

UNIT TEST – 4

STD : X

TIME : 1 ½ Hrs

SUBJECT : MATHS

MARKS : 50

MATRICES

SECTION – I

10 x 1 =10

NOTE: (i) Answer all the 10 questions

(ii) Choose the correct answer from the given four alternatives and write the option code and the corresponding answer

1. Matrix $A = [a_{ij}]_{m \times n}$ is a square matrix if
a) $m < n$ b) $m > n$ c) $m = 1$ d) $m = n$
2. If a matrix is of order 2×3 , then the number of elements in the matrix is
a) 5 b) 6 c) 2 d) 3
3. If A is of order 3×4 and B is of order 4×3 , then the order of BA is
a) 3×3 b) 6 c) 2 d) 3
4. If $A \times \begin{pmatrix} 1 & 1 \\ 0 & 2 \end{pmatrix} = \begin{pmatrix} 1 & 2 \end{pmatrix}$, then the order of A is
a) 2×1 b) 4×4 c) 4×3 d) not defined
5. If A and B are square matrices such that $AB = I$ and $BA = I$, then B is
a) Unit Matrix b) Null Matrix c) Multiplicative Inverse matrix of A d) -A
6. If $A = \begin{pmatrix} 4 & -2 \\ 6 & -3 \end{pmatrix}$, then A^2 is
a) $\begin{pmatrix} 16 & 4 \\ 36 & 9 \end{pmatrix}$ b) $\begin{pmatrix} 8 & -4 \\ 12 & -6 \end{pmatrix}$ c) $\begin{pmatrix} -4 & 2 \\ -6 & 3 \end{pmatrix}$ d) $\begin{pmatrix} 4 & -1 \\ 6 & -3 \end{pmatrix}$
7. A is of order $m \times n$ and B is of order $p \times q$, addition of A and B is possible only if
a) $m = p$ b) $n = q$ c) $n = p$ d) $m = p, n = q$
8. If $A = \begin{pmatrix} 7 & 2 \\ 1 & 3 \end{pmatrix}$ and $A + B = \begin{pmatrix} -1 & 0 \\ 2 & -4 \end{pmatrix}$, then the matrix B =
a) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ b) $\begin{pmatrix} 6 & 2 \\ 3 & -1 \end{pmatrix}$ c) $\begin{pmatrix} -8 & -2 \\ 1 & -7 \end{pmatrix}$ d) $\begin{pmatrix} 8 & 2 \\ -1 & 7 \end{pmatrix}$
9. If $(5 \ x \ 1) \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} = (20)$, then the value of n is
a) 7 b) -7 c) $\frac{1}{7}$ d) 0
10. Which one of the following is true for any two square matrices A and B of same order?

a) $(AB)^T = A^T B^T$ b) $(A^T B)^T = A^T B^T$ c) $(AB)^T = BA$ d) $(AB)^T = B^T A^T$

SECTION – II

5 x 2 =10

NOTE: (i) Answer 5 questions

(ii) Question number 17 is compulsory. Select any 4 questions from the first 6 questions

11. If $A = \begin{pmatrix} 8 & 5 & 2 \\ 1 & -3 & 4 \end{pmatrix}$ Find A^T and $(A^T)^T$.

12. Find the values of x, y and z if $\begin{pmatrix} x & 5 & 4 \\ 5 & 9 & 1 \end{pmatrix} = \begin{pmatrix} 3 & 5 & z \\ 5 & y & 1 \end{pmatrix}$

13. If $A = \begin{pmatrix} 2 & 3 \\ -9 & 5 \end{pmatrix} - \begin{pmatrix} 1 & 5 \\ 7 & -1 \end{pmatrix}$ Then find the additive inverse of A

14. Prove that $\begin{pmatrix} 3 & 5 \\ 1 & 2 \end{pmatrix}$ and $\begin{pmatrix} 2 & -5 \\ -1 & 3 \end{pmatrix}$ are multiplicative inverses to each other.

15. Construct a 2 X 3 matrix $A = [a_{ij}]$ whose elements are given by $a_{ij} = |2i - 3j|$

16. If $A = \begin{pmatrix} 3 & 2 \\ 5 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 8 & -1 \\ 4 & 3 \end{pmatrix}$ Then find the matrix $C = 2A + B$.

17. If $A = \begin{pmatrix} 1 & 3 \\ 9 & -6 \end{pmatrix}$ Then verify that $AI = IA = A$, where I is the unit matrix of order 2.

(OR)

Find a and b if $a \begin{pmatrix} 2 \\ 3 \end{pmatrix} + b \begin{pmatrix} -1 \\ 1 \end{pmatrix} = \begin{pmatrix} 10 \\ 5 \end{pmatrix}$

SECTION – III

6 x 5 =30

NOTE: (i) Answer 6 questions

(ii) Question number 25 is compulsory. Select any 5 questions from the first 7 questions

18. If $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$. Then Verify that $A^2 - 4A + 5I_2 = 0$

19. If $A = \begin{bmatrix} 5 & 2 \\ 7 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 2 & -1 \\ -1 & 1 \end{bmatrix}$. Then Verify that $(AB)^T = B^T A^T$

20. If $A = \begin{pmatrix} 1 & -4 \\ -2 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & 6 \\ 3 & -2 \end{pmatrix}$ then prove that $(A+B)^2 \neq A^2 + 2AB + B^2$

21. If $A = \begin{pmatrix} 3 & 2 \\ -1 & 4 \end{pmatrix}$, $B = \begin{pmatrix} -2 & 5 \\ 6 & 7 \end{pmatrix}$ and $C = \begin{pmatrix} 1 & 1 \\ -5 & 3 \end{pmatrix}$ verify that $A(B+C) = AB + AC$

22. If $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$, $I_2 = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, then show that $A^2 - (a + d)A = (bc - ad)I_2$.

23. Solve for x and y if $\begin{pmatrix} x^2 \\ y^2 \end{pmatrix} + 3 \begin{pmatrix} 2x \\ -y \end{pmatrix} = \begin{pmatrix} -9 \\ 4 \end{pmatrix}$

24. If $A = \begin{bmatrix} -2 \\ 4 \\ 5 \end{bmatrix}$, $B = [1 \quad 3 \quad -6]$ Then Verify that $(AB)^T = B^T A^T$

25. Find X and Y if $2X + 3Y = \begin{pmatrix} 2 & 3 \\ 4 & 0 \end{pmatrix}$ and $3X + 2Y = \begin{pmatrix} 2 & -2 \\ -1 & 5 \end{pmatrix}$.

(OR)

$A = \begin{bmatrix} 3 & 3 \\ 7 & 6 \end{bmatrix}$, $B = \begin{bmatrix} 8 & 7 \\ 0 & 9 \end{bmatrix}$ and $C = \begin{bmatrix} 2 & -3 \\ 4 & 6 \end{bmatrix}$. Then find $(A+B) C$ and $AC + BC$. Is $(A+B) C = AC + BC$ True?