Chemistry 141 Name -

Dr. Cary Willard

Quiz 6A (20 points) March 10, 2011

1 atm = 101.3 kPa = 14.7 psi = 760 torr = 760 mm Hg, PV=nRT, R=0.0821 L atm/mol K=62.4 L torr/mol K

$\frac{rate\_{1}}{rate\_{2}}=\sqrt{\frac{MW\_{2}}{MW\_{1}}}$, $P\_{i}=P\_{total}X\_{i}$, $\left[P+a\left(\frac{n}{V}\right)^{2}\right]×\left[V-nb\right]=nRT$, $K=℃+273.16$

1. (5 points) A 1.30 g sample of dry ice (CO2) is added to a 755 mL flask containing nitrogen gas at a temperature of 25oC and a pressure of 725 torr. The dry ice is allowed to sublime (convert from solid to gas) and the mixture is allowed to return to 25.0oC. What is the total pressure in the flask?
2. (4 points) A sample of nitrogen gas is held in a 5.7 L container. If additional nitrogen is injected into the container, how will the pressure change if the temperature is held constant? Explain why this will occur using kinetic molecular theory.
3. (5 points) A sample of argon effuses from a container in 53.2 seconds. If the same amount of an unknown gas requires 82.3 seconds to effuse, what is the molar mass of the unknown gas?
4. (6 points) Mothballs are composed primarily of the hydrocarbon nahthaleine (C10H8). When 2.53 g of naphthalene is burned in a bomb calorimeter containing 500.0 g of water, the temperature rises from 23.7oC to 37.8oC. The heat capacity of the calorimeter is 5.15 kJ/K and the specific heat of water is 4.184 J/g K. Calculate the molar enthalpy of combustion for naphthalene.

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$\frac{rate\_{1}}{rate\_{2}}=\sqrt{\frac{MW\_{2}}{MW\_{1}}}$, $P\_{i}=P\_{total}X\_{i}$, $\left[P+a\left(\frac{n}{V}\right)^{2}\right]×\left[V-nb\right]=nRT$, $K=℃+273.16$

1. (5 points) A 1.50 g sample of dry ice (CO2) is added to a 755 mL flask containing nitrogen gas at a temperature of 25oC and a pressure of 725 torr. The dry ice is allowed to sublime (convert from solid to gas) and the mixture is allowed to return to 25.0oC. What is the total pressure in the flask?
2. (4 points) A sample of nitrogen gas is held in a 5.7 L container. If additional nitrogen is injected into the container, how will the pressure change if the temperature is held constant? Explain why this will occur using kinetic molecular theory.
3. (5 points) A sample of krypton effuses from a container in 53.2 seconds. If the same amount of an unknown gas requires 82.3 seconds to effuse, what is the molar mass of the unknown gas?
4. (6 points) Mothballs are composed primarily of the hydrocarbon nahthaleine (C10H8). When 2.89 g of naphthalene is burned in a bomb calorimeter containing 500.0 g of water, the temperature rises from 23.7oC to 39.8oC. The heat capacity of the calorimeter is 5.15 kJ/K and the specific heat of water is 4.184 J/g K. Calculate the molar enthalpy of combustion for naphthalene.