Chemistry 115 Name key

Dr. Cary Willard

Quiz 8a (20 points) April 20, 2010

Must show all work to receive credit. Use proper significant figures.

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

1. (5 points) The pressure at the top of Mt. Woodsen is 689 mm Hg, what is that pressure in atmospheres?

$$?atm=689 mm Hg×\frac{1 atm}{760 mm Hg}=0.907 atm$$

1. (5 points) A container is filled with argon with a pressure of 385 torr at 35oC. If the container is heated to 142oC, what is the new pressure of argon in the container?

P1 = 358 torr P2 = ?

T1 = 35oC = 308 K T2 = 142 oC = 415 K

$$\frac{P\_{1}}{T\_{1}}=\frac{P\_{2}}{T\_{2}}\rightarrow P\_{2}=P\_{1}\left(\frac{T\_{2}}{T\_{1}}\right)=385 torr\left(\frac{415 K}{308 K}\right)=519 torr$$

1. (6 points) An unknown gas has a density of 9.24 g/L at 61oC and 2.55 atm. What is the molar mass of the unknown gas?

$$?M=\frac{?g}{mol}=\frac{9.24 g}{L}×\frac{L}{0.0930 mol}=99.4 g/mol$$

$$PV=nRT \rightarrow \frac{n}{V}=\frac{P}{RT}=\frac{\left(2.55 atm\right) mol K}{\left(0.0821 L atm\right)\left(334 K\right)}=\frac{0.0930 mol}{L}$$

1. (4 points) Explain why a gas exerts a pressure using kinetic molecular theory.

The molecules are in constant motion. They exert a pressure on things when they bump into them.

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

1. (5 points) The pressure at the top of Mt. Woodsen is 652 mm Hg, what is that pressure in atmospheres?

$$?atm=652 mm Hg×\frac{1 atm}{760 mm Hg}=0.858 atm$$

1. (5 points) A container is filled with argon with a pressure of 647 torr at 35oC. If the container is heated to 142oC, what is the new pressure of argon in the container?

P1 = 647 torr P2 = ?

T1 = 35oC = 308 K T2 = 142 oC = 415 K

$$\frac{P\_{1}}{T\_{1}}=\frac{P\_{2}}{T\_{2}}\rightarrow P\_{2}=P\_{1}\left(\frac{T\_{2}}{T\_{1}}\right)=647 torr\left(\frac{415 K}{308 K}\right)=872 torr$$

1. (6 points) An unknown gas has a density of 15.8 g/L at 61oC and 4.55 atm. What is the molar mass of the unknown gas?

$$?M=\frac{?g}{mol}=\frac{15.8 g}{L}×\frac{L}{0.166 mol}=95.2 g/mol$$

$$PV=nRT \rightarrow \frac{n}{V}=\frac{P}{RT}=\frac{\left(4.55 atm\right) mol K}{\left(0.0821 L atm\right)\left(334 K\right)}=\frac{0.166 mol}{L}$$

1. (4 points) Explain why a gas exerts a pressure using kinetic molecular theory.

The molecules are in constant motion. They exert a pressure on things when they bump into them.