

# Assignment-2

EE224BTECH11044 - Muthyala Koushik

## I. VECTOR ARITHMETIC(CBSE)

**Question:** If  $(3, 3)$ ,  $(6, y)$ ,  $(x, 7)$  and  $(5, 6)$  are the vertices of a parallelogram taken in order, find the values of  $x$  and  $y$ . (10,2011)

**Solution:** Property: Midpoints of the diagonals of parallelogram coincide.

Given vertices:  $A\left(\begin{smallmatrix} 3 \\ 3 \end{smallmatrix}\right)$ ,  $B\left(\begin{smallmatrix} 6 \\ y \end{smallmatrix}\right)$ ,  $C\left(\begin{smallmatrix} x \\ 7 \end{smallmatrix}\right)$ ,  $D\left(\begin{smallmatrix} 5 \\ 6 \end{smallmatrix}\right)$ .

$$\text{Midpoint of AC} : \left(\begin{smallmatrix} \frac{3+x}{2} \\ 5 \end{smallmatrix}\right) \quad (1)$$

$$\text{Midpoint of BD} : \left(\begin{smallmatrix} \frac{11}{2} \\ \frac{y+6}{2} \end{smallmatrix}\right) \quad (2)$$

Equate midpoints:

$$\frac{3+x}{2} = \frac{11}{2} \implies x = 8 \quad (3)$$

$$5 = \frac{y+6}{2} \implies y = 4 \quad (4)$$

So,  $x = 8$  and  $y = 4$

