1.Summary about the convective heat transfer

Convective heat transfer is one of the three major types(conduction,convection,radiation) of heat transfer.And usually as a major way of transfer in fluids(from liquid to gas, from gas to gas, from liquid to liquid),additionally may take place in soft solids.

We have two types of convection,one is forced convection (which fluids are forced to move,in order to increase the heat transfer.This forcing can be done with a ceiling fan,a pump…) another is natural convection(type of flow,of motion of a liquid such as water or a gas such as air,the driving force is gravity)
Rate of convective heat transfer depends on:temperature difference()velocity of liquid or gas,kind of liquid or gas.
The convective heat transfer coefficient is sometimes referred to as a film coefficient and represents the thermal resistance of a relative layer of fluid between a heat transfer surface and the fluid medium.

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

Comparing the thermal of convection between glass and air,the resistance of glass is a quite small value.Increasing the thickness of a single glass can increase the thermal resistance of the glass, but it does not influence the total thermal resistance.

2.Write an explanation about what mistakes you made in the class that resulted in wrong answers !!
Forget to calculate with the thickness of the solid wall when calculating the thermal resistance of the wall.

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 ! 0.8m high and 1.5m wide double-pane window consisting of two 6 mm thick layers of glass(k=0.78 W/m$^\circ C$) separated by a 13 mm wide stagnant air space(k=0.026 W/m$^\circ C$). the convection heat transfer coefficients on the inner and outer surfaces of the window are h_1=10 W/m$^2{}^\circ C$, h_2=40 W/m$^2{}^\circ C$.

A=0.8m*1.5m=1.2m^2
$R_{conv,1}$=1/h_1A=1/10 W/m$^2{}^\circ C$*1.2m^2≈0.083$^\circ C$/W
$R_{conv,2}$=1/h_2A=1/40 W/m$^2{}^\circ C$*1.2m^2≈0.021$^\circ C$/W
R_{GLASS}=L/KA=0.006m/ 0.78 $_{W/m^\circ C}$*1.2m^2≈0.006$^\circ C$/W
$R_{air\ gap}$=L/KA=0.0013m/ 0.026 $_{W/m^\circ C}$*1.2m^2≈0.417$^\circ C$/W
R_{TOT}= $R_{conv,1}$+ $R_{conv,2}$+ R_{GLASS} + $R_{air\ cap}$=0.527$^\circ C$/W
Q=$^{detT}/_{R_{TOT}}$=56.93W<69.25W(which we calculate in class)

The thickness of the air gap is 13mm>10mm(in class)so the more thicker the air gap the less loss heatig