Date __/__/__

Page No : ____

Types of Matrices :

① Row matrix : A matrix having only 1 row and n columns. $\begin{bmatrix} 3 & 4 & 5 & 6 \end{bmatrix}$

② Column matrix : A matrix having only 1 column and n rows. $\begin{bmatrix} 2 \\ 3 \\ 8 \\ 7 \end{bmatrix}$

③ Null Matrix : If all entries are zero, the matrix is called a zero or null matrix

④ Square Matrix : If the number of rows = the number of columns, the matrix is called a square matrix.

⑤ Diagonal Matrix : If A is a square matrix, where all non-diagonal elements are 0, then A is called a diagonal matrix.

$$\begin{bmatrix} 7 & 0 & 0 \\ 0 & 9 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

⑥ Scalar Matrix : A matrix having same scalar on the diagonal is called a scalar matrix. i.e. when the elements of diagonal are same.

$$\begin{bmatrix} 5 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{bmatrix}$$

Every so scalar matrix is
① diagonal matrix ② square matrix.

Every diagonal matrix is a square matrix

⑦ **Identity Matrix**: If A is a diagonal matrix, where all the diagonal elements are 1, then A is called an identity matrix / unit matrix. It is denoted by 'I' or 'U'.

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

- When the Identity matrix is multiplied by any other matrix, ~~the~~ the result will be the same matrix.

⑧ **Diagonal Matrix**: When only the non diagonal elements are zero, the matrix is called diagonal matrix

$$\begin{bmatrix} 4 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 6 \end{bmatrix}$$

⑨ **Triangular Matrix**:

$$\begin{bmatrix} 1 & 0 & 0 \\ 3 & 7 & 0 \\ 4 & 5 & 9 \end{bmatrix}$$

upper triangular matrix

$$\begin{bmatrix} 1 & 3 & 4 \\ 0 & 7 & 5 \\ 0 & 0 & 6 \end{bmatrix}$$

lower triangular matrix

 i = row j = column

(10) **Symmetric Matrix**: A matrix such that $a_{ij} = a_{ji}$ for all i, j in the matrix

$$\begin{array}{ccc} & \begin{matrix} a_{11} & a_{12} & a_{13} \end{matrix} & \\ \begin{matrix} \\ a_{21} \\ a_{31} \end{matrix} & \begin{bmatrix} 1 & 7 & 3 \\ 7 & 9 & 4 \\ 3 & 4 & 6 \end{bmatrix} & \begin{matrix} \\ a_{23} \\ \\ \end{matrix} \\ & \begin{matrix} \phantom{a_{11}} & a_{32} & a_{33} \end{matrix} & \end{array}$$

The transpose of the matrix is the same as the matrix

(11) **Skew Symmetric Matrix**:

$$X = \begin{bmatrix} 0 & 3 & 4 \\ -3 & 0 & 7 \\ -4 & -7 & 0 \end{bmatrix}$$

negative $a_{ij} = -a_{ji}$

Transpose of a matrix is equal to the matrix