DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 9**

Topic :-MATRICES

1. If the matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is commutative with the matrix $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$, then

   a) $a = 0, b = c$ b) $b = 0, c = d$ c) $c = 0, d = a$ d) $d = 0, a = b$

2. If $A = \begin{bmatrix} 1 & 2 & -1 \\ 3 & 0 & 2 \\ 4 & 5 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$, then AB is equal to

   a) $\begin{bmatrix} 5 & 1 & -3 \\ 3 & 2 & 6 \\ 14 & 5 & 0 \end{bmatrix}$ b) $\begin{bmatrix} 11 & 4 & 3 \\ 1 & 2 & 3 \\ 0 & 3 & 3 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 8 & 4 \\ 2 & 9 & 6 \\ 0 & 2 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 0 & 1 & 2 \\ 5 & 4 & 3 \\ 1 & 8 & 2 \end{bmatrix}$

3. Let A be a skew-symmetric matrix of odd order, then $|A|$ is equal to

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

4. If $P = \begin{bmatrix} \sqrt{3}/2 & 1/2 \\ -1/2 & \sqrt{3}/2 \end{bmatrix}$, $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ and $Q = PAP^T$, then $P^T Q^{2005} P$ is

   a) $\begin{bmatrix} 1 & 2005 \\ 0 & 1 \end{bmatrix}$

   b) $\begin{bmatrix} 1 & 2005 \\ 2005 & 1 \end{bmatrix}$

   c) $\begin{bmatrix} 1 & 0 \\ 2005 & 1 \end{bmatrix}$

   d) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

5. If X and Y are 2×2 matrices such that $2X + 3Y = O$ and $X + 2Y = I$, where O and I denote the 2×2 zero matrix and the 2×2 identity matrix, then X is equal to

   a) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$ c) $\begin{bmatrix} -3 & 0 \\ 0 & -3 \end{bmatrix}$ d) $\begin{bmatrix} 3 & 0 \\ 0 & 3 \end{bmatrix}$

6. Consider the system of linear equations

$x_1 + 2x_2 + x_3 = 3$

$2x_1 + 3x_2 + x_3 = 3$

$3x_1 + 5x_2 + 2x_3 = 1$

The system has

   a) Infinite number of solutions b) Exactly 3 solutions
   c) A unique solution d) No solution

7. If $A=\begin{bmatrix} x & -2 \\ 3 & 7 \end{bmatrix}$ and $A^{-1}=\begin{bmatrix} \frac{7}{34} & \frac{1}{17} \\ \frac{-3}{34} & \frac{2}{17} \end{bmatrix}$, then the value of x is

a) 2 b) 3 c) -4 d) 4

8. If A=$\begin{bmatrix} 0 & 0 & -1 \\ 0 & -1 & 0 \\ -1 & 0 & 0 \end{bmatrix}$. The only correct statement about the matrix A is

a) A is a zero matrix
b) $A=(-1)I$, where I is a unit matrix
c) A^{-1}does not exist
d) $A^2=I$

9. The inverse of the matrix $\begin{bmatrix} 1 & 3 \\ 3 & 10 \end{bmatrix}$ is equal to

a) $\begin{bmatrix} 10 & 3 \\ 3 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 10 & -3 \\ -3 & 1 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 3 \\ 3 & 10 \end{bmatrix}$ d) $\begin{bmatrix} -1 & -3 \\ -3 & -10 \end{bmatrix}$

10. If $A=\begin{bmatrix} 1 & 2 & -1 \\ 3 & 0 & 2 \\ 4 & 5 & 0 \end{bmatrix}$, $B=\begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$, then AB is equal to

a) $\begin{bmatrix} 5 & 1 & -3 \\ 3 & 2 & 6 \\ 14 & 5 & 0 \end{bmatrix}$ b) $\begin{bmatrix} 11 & 4 & 3 \\ 1 & 2 & 3 \\ 0 & 3 & 3 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 8 & 4 \\ 2 & 9 & 6 \\ 0 & 2 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 0 & 1 & 2 \\ 5 & 4 & 3 \\ 1 & 8 & 2 \end{bmatrix}$

11. If $F(x)=\begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$ and $G(y)=\begin{bmatrix} \cos x & 0 & \sin x \\ 0 & 1 & 0 \\ -\sin x & 0 & \cos x \end{bmatrix}$, then $[F(x)G(y)]^{-1}$ is equal to

a) $F(-x)G(-y)$ b) $F(x^{-1})G(y^{-1})$ c) $G(-y)F(-x)$ d) $G(y^{-1})F(x^{-1})$

12. Let A=$\begin{bmatrix} 1 & 2 \\ -5 & 1 \end{bmatrix}$ and $A^{-1}=xA+yI$, then the value of x and y are

a) $x=\frac{-1}{11}, y=\frac{2}{11}$ b) $x=\frac{-1}{11}, y=\frac{-2}{11}$ c) $x=\frac{1}{11}, y=\frac{2}{11}$ d) $x=\frac{1}{11}, y=\frac{-2}{11}$

13. If A^T, $B^T$are transpose matrices of the square matrices A ,B respectively, then $(AB)^T$ is equal to
a) A^TB^T b) AB^T c) BA^T d) B^TA^T

14. If $\begin{bmatrix} x+y+z \\ x+y \\ y+z \end{bmatrix}=\begin{bmatrix} 9 \\ 5 \\ 7 \end{bmatrix}$, then the value of (x,y,z) is

a) (4, 3, 2) b) (3, 2, 4) c) (2, 3, 4) d) None of the above

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

a) Idempotent b) Involuntary c) Nilpotent d) Scalar

16. For non-singular square matrices A, B and C of the same order, $(AB^{-1}C)^{-1}$is equal to
a) $A^{-1}BC^{-2}$ b) $C^{-1}B^{-1}A^{-1}$ c) CBA^{-1} d) $C^{-1}BA^{-1}$

17. The matrix $\begin{bmatrix} \lambda & -1 & 4 \\ -3 & 0 & 1 \\ -1 & 1 & 2 \end{bmatrix}$ is invertible, if

a) $\lambda \neq -17$ b) $\lambda \neq -18$ c) $\lambda \neq -19$ d) $\lambda \neq -20$

18. If a, b, c are non-zero, then the number of solutions of following system of equation is

$\frac{2x^2}{a^2} - \frac{y^2}{b^2} - \frac{z^2}{c^2} = 0 \ldots$(i)

$-\frac{x^2}{a^2} + \frac{2y^2}{b^2} - \frac{z^2}{c^2} = 0 \ldots$(ii)

$-\frac{x^2}{a^2} - \frac{y^2}{b^2} + \frac{2z^2}{c^2} = 0 \ldots$(iii)

a) 6 b) 8 c) 9 d) Infinite

19. If $A = \begin{bmatrix} 1 & \log_b a \\ \log_a b & 1 \end{bmatrix}$, then $|A|$ is equal to

a) 1 b) 0 c) $\log_a b$ d) $\log_b a$

20. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, then A^{-1} is equal to

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