DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 4**

Topic :-MATRICES

1. If the three linear equations
$x + 4ay + az = 0$
$x + 3by + bz = 0$
$x + 2cy + cz = 0$
Have a non-trivial solution, where $a \neq 0, b \neq 0, c \neq 0$, then $ab + bc$ is equal to
a) $2ac$ b) $-ac$ c) ac d) $-2ac$

2. If A and B are two matrices such that rank of $A = m$ and rank of $B = n$, then
a) rank $(AB) = mn$
b) rank $(AB) \geq$ rank (A)
c) rank $(AB) \geq rank$(B)
d) rank $(AB) \leq$ min(rank A, rank B)

3. If A is a non-zero column matrix of order $m \times 1$ and B is a non-zero row matrix of order $1 \times n$, then rank of AB equats
a) 1 b) 2 c) 3 d) 4

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

5. If $A^2 - A + I = 0$, then the inverse of A is
a) $I - A$b) $A - I$c) Ad) $A + I$

6. If B is an invertible matrix and A is a matrix, then
a) rank$(BA) =$ rank(A) b) rank$(BA) \geq$ rank(B) c) rank$(BA) >$ rank(A) d) rank$(BA) >$ rank(B)

7. If $A = \begin{bmatrix} 4 & 2 \\ 3 & 4 \end{bmatrix}$, |adj A|is equal to
a) 6 b) 16 c) 10 d) None of these

8. $\cos\theta \begin{bmatrix} \cos\theta \sin\theta \\ -\sin\theta \cos\theta \end{bmatrix} + \sin\theta \begin{bmatrix} \sin\theta - \cos\theta \\ \cos\theta \sin\theta \end{bmatrix}$ is equal to
a) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

9. Let $A = [a_{ij}]_{m\times n}$ be a matrix such that $a_{ij} = 1$ for all i, j. Then,
   a) rank $(A^T) > 1$ b) rank $(A) = 1$ c) rank $(A) = m$ d) rank $(A) = n$

10. Let A be a square matrix all of whose entries are integers. Then, which one of the following is true?
   a) If det $(A)=\pm 1$, then A^{-1} need not exist
   b) If det $(A)=\pm 1$, thenA^{-1} exists but all its entries are not necessarily integers
   c) If det $(A)\neq \pm 1$, then A^{-1}exists and all its entries are non $-$ integers
   d) If det $(A) =\pm 1$,then A^{-1}exists and all its entries are integers

11. Matrix $A = \begin{bmatrix} 1 & 0 & -k \\ 2 & 1 & 3 \\ k & 0 & 1 \end{bmatrix}$ is invertible for
   a) $k = 1$ b) $k = -1$ c) $k = \pm 1$ d) None of these

12. If $\begin{bmatrix} 1 & -\tan\theta \\ \tan\theta & 1 \end{bmatrix}\begin{bmatrix} 1 & \tan\theta \\ -\tan\theta & 1 \end{bmatrix}^{-1} = \begin{bmatrix} a & -b \\ b & a \end{bmatrix}$, then
   a) $a = 1, b = 1$
   b) $a = \cos 2\,\theta, b = \sin 2\,\theta$
   c) $a = \sin 2\,\theta,\ b = \cos 2\,\theta$
   d) None of these

13. If $x^2 + y^2 + z^2 \neq 0, x = cy + bz, y = az + cx$ and $z = bx + ay$, then $a^2 + b^2 + c^2 + 2abc =$
   a) 2 b) $a + b + c$ c) 1 d) $ab + bc + ca$

14. If $A = \begin{bmatrix} 1 & -3 \\ 2 & k \end{bmatrix}andA^2 - 4A = 10I = A$ then k is equal to
   a) 0 b) -4 c) 4 and not 1 d) 1 or 4

15. Matrix A such that $A^2 = 2A - I$, where I is the identity matrix. Then, for $n \geq 2, A^n$ is equal to
   a) $nA - (n-1)I$ b) $nA - I$ c) $2^{n-1}A - (n-1)I$ d) $2^{n-1}A - I$

16. The matrix A satisfying the equation $\begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix} A = \begin{bmatrix} 1 & 1 \\ 0 & -1 \end{bmatrix}$is
   a) $\begin{bmatrix} 1 & 4 \\ -1 & 0 \end{bmatrix}$ b) $\begin{bmatrix} 1 & -4 \\ 1 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 4 \\ 0 & -1 \end{bmatrix}$ d) None of these

17. If A is an orthogonal matrix, then A^{-1} equals
   a) A b) A^T c) A^2 d) None of these

18. By elementary transformation method, the inverse of $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 4 & 6 \end{bmatrix}$ is
   a) $\begin{bmatrix} -2 & 0 & 1 \\ 0 & 3 & -2 \\ 1 & -2 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 2 & 0 & -1 \\ 0 & -3 & 2 \\ -1 & 2 & -1 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 4 & 6 \end{bmatrix}$ d) None of these

19. What must be the matrix X, if $2X + \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 3 & 8 \\ 7 & 2 \end{bmatrix}$?

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

20. If $A = \begin{bmatrix} 4 & x+2 \\ 2x-3 & x+1 \end{bmatrix}$ is symmetric, then $x =$

a) 3 b) 5 c) 2 d) 4