1. Write the *full* electron configurations of the following elements:

1. copper\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. iodine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. potassium \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. bismuth \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. It takes 38 mL of 0.75 M NaOH solution to completely neutralize 155 mL of a sulfuric acid solution (H2SO4). What is the concentration of the H2SO4 solution?

3. A gummy bear contains 2.67 g sucrose, C12H22O11. When it reacts with 7.19 g potassium chlorate, KClO3, 43.7 kJ of heat are produced. Determine the enthalpy change for the reaction.

4. Determine the oxidation numbers for each element in the compounds below:

1. Br2
2. ZnCl2
3. CH4
4. MnO4-

5.How much energy is required to heat 120.0 g of water from 2.0 °C to 24.0 °C? (Cs=11.05 kJ)

6.The industrial method currently used to produce butan-2-ol is the hydration of but-2-ene.

**C4H8(g) + H2O(g) → C4H10O(g)**

The enthalpy values for the following reactions are:

4C(s) + 4H2(g) → C4 H8(g) ΔH = – 7·1 kJ mol–1

4C(s) + 5H2(g) + ½O2(g) → C4 H10O(g) ΔH = – 292·8 kJ mol–1

2H2(g) + O2(g) → 2H2 O(g) ΔH = – 483·6 kJ mol–1

Using the data above, calculate the enthalpy change, in kJ mol–1, for the production of butan-2-ol by hydration of but-2-ene.

7. Label the following electrolytes as strong, weak, or non-electrolyte.

HNO3

C6H12O6

CaCl2

CaCO3

HF

CH3OH

8. Write the net ionic equation for the following equation:

**BaCl₂(aq) + Na₂SO₄(aq) → BaSO₄(s) + 2NaCl(aq)**