



# Sri Raghavendra Tuition Center

Matrix

10th Standard

Maths

Date : 19-07-24

Reg.No. :

Exam Time : 00:30 Hrs

Total Marks : 30

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Centum Book Available

## I. Multiple Choice Question

22 x 1 = 22

- 1) If A is a  $2 \times 3$  matrix and B is a  $3 \times 4$  matrix, how many columns does AB have  
 (a) 3 (b) 4 (c) 2 (d) 5
- 2) 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)  $2 \times 3$  (b)  $3 \times 2$  (c)  $3 \times 4$  (d)  $4 \times 3$
- 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 the given matrices  $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}$ ,  $B = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$ ,  
 (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

- 8) If  $\begin{bmatrix} 4 & 3 & 2 \\ 1 & -2 & x \end{bmatrix} = [6]$ , then  $x$  is \_\_\_\_\_  
 (a) 4 (b) 3 (c) 2 (d) 1
- 9) If  $A = \begin{bmatrix} y & 0 \\ 3 & 4 \end{bmatrix}$  and  $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$  then  $A^2 = 16I$  for \_\_\_\_\_  
 (a)  $y = 4$  (b)  $y = 5$  (c)  $y = -4$  (d)  $y = 16$
- 10) If  $2A + 3B = \begin{bmatrix} 2 & -1 & 4 \\ 3 & 2 & 5 \end{bmatrix}$  and  $A + 2B = \begin{bmatrix} 5 & 0 & 3 \\ 1 & 6 & 2 \end{bmatrix}$  then  $B =$  [hint:  $B = (A+2B)-(2+3B)$ ]  
 (a)  $\begin{bmatrix} 8 & -1 & -2 \\ -1 & 10 & -1 \end{bmatrix}$  (b)  $\begin{bmatrix} 8 & -1 & 2 \\ -1 & 10 & -1 \end{bmatrix}$  (c)  $\begin{bmatrix} 8 & 1 & 2 \\ -1 & 10 & -1 \end{bmatrix}$  (d)  $\begin{bmatrix} 8 & 1 & 2 \\ 1 & 10 & 1 \end{bmatrix}$
- 11) If  $P$  and  $Q$  are matrices, then which of the following is true?  
 (a)  $PQ \neq QP$  (b)  $(P^T)^T \neq P$  (c)  $P + Q \neq Q + P$  (d) All are true
- 12) If  $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}_{3 \times 2}$  and  $B = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}_{2 \times 3}$  then which of the following products can be made from these matrices  
 (i)  $A^2$   
 (ii)  $B^2$   
 (iii)  $AB$   
 (iv)  $BA$   
 (a) (i) only (b) (ii) and (iii) only (c) (iii) and (iv) only (d) all the above
- 13) If  $A = \begin{bmatrix} 0 & 2 \\ 3 & -4 \end{bmatrix}$  and  $kA = \begin{bmatrix} 0 & 3a \\ 2b & 24 \end{bmatrix}$ , then the values of  $k, a, b$  are respectively  
 (a)  $-6, -12, -18$  (b)  $-6, 4, 9$  (c)  $-6, -4, -9$  (d)  $-6, 12, 18$
- 14) If  $A = \begin{bmatrix} x & 1 \\ 1 & 0 \end{bmatrix}$  and  $A^2 = I$ , then  $x =$   
 (a) 0 (b) 1 (c) -1 (d) 2
- 15) For the given matrix  $A = \begin{bmatrix} 1 & 3 & 5 \\ 2 & 4 & 6 \end{bmatrix}$  the order of the matrix  $(A^T)^T$  is  
 (a)  $2 \times 3$  (b)  $3 \times 2$  (c)  $3 \times 4$  (d)  $4 \times 3$
- 16) If  $U = \begin{bmatrix} 2 & -3 & 4 \end{bmatrix}$ ,  $V = \begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix}$ ,  $X = \begin{bmatrix} 0 & 2 & 3 \end{bmatrix}$  and  $Y = \begin{bmatrix} 2 \\ 2 \\ 4 \end{bmatrix}$ , then  $UV + XY =$   
 (a) 20 (b) [-20] (c) -20 (d) [20]
- 17) If  $A = \begin{bmatrix} 1 & -2 \\ 5 & 3 \end{bmatrix}$  then  $A + A^T =$   
 (a)  $\begin{bmatrix} 2 & 3 \\ 3 & 6 \end{bmatrix}$  (b)  $\begin{bmatrix} 2 & -4 \\ 10 & 6 \end{bmatrix}$  (c)  $\begin{bmatrix} 2 & 4 \\ -10 & 6 \end{bmatrix}$  (d) None of these
- 18) If  $A = \begin{bmatrix} 3 & -3 \\ -3 & 3 \end{bmatrix}$  and  $A^2 = kA$ , then  $k =$   
 (a) 4 (b) 5 (c) 6 (d) 7
- 19) If  $A = \begin{bmatrix} 5 & x \\ y & 6 \end{bmatrix}$ ,  $B = \begin{bmatrix} -4 & y \\ -4 & -5 \end{bmatrix}$  and  $A + B = I$ , then the values of  $x$  and  $y$  respectively are  
 (a)  $-4, 4$  (b)  $-4, -4$  (c)  $4, 4$  (d)  $4, -4$
- 20) If  $A + B = \begin{bmatrix} 10 & 8 \\ 8 & 4 \end{bmatrix}$  and  $A - B = \begin{bmatrix} 2 & -4 \\ 0 & 6 \end{bmatrix}$ , then  $A =$   
 (a)  $\begin{bmatrix} 6 & 2 \\ 4 & 5 \end{bmatrix}$  (b)  $\begin{bmatrix} 6 & 2 \\ 4 & 6 \end{bmatrix}$  (c)  $\begin{bmatrix} 4 & 6 \\ 4 & -1 \end{bmatrix}$  (d)  $\begin{bmatrix} 1 & 3 \\ 4 & 5 \end{bmatrix}$
- 21) If  $A = \begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix}$  and  $f(x) = x^2 - 5x + 4I$ , then  $f(A) =$   
 (a)  $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$  (b)  $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$  (c)  $\begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$  (d)  $\begin{bmatrix} -2 & 0 \\ 0 & 0 \end{bmatrix}$

22) Given  $\mathbf{A} = \begin{bmatrix} -1 & 0 \\ 0 & 2 \end{bmatrix}$ , then  $\mathbf{A}^3 - \mathbf{A}^2 =$

- (a)  $2\mathbf{A}$  (b)  $2\mathbf{I}$  (c)  $\mathbf{A}$  (d)  $\mathbf{I}$

**II. Answer any 6 Question (2 Marks)**

10 x 2 = 20

23) Construct a 3 x 3 matrix whose elements are  $a_{ij} = i^2j^2$

24) If  $\mathbf{A} = \begin{bmatrix} \sqrt{7} & -3 \\ -\sqrt{5} & 2 \\ \sqrt{3} & -5 \end{bmatrix}$  then find the transpose of  $-\mathbf{A}$ .

25) If  $\mathbf{A} = \begin{bmatrix} 5 & 4 & 3 \\ 1 & -7 & 9 \\ 3 & 8 & 2 \end{bmatrix}$  then find the transpose of  $\mathbf{A}$ .

26) If a matrix has 16 elements, what are the possible orders it can have?

27) Find the value of a, b, c, d from the equation  $\begin{pmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{pmatrix} = \begin{pmatrix} 1 & 5 \\ 0 & 2 \end{pmatrix}$

28) Find the values of x, y and z from the following equations

$$\begin{bmatrix} 12 & 3 \\ x & \frac{3}{2} \end{bmatrix} = \begin{bmatrix} y & z \\ 3 & 5 \end{bmatrix}$$

29) If  $\mathbf{A} = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$  prove that  $\mathbf{A}\mathbf{A}^T = \mathbf{I}$ .

30) If  $\mathbf{A} = \begin{bmatrix} 5 & 4 & -2 \\ \frac{1}{2} & \frac{3}{4} & \sqrt{2} \\ 1 & 9 & 4 \end{bmatrix}$ ,  $\mathbf{B} = \begin{bmatrix} -7 & 4 & -3 \\ \frac{1}{4} & \frac{7}{2} & 3 \\ 5 & -6 & 9 \end{bmatrix}$ , find  $4\mathbf{A} - 3\mathbf{B}$ .

31) If  $\mathbf{A} = \begin{bmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \frac{5}{2} \\ 8 & 3 & 1 \end{bmatrix}$  then verify  $(\mathbf{A}^T)^T = \mathbf{A}$

32) Find the values of x, y and z from the following equations.

$$\begin{bmatrix} x+y & 2 \\ 5+x & xy \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 5 & 8 \end{bmatrix}$$

**III. Answer all question (5 Marks)**

1 x 5 = 5

33) Solve for x, y :  $\begin{bmatrix} x^2 \\ y^2 \end{bmatrix} + 2 \begin{bmatrix} -2x \\ -y \end{bmatrix} = \begin{bmatrix} -5 \\ 8 \end{bmatrix}$

**All the best**

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