CHM 1020
Practice for Unit VII

1. If 4 moles of a gas are added to a container that already holds 1 mole of gas, how will the pressure change within the container? (Assume volume and temperature are constant.)
   a. The pressure will be 5 times as great.
   b. The pressure will be 2 times as great.
   c. The pressure will be 4 times as great.
   d. The pressure will not change.

2. An ideal gas is sealed in a container at constant volume. If the temperature T is doubled, the pressure will be:
   a. unchanged
   b. halved
   c. doubled
   d. unable to be determined without more information

3. A mixture of CO_2, O_2, and He is held at constant temperature. Which molecule has the highest average molecular speed?
   a. CO2 heaviest is slowest
   b. O2
   c. He lightest is fastest
   d. all three gases have the same average molecular speed

In complete sentences answer the following questions:

4. What is the effect of an increase in temperature on molecular velocity? Velocity will increase
5. How does this change effect the force of the gas molecule's collisions with the walls of the container?
6. What is the resultant change in pressure in a closed system that cannot expand?
7. What is the resultant change in volume in a system that can expand and contract, but whose ~~volume~~ is constant?

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Imagine an experiment examining how changes in volume affect the pressure of a gas in a syringe. Circle the correct response:

8. To increase the volume of a gas in a syringe we must [increase; decrease] the surface area of the container.
9. There are [the same; fewer] number of molecules in the container when the volume of the container is changed.
10. Pressure in force/area. As the volume of the gas increases then the area [increases; decreases] and so the pressure of the gas [increases; decreases].

11. If 0.95 moles of an ideal gas occupy 2500 milliliters at 2.255 atm pressure, what is the temperature in degrees Celsius for the container? Use PV=nRT or variation thereof.
12. How many moles of gas are in 0.750L at 25°C and 1.00 atm pressure?
13. Calculate the °C temperature at which 0.950 mol of oxygen occupies 2500. mL at 2255 torr.

4. Velocity will increase when temperature increases
5. This increases the force on the walls
6. This will increase Pressure
7. The volume will increase

(11) $PV = nRT$

$\frac{PV}{nR} = T =$

$\frac{(2.500\text{L})(2.255\text{ atm})}{(.95\text{ moles})\left(.08206\frac{\text{L atm}}{\text{mole K}}\right)} = 72.3\text{K}$

$2500\text{mL} \times \frac{\text{L}}{1000\text{mL}} = 2.500\text{L}$

$-200°C$

(12) $n = \frac{PV}{RT} = \frac{(1.00\text{ atm})(.750\text{L})}{\left(.08206\frac{\text{L atm}}{\text{mole K}}\right)(298\text{K})} = .0307\text{ moles}$

(13) $T = \frac{PV}{nR} = \frac{(2.97\text{atm})(2.500\text{L})}{(.950\text{mol})\left(.08206\frac{\text{L atm}}{\text{mole K}}\right)}$

$2255\text{ torr} \times \frac{\text{atm}}{760\text{ torr}} = 2.97\text{atm}$

$= 95.1\text{K} = -178°C$