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Home work/ Week 1

A- short summary about the conductive heat transfer.

B- solving the same exercise with:

L= 0.4 m
A= 20 m2,
DeltaT= 25
k=0.78 W/m C

using both:

a- simple method
b- resistance concept

Pasted from <https://github.com/bnajafi/TES_2019-2020_weeklySubmissions/tree/master/Week%201>

A- Thermal conduction:

Transfer of heat within a body. Conduction takes place in all phases of including solids, liquids, and gases. The rate at which energy is conducted as heat between two bodies is proportional to the area, and the temperature difference between the two bodies and the properties of the conductive interface through which the heat is transferred, and inversely proportional to the lenght

Heat spontaneously flows from a hotter to a colder body. In the absence of an external driving energy source to the contrary, within a body or between bodies, temperature differences decay over time, and thermal equilibrium is approached, temperature becoming more uniform.

A substance of large thermal conductivity K is a good heat conductor, however one with small thermal conductivity is a poor heat conductor.

B. a)- Simple Way:

$$\dot{Q} = kA\frac{\Delta T}{L} =$$ 0.78 * 20 * 25/0.4 = 975.0 W

B. b)- Resistance Concept:

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

$$\dot{Q} = \frac{\Delta T}{R_{Wall}} =$$ 25/0.0256 = 976.5625 W

The Difference between the two results is because of the rounding.