**Quiz 3**

# 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. Describe the three basic parts of Rutherford’s nuclear model of the atom (6 points).
2. Most of the atom’s mass and all of its positive charge are contained in a small core called the nucleus.
3. Most of the volume of the atom is empty space, throughout which, time, negatively charged electrons are dispersed.
4. There are as many negatively charged electrons outside the nucleus as there are positively charged particles within the nucleus, so that the atom is electrically neutral.
5. Two samples of sodium chloride were decomposed into their constituent elements. One sample produced 6.98 g of sodium and 10.7 g of chlorine, and the other sample produced 11.2 g of sodium and 17.3 g of chlorine. Are these results consistent with the law of definite proportions (5 points)?

$$sample 1: \frac{10.7 g chlorine}{6.98 g sodium}=1.53 sample 2: \frac{17.3 g chlorine}{11.2 g sodium}=1.54$$

Yes, the results are consistent with the Law of Definite Proportions.

1. How many carbon atoms are there in a diamond (pure carbon) with a mass of 52 mg (5 points)?

$$52 mg C×\frac{1 g C}{1000 mg C}×\frac{1 mol C}{12.01 g C}×\frac{6.022 ×10^{23}atoms C}{1 mol C}=2.6×10^{21}atoms C$$

1. KF is a strong electrolyte and HF is a weak electrolyte. How does their dissociation in water differ (4 points)?

In a solution of KF, only the ions of K+ and F- are present in the solvent. In an HF solution, there are a few ions of H+ and F- present but mostly dissolved HF molecules.

1. Write the total and net ionic equations for the following unbalanced chemical equation. Circle the spectator ions, if any (5 points).

Zn (s) + 2 AgNO3 (aq) 🡪 2 Ag (s) + Zn(NO3)2 (aq)

Zn (s) + 2 Ag+ (aq) + 2 NO3- (aq) 🡪 2 Ag (s) + Zn2+ (aq) + 2 NO3- (aq)

Zn (s) + 2 Ag+ (aq) 🡪 2 Ag (s) + Zn2+ (aq)