**1A Exam 2 VERSION 1 Name =**

**(Ch 4, 10, 5 thru Calorimetry)**

**\*\*Relax & Good Luck. Please read carefully! ALL CALCULATIONS MUST BE SHOWN & INCLUDE UNITS.**

1. Calculate the volume (in mL) of a 4.25M NaHCO3 aqueous solution that is needed to neutralize a 156mL spill of 5.95M H2SO4. Be sure to write a balanced equation to start!
2. Write the balanced NET IONIC reaction for the reaction above assuming the sodium product to be soluble.
3. Complete the following single replacement reactions assuming they occur:
   1. Chlorine reacts with potassium bromide
   2. Zinc reacts with silver nitrate
4. Write the balanced reaction for the combustion of butane, C4H10. Then, assign oxidation states to each atom in the combustion reaction. Explain clearly which atom is the oxidizing agent.
5. A fixed amount of oxygen gas is held in a 2.500 L tank at a pressure of 15.68 atm. The tank is connected to an empty 5.50 L tank by a tube with a valve. After this valve has been opened and the oxygen is allowed to flow freely between the two tanks at a constant temperature, calculate the pressure of the gas now.
6. Calculate the density, in g/L, of xenon gas at 182°C and 605 torr.
7. When a 1.23 g sample of the rocket fuel hydrazine, N2H4, is burned in a bomb calorimeter, the temperature of the calorimeter rises from 24.62°C to 28.16°C. If the heat capacity for the bomb is 840 J/°C, calculate the enthalpy of combustion in kJ/mole. Label as endo- or exo-thermic.
8. Calculate the number of times a 135lbs person must jump up 25cm in order to burn off the 299 Calorie hamburger they just ate. (2.21lbs/kg; 103 cal = 1Cal; 4.184J = 1cal)

**1A Exam 2 VERSION 2 Name =**

**(Ch 4, 10, 5 thru Calorimetry)**

**\*\*Relax & Good Luck. Please read carefully! ALL CALCULATIONS MUST BE SHOWN & INCLUDE** **UNITS.**

1. A fixed amount of oxygen gas is held in a 1.500 L tank at a pressure of 9.68 atm. The tank is connected to an empty 2.50 L tank by a tube with a valve. After this valve has been opened and the oxygen is allowed to flow freely between the two tanks at a constant temperature, calculate the pressure of the gas now.
2. Calculate the density, in g/L, of argon gas at 282°C and 505 torr.
3. When a 2.23 g sample of the rocket fuel hydrazine, N2H4, is burned in a bomb calorimeter, the temperature of the calorimeter rises from 24.62°C to 35.16°C. If the heat capacity for the bomb is 840 J/°C, calculate the enthalpy of combustion in kJ/mole. Label as endo- or exo-thermic.
4. Calculate the number of times a 255lbs person must jump up 45cm in order to burn off the 299 Calorie hamburger they just ate. (2.21lbs/kg; 103 cal = 1Cal; 4.184J = 1cal)
5. Calculate the volume (in mL) of a 7.35M NaHCO3 aqueous solution that is needed to neutralize a 356mL spill of 4.95M H2SO4. Be sure to write a balanced equation to start!
6. Write the balanced TOTAL IONIC reaction for the reaction above assuming the sodium product to be soluble.
7. Complete the following single replacement reactions assuming they occur:
   1. Fluorine reacts with potassium bromide
   2. Cadmium reacts with silver nitrate
8. Write the balanced reaction for the combustion of propane, C3H8. Then, assign oxidation states to each atom in the combustion reaction. Explain clearly which atom is the reducing agent.