DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 3**

Topic :-MATRICES

1. If A and B are matrics such that AB and $A + B$ both are defined, then
   a) $A$and$B$ can be any two matrices
   b) $A$and$B$ are square matrices not necessarily of the same order
   c) A,$B$are square matrices of the same order
   d) Number of columns of A is same as the number of rows of B

2. Let a, b, c be any real numbers. Suppose that there are real numbers x, y, z not all zero such that $x = cy + bz$, $y = az + cx$, and $z = bx + ay$ have non-zero solution. Then, $a^2 + b^2 + c^2 + 2\,abc$ is equal to
   a) 1 b) 2 c) -1 d) 0

3. If I_n is the identity matrix of order n, then rank of I_n is
   a) 1 b) n c) 0 d) None of these

4. If the matrix $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & \lambda \end{bmatrix}$ is singular, then λ is equal to
   a) 3 b) 4 c) 2 d) 5

5. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, then $I + A + A^2 + A^3 + \ldots\infty$ equals to
   a) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ b) $\begin{bmatrix} -1 & -2 \\ -3 & -4 \end{bmatrix}$ c) $\begin{bmatrix} 1/2 & -1/3 \\ -1/2 & 0 \end{bmatrix}$ d) $\begin{bmatrix} -1/4 & 1/3 \\ 1/2 & 0 \end{bmatrix}$

6. If A is a non-singular square matrix of order n, then the rank of A is
   a) Equal to n b) Less than n c) Greater than n d) None of these

7. If A=$\begin{bmatrix} 1 & -2 \\ 4 & 5 \end{bmatrix}$ and $f(t) = t^2 - 3t + 7$, then $f(A) + \begin{bmatrix} 3 & 6 \\ -12 & -9 \end{bmatrix}$is equal to
   a) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$

8. The system of linear equations
$x + y + z = 2$
$2x + y - z = 3$
$3x + 2y + kz = 4$has a unique solution if
   a) $k \neq 0$ b) $-1 < k < 1$ c) $-2 < k < 2$ d) $k = 0$

9. The number of solutions of the system of equations
$2x + y - z = 7, x - 3y + 2z = 1, x + 4y - 3z = 5$ is

a) 0 b) 1 c) 2 d) 3

10. If $X = \begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix}$, the value of X^n is equal to

a) $\begin{bmatrix} 3n & -4n \\ n & -n \end{bmatrix}$ b) $\begin{bmatrix} 2+n & 5-n \\ n & -n \end{bmatrix}$ c) $\begin{bmatrix} 3^n & (-4)^n \\ 1^n & (-1)^n \end{bmatrix}$ d) None of these

11. If I_3 is the identity matrix of order 3, then $(I_3)^{-1} =$

a) 0 b) $3\ I_3$ c) I_3 d) Not necessarily exists

12. If $A = [a_{ij}]$ is a square matrix of order $n \times n$ and k is a scalar, then $|kA| =$

a) $k^n|A|$ b) $k|A|$ c) $k^{n-1}|A|$ d) None of these

13. If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ a & b & -1 \end{bmatrix}$, then A^2 is equal to

a) Null matrix b) Unit matrix c) $-A$ d) A

14. If $A = \begin{bmatrix} \alpha & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 5 & 1 \end{bmatrix}$, then value of α for which $A^2 = B$ is

a) 1 b) -1 c) 4 d) No real values

15. If A is a square matrix such that A (adj A) $= \begin{bmatrix} 4 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 4 \end{bmatrix}$, then |adj A| =

a) 4 b) 16 c) 64 d) 256

16. If ω is a complex cube root of unity and $A = \begin{bmatrix} \omega & 0 \\ 0 & \omega \end{bmatrix}$, then A^{50} is

a) $\omega^2 A$ b) ωA c) A d) 0

17. If $A = \begin{bmatrix} 1 & 2 & x \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 & y \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ and $AB = I_3$, then $x + y$ equals

a) 0 b) -1 c) 2 d) None of these

18. The adjoint of the matrix $\begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ is

a) $\begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$ b) $\begin{bmatrix} \sin\theta & \cos\theta \\ \cos\theta & \sin\theta \end{bmatrix}$ c) $\begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ d) $\begin{bmatrix} -\sin\theta & \cos\theta \\ \cos\theta & \sin\theta \end{bmatrix}$

19. The inverse matrix of $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$ is

a) $\begin{bmatrix} \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} \\ -4 & 3 & -1 \\ \frac{5}{2} & -\frac{3}{2} & \frac{1}{2} \end{bmatrix}$ b) $\begin{bmatrix} \frac{1}{2} & -4 & \frac{5}{2} \\ 1 & -6 & 3 \\ 1 & 2 & -1 \end{bmatrix}$ c) $\frac{1}{2}\begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \\ 4 & 2 & 3 \end{bmatrix}$ d) $\frac{1}{2}\begin{bmatrix} 1 & -1 & -1 \\ -8 & 6 & -2 \\ 5 & -3 & 1 \end{bmatrix}$

20. If $f(\theta) = \begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$, then $\{f(\theta)^{-1}\}$ is equal to

a) $f(-\theta)$ b) $f(\theta)^{-1}$ c) $f(2\theta)$ d) None of these