DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **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 $x_2 - x_3 = 1, -x_1 + 2x_3 = -2, x_1 - 2, x_1 - 2 x_2 = 3$ 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) 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 $\lim_{n\to\infty} \frac{1}{n} A^n$ 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=$\begin{bmatrix} x & 1 \\ 1 & 0 \end{bmatrix}andA^2$ 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) $\begin{bmatrix} \frac{8}{3} \\ \frac{-1}{3} \\ 0 \end{bmatrix}$ c) $\begin{bmatrix} -\frac{8}{3} \\ 1 \\ 0 \end{bmatrix}$ d) $\begin{bmatrix} \frac{8}{3} \\ \frac{1}{3} \\ -1 \end{bmatrix}$