SAINIK SCHOOL GOPALGANJ
SUB: MATHEMATICS
CLASS - XII

ASSIGNMENT- 3

Chapter 3: Matrices

(Q1 to 10) There are four Options against each question. Choose the option which you consider the most appropriate as your answer.

1. For any square matrix A , $A + A^T$ is always

   (a)$skew\ symmetric$ **(b)**symmetric (c) singular (d) none

2. If $A = \begin{bmatrix} p & 0 & 0 \\ 0 & p & 0 \\ 0 & 0 & p \end{bmatrix}$ then $A^n =$

   (a) n. $\begin{bmatrix} p & 0 & 0 \\ 0 & p & 0 \\ 0 & 0 & p \end{bmatrix}$ (b)$\begin{bmatrix} p & 0 & 0 \\ 0 & p & 0 \\ 0 & 0 & p \end{bmatrix}$ (c)$\frac{1}{n}\begin{bmatrix} p & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & p \end{bmatrix}$(d) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

3. If the Matrix $\begin{bmatrix} 0 & 5 & -7 \\ a & b & 11 \\ 7 & -11 & 0 \end{bmatrix}$ is skew symmetric then (a , b) =

   (a) (1 , o) (b) (5 , 1) (c)$(-5 , 0)$ (d) $(0 , -5)$

4. Value of $cosx \begin{bmatrix} cosx & sinx \\ -sinx & cosx \end{bmatrix} + sinx \begin{bmatrix} sinx & -cosx \\ cosx & sinx \end{bmatrix}$ =

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

5. If matrix $[a_{ij}]$ is skew symmetric then ,which one is true

   (a) $a_{ii} = 1$ **(b)** $a_{ii} = 0$ (c) $a_{ij} = a_{ji}$ (d)none

6. What is the value of $[A + B]^T$

   (a)$A + B$ (b)$A^T + B^T$ (c) $A^T - B^T$ (d)none

7. Which one of the following is a scalar matrix?

   (a)$\begin{bmatrix} 1 & 0 \\ 0 & 5 \end{bmatrix}$ (b)$\begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$ **(c)**$\begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$ (d)$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

8. The number of all possible matrices of order 3x3 with entries 1 or 2 is

   (a) 27 (b) 18 (c) 81 (d) 512

9. If A is a matrix which is both symmetric and skew symmetric then A is

   (a) Null Matrix (b) Identity Matrix **(c)** Scalar Matrix (d) None

10. If $A = \begin{bmatrix} 1 & 2 & 0 \\ 3 & -4 & 5 \\ 0 & -1 & 3 \end{bmatrix}$` then $A^2 + 3 I_3 =$

    (a) -4A (b) $4A$ (c) $3A$ **(d)** I_3

11. If $A=\begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$ and $A^2 - 8A + k.I = O$ then find k.

12. If $A=\begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ Show that $A^2 - 5A + 7.I = O$

13 Find a 2x2 matrix A such that $A.\begin{bmatrix} 1 & -2 \\ 1 & 4 \end{bmatrix} = 6I_2$

14. If $X - Y = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ and $X + Y = \begin{bmatrix} 3 & 5 & 1 \\ -1 & 1 & 4 \\ 11 & 8 & 0 \end{bmatrix}$ then find Matrices X and Y.

15 If $\begin{bmatrix} x & 3x-y \\ 2x+z & 3y-w \end{bmatrix}=\begin{bmatrix} 3 & 2 \\ 4 & 7 \end{bmatrix}$ then find x , y ,z and w.

16. Express $A = \begin{bmatrix} 1 & 2 & 0 \\ 3 & -4 & 5 \\ 0 & -1 & 3 \end{bmatrix}$ as sum of a symmetric and a skew symmetric matrix.

17. If $A = \begin{bmatrix} 0 & -\tan\frac{x}{2} \\ \tan\frac{x}{2} & 0 \end{bmatrix}$ then show that $(I + A) = (I - A)\begin{bmatrix} cosx & -sinx \\ sinx & cosx \end{bmatrix}$

18. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ then prove that $A^2 - 4A - 5I = O$, hence find A^{-1}.

19. Using elementary row transformations find the inverse of the matrix $\begin{bmatrix} 1 & 2 & 0 \\ 2 & 3 & -1 \\ 1 & -1 & 3 \end{bmatrix}$

20. Using elementary row transformations find the inverse of the matrix $\begin{bmatrix} 1 & 3 & -2 \\ -3 & 0 & 1 \\ 2 & 1 & 0 \end{bmatrix}$.

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