**Quiz 9A**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. Nitrogen gas reacts with powdered aluminum to produce aluminum nitride. The nitrogen gas is measured at 892 torr and 95 °C (14 points).
	1. What is the pressure of the nitrogen gas in atm?

$$892 torr×\frac{1 atm}{760 torr}=1.17 atm$$

* 1. What is the temperature of the nitrogen gas in Kelvin?

$$T\_{K}=T\_{℃}+273.15=95+273.15=368.15 K≈368 K$$

* 1. Write the balanced combination reaction.

N2 (g) + 2 Al (s) → 2 AlN (s)

* 1. How many moles of nitrogen gas are required to completely react with 18.5 g of aluminum?

$$18.5 g Al×\frac{1 mol Al}{26.982 g Al}×\frac{1 mol N\_{2}}{2 mol Al}=0.34282114 mol N\_{2}≈0.342 mol N\_{2}$$

* 1. How many liters of nitrogen gas are required to completely react with 18.5 g of aluminum?

$$PV=nRT⇒V=\frac{nRT}{P}=\frac{\left(0.342 mol\right)\left(0.08206 \frac{L atm}{mol K}\right)(368 K)}{1.17 atm }=8.82 L N\_{2}$$

1. What kind of intermolecular forces are present in the following substances (6 points)?
	1. HCl \_\_\_\_\_\_\_\_London-dispersion forces, dipole forces
	2. He \_\_\_\_\_\_\_\_London-dispersion forces
	3. NH3 \_\_\_\_\_\_\_\_London-dispersion forces, dipole forces, hydrogen bonding

**Quiz 9B**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. What kind of intermolecular forces are present in the following substances (6 points)?
	1. Kr \_\_\_\_\_\_\_\_London-dispersion forces
	2. CO \_\_\_\_\_\_\_\_London-dispersion forces, dipole forces
	3. HF \_\_\_\_\_\_\_\_London-dispersion forces, dipole forces, hydrogen bonding
2. Silver metal and oxygen gas react to produce silver oxide. The oxygen gas is measured at 541 mm Hg and 84 °C (14 points).
	1. What is the pressure of the oxygen gas in atm?

$$541 mmHg×\frac{1 atm}{760 mm Hg}=0.712 atm$$

* 1. What is the temperature of the oxygen gas in Kelvin?

$$T\_{K}=T\_{℃}+273.15=84+273.15=357.15 K≈357 K$$

* 1. Write the balanced combination reaction.

O2 (g) + 4 Ag (s) → 2 Ag2O (s)

* 1. How many moles of oxygen gas are required to completely react with 125.4 g of silver?

$$125.4 g Ag×\frac{1 mol Ag}{107.868 g Al}×\frac{1 mol O\_{2}}{4 mol Ag}=0.2906 mol O\_{2}$$

* 1. How many liters of oxygen gas are required to completely react with 125.4 g of silver?

$$PV=nRT⇒V=\frac{nRT}{P}=\frac{\left(0.2906 mol\right)\left(0.08206 \frac{L atm}{mol K}\right)(357 K)}{0.712 atm }=12.0 L O\_{2}$$