DPP

DAILY PRACTICE PROBLEMS

CLASS : XIIth

DATE :

SUBJECT : MATHS

DPP NO. : 2

Topic :-MATRICES

1. Matrix A is such that $A^2 = 2A - I$, where I is the indentity matrix, then for $n \geq 2$, A^n is equal to
   a) $nA - (n-1)I$
   b) $nA - I$
   c) $2^{n-1}A - (n-1)I$
   d) $2^{n-1}A - I$

2. Matrix M_r is defined as $M_r = \begin{bmatrix} r & r-1 \\ r-1 & r \end{bmatrix}$, $r \in N$ value of $\det(M_1) + \det(M_2) + \det(M_3) + \ldots + \det(M_{2007})$ is
   a) 2007
   b) 2008
   c) 2008^2
   d) 2007^2

3. The number of solutions of the system of equations $x_2 - x_3 = 1, -x_1 + 2x_3 = -2, x_1 - 2, x_1 - 2x_2 = 3$ is
   a) Zero
   b) One
   c) Two
   d) Infinite

4. If $A = [a_{ij}]$ is a scalar matrix of order $n \times n$ such that $a_{ii} = k$ for all i, then trace of A is equal to
   a) nk
   b) $n + k$
   c) n/k
   d) None of these

5. If $D = \text{diag}[d_1, d_2, d_3, \ldots, d_n]$, where $d_i \neq 0 \forall\ i = 1, 2, \ldots, n$ then D^{-1} is equal to
   a) O
   b) I_n
   c) $\text{diag}[d_1^{-1}, d_2^{-1}, \ldots, d_n^{-1}]$
   d) None of the above

6. If $A = \begin{bmatrix} 1 & a \\ 0 & 1 \end{bmatrix}$, then $\lim\limits_{n \to \infty} \frac{1}{n} A^n$ is
   a) $\begin{bmatrix} 0 & a \\ 0 & 0 \end{bmatrix}$
   b) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$
   c) $\begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$
   d) None of these

7. The system of equations $2x + y - 5 = 0, x - 2y + 1 = 0, 2x - 14y - a = 0$, is consistent.Then, a is equal to
   a) 1
   b) 2
   c) 5
   d) None of these

8. The system of equation
   $ax + y + z = \alpha - 1$
   $x + \alpha y + z = \alpha - 1$
   $x + y + \alpha z = \alpha - 1$
   Has no solution, if α is
   a) 1
   b) Not-2
   c) Either-2 or1
   d) -2

9. A matrix $A = |a_{ij}|$ is an upper triangular matrix, if
   a) It is a square matrix and $a_{ij} = 0, i < j$
   b) It is a square matrix and $a_{ij} = 0, i > j$
   c) It is not a square matrix and $a_{ij} = 0, i > j$
   d) It is not a square matrix and $a_{ij} = 0, i < j$

10. If $A=\begin{bmatrix} x & 1 \\ 1 & 0 \end{bmatrix}$ and A^2 is the identity matrix, then x is equal to
    a) -1   b) 0   c) 1   d) 2

11. $A = \begin{bmatrix} 0 & 3 \\ 2 & 0 \end{bmatrix}$ and $A^{-1} = \lambda$ (adj A), then λ equal to
    a) $-\frac{1}{6}$ b) $\frac{1}{3}$ c) $-\frac{1}{3}$ d) $\frac{1}{6}$

12. If $A = [a_{ij}]$ is a 4×4 matrix and C_{ij} is the cofactor of the element a_{ij} in $|A|$, then the expression $a_{11}C_{11} + a_{12}C_{12} + a_{13}C_{13} + a_{14}C_{14}$ is equal to
    a) 0   b) -1 c) 1   d) $|A|$

13. For what value of λ, the system of equations $x + y + z = 6, \ x + 2y + 3z = 10, \ x + 2y + \lambda z = 10$ is consistent?
    a) 1   b) 2   c) -1   d) 3

14. If $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$, then A^{100} is equal to
    a) $2^{100}A$ b) $2^{99}A$ c) $100 A$ d) $299 A$

15. Inverse of the matrix $\begin{bmatrix} \cos 2\theta & -\sin 2\theta \\ \sin 2\theta & \cos 2\theta \end{bmatrix}$ is
    a) $\begin{bmatrix} \cos 2\theta & -\sin 2\theta \\ \sin 2\theta & \cos 2\theta \end{bmatrix}$ b) $\begin{bmatrix} \cos 2\theta & \sin 2\theta \\ \sin 2\theta & -\cos 2\theta \end{bmatrix}$ c) $\begin{bmatrix} \cos 2\theta & \sin 2\theta \\ \sin 2\theta & \cos 2\theta \end{bmatrix}$ d) $\begin{bmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$

16. Which of the following is correct?
    a) Determinant is square matrix
    b) Determinant is a number associated to a matrix
    c) Determinant is a number associated to a square matrix
    d) None of these

17. If $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, J = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then B equals
    a) $I \cos\theta + J \sin\theta$ b) $I \sin\theta + J \cos\theta$ c) $I \cos\theta - J \sin\theta$ d) $-I \cos\theta + J \sin\theta$

18. What must be the matrix X if $2X + \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 3 & 8 \\ 7 & 2 \end{bmatrix}$?
    a) $\begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix}$ b) $\begin{bmatrix} 1 & -3 \\ 2 & -1 \end{bmatrix}$ c) $\begin{bmatrix} 2 & 6 \\ 4 & -2 \end{bmatrix}$ d) $\begin{bmatrix} 2 & -6 \\ 4 & -2 \end{bmatrix}$

19. A and B be 3×3 matrices. Then, $AB = O$ implies
   a) $A = O$ and $B = O$
   b) $|A| = O$ and $|B| = O$
   c) Either $|A| = O$ or $|B| = O$
   d) $A = O$ or $B = O$

20. Let $X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$, $D = \begin{bmatrix} 3 \\ 5 \\ 11 \end{bmatrix}$ and $A = \begin{bmatrix} 1 & -1 & -2 \\ 2 & 1 & 1 \\ 4 & -1 & -2 \end{bmatrix}$, if $X = A^{-1}D$, then X is equal to

   a) $\begin{bmatrix} 1 \\ 0 \\ 2 \end{bmatrix}$
   b) $\begin{bmatrix} \frac{8}{3} \\ -1 \\ \frac{3}{3} \\ 0 \end{bmatrix}$
   c) $\begin{bmatrix} -\frac{8}{3} \\ 1 \\ 0 \end{bmatrix}$
   d) $\begin{bmatrix} \frac{8}{3} \\ \frac{1}{3} \\ -1 \end{bmatrix}$