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UNIT TEST

CLASS: 10   **MARKS: 50**
SUBJECT: MATHS   **TIME: 1.30 hrs.**
I. Choose the correct answer: **7 x 1 = 7**

1. For the given matrix A = $\begin{pmatrix} 1 & 3 & 5 & 7 \\ 2 & 4 & 6 & 8 \\ 9 & 11 & 13 & 15 \end{pmatrix}$ the order of the matrix A^T is

    (A) 2 x 3   (B) 3 x 2   (C) 3 x 4   (D) 4 x 3

2. If A is a 2 x 3 matrix and B is a 3 x 4 matrix, how many columns does AB have
    (A) 3   (B) 4   (C) 2   (D) 5

3. If number of columns and rows are not equal in a matrix then it is said to be a
    (A) Diagonal matrix   (B) rectangular matrix (C) square matrix (D) identity matrix

4. Transpose of a column matrix is
    (A) Unit matrix   (B) diagonal matrix   (C) column matrix   (D) row matrix

5. Find the matrix X if 2X + $\begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix}$ = $\begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$.

    (A) $\begin{pmatrix} -2 & -2 \\ 2 & -1 \end{pmatrix}$ (B) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$ (C) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$ (D) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$.

6. Which of the following can be calculated from A=$\begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}$, B=$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$,

(i) A^2 (ii) B^2 (iii) AB (iv)BA .
    (A) (i) and (ii) only   (B) (ii) and (iii) only   (C) (ii) and (iv) only   (D) all of these

7. If A = $\begin{pmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{pmatrix}$, B = $\begin{pmatrix} 1 & 0 \\ 2 & -1 \\ 0 & 2 \end{pmatrix}$ and C = $\begin{pmatrix} 0 & 1 \\ -2 & 5 \end{pmatrix}$, which of the following statements are

correct? (i) AB+C=$\begin{pmatrix} 5 & 5 \\ 5 & 5 \end{pmatrix}$ (ii) BC=$\begin{pmatrix} 0 & 1 \\ 2 & -3 \\ -4 & 10 \end{pmatrix}$ (iii) BA+C=$\begin{pmatrix} 2 & 5 \\ 3 & 0 \end{pmatrix}$ (iv)(AB)C=$\begin{pmatrix} -8 & 20 \\ -8 & 13 \end{pmatrix}$.

    (A) (i) and (ii) only   (B)(ii) and (iii) only   (C) (iii) and (iv) only   (D) all of these.

II. Answer any FIVE questions: (Q.No.14 is compulsory)   **7 x 2 = 14**

8. If a matrix has 18 elements, what are the possible orders it can have? What if it has 6 elements?

9. Construct a 3 x 3 matrix whose elements are given by $a_{ij} = |i - 2j|$

10. If A = $\begin{pmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \frac{5}{2} \\ 8 & 3 & 1 \end{pmatrix}$ then verify that $(A^T)^T$.

11. If A= $\begin{pmatrix} 0 & 4 & 9 \\ 8 & 3 & 7 \end{pmatrix}$, B= $\begin{pmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{pmatrix}$ find the value of 3A-9B.

12. If A = $\begin{pmatrix} 1 & 9 \\ 3 & 4 \\ 8 & -3 \end{pmatrix}$, B = $\begin{pmatrix} 5 & 7 \\ 3 & 3 \\ 1 & 0 \end{pmatrix}$ then verify that A+(-A)=(-A)+A=O.

13. Find the value of x,y,z if $(x \quad y - z \quad z + 3) + (y \quad 4 \quad 3) = (4 \quad 8 \quad 6)$.

14. If A = $\begin{pmatrix} cos\theta & sin\theta \\ -sin\theta & cos\theta \end{pmatrix}$ prove that AA^T = I.

III. Answer any FIVE questions. (Q.No.21 is compulsory)   **7 x 5 = 35**

15. If A=$\begin{pmatrix} 4 & 3 & 1 \\ 2 & 3 & -8 \\ 1 & 0 & -4 \end{pmatrix}$, B=$\begin{pmatrix} 2 & 3 & 4 \\ 1 & 9 & 2 \\ -7 & 1 & -1 \end{pmatrix}$ and C=$\begin{pmatrix} 8 & 3 & 4 \\ 1 & -2 & 3 \\ 2 & 4 & -1 \end{pmatrix}$ then verify A+(B+C) = (A+B)+C.

16. Find the non-zero values of x satisfying the matrix equation: $x\begin{pmatrix} 2x & 2 \\ 3 & x \end{pmatrix} + 2\begin{pmatrix} 8 & 5x \\ 4 & 4x \end{pmatrix} = 2\begin{pmatrix} x^2 + 8 & 24 \\ 10 & 6x \end{pmatrix}$.

17. Let A = $\begin{pmatrix} 1 & 2 \\ 1 & 3 \end{pmatrix}$, B = $\begin{pmatrix} 4 & 0 \\ 1 & 5 \end{pmatrix}$, C = $\begin{pmatrix} 2 & 0 \\ 1 & 2 \end{pmatrix}$. Show that (i) A(BC)=(AB)C.

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

19. If A = $\begin{pmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{pmatrix}$, B = $\begin{pmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{pmatrix}$ verify that $(AB)^T = B^TA^T$.

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20. If A = $\begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ show that $A^2-5A+7I_2 = O$.

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

IV. Answer all the question: **1 x 8 = 8**

22. Draw the two tangents from a point which is 10cm away from the centre of a circle of radius 5cm. Also, measure the lengths of the tangents.   **(OR)**

Nishanth is the winner in a Marathon race of 12 km distance. He ran at the uniform speed of 12km/hr and reached the destinations in 1 hour. He was followed by Aradhana, Jeyanth, Sathya and Swetha with their respective speed of 6 km/hr, 4 km/hr, 3 km/hr and 2km/hr. And they covered the distance in 2 hrs, 3 hrs, 4 hrs and 6 hours respectively. Draw the speed-time graph and use it to find the time taken to Kauhik with his speed of 2.4 km/hr.

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