DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 1**

Topic :-MATRICES

1. If $A = [a_{ij}]_{m\times n}$ is a matrix of rank r and B is a square submatrix of order $r+1$, then
   a) B is invertible
   b) B is not invertible
   c) B may or may not be invertible
   d) None of these

2. If A is square matrix, A', is its transpose, then $\frac{1}{2}(A - A')$is
   a) A symmetric matrix
   b) A skew-symmetric matrix
   c) A unit matrix
   d) An elementary matrix

3. Inverse of the matrix $A = \begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix}$is
   a) $\frac{1}{10}\begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix}$ b) $\frac{1}{10}\begin{bmatrix} 4 & 2 \\ -3 & 1 \end{bmatrix}$ c) $\begin{bmatrix} 4 & 2 \\ -3 & 1 \end{bmatrix}$ d) $\frac{1}{10}\begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix}$

4. Let A be a matrix of rank r.Then,
   a) rank $(A^T) = r$ b) rank $(A^T) < r$ c) rank $(A^T) > r$ d) None of these

5. The adjoint matrix of $\begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$ is
   a) $\begin{bmatrix} 4 & 8 & 3 \\ 2 & 1 & 6 \\ 0 & 2 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 1 & -1 & 0 \\ -2 & 3 & -4 \\ -2 & 3 & -3 \end{bmatrix}$ c) $\begin{bmatrix} 11 & 9 & 3 \\ 1 & 2 & 8 \\ 6 & 9 & 1 \end{bmatrix}$ d) $\begin{bmatrix} 1 & -2 & 1 \\ -1 & 3 & 3 \\ -2 & 3 & -3 \end{bmatrix}$

6. If a matrix A is such that $3A^3 + 2A^2 + 5A + I = 0$, then A^{-1} is equal to
   a) $-(3A^2 + 2A + 5)$ b) $3A^2 + 2A + 5$ c) $3A^2 - 2A - 5$ d) None of these

7. Let $A = [a_{ij}]_{n\times n}$ be a square matrix, and let c_{ij} be cofactor of a_{ij} in A.If$C = [c_{ij}]$, then
   a) $|C| = |A|$ b) $|C| = |A|^{n-1}$ c) $|C| = |A|^{n-2}$ d) None of these

8. The system of equations $x + y + z = 0, 2x + 3y + z = 0$ and $x = 2y = 0$ has
   a) A unique solution; $x = 0, y = 0, z = 0$
   b) Infinite solutions
   c) No solutions
   d) Finite number of non-zero solutions

9. If $2X - \begin{bmatrix} 1 & 2 \\ 7 & 4 \end{bmatrix} = \begin{bmatrix} 3 & 2 \\ 0 & -2 \end{bmatrix}$, then X is equal to

a) $\begin{bmatrix} 2 & 2 \\ 7 & 4 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 2 \\ \frac{7}{2} & 2 \end{bmatrix}$ c) $\begin{bmatrix} 2 & 2 \\ \frac{7}{2} & 1 \end{bmatrix}$ d) None of these

10. Let $A = \begin{bmatrix} 1 & 2 \\ -5 & 1 \end{bmatrix}$ and $A^{-1} = xA + yI$, then the values 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) $x = \frac{1}{11}, y = -\frac{2}{11}$

11. Let A and B be two symmetric matrices of same order. Then, the matrix $AB - BA$ is

a) A symmetric matrix b) A skew-symmetric matrix
c) A null matrix d) The identity matrix

12. If $A = \begin{bmatrix} 1 & x \\ x^2 & 4y \end{bmatrix} a, B = \begin{bmatrix} -3 & 1 \\ 1 & 0 \end{bmatrix}$ and adj $A + B = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then the values of x and y are respectively

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

13. Let p is a non-singular matrix such that $1 + p + p^2 + \ldots + p^n = O$ (O denotes the null matrix), then p^{-1} is

a) p^n b) $-p^n$ c) $-(1 + p + \ldots + p^n)$ d) None of these

14. If $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \frac{1}{40} \begin{bmatrix} 5 & 10 & -5 \\ -5 & -2 & 13 \\ 10 & -4 & 6 \end{bmatrix} \begin{bmatrix} 5 \\ 0 \\ 5 \end{bmatrix}$, then the value of $x + y + z$ is

a) 3 b) 0 c) 2 d) 1

15. The matrix $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ is the matrix reflection in the line

a) $x = 1$ b) $x + y = 1$ c) $y = 1$ d) $x = y$

16. 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) $a = \sin 2\theta, b = \cos 2\theta$
c) $a = \cos 2\theta, b = \sin 2\theta$ d) None of the above

17. If $A = \begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$, then adj A is equal to

a) A b) A' c) $3A$ d) $3A'$

18. Let the homogeneous system of linear equations $px + y + z = 0, x + qy + z = 0$, and $x + y + rz = 0$, where $p, q, r \neq 1$, have a non-zero solution, then the value of $\frac{1}{1-p} + \frac{1}{1-q} + \frac{1}{1-r}$ is

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

19. If $A = \begin{bmatrix} 1 & \tan\frac{\theta}{2} \\ -\tan\frac{\theta}{2} & 1 \end{bmatrix}$ and $AB = I$, then B is equal to

a) $\cos^2\frac{\theta}{2} \cdot A$ b) $\cos^2\frac{\theta}{2} \cdot A^T$ c) $\cos^2\theta \cdot I$ d) $\sin^2\frac{\theta}{2} \cdot A$

20. The values of x, y, z in order, if the system of equations $3x + y + 2z = 3, 2x - 3y - z = -3$, $x + 2y + z = 4$ has unique solution, are

a) 2, 1, 5 b) 1, 1, 1 c) $1, -2, -1$ d) $1, 2, -1$