CUET (UG) – MATHEMATICS

Chapter Test - Unit II: Algebra - Determinants

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.

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1. If A is a square matrix of order 3 such that $|A| = 4$, then the value of $|2A|$ is:
   (A) 8
   (B) 16
   (C) 32
   (D) 64

2. If the points $(x, -2)$, $(5, 2)$ and $(8, 8)$ are collinear, then the value of x is:
   (A) 3
   (B) -3
   (C) 4
   (D) 5

3. If A is a square matrix of order 3, then $|A \cdot adjA|$ is equal to:
   (A) $|A|^2$
   (B) $|A|^3$
   (C) $|A|$
   (D) $3|A|$

4. The value of the determinant $\begin{vmatrix} 102 & 18 & 36 \\ 1 & 3 & 4 \\ 17 & 3 & 6 \end{vmatrix}$ is:
   (A) 0
   (B) 102
   (C) 36
   (D) 17

5. If $A = \begin{bmatrix} 2 & 3 \\ 5 & k \end{bmatrix}$ is a singular matrix, then k is:
   (A) 15/2
   (B) 2/15
   (C) 0
   (D) 7

6. If A is a square matrix of order 3 and $|A| = 2$, then $|adj(adjA)|$ is:
   (A) 16
   (B) 8
   (C) 64
   (D) 4

7. For a 3×3 matrix A, if $det(A) = -3$, then the value of $det(A^{-1})$ is:
   (A) 3
   (B) -3
   (C) 1/3
   (D) -1/3

8. If the system of equations $x + ky = 3$ and $3x + 3y = 9$ has infinitely many solutions, then k is:
   (A) 1
   (B) 3
   (C) 0
   (D) 9

9. If A_{ij} is the cofactor of element a_{ij} of $\Delta = |a_{ij}|$, then value of Δ is given by:
   (A) $a_{11}A_{31} + a_{12}A_{32} + a_{13}A_{33}$

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(B) $a_{11}A_{11} + a_{12}A_{21} + a_{13}A_{31}$
(C) $a_{21}A_{11} + a_{22}A_{12} + a_{23}A_{13}$
(D) $a_{11}A_{11} + a_{12}A_{12} + a_{13}A_{13}$

10. If A is an invertible matrix of order 3 and $|A| = 5$, then $|A^{-1} \cdot adjA|$ is:
(A) 5
(B) 25
(C) 125
(D) 1/5

11. The area of a triangle with vertices $(x_1, y_1), (x_2, y_2)$ and (x_3, y_3) is zero if and only if the points are:
(A) Vertices of a right triangle
(B) Collinear
(C) Equidistant from origin
(D) None of these

12. If $A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$, then $|A|$ is:
(A) 0
(B) 1
(C) 2
(D) -2

13. If A is a square matrix of order 2, then $|adjA|$ is equal to:
(A) $|A|$
(B) $|A|^2$
(C) 1
(D) O

14. If $\begin{vmatrix} 2x & 5 \\ 8 & x \end{vmatrix} = \begin{vmatrix} 6 & -2 \\ 7 & 3 \end{vmatrix}$, then x is:
(A) 3
(B) ± 3
(C) ± 6
(D) 6

15. If A is a non-singular matrix, then $(A')^{-1}$ is equal to:
(A) $(A^{-1})'$
(B) A'
(C) A
(D) A^{-1}

16. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, then $|AB|$ is equal to:
(A) $|A| + |B|$
(B) $|A| \cdot |B|$
(C) $|A|/|B|$
(D) $det(A + B)$

17. The value of a determinant is zero if:
(A) Two rows are identical
(B) All elements of a column are zero

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(C) Two columns are proportional
(D) All of the above

18. If $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$, then $|adjA|$ is:
(A) 8
(B) 16
(C) 64
(D) 32

19. In a 3×3 matrix, if the elements of the first row are multiplied by the cofactors of the second row, the sum is:
(A) $|A|$
(B) 1
(C) 0
(D) $-|A|$

20. If A is a square matrix of order n, then $|A \cdot adjA| = |A|^k$. The value of k is:
(A) $n-1$
(B) n
(C) $n+1$
(D) 1

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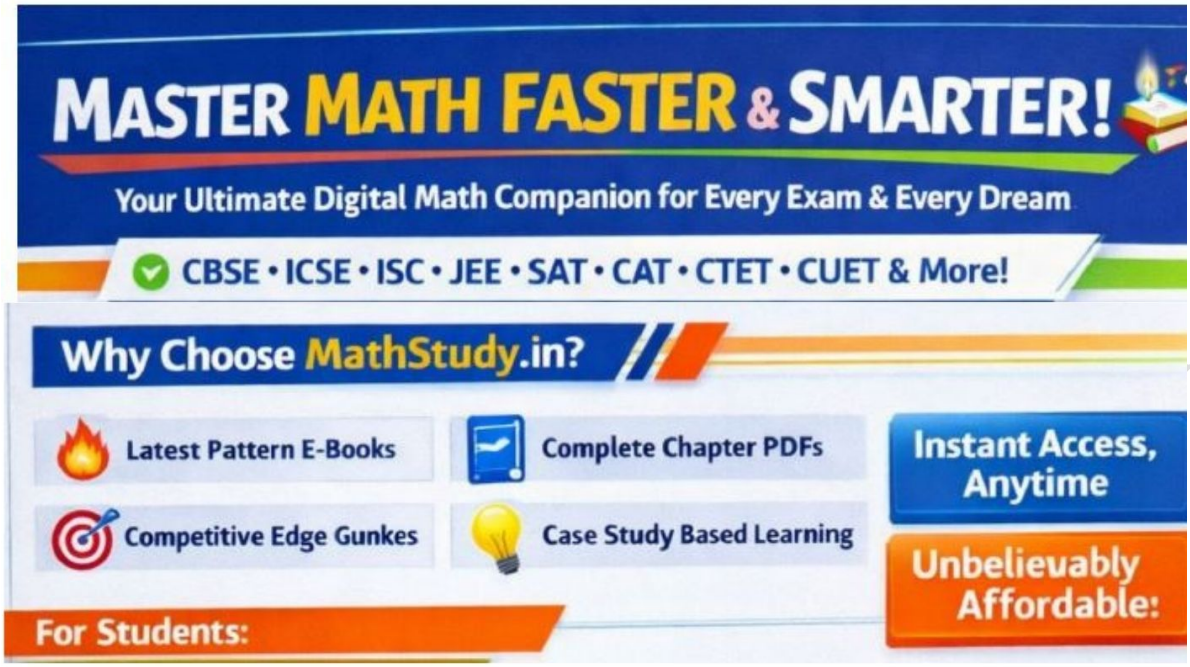

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