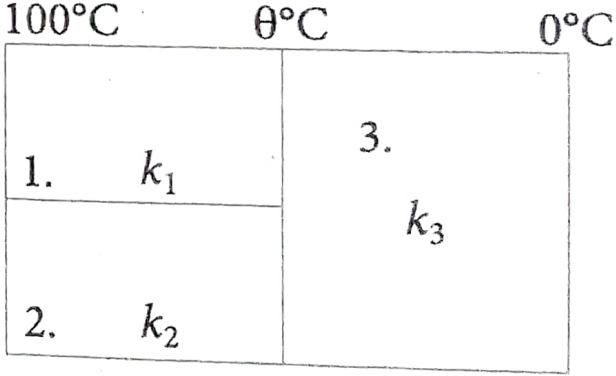
. **(40)** : As conductors 1st and 2nd are in parallel.

So, equivalent conductivity between 1st and 2nd is

$k_{12} = k_1 + k_2 = 120 + 60 = 180 \text{ Js}^{-1} \text{ m}^{-1}\text{K}^{-1}$

Let, $T_1 = 100°\text{C} = 373 \text{ K}$, $T_2 = \theta\text{K}$, $T_3 = 0°\text{C} = 273 \text{ K}$.

$$\therefore \quad \frac{T_1 - T_2}{\frac{l}{k_{12}A}} = \frac{T_2 - T_3}{\frac{l}{k_3 2A}}$$



$$\Rightarrow \quad \frac{373 - T_2}{\frac{l}{(180)\,A}} = \frac{T_2 - 273}{\frac{l}{(135)\,2A}}$$

$\Rightarrow \quad (373 - \theta)\,180 = 135\,(\theta - 273)2$

$\Rightarrow \quad 746 - 2\theta = 3\theta - 819 \Rightarrow \theta = 313 \text{ K} = 40°\text{C}.$