

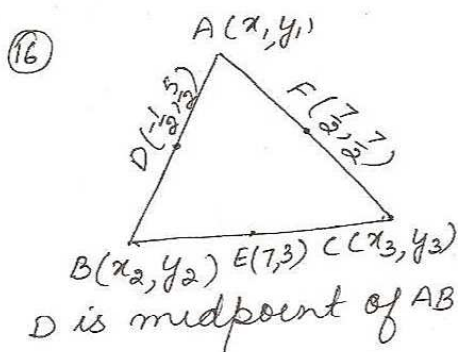
(15)  $P(x, y)$   
 $A(3, 2)$        $B(5, 1)$   
 $AP:PB = 1:2$   
 $\therefore x = \frac{2 \times 3 + 1 \times 5}{1+2}, y = \frac{2 \times 2 + 1 \times 1}{1+2}$   
 $= \frac{11}{3} \quad = \frac{5}{3}$

Pt P lies on  $3x - 18y + k = 0$

$$3 \times \frac{11}{3} - 18 \times \frac{5}{3} + k = 0$$

$$\Rightarrow 11 - 30 + k = 0$$

$$\Rightarrow k = 19$$



$$\therefore \frac{x_1 + x_2}{2} = \frac{-1}{2} \quad \left| \quad \frac{y_1 + y_2}{2} = \frac{5}{2} \right.$$

$$\Rightarrow x_1 + x_2 = -1 \dots \textcircled{i} \quad \left| \quad \Rightarrow y_1 + y_2 = 5 \dots \textcircled{ii} \right.$$

E is midpoint of BC

$$\frac{x_2 + x_3}{2} = 7 \quad \left| \quad \frac{y_2 + y_3}{2} = 3 \right.$$

$$\Rightarrow x_2 + x_3 = 14 \dots \textcircled{iii} \quad \left| \quad \Rightarrow y_2 + y_3 = 6 \dots \textcircled{iv} \right.$$

F is midpoint of AC

$$\therefore \frac{x_1 + x_3}{2} = 7 \dots \textcircled{v} \quad \left| \quad \frac{y_1 + y_3}{2} = 7 \dots \textcircled{vi} \right.$$

$$\textcircled{i} + \textcircled{iii} + \textcircled{v}$$

$$2(x_1 + x_2 + x_3) = -1 + 14 + 7$$

$$\Rightarrow x_1 + x_2 + x_3 = \frac{20}{2}$$

$$\Rightarrow x_1 + x_2 + x_3 = 10 \dots \textcircled{vii}$$

using  $\textcircled{i}$

$$-1 + x_3 = 10$$

$$\Rightarrow x_3 = 11$$

from  $\textcircled{ii}$  and  $\textcircled{vii}$

$$x_1 + 14 = 10$$

$$\Rightarrow x_1 = -4$$

from  $\textcircled{v}$  and  $\textcircled{vii}$

$$7 + x_2 = 10$$

$$\Rightarrow x_2 = 10 - 7 = 3$$