# Homework 1

Short summary on conductive heat transfer

Conductive heat transfer is a physical act, the exchange of thermal energy between two objects containing different temperatures. In this process, the heat is transferred via molecular collision. When two objects of different temperatures collide, the molecules of the warmer object pass some heat energy to the comparatively cooler object until they gain the same temperature. The whole process is named as conductive heat transfer and the objects that have this quality are called conductors.

Solid objects are better conductors than liquids whereas liquids are better conductors than gases. A simple diagram of this process is shown below -
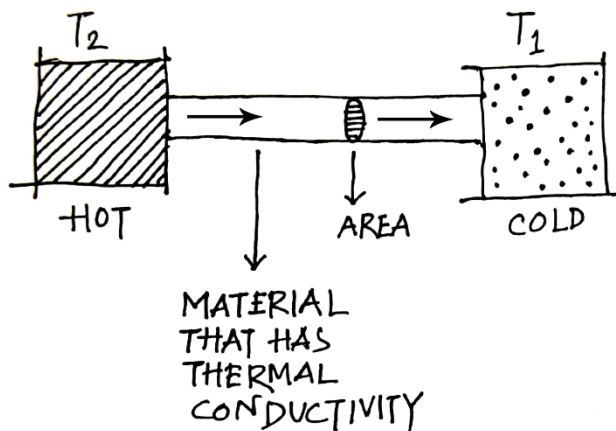
The heat is conducting through a particular length and cross-sectional area during a particular time from hot material to the cold material, therefore creating conductive heat transfer.

Solving the same exercise with L= 0.4 m, A= 20 m2, ΔT= 25, and k=0.78 W/m K using both simple method and using the resistance concept

A = 20m²

ΔT = 25

L = 0.4m
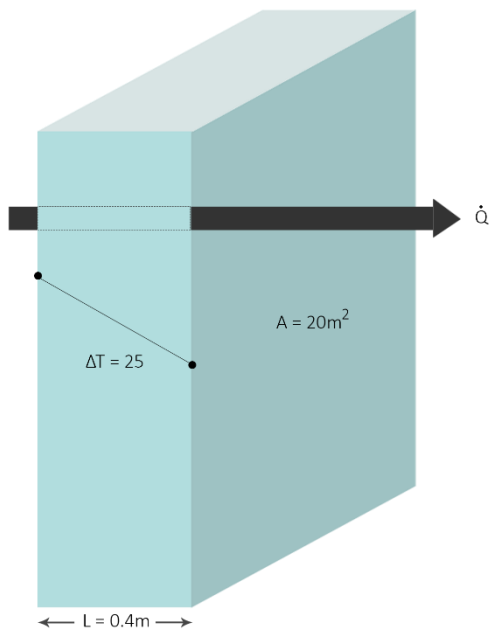
Simple method:

$$\dot{Q} = kA\frac{\Delta T}{L}$$

$$= 0.78 * 20 * \frac{25}{0.4} = 975\ W$$

Resistance concept:

$$R_{wall} = \frac{L}{kA} = \frac{0.4}{0.78 * 20} = 0.0256\ °C/W$$

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