TECHNICAL ENVIRONMENTAL SYSTEMS: WEEK 2:

1. summary about the convective heat transfer

Convective heat transfer:

Convection is a thermal energy transfer from one place to another by the movement of flows, convection incorporates the combined effect of conduction and flow or mass exchange. There are two types of shuttle heat transfer: **natural convection and convicted convection.**

Natural convection: describes the condition in which convection is caused by buoyancy forces caused by changes in density as a result of temperature change in the flow.
In the absence of an external source when flowing into contact with the hot surface the molecules separate and disperse which causes the fluid to become less dense, as a result the hot part of the fluid rises and the cold part descends and flow results in heat transferring from the surface to the coldest part of the liquid.

Convicted Convection: describes a flow of movement as a result of an external source such as fans, pumps, causing an artificial convection current. Convection can also be classified by external and internal flows. Internal flow occurs when the flow is delimited by a solid boundary, for example, flow within a tube.
External flow occurs when it is not constrained by a solid shell such as a stream which meets a straight board. In both of these mechanisms convection can be either natural or forced or both. The average temperature of the flow is a convenient reference point for assessing heat transfer-related properties in the shuttle, especially in flow-related applications in pipes or canals.

In our case, the thickness of the glass is useless because the glass is not signifies at all on the heat transfer, Because it is transparent and the rays of the sun (and heat) still pass through it, no matter how thick the glass will be.
In addition, the Rglass is so minor so the effects on the R total isnt signifies.

2. My mistakes in the classroom were due to a lack of proper calculation of the exercise. Small calculation errors, and lack of time to solve the exercise.
   Beyond of that, missing data because I was missing the question. (maybe in the future it will be more efficient to solve it on the blackboard, so we can see the data and still can see the calculations).

3. Solving the problem as that of double pane window:

   Rglass1=Rglass2= $\frac{(Lglass)}{(k*A)}=\frac{0.006}{0.78*1.2}$=0.00641° $\frac{C}{W}$

   R air gap= $\frac{(Lglass)}{(k*A)}=\frac{0.013}{0.026*1.2}$ =0.4166°$\frac{C}{W}$

   Rconv1= $\frac{1}{hA}=\frac{1}{(10*1.2)}$=0.0833

   Rconv2= $\frac{1}{hA}=\frac{1}{(40*1.2)}$=0.0208

   Rtotal=0.0833+0.0208+0.4166+2*0.00641=0.532°$\frac{C}{W}$

   $\dot{Q}$total= $\frac{T\infty 1-T\infty 4}{\frac{1}{h1*A}}=\frac{30}{0.532}$=56.31 W

   $\dot{Q}$conv. tTotal=53.61= $\frac{T\infty 1-T1}{\frac{1}{h1*A}}$=53.61= $\frac{20-T1}{\frac{1}{10*1.2}}$ → 20-(56.31*0.0833)=15.30°C → T1=15.30°C