1.Convective Heat Transfer:

Convection occurs when a fluid, or air comes into contact with a warmer surface such as a wall. Due to the temperature difference between the air and the object, a new phenomenon will occur that will create an air flow where the colder air will take the place of the warmer one creating a natural "cycle" around the wall or the surface.

The Convective heat transfer depends on many factors such as the difference between the temperature on the surface (Ts) and the temperature of air in the room that is not close to the wall (Tinf). Also, it depends on the density of material and its resistance. And last and most importantly, the convection depends on a factor called "h". h refers to the air conditions and the air speed, the wind, that is next to the wall. The stronger the wind is the higher h is, and the more heat is taken away from the surface.

As the convective heat transfer depends on all the factors already stated therefore we note $Qconv = \frac{Ts-Tinf}{Rconv}$ with $Rconv = \frac{1}{h}$.

Increasing the thickness of a single pane glass will not increase the total resistance because its resistance is too low. Having a double pane window will increase the resistance by far since the air's conduction is too low, therefore its resistance will be much higher the glass's. However, the distance of the air between the glass panes should be small, the air shouldn't be able to move or else it'll create a new convective cycle.

2.My Mistake: I used the wrong formula.

3.Application :

T1=20℃ T4=-10℃ Kg=0.78 W/℃ Lg=0.006m
h1=10W/m2 h2=40W/m2 Ka=0.26 W/℃ La=0.13m
0.8 high and 1.5 width.

- A=0.8x1.5=1.2 m2
- Rg1=Rg2=$\frac{L}{kg.A} = \frac{0.006}{0.78*1.2} = 0.0064$ ℃/w
- Ra=$\frac{0.013}{0.026*1.2} = 0.416$ ℃]W
- Rconv1=$\frac{1}{h1*A} = \frac{1}{10*1.2} = 0.0833$℃/w
- Rconv2=$\frac{1}{h2*A} = \frac{1}{40*1.2} = 0.0208$℃/w
- We consider that the air in the middle doesn't move (no conductivity)
- Rtotal=Rconv1+Rconv2+Ra+2Rg=0.0064x2+0.416+0.0833+0.0208
  =0.5329℃/w