Demre Ertem Weekly Submission 2

15 Ekim 2019 Salı 23:56

1

-a summary about the convective heat transfer

Convective heat transfer, often referred to simply as convection. Heat conduction is the movement of a substance by the collision of heat molecules. Convective Heat transfer is affected by air flow and wind speed. Heat flows in only one direction from the warmer to the cooler object until they become at the same temperature.

Convection cannot always done in solids. The convection take place in mixtures in which the solid particles can pass easily. This has mechanism to transfer heat depending on the specific material like mass or liquid. This can be also combined in different ways.

Consider a heat transfer along the wall with a thickness of L along the wall, where the wall becomes the outer wall (T2) at higher temperature (T1) in the room. The heat transfer is x leading and perpendicular to the temperature difference plane. The most important phase is a conductivity of the matter(k). Then, the area of the wall affects the result. In another way, resistance can be calculated while using thickness of the wall, conductive coefficient and area of the wall.

-explain why increasing the thickness of a single pane glass does not increase the total resistance

2

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

The most important mistake was to make not enough consideration on units of the values. Also, Before solving question, we should synthesize the formulas and what is the idea behind the formulas.

3

-Consider a 0.8-m-high and 1.5-m-wide double-pane window consisting of two 6-mm-thick layers of glass (k= 0.78 W/m.°C) separated by a 13-mm-wide stagnant air space (k= 0.026 W/m.°C). Determine the steady rate of heat transfer through this double-pane window and the temperature of its inner surface.

Take the convection heat transfer coefficients on the inner and outer surfaces of the window to be h1= 10 W/m2 · °C and h2=40 W/m2 · °C, which includes the effects of radiation.

A=0.8*1.5

$R_{total}=R_{conv1}+R_{wall1}+R_{air}+R_{wall2}+R_{conv2}$

$$R_{wall} = \frac{L}{kA}$$

$$R_{total} = \frac{1}{\frac{10W*1.2}{m2C}} + \frac{0.006}{\frac{0.78W}{m2C}*1.2} + \frac{0.013}{\frac{0.026W}{m2C}*1.2} + \frac{0.006}{\frac{0.78W}{m2C}*1.2} + \frac{1}{\frac{40W}{m2C}*1.2}$$

=0.0833+0.0064+0.4167+0.0064+0.0208

=0.5333C/w

$Q=(T_{ilk}+ T_{son})/ R_{total}$

=20-(-10)/0.5333
=56.2535W

-comment on your results and explain why we have an optimal range for the air-gap's distance !