

Accompanying Questions
Topic 03: Lewis Structure and Bonding

Objective:

This is to provide guiding questions to help you comprehend the material we have covered in this section of the class. These questions have been answered within the video lecture and/or live class.

Instructions and Notes:

- Most of these questions/concepts are taken or derived from the chapters in the Chemistry: Atoms First 2e Online Textbook (OpenStax)
- Book sections covered: 1.2, 2.4, 3.6, 3.7, 4.1, 4.2, 4.4

Submission:

Students do not submit this and it is not graded.

Helpful Tips:

- These questions or very similar questions may appear on the exams so I strongly recommend that you complete them.
- Download the lectures and rewatch the lectures.
- Pause the lectures and rewind them through concepts you don't fully understand.
- Go to tutoring in the ASTC or MESA, ask your classmates in our Discord room, watch YouTube Videos, come to office hours, etc.

In-Lecture Questions

1. Draw the Lewis structure for sodium.
2. Draw the Lewis structure for helium.
3. Draw the Lewis structure for phosphorous.
4. Draw the Lewis structure for calcium.
5. Aluminum and carbon react to form an ionic compound. Predict which forms an anion, which forms a cation, and the charges of each ion. Write the symbol for each ion and name them.
6. Draw the Lewis structure for KF.
7. Draw the Lewis structure for Li_2S .
8. Draw the Lewis structure for BaBr_2 .
9. Predict the formula of the ionic compound formed between the sodium cation, Na^+ , and the sulfide anion, S^{2-} .
10. Predict the formula of the ionic compound formed between the lithium ion and the peroxide ion, O_2^{2-} (Hint: Use the periodic table to predict the sign and the charge on the lithium ion.)

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11. Draw the Lewis structure for CCl_4 .
12. Draw the Lewis structure for CH_2O .
13. Draw the Lewis structure for CO .
14. Draw the Lewis structure for CO_2 .
15. Draw the Lewis structure for CO_3^{2-} .
16. Draw the Lewis structure for NH_4^{1+} .
17. Draw the Lewis structure for H_2O .
18. Draw the Lewis structure for NH_3 .
19. Using the periodic table, predict whether the following compounds are ionic or covalent:
 - a) SO_2
 - b) CaF_2
 - c) N_2H_4
 - d) $\text{Al}_2(\text{SO}_4)_3$
20. Classify the following as atom/element, molecule, compound, molecular element, molecular compound, ionic compound
 - a) What is He?
 - b) What is NO?
 - c) What is H_2O ?
 - d) What is Fe?
 - e) What is H_2 ?
 - f) What is NaCl?
21. How many total atoms in H_2 ?
22. How many total atoms in H_2O ? How many H?
23. How many total atoms in $2(\text{H}_2\text{O}_2)$? How many O?
24. How many total atoms in $2(\text{NH}_4)_2(\text{SO}_4)$? How many S? How many H?
25. What is the empirical formula for the following?
 - a) N_2H_4
 - b) NH_3
 - c) $\text{C}_6\text{H}_{12}\text{O}_6$
26. A molecule of metaldehyde (a pesticide used for snails and slugs) contains 8 carbon atoms, 16 hydrogen atoms, and 4 oxygen atoms. What are the molecular and empirical formulas of metaldehyde?
27. How many grams per mole in H?
28. How many grams per mole in H_2 ?
29. How many grams per mole in H_2O ?
30. How many grams per mole in $2\text{H}_2\text{O}$?
31. A molecule of metaldehyde (a pesticide used for snails and slugs) contains 8 carbon atoms, 16 hydrogen atoms, and 4 oxygen atoms. What are the molecular and empirical formulas of metaldehyde? Calculate Grams Per Mole for the empirical and molecular formula.