1. (Part A)
Heat convection, also as convective heat transfer is one of the three ways of transfer of heat. It happend between two moving fliuds (liquid and liquid , gas and gas and liquid and gas) or a solid body and a moving fluid (solid and gas).
e.g
Transfer of hear between a solid wall and air (interior or exterior) is convection.

The main cause of Convection is the difference of temprature between the two moving fluids or between the solid and the fluid.
Usually the heat is transfered from the hotter subject to the cooler one, it could be observed by the changes of temprature of both sides, as the temperature of the hotter object decreases and the temprature of the coller object increases.

In natural convection, any fluid motion is caused by natural means such as the buoyancy effect, i.e. the rise of warmer fluid and fall the cooler fluid. Whereas in forced convection, the fluid is forced to flow over a surface or in a tube by external means such as a pump or fan

Convection is of two main types: Free or natural convection and forced convection

1. (Part B)
The thermal resistance of the glass is quite small value as compared to the thermal resitance of convection between air and glass.
So there wont be a significate increase in theraml resistance just by increasing the thickness of the glass.

2. The mistake i made in one of the questions was just because of the calculation process. I almost negected the thickness of the solid wall.

3.

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

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

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

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

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

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

We cannot increase the distance between two glasses (air gap) more than a specific distance because after that air starts to move and we have heat convection.