write a summary of convective:

Transferring the heat from a warmer object (gas, liquid and solid) to the colder object is called convection. We can see this phenomenon in the boiling water in fact after increasing the temperature of water, the warmer water rises and cooler water descends and the heat transfer to the air and can make our space warmer. Also the convection can occur in two ways:

 1. Forced (such as the external energy, for example: wind)

2. natural circulation

It happens when the density of cold air goes down but the heat goes up. The rate of convection heat transfer depends on:

1. Temperature difference between the milieu
2. velocity of liquid or gas
3. Type of liquid or gas

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

Total thermal Resistance is sum of the all material's resistances but the thermal resistance of glass is not big value in comparison with other materials also in formula of Resistance($R_{glass} = \frac{L}{K.A}$) the k of the glass is high and after increasing the thickness (L) we cannot have the big number then increasing the thickness don't have great influence on the total thermal resistance.

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

I made mistake because I inserted 2 decimals for each answers instead of 4 decimals then my answer was become different with your answer.

Question3

solve the same problem as that of double pane window with the air-gap thickness of 13 mm and glass thickness of 6 mm:

$$\dot{Q} = \frac{T_{\infty 1} - T_{\infty 2}}{R_{total}}$$

$$R_{total} = R_{conv1} + R_g + R_{air} + R_g + R_{conv2}$$

$$R_{total} = \frac{1}{h_1.A} + \frac{L}{K.A} + \frac{L}{K.A} + \frac{L}{K.A} + \frac{1}{h_2.A} =$$

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

$R_{total} =$ 0.0833+0.0064+0.4166+0.0064+0.0208= 0.5335 $C°/W$

$$\dot{Q} = \frac{20-(-10)}{0.5335} = 56.2324 \text{ w}$$

COMMENT: we increase the thickness of glass around 1.5 times more than previous question but the $Q^{.}$ (heat transfer) Is bigger just 13w then the increasing the thickness of glass does not have great influence in order to avoid heat transfer.

why we have an optimal range for the air-gap's distance!

Optimal range of air gaps: because, after you increase the air-gap's distance between the glasses infact the air circulation can be started and the convection phenomenon is run. Then it is important to have optimal gaps.