

**Comprehensive Test Series-03**  
**(Matrices)**  
**XII**

**TIME: 1hr.**

**MM: 30**

**General Instructions:**

- All Questions are compulsory.
  - Use of calculator is not permitted.
- 

Q.1 Construct a  $4 \times 3$  matrix whose elements  $a_{ij}$  are given by

$$(i) a_{ij} = 2i + \frac{i}{j} \quad (ii) a_{ij} = \frac{i-j}{i+j}$$

Q.2 Find  $x$ ,  $y$ ,  $a$  and  $b$  if  $\begin{bmatrix} 2x-3y & a-b & 3 \\ 1 & x+4y & 3a+4b \end{bmatrix} = \begin{bmatrix} 1 & -2 & 3 \\ 1 & 6 & 29 \end{bmatrix}$

Q.3 If  $A = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$ , find  $K$  so that  $A^2 = 8A + KI$

Q.4 Find  $X$  and  $Y$  if

$$2X - Y = \begin{bmatrix} 5 & -5 & 0 \\ -2 & 1 & 1 \end{bmatrix}, X + 2Y = \begin{bmatrix} 2 & 3 & 0 \\ 4 & 0 & -1 \end{bmatrix}$$

Q.5 If  $A = \begin{bmatrix} 9 & 1 \\ 7 & 8 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & 5 \\ 7 & 12 \end{bmatrix}$  find matrix  $C$  such that  $5A + 3B + 2C$  is a null matrix.

Q.6 Evaluate  $\left\{ \begin{bmatrix} 1 & 3 \\ -1 & -4 \end{bmatrix} + \begin{bmatrix} 3 & -2 \\ -1 & 1 \end{bmatrix} \right\} \begin{bmatrix} 1 & 5 \\ 2 & 6 \end{bmatrix}$

Q.7 If  $R(\theta) = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$ , show that  $R(\theta) \cdot R(\phi) = R(\theta + \phi)$

Q.8 Find the matrix  $X$ , for which  $\begin{bmatrix} 5 & 4 \\ 1 & 1 \end{bmatrix} X = \begin{bmatrix} 1 & -2 \\ 1 & 3 \end{bmatrix}$ .

Q.9 Use matrix multiplication to divide Rs. 30,000 in two parts such that the total annual interest at 9% on the first part and 11% on the second part amounts Rs. 3060.

Q.10 Find the inverse of the matrix  $A = \begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$  using elementary row transformations.