Chemistry 115 Name key

Dr. Cary Willard

Quiz 9A (20 points) April 23, 2009

PV=nRT, 760 torr = 760 mmHg = 1 atm = 101 kPa = 14.7 psi = 30 in Hg,

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

1. (3 points) Explain why pressure increases with increasing temperature using kinetic molecular theory?

As temperature increases the molecules begin moving faster they hit the surfaces of the container harder thus increasing pressure.

1. (3 points) A sample of nitrogen gas has a pressure of 583 torr at 15oC. What is the pressure of the nitrogen gas if the temperature is increased to 55oC?

$$\frac{P\_{1}}{T\_{1}}=\frac{P\_{2}}{T}\_{2}\rightarrow \rightarrow P\_{2}=P\_{1}\left(\frac{T\_{2}}{T\_{1}}\right)=583 torr\left(\frac{328 K}{288 K}\right)=$$

1. (4 points) Determine the volume that 8.34 grams of nitrogen gas will occupy at 2.94 atm pressure and 25.0oC. (Hint: Calculate the number of moles first.)

$$?mol N\_{2}=3.84 g N\_{2}×\frac{1 mol N\_{2}}{28.00 g N\_{2}}=0.298 mol N\_{2}$$

$$PV=nRT\rightarrow \rightarrow V=\frac{nRT}{P}=\frac{\left(0.298 mol\right)\left(0.0821 L atm\right)\left(298 K\right)}{\left(2.94 atm\right)mol K}=$$

1. (3 points) The atmosphere of a newly discovered planet is composed of nitrogen (933 mm Hg), methane gas (158 mm Hg), and bromine gas (687 mm Hg). What is the atmospheric pressure on this planet?

Total pressure = 933 mm Hg + 158 mm Hg + 687 mm Hg = 1780 mm Hg (2.34 atm)

1. (4 points) Given the reaction 4 NH3(g) + 5 O2(g) 🡪 4 NO(g) + 6 H2O(g). How many L of nitrogen monoxide will be produced by the reaction of 63.4 L of oxygen gas with excess ammonia at 25oC and 1.14 atm pressure?

$$?L NO=63.4 L O\_{2}×\frac{4 L NO}{5 L O\_{2}}=50.7 L NO$$

1. (3 points) Draw the lewis electron dot structure for a water (H2O) molecule and point out the negative and positive ends of the molecule.



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Quiz 9B (20 points) April 23, 2009

PV=nRT, 760 torr = 760 mmHg = 1 atm = 101 kPa = 14.7 psi = 30 in Hg,

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

1. (3 points) Explain why pressure increases with increasing temperature using kinetic molecular theory?

As temperature increases the molecules begin moving faster they hit the surfaces of the container harder thus increasing pressure.

1. (3 points) A sample of nitrogen gas has a pressure of 738 torr at 15oC. What is the pressure of the nitrogen gas if the temperature is increased to 55oC?

$$\frac{P\_{1}}{T\_{1}}=\frac{P\_{2}}{T}\_{2}\rightarrow \rightarrow P\_{2}=P\_{1}\left(\frac{T\_{2}}{T\_{1}}\right)=738 torr\left(\frac{328 K}{288 K}\right)=$$

1. (4 points) Determine the volume that 6.78 grams of nitrogen gas will occupy at 2.94 atm pressure and 25.0oC. (Hint: Calculate the number of moles first.)

$$?mol N\_{2}=6.78 g N\_{2}×\frac{1 mol N\_{2}}{28.00 g N\_{2}}=0.242 mol N\_{2}$$

$$PV=nRT\rightarrow \rightarrow V=\frac{nRT}{P}=\frac{\left(0.242 mol\right)\left(0.0821 L atm\right)\left(298 K\right)}{\left(2.94 atm\right)mol K}=$$

1. (3 points) The atmosphere of a newly discovered planet is composed of nitrogen (689 mm Hg), methane gas (203 mm Hg), and bromine gas (534 mm Hg). What is the atmospheric pressure on this planet?

Total pressure = 689 mm Hg + 203 mm Hg + 534 mm Hg = 1430 mm Hg (1.88 atm)

1. (4 points) Given the reaction 4 NH3(g) + 5 O2(g) 🡪 4 NO(g) + 6 H2O(g). How many L of nitrogen monoxide will be produced by the reaction of 73.9 L of oxygen gas with excess ammonia at 25oC and 1.14 atm pressure?

$$?L NO=73.9 L O\_{2}×\frac{4 L NO}{5 L O\_{2}}=59.1 L NO$$

1. (3 points) Draw the lewis electron dot structure for a water (H2O) molecule and point out the negative and positive ends of the molecule.

