

## Honors Chemistry Ideal Gas Law Homework

Balloons rise when their weight is less than that of the weight of the same volume of air that they take up. (For example, in order for a 5 L balloon to rise, the weight of the balloon plus the weight of the gas inside the balloon must weigh less than 5 L of the air under whatever conditions are present).

I have built a hot air balloon that has a volume of 185,000 L and weighs 65 kg. If the air inside the balloon is at a temperature of  $55^{\circ}\text{C}$  and the temperature of the outside air is  $14^{\circ}\text{C}$ , will this balloon float? (Assume that air has an average molar mass of 29 g/mol and that the pressure of both the balloon and the outside air is 1.00 atm).

Part 2 (do on the back): If the balloon does float, how much extra weight can I carry on it? If it does not float, how much lighter do I have to make the balloon?