Chemistry 115 Name key

Dr. Cary Willard

Quiz 7a (20 points) November 7, 2012

Data: 1 atm=760 torr=760 mm Hg, K=oC+273; PV=nRT, R=0.0821 L atm/mol K=62.4 L torr/mol K

1. (4 points) The pressure of a gas is 638 torr. Calculate the pressure in atmospheres.

$$?atm=638 torr×\frac{1 atm}{760 torr}=0.839 atm$$

1. (4 points) Why do scuba divers need to exhale air when they ascend to the surface of the water?

As scuba divers ascend, the pressure on their lungs decreases and the volume of air will increase. If they do not exhale, the air will expand and burst their lungs.

1. (4 points) A gas with a volume of 4.00 L and a pressure of 852 torr is in a closed container. Calculate the new pressure if the volume is compressed to 3.64 L with no change in temperature.

$$P\_{1}V\_{1}=P\_{2}V\_{2} P\_{2}=P\_{1}\left(\frac{V\_{1}}{V\_{2}}\right)=852 torr\left(\frac{4.00 L}{3.64 L}\right)=936 torr$$

1. (4 points) A gas has a volume of 6.23 L at 15oC. What final temperature in oC is needed to cause the volume of the gas to increase to 9.52 L if the pressure remains constant?

$$\frac{V\_{1}}{T\_{1}}=\frac{V\_{2}}{T\_{2}} T\_{2}=T\_{1}\left(\frac{V\_{2}}{V\_{1}}\right)=288 K\left(\frac{9.52 L}{6.23 L}\right)=440 K or 167℃$$

1. (4 points)A 45.0 g sample of argon gas has a temperature of 35oC at 0.854 atm. What is the volume of the argon gas in L?

$$mol Ar=45.0 g Ar×\frac{1 mol Ar}{39.95 g Ar}=1.13 mol Ar$$

$$PV=nRT V=\frac{nRT}{P}=\frac{\left(1.13 mol\right)\left(0.0821 L atm\right)\left(308 K\right)}{mol K\left(0.854 atm\right)}=33.5 L$$

Chemistry 115 Name key

Dr. Cary Willard

Quiz 7b (20 points) November 7, 2012

Data: 1 atm=760 torr=760 mm Hg, K=oC+273; PV=nRT, R=0.0821 L atm/mol K=62.4 L torr/mol K

1. (4 points) The pressure of a gas is 834 torr. Calculate the pressure in atmospheres.

$$?atm=834 torr×\frac{1 atm}{760 torr}=1.10 atm$$

1. (4 points) Why do scuba divers need to exhale air when they ascend to the surface of the water?

As scuba divers ascend, the pressure on their lungs decreases and the volume of air will increase. If they do not exhale, the air will expand and burst their lungs.

1. (4 points) A gas with a volume of 5.00 L and a pressure of 852 torr is in a closed container. Calculate the new pressure if the volume is compressed to 4.64 L with no change in temperature.

$$P\_{1}V\_{1}=P\_{2}V\_{2} P\_{2}=P\_{1}\left(\frac{V\_{1}}{V\_{2}}\right)=852 torr\left(\frac{5.00 L}{4.64 L}\right)=918 torr$$

1. (4 points) A gas has a volume of 6.23 L at 35oC. What final temperature in oC is needed to cause the volume of the gas to increase to 9.52 L if the pressure remains constant?

$$\frac{V\_{1}}{T\_{1}}=\frac{V\_{2}}{T\_{2}} T\_{2}=T\_{1}\left(\frac{V\_{2}}{V\_{1}}\right)=308 K\left(\frac{9.52 L}{6.23 L}\right)=471 K or 198℃$$

1. (4 points)A 45.0 g sample of argon gas has a temperature of 15oC at 0.854 atm. What is the volume of the argon gas in L?

$$mol Ar=45.0 g Ar×\frac{1 mol Ar}{39.95 g Ar}=1.13 mol Ar$$

$$PV=nRT V=\frac{nRT}{P}=\frac{\left(1.13 mol\right)\left(0.0821 L atm\right)\left(288 K\right)}{mol K\left(0.854 atm\right)}=31.3 L$$

Chemistry 115 Name key

Dr. Cary Willard

Quiz 7c (20 points) November 7, 2012

Data: 1 atm=760 torr=760 mm Hg, K=oC+273; PV=nRT, R=0.0821 L atm/mol K=62.4 L torr/mol K

1. (4 points) The pressure of a gas is 0.672 atm. Calculate the pressure in torr.

$$?atm=0.672 atm×\frac{760 torr}{1 atm}=511 torr$$

1. (4 points) Why does a sealed bag of chips expand when you take it to a higher altitude?

As you go to higher altitude, the atmospheric pressure decreases. With a decrease in pressure the gas inside the bag expands.

1. (4 points) A gas with a volume of 4.00 L and a pressure of 2.75 atm is in a closed container. Calculate the new pressure if the volume of the gas expands to 6.94 L with no change in temperature.

$$P\_{1}V\_{1}=P\_{2}V\_{2} P\_{2}=P\_{1}\left(\frac{V\_{1}}{V\_{2}}\right)=2.75 atm\left(\frac{4.00 L}{6.94 L}\right)=1.59 atm$$

1. (4 points) A gas has a volume of 8.34 L at 95oC. What final temperature in oC is needed to cause the volume of the gas to decrease to 6.52 L if the pressure remains constant?

$$\frac{V\_{1}}{T\_{1}}=\frac{V\_{2}}{T\_{2}} T\_{2}=T\_{1}\left(\frac{V\_{2}}{V\_{1}}\right)=368 K\left(\frac{6.52 L}{8.34 L}\right)=288 K or 15℃$$

1. (4 points)A 45.0 g sample of argon gas occupies a volume of 47.5 L at a temperature of 35oC. What is the pressure of the argon gas in atm?

$$mol Ar=45.0 g Ar×\frac{1 mol Ar}{39.95 g Ar}=1.13 mol Ar$$

$$PV=nRT P=\frac{nRT}{V}=\frac{\left(1.13 mol\right)\left(0.0821 L atm\right)\left(308 K\right)}{mol K\left(47.5 L\right)}=0.602 atm$$

Chemistry 115 Name key

Dr. Cary Willard

Quiz 7d (20 points) November 7, 2012

Data: 1 atm=760 torr=760 mm Hg, K=oC+273; PV=nRT, R=0.0821 L atm/mol K=62.4 L torr/mol K

1. (4 points) The pressure of a gas is 1.28 atm. Calculate the pressure in torr.

$$?atm=1.28 atm×\frac{760 torr}{1 atm}=973 torr$$

1. (4 points) Why does a sealed bag of chips expand when you take it to a higher altitude?

As you go to higher altitude, the atmospheric pressure decreases. With a decrease in pressure the gas inside the bag expands.

1. (4 points) A gas with a volume of 6.00 L and a pressure of 2.75 atm is in a closed container. Calculate the new pressure if the volume of the gas expands to 8.43 L with no change in temperature.

$$P\_{1}V\_{1}=P\_{2}V\_{2} P\_{2}=P\_{1}\left(\frac{V\_{1}}{V\_{2}}\right)=2.75 atm\left(\frac{6.00 L}{8.43 L}\right)=1.96 atm$$

1. (4 points) A gas has a volume of 9.34 L at 95oC. What final temperature in oC is needed to cause the volume of the gas to decrease to 7.52 L if the pressure remains constant?

$$\frac{V\_{1}}{T\_{1}}=\frac{V\_{2}}{T\_{2}} T\_{2}=T\_{1}\left(\frac{V\_{2}}{V\_{1}}\right)=368 K\left(\frac{7.52 L}{9.34 L}\right)=296 K or 23℃$$

1. (4 points)A 45.0 g sample of argon gas occupies a volume of 54.4 L at a temperature of 65oC. What is the pressure of the argon gas in atm?

$$mol Ar=45.0 g Ar×\frac{1 mol Ar}{39.95 g Ar}=1.13 mol Ar$$

$$PV=nRT P=\frac{nRT}{V}=\frac{\left(1.13 mol\right)\left(0.0821 L atm\right)\left(338 K\right)}{mol K\left(54.4 L\right)}=0.576 atm$$