DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth | **SUBJECT : MATHS**

DATE : | **DPP NO. : 6**

Topic :-MATRICES

1. The system of equations $x+2y+3z=1, 2x+y+3z=2, 5x+5y+9z=5$ has
   a) Unique solution
   b) Infinite many solution
   c) Inconsistent
   d) None of the above

2. The rank of the matrix $\begin{bmatrix} 4 & 2 & (1-x) \\ 5 & k & 1 \\ 6 & 3 & (1+x) \end{bmatrix}$ is 2, then
   a) $k=\frac{5}{2}, x=\frac{1}{5}$
   b) $k=\frac{5}{2}, x\neq\frac{1}{5}$
   c) $k=\frac{1}{5}, x=\frac{5}{2}$
   d) None of these

3. If $A=\begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, then $A^2=$
   a) $\begin{bmatrix} 8 & -5 \\ -5 & 3 \end{bmatrix}$
   b) $\begin{bmatrix} 8 & -5 \\ 5 & 3 \end{bmatrix}$
   c) $\begin{bmatrix} 8 & -5 \\ -5 & -3 \end{bmatrix}$
   d) $\begin{bmatrix} 8 & 5 \\ -5 & 3 \end{bmatrix}$

4. If ω is a root of unity and $A=\begin{bmatrix} 1 & 1 & 1 \\ 1 & \omega & \omega^2 \\ 1 & \omega^2 & \omega \end{bmatrix}$, then A^{-1} is equal to
   a) $\begin{bmatrix} 1 & \omega & \omega^2 \\ \omega^2 & 1 & \omega \\ \omega & \omega^2 & 1 \end{bmatrix}$
   b) $\frac{1}{3}\begin{bmatrix} 1 & 1 & 1 \\ 1 & \omega^2 & \omega \\ 1 & \omega & \omega^2 \end{bmatrix}$
   c) $\begin{bmatrix} 1 & \omega & \omega^2 \\ 1 & \omega^2 & \omega \\ 1 & 1 & 1 \end{bmatrix}$
   d) $\frac{1}{2}\begin{bmatrix} 1 & \omega & \omega^2 \\ 1 & \omega^2 & \omega \\ 1 & 1 & 1 \end{bmatrix}$

5. If $A=[a_{ij}]_{m\times n}$ is a matrix of rank r, then
   a) $r=\min(m,n)$
   b) $r<\min(m,n)$
   c) $r\leq\min(m,n)$
   d) None of these

6. For each real $x: -1<x<1$. Let $A(x)$ be the matrix $(1-x)^{-1}\begin{bmatrix} 1 & -x \\ -x & 1 \end{bmatrix}$ and $z=\frac{x+y}{1+xy}$, then
   a) $A(z)=A(x)A(y)$
   b) $A(z)=A(x)-A(y)$
   c) $A(z)=A(x)[A(y)]^{-1}$
   d) $A(z)=A(x)+A(y)$

7. If $A(\alpha)=\begin{bmatrix} cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$, then the matrix $A^2(\alpha)$ is
   a) $A(2\alpha)$
   b) $A(\alpha)$
   c) $A(3\alpha)$
   d) $A(4\alpha)$

8. If A is a symmetric matrix and $n\in N$, then A^n is
   a) Symmetric matrix
   b) A diagonal matrix
   c) Skew-symmetric matrix
   d) None of the above

9. The inverse matrix of $\begin{bmatrix}0 & 1 & 2\\1 & 2 & 3\\3 & 1 & 1\end{bmatrix}$ 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) $\frac{1}{2}\begin{bmatrix}1 & -1 & -1\\-8 & 6 & -2\\5 & -3 & 1\end{bmatrix}$

10. If $A = \begin{bmatrix}2 & 0 & -3\\4 & 3 & 1\\-5 & 7 & 2\end{bmatrix}$ is expressed as the sum of a symmetric and skew-symmetric matrix, then the symmetric matrix is

a) $\begin{bmatrix}2 & 2 & -4\\2 & 3 & 4\\-4 & 4 & 2\end{bmatrix}$ b) $\begin{bmatrix}2 & 4 & -5\\0 & 3 & 7\\-3 & 1 & 2\end{bmatrix}$ c) $\begin{bmatrix}4 & 4 & -8\\4 & 6 & 8\\-8 & 8 & 4\end{bmatrix}$ d) $\begin{bmatrix}1 & 0 & 0\\0 & 1 & 0\\0 & 0 & 1\end{bmatrix}$

11. If the system of linear equations $x + 2ay + az = 0$,$x + 3by + bz = 0$ and $x + 4cy + cz = 0$ has anon-zero solution, then a, b, c

a) Are in AP b) Are in GP
c) Are in HP d) Satisfy $a + 2b + 3c = 0$

12. For what value of k the following system of linear equations will have infinite solutions
$x - y + z = 3$, $2x + y - z = 2$
and $-3x + 2ky + 6z = 3$

a) $k \neq 2$ b) $k = 0$c) $k = 3$d) $k \in [2, 3]$

13. The product of two orthogonal matrices is

a) Orthogonal b) Involutory c) Unitary d) Idempotent

14. The system of equations $x + y + z = 8$, $x - y + 2z = 6$, $3x + 5y - 7z = 14$ has

a) No solution b) Unique solution
c) Infinitely many solution d) None of the above

15. If the system of equations $x + ay = 0$,$az + y = 0$ and$ax + z = 0$ has infinite solutions, then the value of a is

a) -1 b) 1 c) 0 d) No real values

16. $\begin{bmatrix}-6 & 5\\-7 & 6\end{bmatrix}^{-1} =$

a) $\begin{bmatrix}-6 & 5\\-7 & 6\end{bmatrix}$ b) $\begin{bmatrix}6 & -5\\-7 & 6\end{bmatrix}$ c) $\begin{bmatrix}6 & 5\\7 & 6\end{bmatrix}$ d) $\begin{bmatrix}6 & -5\\7 & -6\end{bmatrix}$

17. Let $F(\alpha) = \begin{bmatrix}\cos\alpha & -\sin\alpha & 0\\\sin\alpha & \cos\alpha & 0\\0 & 0 & 1\end{bmatrix}$, then $[F(\alpha)]^{-1}$ is equal to

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

18. Let for any matrix M, M^{-1}exist which of the following is not true?

a) $|M^{-1}| = |M|^{-1}$ b) $(M^2)^{-1} = (M^{-1})^2$ c) $(M^T)^{-1} = (M^{-1})^T$ d) $(M^{-1})^{-1} = M$

19. If A and B are square matrices of size $n \times n$ such that $A^2 - B^2 = (A - B)(A + B)$, then which of the following will be always true?

a) $AB = BA$ b) Either of A or B is a zero matrix

c) Either of A or B is an identity matrix d) $A = B$

20. $x_1 + 2x_2 + 3x_3 = 2x_1 + 3x_2 + x_3 = 3x_1 + x_2 + 2x_3 = 0.$

This system of equations has

a) Infinite solution b) No solution c) No solution d) Unique solution