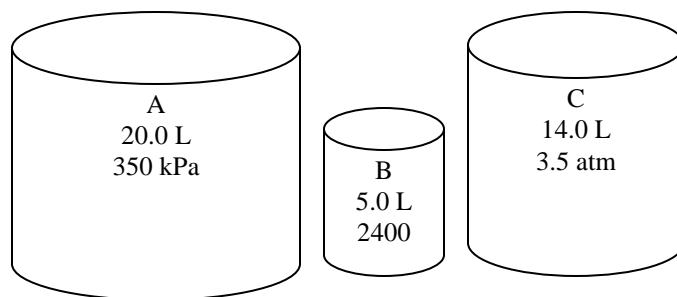


1.) Consider the following setup:

- a.) If all three are at the same temperature, which contains the greatest number of moles? (2 pts.)
b.) Assuming that the connecting tubes have negligible volume, what is the partial pressure of each gas and the total pressure when all the stopcocks are open. Report partial pressures in torr. (4 pts.)



2.) 3260 g of butane, C_4H_{10} , is mixed with 6510 g of oxygen in a 50.0 liter titanium tank. A spark ignites the fuel mixture and the container is measured at the end of the combustion reaction at $46.0^\circ C$. What is the partial pressure of each gas and the total pressure in the tank in atmospheres? (6 pts.)

3.) Calculate the v_{rms} , root mean square velocity of a molecule of N_2O_5 at 400. K. What temperature is required to double the root mean square velocity of this gas molecule? Units! $R = 8.3145 J/K \cdot mol$ (3 pts.)

4.) At 400 K, the molecules or atoms of an unknown gas, X, have an average velocity equal to that of Ar atoms at 750K. Assuming ideal behavior what is the molar mass of X? (4 pts.)

5.) A sample of Cl_2O gas is contaminated with a gas of an unknown molar mass. The partial pressure of each gas is known to be 160. torr at $30^\circ C$. These gases are allowed to effuse through a pinhole, and it is found that the unknown gas escapes at a rate 1.87 times the rate of Cl_2O . What is the molar mass of the unknown gas? (3 pts.)