Chemistry Unit Review

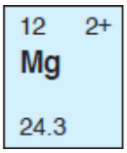
Using Key Terms

1. Draw a concept map that shows the relationship between the following terms. Give an example of each
   - Compound
   - Element
   - Matter
   - Mixture
   - pure substance

4. Sketch an outline of the periodic table, and identify the following on your outline.
   - alkali metal
   - alkaline-earth metal
   - group
   - halogen
   - metal
   - noble gas
   - non-metal
   - period
   - semi-metal

Communicating Concepts

5. Draw a Bohr diagram that represents an atom and ion of each of the following elements. Include protons, neutrons and electrons
   a. oxygen
   b. neon
   c. lithium
6. Describe the relationship between the reactivity of an element and the number of electrons in the valence shell of each atom of the element.
7. Use this incomplete box from the periodic table to answer the following questions.



   1. What is the atomic number of the element?
   2. What is the full chemical name of the element?
   3. Draw the Bohr diagram of an atom of this element.
   4. Draw the Bohr diagram of an ion of this element. Explain why the element forms this ion.

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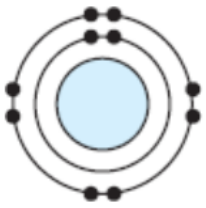
8. Use this Bohr diagram to answer the questions below.



   If this model represents an atom, what element is it? How do you know?
   If this model represents an ion with a charge of 2+, what element is it? Explain your answer.
   If this model represents an ion with a charge of 1–, what element is it? Explain your answer.
9. Complete the table below in your notebook.

Properties of Neutral Atoms

Symbol	Atomic Number	Number of Electrons	Number of Protons
Ne			
	3		
Ca			
		18	

10. Use atomic theory to explain why noble gases are inert(do not react). Use a Bohr diagram as part of your explanation.
11. Describe two trends in the periodic table. Use examples of elements to support your answer.
12. Write the chemical formulas of each of the following ionic compounds.
    . lithium chloride
    a. zinc sulfide
    b. copper(II) chloride
    c. ammonium acetate
    d. manganese(III) nitrate
    e. cobalt(II) phosphate
14. Write the chemical formulas of each of the following covalent compounds.
    . sulfur dioxide
    a. silicon tetrabromide
    b. phosphorus pentachloride
    c. dinitrogen trioxide
15. Chromium is a multivalent element.
    What does multivalent mean?
    . What ions can chromium form?
    Predict all of the different compounds that chromium could form with chlorine. Give their names and formulas.

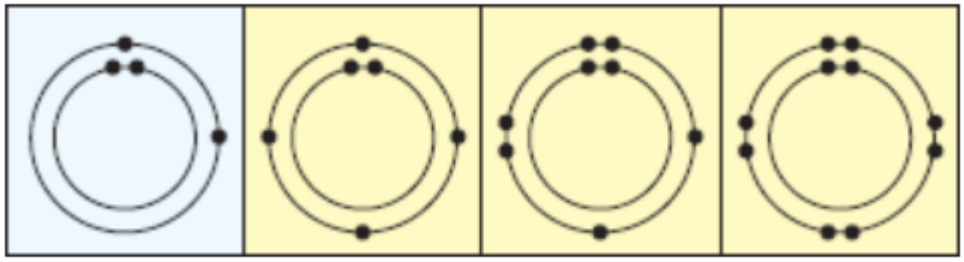
    Write the chemical names for the following compounds. Identify each as an ionic or covalent compound.
    a. SCl_2
    b. $AlBr_3$
    c. $NiSO_4$
    d. P_2O_5
17. Compare how an ionic bond forms with how a covalent bond forms. How are they the same? How are they different?

Developing Skills.

19. Design a flowchart that you could use to help you write a chemical formula when given the name of a compound. Make sure that your method includes how to write formulas for both ionic and covalent compounds.

Thinking Critically and Creatively

21. Diagrams showing the electron arrangements of atoms of five elements are shown below. Use these to answer the following questions.



a. Write the element symbol for each. Explain how you determined what element each diagram represents.

b. Do these elements belong to the same period or the same group? Which common period or group do they belong to? How do you know?

c. Describe a periodic trend of these elements.

23. The air we breathe is 78 percent nitrogen by mass. Write the chemical formula for nitrogen to show how it exists in air. Is a molecule of nitrogen considered a compound? Explain your answer.

Thinking Critically and Creatively

27. Sodium fluoride is added to many toothpastes to help reduce cavities.
    a. What is the chemical formula for sodium fluoride?
    b. Is sodium fluoride an ionic or a covalent compound? How do you know?
    c. Predict at least three properties you would expect sodium fluoride to have.
    d. Describe what happens when sodium and fluorine react to form sodium fluoride.
28. Covalent compounds are also called molecular compounds. Why is this name appropriate?