Workshop 4

Some comments on this workshop and exam prep

1. This week we will only have one problem. Take the advantage to prepare for your first exam.
2. As far as I know, Professor Ghoshal's been teaching this course for a long time. Most people think it's easy and straight forward. Here are some personal suggestions for you to do well on his exams:
   - You should be familiar with all the concepts that's covered on both his lectures and the textbook. I do recommend going through the book again if you're still unfamiliar with some concepts.
   - You should be able to tell how all of the formulations/physical processes are derived/established.
   - Don't worry about the hard and complex problems on homework. That will most probably not appearing on the exam. You better go through them and get a sense of how to apply formulae on physical problems for sure. That is to say, there will be simple problems that you need to know how to use the formulae to setup the problem and calculate some physical quantities (but I don't know for sure). That's to say, if you're running out of time of reviewing, only focus on the basics instead of the complex homework problems.
3. Review early and go to Professor Ghoshal's office hours (or other people's office hours idk). He's good at explaining.
4. I think you're allowed to bring a cheatsheet? Put everything you are not sure or you think will cover on the cheatsheet.
5. I‘ve graded your 2nd homework. Welcome to send me regrade requests.

Problem 3.6

A glass bulb contains air at room temperature and at a pressure of 1 atmosphere. It's placed in a chamber filled with helium gas at 1 atmosphere and at room temperature. A few months later, the experimenter happens to read in a journal article that the particular glass of which the bulb is made is quite permeable to helium although not to any other gases. Assuming that equilibrium has been attained by this time, what gas pressure will the experimenter measure inside the bulb when he goes back to check?

Hint: write down the initial pressure and final pressure for both bulb and room. Assume ideal gas. You should assume the room is much much bigger than the bulb.

Some reading on partial pressure: https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Supplemental_Modules_(Physical_and_Theoretical_Chemistry)/Physical_Properties_of_Matter/States_of_Matter/Properties_of_Gases/Gas_Laws/Dalton's_Law_(Law_of_Partial_Pressures)

Solution

After some period of time, we know that certain amount of Helium gas is diffused into the bulb until the pressure of helium of both outside and inside balance. However, since the bulb is so small, the amount of Helium diffused into the bulb is also very small. Thus, the pressure of the chamber is can be still treated as 1 bar. Since the pressure of Helium balances on both inside and outside, the pressure of helium inside the bulb is also 1 bar. Adding up the original 1 bar since the air cannot go anywhere else, we have the pressure inside the bulb now is 2 bars.