

The Summary of the conductive heat transfer:

Conductive heat transfer takes place when there is a temperature gradient in objects or other mediums.

The energy transfer always from more energetic to less energetic.

The heat transfer related to thermal conductivity of materials, the thickness of material and heat transfer area. Different materials have different thermal conductivity.

The Question: L= 0.4m, A= 20 m², ΔT= 25, and k=0.78 W/mK using both simple method and using the resistance concept.

$$\dot{Q} = kA \frac{\Delta T}{L} = 0.78 * 20 * \frac{25}{0.4} = 975W$$

Simple method :

$$R_{wall} = \frac{L}{kA} = \frac{0.4}{0.78 * 20} \approx 0.0256 \text{ } ^\circ\text{C}/W$$

$$\dot{Q} = \frac{\Delta T}{R_{wall}} = \frac{25}{0.0256} \approx 976.6 W$$