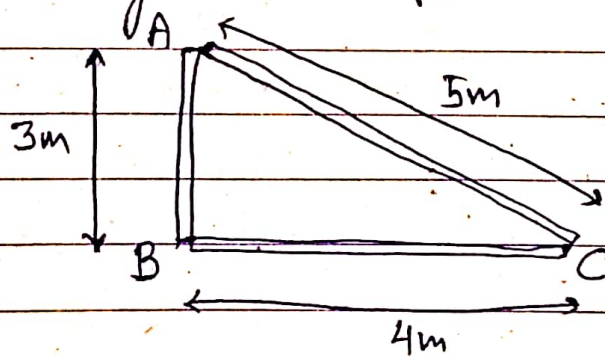


Question

Three rods (same material, same cross-section) of different length are joined to form a triangle ABC as shown in figure. If temperature of point A and point B are 200°C and 20°C respectively. find temperature of point C.



Solution:

As point A is at higher temperature than B, So heat flow is along $(A \rightarrow C \rightarrow B)$ and $(A \rightarrow B)$

Let temperature of point C be θ .

Thermal resistance of rod AC,

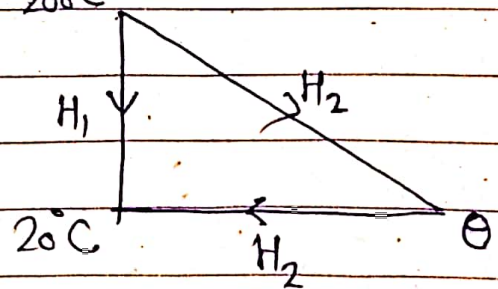
$$X_1 = \frac{5}{KA}$$

Thermal resistance of rod CB,

$$X_2 = \frac{4}{KA}$$

As rod AC and CB are in series so heat flow H_2 is same

$$\frac{200 - \theta}{X_1} = \frac{\theta - 20}{X_2}$$



$$KA \frac{(200 - \theta)}{5} = \frac{KA (\theta - 20)}{4}$$

$$800 - 4\theta = 5\theta - 100$$

$$\theta = 100^{\circ}\text{C}$$