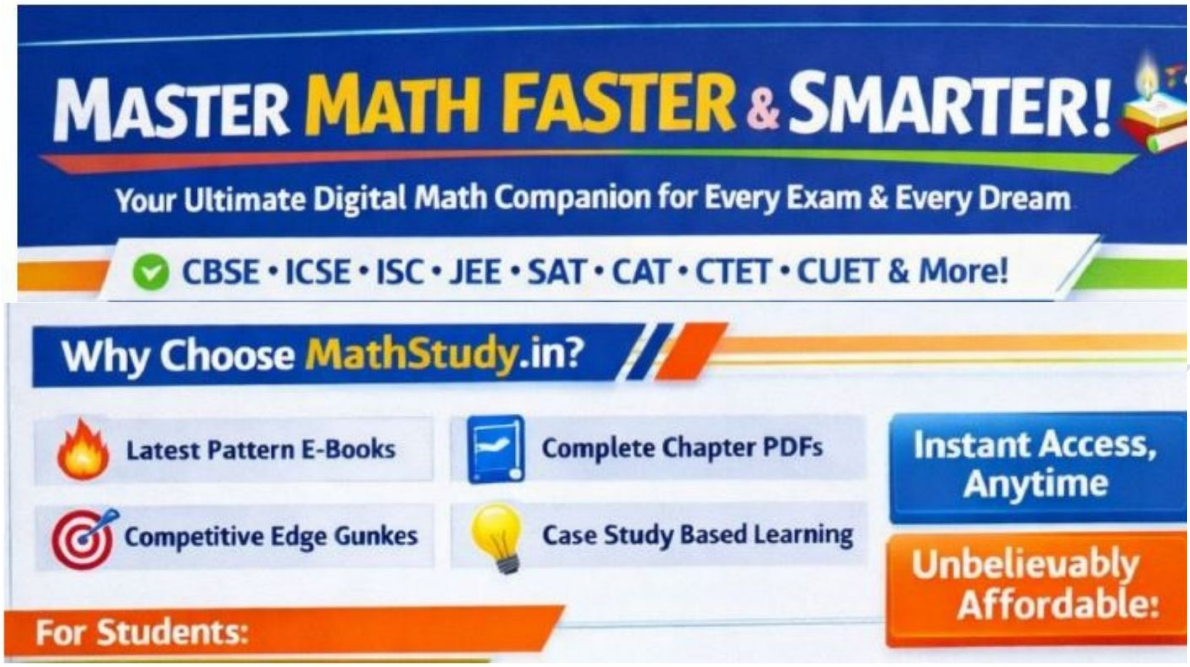
16. For square matrices $A$ and $B$, $(A + B)'$ is equal to:
    (A) $A'B'$
    (B) $B'A'$
    (C) $A' + B'$
    (D) $A - B$

17. If $A = \begin{bmatrix} \lambda & 1 \\ 0 & \lambda \end{bmatrix}$, then $A^n$ is:
    (A) $\begin{bmatrix} \lambda^n & n\lambda^{n-1} \\ 0 & \lambda^n \end{bmatrix}$
    (B) $\begin{bmatrix} \lambda^n & 1 \\ 0 & \lambda^n \end{bmatrix}$
    (C) $\begin{bmatrix} \lambda^n & n \\ 0 & \lambda^n \end{bmatrix}$
    (D) $\begin{bmatrix} n\lambda & n \\ 0 & n\lambda \end{bmatrix}$

18. If $A$ is a square matrix of order $n$, and $k$ is a scalar, then $(kA)'$ is:
    (A) $k'A$
    (B) $kA'$
    (C) $k^nA'$
    (D) $A'$

19. Which property does NOT hold for matrix multiplication?
    (A) Associative Law: $(AB)C = A(BC)$
    (B) Distributive Law: $A(B + C) = AB + AC$
    (C) Commutative Law: $AB = BA$
    (D) Existence of Multiplicative Identity: $AI = IA = A$

20. If $A = \begin{bmatrix} i & 0 \\ 0 & i \end{bmatrix}$, where $i = \sqrt{-1}$, then $A^2$ is:
    (A) $I$
    (B) $-I$
    (C) $O$
    (D) $A$

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