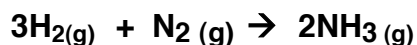


For the following problems give the complete setups including correct units throughout the problem and in your answer. Be sure your significant figures are correct. Present your work in a neat and organized fashion. Use the molar masses provided on the last sheet of the exam.

1. A sample of air has a volume of 1676 mL at $-85.1\text{ }^{\circ}\text{C}$ and 225 mm Hg. What would be the new temperature, in $^{\circ}\text{C}$., if the volume is halved and the pressure is changed to 3.5 atm. (12 points)

Answer _____

2. 25.0 L of hydrogen gas is reacted with 15.0 L of nitrogen at 335°C and 4.35 atm. to produce ammonia in the following reaction: (10 points)



How many Liters of ammonia are produced?

Answer _____
/22 points

3. A 2.0 L sample of a gas at 73 °C and 755 mm Hg is a mixture of helium and nitrogen. If the partial pressure of nitrogen is 355 mm Hg, what is the mass of the helium in the balloon? (10 points)

Answer _____

4. What is the density of a sample of diphosphorous pentoxide gas at 760 torr and 273 °C? (6 points)

Answer _____

5. If the temperature of a gas cut to 1/4 at constant volume, what will happen to the pressure of the gas? (5 points) Show work.

Answer _____

/21 points

6. What will be the pressure, in atm, of 82.3 g of sulfur dioxide gas at 463 °C if it has a volume of 33.2 L? (10 points)

Answer _____

7. A common laboratory preparation for oxygen gas involves the thermal decomposition of potassium chlorate:



What volume, in liters, of oxygen will be formed at 283 °C and 3.00 atm when 2.25×10^{24} formula units of potassium chlorate is decomposed ? (10 points)

Answer _____

/20 points

8. What is the molar mass of a gas if a of 38.56 L sample of the gas at .801 atm and 45.2 °C has a mass of 71.88 g? (8 points)

Answer _____

9. What volume of 1.500 M sulfuric acid is required to react with excess of aluminum to produce 3,255 mL of hydrogen gas at 975 torr and 385 K? You must write the balanced equation for the reaction of Aluminum with sulfuric acid. (12 points)

Answer _____
/20 points

10. Calculate the total energy change when 425.0 g of steam ($\text{H}_2\text{O}_{(g)}$) at 105.2°C is changed to ice ($\text{H}_2\text{O}_{(s)}$) at -4.4°C . (18 points)

Heat of vaporization for H_2O is 540 cal/gram

Heat of fusion for H_2O is 80 cal/gram

Specific heat of liquid water is 1.00 cal/g $^\circ\text{C}$

Specific heat of solid water is 0.50 cal/g $^\circ\text{C}$

Specific heat of gaseous water is .48 cal/g $^\circ\text{C}$

Answer _____

/18points

Molar Masses grams/mole

$R = 0.0821 \frac{\text{L atm}}{\text{K mole}}$ or $62.4 \frac{\text{L torr}}{\text{K mole}}$

H_2	2.02
O_2	32.00
H_2O	18.02
KClO_3	122.55
KCl	74.55
SO_2	64.08
CO_2	44.01
N_2	28.01
HCl	36.46
P_2O_5	141.943
CO	28.01
NO_2	46.01

