Lab Quiz

Format: 5 questions of 10 points each covering labs that have been graded and returned to you. The possible labs where questions may be taken:

1. Density and Specific Gravity
2. [Friday Lab missed, not on quiz]
3. Gravimetric Determination of Hydrate in a Mixture
4. % Copper and Molar Mass of Copper Compound
5. Determination of a Chemical Formula
6. Preparation and Standardization of NaOH + HCl
7. Enthalpy of Reactions
8. Thermochemistry of Neutralization
9. (Spectroscopy of Cobalt Chloride)

Here are some Notes. The best place to get in formation is the pre-lab notes. You will be tested mostly on the calculations you did in lab.

\[ \text{Exp} 1 \quad D = \frac{m}{V} \quad DV = m \quad V = \frac{m}{D} \]

Understand how to calibrate a pipet or buret using the density of H\(_2\)O.
Exp 3 uses stoichiometry to determine a substance in an impure mixture. For this lab:

\[ g \text{ of } H_2O \rightarrow \text{ mol of } H_2O \rightarrow \text{ mol of } BaCl_2 \cdot 2H_2O \rightarrow j \text{ of } BaCl_2 \cdot 2H_2O \]

Exp 4: % element = \( \frac{g \text{ of element}}{\text{total sample}} \times 100 \)

Also uses stoichiometry to get molar mass.

If there is one atom of an element in a formula,

\[ \text{mol of element} = \text{mol of compound} \]

\[ \text{molar mass} = \frac{g \text{ of compound}}{\text{mol of compound}} \]

Exp 5: Determining a chemical formula from g of elements present. Elements' masses may be determined by difference as in your lab Mg + oxygen \( \rightarrow \) MgO.

\[ \text{mass } O = \text{mass } \text{MgO} - \text{mass } \text{Mg} \]

To get empirical formula (Example 3 elements:

\[ gA \rightarrow \text{mol } A \quad \text{Formula } A^{molA}B^{molB}C^{molC} \]

1) Divide by smallest to convert one subscript to 1
2) Other subscripts may be close to whole number: \( 7.92 \div 7 = 1.13 \)
3) If subscripts are not close to a small whole number, multiply by all small whole number to clear fractions.

\[ A_{1.33}B_{2.00}C_{4.00} \times 3 \rightarrow A_4B_6C_3 \]

Exp 6: Uses basic stoichiometry of solutions + masses:

\[ \frac{g \text{ of } A}{\text{mol of } A} \rightarrow \text{mol of } A \rightarrow \text{mol of } B \rightarrow \text{mol of } B \]
Remember \[ \text{Molarity} = \frac{\text{mol of solute}}{\text{Volume of solution}} \]
and \[ \text{Molarity (mol/L)} \times \text{Volume (L)} = \text{moles} \]

Exp 7 Remember basic thermochemistry

Enthalpy = heat (q) + transferred at constant P

Calorimetry

\[ \text{heat} = \Delta H = \sum (m_\text{H}_2\text{O} \times S_\text{H}_2\text{O} \times \Delta T_\text{H}_2\text{O}) \]

To get enthalpy/mol

\[ \frac{\text{heat (enthalpy) of process}}{\text{mol used in experiment}} \]

Exp 9 You need to know how to construct 3 graphs given appropriate data

1. Absorbance + wavelengths (constant concentration)

2. Absorbance + concentrations (constant wavelength)

(3) Using curve 2 - Determine the concentration of an unknown