

1. Prove that  $(AB)'$  is not same as  $(BA)'$ .
2. Show that  $A'A$  and  $AA'$  are both symmetric matrices for any matrix  $A$ .
3. If  $A = \begin{bmatrix} 1 & 2 \\ 4 & 1 \\ 5 & 6 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & 2 \\ 6 & 4 \\ 7 & 3 \end{bmatrix}$ , then verify that : (i)  $(2A + B)' = 2A' + B'$  (ii)  $(A - B)' = A' - B'$
4. Show that all the diagonal elements of a skew symmetric matrix are always zero.
5. . If  $AB = BA$  for any two square matrices, prove by mathematical induction that  $(AB)^n = A^n B^n$
6. If  $A, B$  are square matrices of same order and  $B$  is a skew-symmetric matrix, show that  $A'BA$  is skew symmetric.
7. Verify that If  $A$  is skew symmetric matrix, then  $A^2$  is a symmetric matrix.
8. Given  $A = \begin{bmatrix} 2 & 4 & 0 \\ 3 & 9 & 6 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & 4 \\ 2 & 8 \\ 1 & 3 \end{bmatrix}$ . Is  $(AB)' = B'A'$ ?
9. If  $A$  is  $3 \times 4$  matrix and  $B$  is a matrix such that  $A^T B$  and  $BA^T$  are both defined, then  $B$  is of type  
 (A)  $3 \times 4$                       (B)  $3 \times 3$                       (C)  $4 \times 4$                       (D)  $4 \times 3$
10.  $A$  and  $B$  are two matrices of order  $3 \times 3$  so that  $AB = A$ , and  $BA = B$ . Then  $(A + B)^7 =$   
 a)  $7(A+B)$                       b)  $7I_3$                       c)  $64(A+B)$                       d)  $32(A^2 + B^2)$

-----