lunedì 14 ottobre 2019
21:34

1 write a summary (in your own words !, (in your own words !!!) about the convective heat transfer (half a page) and explain why increasing the thickness of a single pane glass does not increase the total resistane

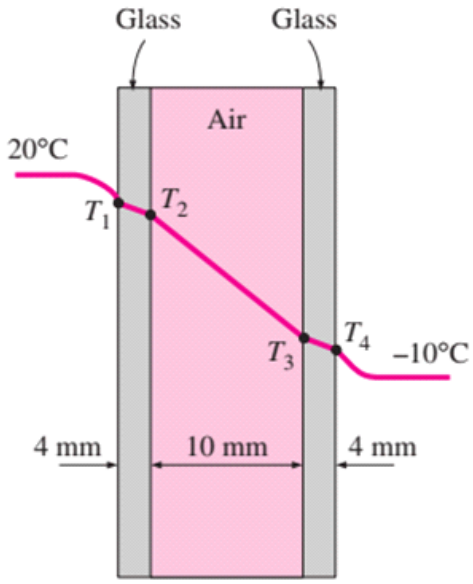
2 write an explanation about what mistakes you made in the class that resulted in wrong answers !!

3 solve the same probelm as that of double pane window with with the air-gap thickness of 13 mm and glass thickness of 6 mm, commment on your results and explain why we have an optimal range for the air-gap's distance !

During last lesson our topic was the convective heat transfer: we analyzed two different cases
Connective heat transfer is the transfer of heat from one place to another one .
There are two kinds of convection of heat: Natural conevction and froced convection.
We took as esxamples two different cases:

- In the first one we had a window composed by only one glass. In our data we had the temperature inside and outside and the thickness of the glass. The problem ask us to calculate the heat transfer Q. So we started to calculate the single resistence of each elements and sum them finding the total resistence. Then we can can calculate the Q dividing the $\Delta T \ for \ total \ resistence$.
- In the second case we had a little changing; we took in consideration the case of a double panel of glass with a air gap. We discovered that the procediment is the same and we need to calculate more resistances.

At the end of these two exercises we discover that is useless to make bigger the thickness of the glass is better to use a air-gap between the two glass panels. This fact happen because the resistance of glass panel is lower than the convection resistance. The higher resistance is located in the indoor surface. This tool reduce the dispertion of heat and let us to use less money to mantain our home in a energy point of view.



$$A = \ 0.8 * 1.5 = 1.2$$

$$R_{g_1} = R_{g_2} = \frac{L_g}{(K_g \times A)} = \frac{0.006}{0.78 * 1.2} = 0.0064 \, ° \frac{C}{W}$$

$$R_{airGap} = \frac{L_{airGap}}{(K_{airGap} \times A)} = \frac{0.013}{0.024 * 1.2} = 0.4513 \ °C/W$$

$$R_{conv_1} = \frac{1}{h_1 \times A} = (\frac{1}{10 * 1.2)} = 0.0833 \, °C/W$$

$$R_{conv_2} = \frac{1}{h_2 \times A} = (\frac{1}{40 * 1.2)} = 0.0208 \, ° \frac{C}{W}$$

$$R_{tot} = R_{conv_1} + R_{conv_2} + 2 \times R_g + R_{airGap}$$

$$= 0.0833 + 0.0208 + 2 * 0.0064 + 0.4513 = 0.5682 \, ° \frac{C}{W}$$

$$Q = \frac{\Delta T}{R_{Tot}} = \frac{30}{0.5682} = 52.79 \, W$$