

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:

As many as 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.

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

As many as 3 pts: The answer is conceptually correct.

1. Which pairs of elements are likely to form covalent bonds with each other? What pairs will form ionic bonds? Are there any pairs that will not bond? 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, H₃, in which three hydrogens are covalently bonded together in a chain. Explain the error in your teacher's thinking. Why is H₃ unlikely to exist as a stable molecule?
3. The bonding properties of carbon are given most of the credit for the ability of some molecules to form polymers. Explain how carbon's bonding properties are different from other elements, and how that contributes to the formation of polymers.
4. Explain why neon is found as individual atoms, but pure chlorine exists as a diatomic molecule. Use drawings to help illustrate your points.
5. In the 1940's, scientists working on the atomic bomb project used "heavy water" that contained two atoms of hydrogen-2 (${}^2_1\text{H}$) instead of two atoms of hydrogen-1 (${}^1_1\text{H}$). Explain what effect the presence of hydrogen-2 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.