DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 10**

Topic :-MATRICES

1. If $P=\begin{bmatrix} i & 0 & -i \\ 0 & -i & i \\ -i & i & 0 \end{bmatrix}$ and $Q=\begin{bmatrix} -i & i \\ 0 & 0 \\ i & -i \end{bmatrix}$, then PQ is equal to

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

2. If $A=\begin{bmatrix} 1 & -1 & 1 \\ 0 & 2 & -3 \\ 2 & 1 & 0 \end{bmatrix}$ and $B=(\text{adj } A)$, and $C=5A$, then $\frac{|\text{adj } B|}{|C|}$ is equal to

   a) 5 b) 25 c) -1 d) 1

3. For $0<\theta<\pi$, if $A=\begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$, then

   a) $A^T=A$ b) $A^T=-A$ c) $A^2=I$ d) $A^T=A^{-1}$

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

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

5. If $x\begin{bmatrix} -3 \\ 4 \end{bmatrix}+y\begin{bmatrix} 4 \\ 3 \end{bmatrix}=\begin{bmatrix} 10 \\ -5 \end{bmatrix}$, then

   a) $x=-2, y=1$ b) $x=-9, y=10$ c) $x=22, y=1$ d) $x=2, y=-1$

6. If A is a square matrix such that $AA^T=I=A^TA$, then A is
   a) A symmetric matrix
   b) A skew-symmetric matrix
   c) A diagonal matrix
   d) An orthogonal matrix

7. The inverse of the matrix $\begin{bmatrix} 5 & -2 \\ 3 & 1 \end{bmatrix}$ is

   a) $\frac{1}{11}\begin{bmatrix} 1 & 2 \\ -3 & 5 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 2 \\ -3 & 5 \end{bmatrix}$ c) $\frac{1}{13}\begin{bmatrix} -2 & 5 \\ 1 & 3 \end{bmatrix}$ d) $\begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}$

8. If $A=\begin{bmatrix}2 & 0 & 0\\ 0 & 2 & 0\\ 0 & 0 & 2\end{bmatrix}$, then $A^5=$

a) $5A$ b) $10A$ c) $16A$ d) $32A$

9. If $A(\theta)=\begin{bmatrix}1 & \tan\theta\\ -\tan\theta & 1\end{bmatrix}$ and $AB=I$, then $(\sec^2\theta)B$ is equal to

a) $A(\theta)$ b) $A\left(\frac{\theta}{2}\right)$ c) $A(-\theta)$ d) $A\left(-\frac{\theta}{2}\right)$

10. If $A=[a_{ij}]$ is a skew-symmetric matrix of order n, then $a_{ii}=$

a) 0 for some i b) 0 for all $i=1,2,\ldots,n$ c) 1 for some i d) 1 for all $i=1,2,\ldots,n$

11. Let $A=\begin{bmatrix}a & 0 & 0\\ 0 & a & 0\\ 0 & 0 & a\end{bmatrix}$, then A^n is equal to

a) $\begin{bmatrix}a^n & 0 & 0\\ 0 & a^n & 0\\ 0 & 0 & a\end{bmatrix}$ b) $\begin{bmatrix}a^n & 0 & 0\\ 0 & a & 0\\ 0 & 0 & a\end{bmatrix}$ c) $\begin{bmatrix}a^n & 0 & 0\\ 0 & a^n & 0\\ 0 & 0 & a^n\end{bmatrix}$ d) $\begin{bmatrix}na & 0 & 0\\ 0 & na & 0\\ 0 & 0 & na\end{bmatrix}$

12. If A,B are symmetric matrices of the same order then $AB-BA$ is

a) Symmetric matrix
b) Skew-symmetric matrix
c) Null matrix
d) Unit matrix

13. If A is any $m\times n$ matrix such that AB and BA are both defined., then B is an

a) $m\times n$matrix b) $n\times m$ matrix c) $n\times n$ matrix d) $m\times m$ matrix

14. If A is a square matrix of order $n\times n$ and k is a scalar, then adj (kA) is equal to

a) k adj A b) k^nadj A c) k^{n-1}adj A d) k^{n+1}adj A

15. $x+ky-z=0, 3x-ky-z=0$ and $x-3y+z=0$ has non-zero solution for k is equal to

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

16. If $A=\begin{bmatrix}0 & 1\\ 0 & 0\end{bmatrix}$, I is the unit matrix of order 2 and a,b are arbitrary constants, then $(aI+bA)^2$ is equal to

a) a^2I-abA b) $a^2I+2abA$ c) a^2I+b^2A d) None of the above

17. If A is an orthogonal matrix, then

a) $|A|=0$ b) $|A|=\pm 1$ c) $|A|=\pm 2$ d) None of these

18. Given $2x-y+2z=2, x-2y+2z=-4, x+y+\lambda z=4$ then the value of λ such that the given system of equations has no solution, is

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

19. If $A = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & x \end{bmatrix}$ is an idempotent matrix, then x is equal to

a) -5 b) -1 c) -3 d) -4

20. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 3 & 0 \\ 0 & 1 & 2 \end{bmatrix}$ and adj $A = \begin{bmatrix} 6 & -2 & -6 \\ -4 & 2 & x \\ y & -1 & -1 \end{bmatrix}$, then $x + y =$

a) 6 b) -1 c) 3 d) 1