CHM 151 Quiz 6b 25 Pts Fall 2007 Name: Key

R = 62.4 L·torr/mol·K R = 0.0821 L ·atm/mol·K

PV = nRT $P_1V_1T_2 = P_2V_2T_1$

1. A sample of a gas occupies a volume of 350 mL at 3.95 atm and 25°C. Calculate the number of moles of gas present.

$PV = nRT$

$n = \frac{PV}{RT}$

$n = \frac{(3.95\ \text{atm})(0.350\ \text{L})}{(0.0821\ \text{L·atm/mol·K})(298\ \text{K})}$

$n = 0.057\ \text{mol}$

2. A given mass of xenon gas has a volume of 200 mL at 25.0°C and 760 torr. To what temperature must the xenon be heated to occupy 450 mL at 760 torr?

$P_1V_1T_2 = P_2V_2T_1$

$(760\ \text{torr})(200\ \text{mL})(T_2) = (760\ \text{torr})(450\ \text{mL})(298\ \text{K})$

$T_2 = 670.5\ \text{K} = 398\ ^\circ\text{C}$

3. What is the volume occupied by 3.50 grams of Cl_2 gas at 45°C and 745 torr?

$PV = nRT$

$n = \frac{3.50\ \text{g}\ Cl_2}{70.9\ \text{g/mol}} = 0.04936\ \text{mol}\ Cl_2$

$V = \frac{nRT}{P}$

$V = \frac{(0.04936\ \text{mol})(62.4\ \text{L·torr/mol·K})(318\ \text{K})}{745\ \text{torr}}$

$V = 1.31\ \text{L}$

4. A sample of carbon monoxide, CO, occupies a volume of 350 mL and exerts a pressure of 1020 torr at 25°C. If the volume expands to 500 mL with no temperature change, what pressure will the gas exert?

$P_1V_1T_2 = P_2V_2T_1$

$(1020\ \text{torr})(350\ \text{mL}) = P_2(500\ \text{mL})$

$P_2 = 714\ \text{torr}$

5. A sample of oxygen occupies 47.2 liters under a pressure of 1240 torr at 25°C. What volume would it occupy at 25°C if the pressure were decreased to 730 torr?

$P_1V_1T_2 = P_2V_2T_1$

$(47.2)(1240\ \text{torr}) = (730\ \text{torr})(V_2)$

$V_2 = 80.2\ \text{L}$