WEEK 2 ASSIGNMENT

1. The transfer of heat between a solid and a moving fluid is called convection. It is the most common and dominant mode of heat transfer in liquids and gases. Its also worth noting that convection can also be induced by movment of the fluid apart from buoyancy forces. Another example of forced convection is due to the thermal expansion of the fluid while natural convection is due to the natural buoyancy forces.

Example of natural convection can be the shaft of chimney above a fire place. In this case, the increase in heat produces a density reduction which inturn cause fluid motion arising from the various pressures and forces when different fluid densities are affected by gravity.

Without the presence of gravity, natural convection does not occur, but only forced convections.

2. The mistakes I made in the previous class included not considering the unit conversion

3.

$$R_{g_1} = R_{g_2} = \frac{L_g}{(K_g \times A)} = \frac{0.006}{0.78 * 0.8 * 1.5} = 0.0064\,° \frac{C}{W}$$

$$R_{airGap} = \frac{L_{airGap}}{(K_{airGap} \times A)} = \frac{0.013}{0.026 * 1.2} = 0.4166\ °C/W$$

$$R_{conv_1} = \frac{1}{\mathrm{h}_1 \times A} = \frac{1}{10 * 1.2)} = 0.0833\,°C/W$$

$$R_{conv_2} = \frac{1}{\mathrm{h}_2 \times A} = (\frac{1}{40 * 1.2)} = 0.0208\,° \frac{C}{W}$$

$$R_{tot} = 0.0833 + 0.0208 + 2 * 0.0064 + 0.4166 = 0.5335\,° \frac{C}{W}$$

$$\dot{Q} = \frac{\Delta T}{R_{Tot}} = \frac{30}{0.5335} = 56.2324\ W$$

If we increase the distance between two glass panes, it will result in a significant air gap. This will cause the motion of air and will result in heat convection.