Atomic Energy Education Society, Mumbai

Chapter: Matrices, Module 2, Worksheet-2

---

1. Express the matrix A as the sum of a symmetric and a skew symmetric matrix, where A = $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 0 \\ 4 & 6 & 7 \end{bmatrix}$

2. If A and B are symmetric matrices of the same order, then A'B –B'A is a Skew symmetric matrix.

3. If A and B are two skew symmetric matrices of same order such that AB = BA., then prove that AB is symmetric matrix .

4. If $A = \begin{bmatrix} 0 & -1 & 2 \\ 4 & 3 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 0 \\ 1 & 3 \\ 2 & 6 \end{bmatrix}$, then verify that :

   (i) $(A')' = A$

   (ii) $(AB)' = B'A'$

   (iii) $(kA)' = (kA')$.

5. If A = $\begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$, verify that it is symmetric.

6. If A and B are two skew symmetric matrices of order n, then

   a. AB is a skew symmetric matrix

   b. AB is a symmetric matrix

   c. AB is a symmetric matrix if A and B commute

   d. None of these

7. A and B are square matrices such that . Then

(a) AB = BA (b) AB – BA = I (c) AB + BA = 0 (d) AB + BA = I

8. If $A(\alpha) = \begin{bmatrix} \cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$, then $A(\alpha)\, A(\beta)$ equals

   (a) $A(\alpha + \beta)$ (b) $A(\alpha - \beta)$ (c) $A(\beta - \alpha)$ (d) none of these

9. Which of the following statements is correct?

   a) A skew – symmetric matrix of odd order is always invertible

   b) A skew – symmetric matrix of odd order is always non – invertible

   c) A skew – symmetric matrix of even order is always non – invertible

   d) None of these

10. Statement 1 : The number of possible dimensions of a matrix containing 32 elements = 6

Statement 2 : Number of ways of expressing 32 as product of two positive integer = 6

(a) STATEMENT–1 is True, STATEMENT–2 is True; STATEMENT–2 is a Correct explanation for STATEMENT–1

(b) STATEMENT–1 is True, STATEMENT–2 is True; STATEMENT–2 is NOT a Correct explanation for STATEMENT–1

(c) STATEMENT–1 is True, STATEMENT–2 is False

(d) STATEMENT–1 is False, STATEMENT–2 is True
