WEEK 1 - ASSIGMENT

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

<u>Conductive heat transfer :</u> The conductive heat transfer is the transfer of energy from more energetic to less energetic molecules. The heat flows in direction of decreasing temperatures from something that has an higher temperature to something that has a lower temperature. In the case of the heat transfer through a plane wall of a house, we can consider it as steady and one-dimensional. Conductive heat transfer can be expressed by Fourier's law : $Q = kA (T_1 – T_2)/L$ (W). k (W/m K or W/m C°) is the thermal conductivity, that depends on materiality; A (m^2) is the surface of the wall; T (K or C°) is the temperature and L (m) is the thickness of the wall. We can see how the conductive is proportional to the conductivity, the surface of the wall and the difference of the temperature, instead it's inversely proportional to the thickness of the wall.

EXERCISE

DATA

A= 20 m^2
L=0.4 m
ΔT= 25
k= 0.78 W/m k

SIMPLE METHOD

$Q = kA (\Delta T)/L$
Q = 0.78 W/m k * 20 m^2 * 25 K / 0.4 m = 975 W

RESISTANCE METHOD

$R= L/(KA)$
$Q= \Delta T/R$

R= 0.4 m / (0.78 W/m k *20 m^2) = 0.02564103 k /W
Q= 25 k / 0.02564103 k/W = 974,99 W