DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 8**

Topic :-MATRICES

1. Consider the following statements:
1. A square matrix A is hermitian, if $A = A'$
2. Let $A = [a_{ij}]$ be a skew- hermitian matrix, then a_{ij} is purely imaginary
3. All integer powers of a symmetric matrix are symmetric. Which of these is/are correct?
a) (1)and (2) b) (2)and (3) c) (3)and (1) d) (1), (2) and (3)

2. If a_1,a_2,a_3,a_4,a_5,a_6 are in AP with common difference$d \neq 0$,then the system of equations $a_1x + a_2y = a_3$,$a_4x + a_5y = a_6$has
a) Infinite number of solutions b) Unique solution
c) No solution d) Cannot say any thing

3. If I_n is the identity matrix of order n, then $(I_n)^{-1}$ is equal to
a) Does not exist b) I_n c) 0 d) nI_n

4. If A is a square matrix, then adj A^T − (adj $A)^T$ is equal to
a) 2 $|A|$ b) 2 $|A|I$ c) Null matrix d) Unit matrix

5. If $\begin{bmatrix}2 & -1 & 3\\ 1 & 3 & -1\\ 3 & 2 & 1\end{bmatrix}\begin{bmatrix}x\\ y\\ z\end{bmatrix} = \begin{bmatrix}9\\ 4\\ 10\end{bmatrix}$,then$\begin{bmatrix}x\\ y\\ z\end{bmatrix}$is equal to
a) $\begin{bmatrix}3\\ 2\\ 1\end{bmatrix}$ b) $\begin{bmatrix}2\\ 3\\ 1\end{bmatrix}$ c) $\begin{bmatrix}1\\ 2\\ 3\end{bmatrix}$ d) $\begin{bmatrix}2\\ 1\\ 3\end{bmatrix}$

6. Consider the system of equations
$a_1\,x + b_1\,y + c_1\,z = 0$
$a_2\,x + b_2\,y + c_2\,z = 0$
$a_3\,x + b_3\,y + c_3\,z = 0$
if $\begin{vmatrix}a_1 & b_1 & c_1\\ a_2 & b_2 & c_2\\ a_3 & b_3 & c_3\end{vmatrix} = 0$, then the system has
a) More than two solutions
b) One trivial and one non-trivial solutions
c) No solution
d) Only trivial solution (0,0,0)

7. The number of solutions of the system of equations

$x - y + z = 2$

$2x + y - z = 5$

$4x + y + z = 10$ is

a) ∞ b) 1 c) 2 d) 0

8. If $\begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$, then which of the following statement is not correct?

a) A is orthogonal matrix b) A' is orthogonal matrix

c) Determinant $A = 1$ d) A is not invertible

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

a) $2A$ b) A c) $-A$ d) I

10. The rank of the matrix $\begin{bmatrix} -1 & 2 & 5 \\ 2 & -4 & a-4 \\ 1 & -2 & a+1 \end{bmatrix}$ is

a) 1 if $a = 6$ b) 2 if $a = 1$ c) 3 if $a = 2$ d) 4 if $a = -6$

11. If $D = \text{diag}\,(d_1, d_2, d_3, \ldots, d_n)$, where $d_i \neq 0$ for all $i = 1, 2, \ldots, n$, then D^{-1} is equal to

a) D b) diag $(d_1^{-1} d_2^{-1}, \ldots, d_n^{-1})$ c) I_n d) None of these

12. If $f(x) = x^2 + 4x - 5$ and $A = \begin{bmatrix} 1 & 2 \\ 4 & -3 \end{bmatrix}$, then $f(A)$ is equal to

a) $\begin{bmatrix} 0 & -4 \\ 8 & 8 \end{bmatrix}$ b) $\begin{bmatrix} 2 & 1 \\ 2 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 8 & 4 \\ 8 & 0 \end{bmatrix}$

13. If $A = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$ and I is the unit matrix of order 2, then A^2 equals

a) $4A - 3I$ b) $3A - 4I$ c) $A - I$ d) $A + I$

14. Which one of the following is true always for any two non-singular matrices A and B of same order?

a) $AB = BA$ b) $(AB)^t = A^t B^t$

c) $(A + B)(A - B) = A^2 - B^2$ d) $(AB)^{-1} = B^{-1} A^{-1}$

15. The inverse of $\begin{bmatrix} 0 & 0 & 2 \\ 0 & 2 & 0 \\ 2 & 0 & 0 \end{bmatrix}$ is

a) $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$ b) $\begin{bmatrix} 1/2 & 0 & 2 \\ 0 & 1/2 & 0 \\ 0 & 0 & 1/2 \end{bmatrix}$ c) $\begin{bmatrix} 0 & 0 & 2 \\ 0 & 2 & 0 \\ 2 & 0 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 0 & 0 & 1/2 \\ 0 & 1/2 & 0 \\ 1/2 & 0 & 0 \end{bmatrix}$

16. The values of a for which the system of equations $ax + y + z = 0, x - ay + z = 0,$ $x + y + z = 0$ possesses non-zero solution, are given by

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

17. If A is square matrix, then
a) $A + A^T$ is symmetric b) AA^T is skew-symmetric
c) $A^T + A$ is skew-symmetric d) $A^T A$ is skew-symmetric

18. If $A = \begin{bmatrix} 1 & 2 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$, then det [adj(adj A)] is equal to
a) 12^4 b) 13^4 c) 14^4 d) None of these

19. If $\begin{bmatrix} 1 & 1 & 1 \\ 1 & -2 & -2 \\ 1 & 3 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 3 \\ 4 \end{bmatrix}$, then $\begin{bmatrix} x \\ y \\ z \end{bmatrix}$ is equal to
a) $\begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$ b) $\begin{bmatrix} 1 \\ 2 \\ -3 \end{bmatrix}$ c) $\begin{bmatrix} 5 \\ -2 \\ 1 \end{bmatrix}$ d) $\begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix}$

20. If $A = \begin{bmatrix} 1 & 2 \\ -4 & -1 \end{bmatrix}$, then A^{-1} is
a) $\frac{1}{7}\begin{bmatrix} -1 & -2 \\ 4 & 1 \end{bmatrix}$ b) $\frac{1}{7}\begin{bmatrix} 1 & 2 \\ -4 & -1 \end{bmatrix}$ c) $\frac{1}{7}\begin{bmatrix} 1 & 2 \\ 4 & 1 \end{bmatrix}$ d) Does not exist