

For each question, select the best answer from the four alternatives.

- Glucose, a type of sugar, has the formula $C_6H_{12}O_6$. What is the total number of atoms in one molecule of glucose? (7.1) **K/U**
 - 3
 - 6
 - 12
 - 24
- Which of these chemical formulas represents an element? (7.1) **K/U**
 - O_2
 - CO
 - CH_4
 - CCl_4
- A sulfide ion has 16 protons and a charge of -2 . How many electrons does a sulfide ion have? (7.1) **K/U**
 - 8
 - 14
 - 18
 - 34
- A certain type of brass is 75 % copper and 25 % zinc. Which type of material is brass? (7.3) **K/U**
 - an alloy
 - an element
 - an ionic compound
 - a covalent compound
- What does the formula N_2 represent? (7.1) **K/U**
 - an atom and an element
 - an element and a molecule
 - a molecule and a compound
 - a compound and an element

Indicate whether each of the statements is TRUE or FALSE. If you think the statement is false, rewrite it to make it true.

- Ozone (O_3) is a diatomic molecule. (7.1) **K/U**
- Non-metals react with other non-metals to form ionic compounds. (7.3) **K/U**
- Toxic materials such as DDT and PCBs are a hazard for people living in Canada's north. (7.8) **K/U**

Copy each of the following statements into your notebook. Fill in the blanks with a word or phrase that correctly completes the sentence.

- Propane (C_3H_8), butane (C_4H_{10}), and pentane (C_5H_{12}) all belong to the class of organic compounds called _____. (7.1) **K/U**
- All the bonds in methanol (CH_3OH) are _____ bonds. (7.3) **K/U**
- A(n) _____ is formed when an atom loses one or more electrons and retains the same number of protons. (7.1) **K/U**

Match each term on the left with the most appropriate description on the right.

- | | |
|-----------------|--------------------------------------|
| 12. (a) rust | (i) sodium chloride |
| (b) table salt | (ii) sodium hydrogen carbonate |
| (c) baking soda | (iii) sodium hydroxide |
| (d) lye | (iv) calcium carbonate |
| (e) limestone | (v) iron oxide (7.2, 7.3) K/U |

Write a short answer to each of these questions.

- Why are the noble gases the most stable elements? (7.3) **K/U**
- Explain why all molecules are not considered compounds. (7.1) **K/U**
- A chemist carries out an experiment in which potassium metal (K) reacts with chlorine gas (Cl_2) to form the salt potassium chloride (KCl), an ionic compound. The salt is then dissolved in water, where it separates into potassium ions (K^+) and chloride ions (Cl^-). (7.1) **T/I**
 - Describe what happened in the outermost electron orbits of the potassium and chlorine atoms during the reaction.
 - A chloride ion has 17 protons. How many electrons does it have?
 - A potassium ion has 19 protons. How many electrons does it have?

16. Just as iron rusts, copper also reacts with oxygen in the air in the process of corrosion. Design an experiment to study how each of the following factors affects the rate at which copper corrodes. (Hint: Pennies are made mostly of copper. Begin with pennies that have been made equally shiny by rubbing with steel wool.) (7.2) **T/I**
- water
 - salt
 - acid (in the form of vinegar)
17. Three flasks contain colourless gases. You know that one flask contains pure oxygen, one contains carbon dioxide, and one contains air, but you do not know which is which. (7.5) **T/I**
- Describe a test you could perform to identify the gases.
 - Explain what you would observe when you performed the test on each gas.
18. A student is studying the properties of two metals. Metal A burns brightly when touched to a flame, leaving behind a white powder. Metal B does not burn, but when it is left exposed for several weeks, a dark, scaly coating forms on its surface. (7.2) **T/I**
- Describe the chemical property that the two metals have in common.
 - Describe the chemical composition of the white powder and the dark, scaly coating.
19. Describe three ways you come into contact with alloys in your daily life. (7.3) **A**
20. Beryllium metal (Be) and fluorine gas (F_2) react to form beryllium fluoride (BeF_2).
- Draw a Bohr–Rutherford diagram to show how electrons are transferred during this reaction. (Hint: draw a beryllium atom, and then draw one fluorine atom on either side of the beryllium atom.)
 - Describe what is happening in this reaction in your own words. (7.1) **C**
21. Oxygen reacts rapidly with some materials and slowly with others. (7.1, 7.2, 7.5) **A**
- Identify one material with which oxygen reacts rapidly and describe something people do to prevent this reaction.
 - Identify one material with which oxygen reacts slowly and describe something people do to prevent this reaction.
22. Consider the type of bonding in Cl_2 (chlorine gas) and in NaCl (table salt). Which substance is a molecule and which substance is an ionic compound? Explain your answer. (7.1, 7.3) **T/I K/U**
23. The chemical formulas of the four smallest hydrocarbons are shown below:
- $$\text{CH}_4 \quad \text{C}_2\text{H}_6 \quad \text{C}_3\text{H}_8 \quad \text{C}_4\text{H}_{10}$$
- The molecules are classified as saturated hydrocarbons because they have the maximum number of hydrogen atoms per carbon atom. Write an explanation or create a formula that can be used to determine the number of hydrogen atoms in a saturated hydrocarbon given the number of carbon atoms. (7.1) **T/I C A**
24. Draw atomic models of carbon dioxide (CO_2), water (H_2O), ammonia (NH_3), and methanol (CH_3OH) by rearranging the balls shown in Figure 1 below. You will need to use all the balls. (7.4) **C**

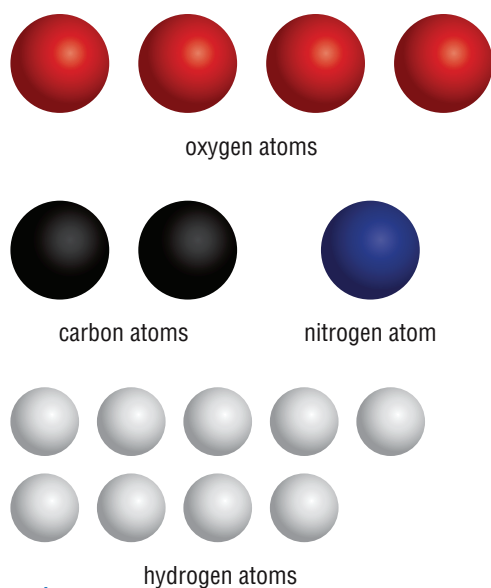


Figure 1