Chemistry 115 Name

Dr. Cary Willard

Quiz 7a (20 points) April 24, 2013

Data: PV=nRT, 1 atm=760 torr = 760 mm Hg = 14.7 psi = 101.3 kPa, R = 0.0821 L atm/mol K = 62.4 L torr/mol K, K=oC + 273.16

1. (4 points)The atmospheric pressure on Jupiter is 3.27 atm. What is the atmospheric pressure in torr?

$$?torr=3.27 atm×\frac{760 torr}{1 atm}=2490 torr$$

1. (2 points) A gas occupies 5.23 L at 482 torr, what volume will it occupy at a pressure of 823 torr?

$$P\_{1}V\_{1}=P\_{2}V\_{2} \rightarrow \rightarrow V\_{2}=V\_{1}\left(\frac{P\_{1}}{P\_{2}}\right)=5.23 L\left(\frac{482 torr}{823 torr}\right)=3.06 L$$

1. (4 points) A sample of methane gas has a pressure of 8355 torr at 25oC. If the maximum pressure of the tank is 10,000. torr, how high can the temperature rise before the tank bursts? (Give the final temperature in oC.)

$$\frac{P\_{1}}{T\_{1}}=\frac{P\_{2}}{T\_{2}}\rightarrow \rightarrow T\_{2}=T\_{1}\left(\frac{P\_{2}}{P\_{1}}\right)=298 K\left(\frac{10000. torr}{8355 torr}\right)=356 K or 84℃$$

1. (4 points) How many moles of argon gas will a 12.5 L canister hold at 52oC if the pressure is 7.34 atm?

$$PV=nRT\rightarrow \rightarrow n=\frac{PV}{RT}=\frac{\left(7.34 atm\right)\left(12.5 L\right)mol K}{\left(0.0821 L atm\right)\left(325.K\right)}=3.44 mol Ar$$

1. (4 points) What volume will 25.0 g of oxygen gas occupy at 25oC and 822 torr?

$$PV=nRT\rightarrow \rightarrow V=\frac{nRT}{P}=\frac{\left(0.781 mol\right)\left(62.4 L torr\right)\left(298 K\right)}{\left(822 torr\right)mol K}=17.7 L O\_{2}$$

$$?mol O\_{2}=25.0 g O\_{2}×\frac{1 mol O\_{2}}{32.0 g O\_{2}}=0.781 mol O\_{2}$$

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Quiz 7b (20 points) April 24, 2013

Data: PV=nRT, 1 atm=760 torr = 760 mm Hg = 14.7 psi = 101.3 kPa, R = 0.0821 L atm/mol K = 62.4 L torr/mol K, K=oC + 273.16

1. (4 points)The atmospheric pressure on Jupiter is 4.05 atm. What is the atmospheric pressure in torr?

$$?torr=4.05 atm×\frac{760 torr}{1 atm}=3080 torr$$

1. (2 points) A gas occupies 5.23 L at 482 torr, what volume will it occupy at a pressure of 279 torr?

$$P\_{1}V\_{1}=P\_{2}V\_{2} \rightarrow \rightarrow V\_{2}=V\_{1}\left(\frac{P\_{1}}{P\_{2}}\right)=5.23 L\left(\frac{482 torr}{279 torr}\right)=9.04 L$$

1. (4 points) A sample of methane gas has a pressure of 6922 torr at 25oC. If the maximum pressure of the tank is 10,000. torr, how high can the temperature rise before the tank bursts? (Give the final temperature in oC.)

$$\frac{P\_{1}}{T\_{1}}=\frac{P\_{2}}{T\_{2}}\rightarrow \rightarrow T\_{2}=T\_{1}\left(\frac{P\_{2}}{P\_{1}}\right)=298 K\left(\frac{10000. torr}{6922 torr}\right)=431 K or 157℃$$

1. (4 points) How many moles of argon gas will a 12.5 L canister hold at 52oC if the pressure is 15.7 atm?

$$PV=nRT\rightarrow \rightarrow n=\frac{PV}{RT}=\frac{\left(15.7 atm\right)\left(12.5 L\right)mol K}{\left(0.0821 L atm\right)\left(350.K\right)}=6.83 mol Ar$$

1. (4 points) What volume will 25.0 g of oxygen gas occupy at 25oC and 941 torr?

$$PV=nRT\rightarrow \rightarrow V=\frac{nRT}{P}=\frac{\left(0.781 mol\right)\left(62.4 L torr\right)\left(298 K\right)}{\left(941 torr\right)mol K}=15.4 L O\_{2}$$

$$?mol O\_{2}=25.0 g O\_{2}×\frac{1 mol O\_{2}}{32.0 g O\_{2}}=0.781 mol O\_{2}$$

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Quiz 7c (20 points) April 24, 2013

Data: PV=nRT, 1 atm=760 torr = 760 mm Hg = 14.7 psi = 101.3 kPa, R = 0.0821 L atm/mol K = 62.4 L torr/mol K, K=oC + 273.16

1. (4 points)The atmospheric pressure on Jupiter is 4680 torr. What is the atmospheric pressure in atm?

$$?atm=4680 torr×\frac{1 atm}{760 torr}=6.16 atm$$

1. (2 points) A gas occupies 5.23 L at 584 torr, what will the pressure be if the volume is allowed to expand to 8.69 L?

$$P\_{1}V\_{1}=P\_{2}V\_{2} \rightarrow \rightarrow P\_{2}=P\_{1}\left(\frac{V\_{1}}{V\_{2}}\right)=584 torr\left(\frac{5.23 L}{8.69 L}\right)=351 torr$$

1. (4 points) A sample of methane gas has a pressure of 6944 torr at 25oC. If the maximum pressure of the tank is 10,000. torr, how high can the temperature rise before the tank bursts? (Give the final temperature in oC.)

$$\frac{P\_{1}}{T\_{1}}=\frac{P\_{2}}{T\_{2}}\rightarrow \rightarrow T\_{2}=T\_{1}\left(\frac{P\_{2}}{P\_{1}}\right)=298 K\left(\frac{10000. torr}{6944 torr}\right)=429 K or 156℃$$

1. (4 points) How many moles of argon gas will a 12.5 L canister hold at 52oC if the pressure is 876 torr?

$$PV=nRT\rightarrow \rightarrow n=\frac{PV}{RT}=\frac{\left(876 torr\right)\left(12.5 L\right)mol K}{\left(62.4 L torr\right)\left(325K\right)}=0.540 mol Ar$$

1. (4 points) What will the pressure (in atm) of 250. g of oxygen gas be in a 55.0 L canister at 25oC?

$$PV=nRT\rightarrow \rightarrow P=\frac{nRT}{V}=\frac{\left(7.81 mol\right)\left(0.0821 L atm\right)\left(298 K\right)}{\left(55.0 L\right)mol K}=3.47 atm$$

$$?mol O\_{2}=250. g O\_{2}×\frac{1 mol O\_{2}}{32.0 g O\_{2}}=7.81 mol O\_{2}$$

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Quiz 7d (20 points) April 24, 2013

Data: PV=nRT, 1 atm=760 torr = 760 mm Hg = 14.7 psi = 101.3 kPa, R = 0.0821 L atm/mol K = 62.4 L torr/mol K, K=oC + 273.16

1. (4 points)The atmospheric pressure on Jupiter is 5880 torr. What is the atmospheric pressure in atm?

$$?atm=5880 torr×\frac{1 atm}{760 torr}=7.74 atm$$

1. (2 points) A gas occupies 5.23 L at 584 torr, what will the pressure be if the volume is compressed to 4.23 L?

$$P\_{1}V\_{1}=P\_{2}V\_{2} \rightarrow \rightarrow P\_{2}=P\_{1}\left(\frac{V\_{1}}{V\_{2}}\right)=584 torr\left(\frac{5.23 L}{4.23 L}\right)=722 torr$$

1. (4 points) A sample of methane gas has a pressure of 5791 torr at 25oC. If the maximum pressure of the tank is 10,000. torr, how high can the temperature rise before the tank bursts? (Give the final temperature in oC.)

$$\frac{P\_{1}}{T\_{1}}=\frac{P\_{2}}{T\_{2}}\rightarrow \rightarrow T\_{2}=T\_{1}\left(\frac{P\_{2}}{P\_{1}}\right)=298 K\left(\frac{10000. torr}{5791 torr}\right)=515 K or 242℃$$

1. (4 points) How many moles of argon gas will a 12.5 L canister hold at 52oC if the pressure is 931 torr?

$$PV=nRT\rightarrow \rightarrow n=\frac{PV}{RT}=\frac{\left(931 torr\right)\left(12.5 L\right)mol K}{\left(62.4 L torr\right)\left(325 K\right)}=0.574 mol Ar$$

1. (4 points) What will the pressure (in atm) of 250. g of oxygen gas be in a 65.0 L canister at 25oC?

$$PV=nRT\rightarrow \rightarrow P=\frac{nRT}{V}=\frac{\left(7.81 mol\right)\left(0.0821 L atm\right)\left(298 K\right)}{\left(65.0 L\right)mol K}=2.94 atm$$