

QUESTIONS:

A short summary about the conductive heat transfer and solving the same exercise with $L = 0.4 \text{ m}$, $A = 20 \text{ m}^2$, $\Delta T = 25$, and $k = 0.78 \text{ W/m K}$ using both simple method and using the resistance concept.

ANSWERS:

Thermal energy transfer due to temperature difference.

The thermal conductivity of an object is related to many factors such as the composition, structure, temperature, humidity, pressure and aggregation state of the material.

1 Simple Method:

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

2 Thermal Resistance Concept:

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

$$Q = \frac{\Delta T}{R_{\text{wall}}} = \frac{25}{0.0256} = 976.56 \text{ W}$$