TES Homework 1

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Guidelines for this week's submission:

A short summary about the conductive heat transfer and solving the same exercise with L= 0.4 m, A= 20 m2, DeltaT= 25, and k=0.78 W/m K using both simple method and using the resistance concept

From <https://github.com/bnajafi/TES_2019-2020_weeklySubmissions/blob/master/Week%201/README.md#guidelines-for-this-weeks-submission>

Summary:

Heat transfer is a process that varies based on the following factors:
Material thickness
Material conductivity
Surface area

All these factors create wall resistance. Thicker material, smaller surface area and conductivity contribute towards greater resistance. In turn, greater resistance creates lower conductivity.
In areas where heat transfer is undesired, these factors may be taken into account.

Answer:

1. **SIMPLE METHOD**

$$\dot{Q} = kA\frac{dT}{l}$$

$$= 0.78\ W/mK\ \cdot 20\ m^2 \cdot \frac{25K}{0.4m}$$

$$= 975\ W$$

2. **RESISTANCE METHOD**

$$R\text{wall} = \frac{l}{kA}$$

$$= \frac{0.4m}{0.78\ W/mK\ \cdot 20\ m^2}$$

$$= 0.0256\ K/W$$

$$\dot{Q} = \frac{dT}{R\text{wall}}$$

$$= \frac{25\ K}{0.0256\ K/W}$$

$$= 976.56\ W$$