

6 Null matrix : Matrix with all elements equal to zero.

$$\text{For e.g., } A = [0] \quad \text{or} \quad \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

It is denoted by 0

7 Identity matrix : Diagonal matrix with diagonal elements equal to one.

$$\text{For e.g., } A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \quad \text{or} \quad \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

It is denoted by I

8 Upper Triangular matrix : Square matrix with elements below diagonal as zero.

$$\text{For e.g., } A = \begin{bmatrix} 1 & 3 \\ 0 & 2 \end{bmatrix} \quad \text{or} \quad \begin{bmatrix} 1 & 2 & 3 \\ 0 & 4 & 5 \\ 0 & 0 & 6 \end{bmatrix}$$

9 Lower Triangular matrix : Square matrix with elements above diagonal as zero.

$$\text{For e.g., } A = \begin{bmatrix} 1 & 0 \\ 3 & 2 \end{bmatrix} \quad \text{or} \quad \begin{bmatrix} 1 & 0 & 0 \\ 2 & 4 & 0 \\ 3 & 5 & 6 \end{bmatrix}$$

Addition and Subtraction Of Matrices

- For adding or subtracting, the 2 matrices should be of the same order.
- When order is same for the two matrices, each element from the first matrix is added to or subtracted from the corresponding element of the second matrix.

Properties Of Matrix Addition

For three matrices A, B, C of same order,

- 1 Commutative Law:** $A + B = B + A$
- 2 Associative Law:** $(A + B) + C = A + (B + C)$
- 3 Additive Identity :** $A + 0 = 0 + A = A$

Scalar Multiplication Of Matrix

In this, every element of matrix is multiplied by a fixed scalar quantity

$$\text{For e.g., If } A = \begin{bmatrix} 1 & 0 \\ 3 & 2 \end{bmatrix} \quad \text{then } 5A = \begin{bmatrix} 5 & 0 \\ 15 & 10 \end{bmatrix}$$