ASSIGNMENT

Find the rate of heat transfer through the wall if L= 0.4 m, A= 20 m2, T= 25, and k=0.78 W/m K using both simple method and using the resistance concept?

SIMPLE METHOD:

$$\dot{Q} = kA\frac{\Delta T}{L} = 0.78 * 15 * \frac{16-2}{0.3} = 975\ W$$

RESISTANCE CONCEPT:

$$R_{wall} = \frac{L}{kA} = \frac{0.4}{0.78 * 20} = 0.0222\ °C/W$$

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

Summary

HEAT TRANSFER- CONDUCTION AND CONVECTION

In a steady heat transfer through a wall, the transfer is always steady and constant. The heat transfer is in horizontal or x- direction.

The rate of heat conduction through a plane wall:

- is proportional to the average thermal conductivity, the wall area, and the temperature difference
-but is inversely proportional to the wall thickness.
- The better the conductor, the more rapidly **heat** will be **transferred.**

Conduction resistance of the wall:

Thermal resistance of the wall is against heat conduction.
Thermal resistance of a medium depends on the geometry and the thermal properties of the medium.