Unit 3 Free Response Questions

Your class will select three questions from the following set that you must answer. Your answer to each question is worth a maximum of ten points each. Points are earned in the following ways:

3 pts: English writing conventions – the student writes complete sentences with proper punctuation and grammar. The question is restated in the context of the answer.

4 pts: The answer addresses the question that was asked. Required examples, explanations and illustrations are provided, though they might not be correct.

3 pts: The answer is conceptually correct.

1. Which pairs of elements are likely to form covalent bonds with each other? Explain your reasoning!

    a. Cl, C
    b. Li, Cl
    c. K, He
    d. I, Na

2. Your teacher proposes the existence of a new molecule, H_3, in which three hydrogens are covalently bonded together in a chain. Explain the error in your teacher's thinking. Why is H_3 unlikely to exist as a stable molecule?

3. Explain why neon is found as individual atoms, but pure chlorine exists as a diatomic molecule. Use drawings to help illustrate your points.

4. Draw electron dot structures for the following molecules, which have only single covalent bonds.

    a. H_2S
    b. PH_3
    c. BrF

5. In the 1940's, scientists working on the atomic bomb project produced "heavy water" by reacting hydrogen-2 and hydrogen-3 with oxygen. Explain what effect the use of these isotopes would have on:

    a) The Lewis structure of the water produced

    b) The molar mass of the water produced

6. Draw a Lewis structure for the compound hydrogen cyanide, HCN. Describe how many electrons each element has surrounding it in the Lewis Structure, and why that number is appropriate.