Assigment Week 1.

Julia Lis Franco

a) Simplify method:

- $Q = K \cdot A \cdot \frac{\Delta T}{L}$

- $Q = 0{,}78 W/m \cdot 20 m^2 \cdot \frac{25^oC}{0{,}40m}$

- $Q = 0{,}78 W/m \cdot 20 m^2 \cdot 62{,}50\ ^oC/m$

- **$Q = 975 W$**

b) Resistant concept:

$$R_{wall} = \frac{L}{K \cdot A}$$

$$R_{wall} = \frac{0{,}40m}{0{,}78 W/m \cdot 20 m^2}$$

$$R_{wall} = 0{,}0256\ ^oC/W$$

- $Q = \frac{\Delta T}{R_{wall}}$

- $Q = \frac{25^oC}{0{,}0256\ ^oC/W}$

- **$Q = 976{,}56 W$**

Theorical review "Convection and conduction":

Fourier's law of heat conduction.
Formulated in 1822, Fourier's law explain that the thermal conduction is the transfer of heat in the direction of decreasing temperature, from a hot to a cold body. According to his law, the heat transfer through a wall can be described as steady and one-dimensional. This means that under steady conditions the heat transfer is constant and can be analysed like a straight line. Its mathematical expression is:

- $Q = K \cdot A \cdot \frac{\Delta T}{}$

L

The formula state that the heat conduction through a wall is related to the coefficient of conductivity (K), the area of the wall (A), its thickness (L) and the difference of temperature between inside the building and the outside (ΔT).

Fourie's law can also be calculated in terms of resistance. In this case first we need to calculate the resistance of the wall taking an account its thickness (L) and the coefficient of conductivity and the area of the wall (K). As a second step we must calculate the heat transfer based on the variation of temperature (ΔT) and the resistance (previously calculated). Is mathematical expression is:

$$R_{wall} = \frac{L}{K \cdot A}$$

- $$\dot{Q} = \frac{\Delta T}{R_{wall}}$$

Julia Lis Franco
8/10/2019