

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

- Which of the following correctly describes the atomic number of an element? (6.6) **K/U**
 - the number of protons in the atom's nucleus
 - the number of electrons in the atom's nucleus
 - the number of neutrons in the atom's nucleus
 - the number of protons, neutrons, and electrons in the atom's nucleus
- Which phrase best describes a group or family in the periodic table? (6.7) **K/U**
 - elements that have the same melting point
 - elements that have the same number of protons in their nucleus
 - elements that are all in the same physical state at room temperature
 - elements that have the same number of electrons in their outermost orbits
- From the information in the periodic table, how many neutrons does the most common isotope of carbon have? (6.7) **K/U**
 - 1
 - 6
 - 12
 - 14
- Which of the following is a compound? (6.1) **K/U**
 - sodium
 - chlorine
 - water
 - oxygen

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

- In the periodic table we use today, the elements are arranged by increasing mass. (6.7) **K/U**
- Diamonds, the graphite used in pencils, and charcoal are made mostly of carbon atoms. (6.8) **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.

- Elements classified as metalloids have properties of both _____ and _____. (6.1) **K/U**
- The elements in group 17 of the periodic table, such as fluorine and chlorine, are also called _____. (6.4) **K/U**
- _____ of an element have the same number of protons but different numbers of neutrons. (6.7) **K/U**

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

- | | |
|--------------|--|
| 10. (a) atom | (i) a positively charged particle |
| (b) proton | (ii) a pure substance listed on the periodic table |
| (c) element | (iii) a negatively charged particle |
| (d) electron | (iv) a particle that has no charge |
| (e) neutron | (v) the smallest unit of an element (6.6) K/U |

Write a short answer to each of these questions.

- Explain the difference between a group and a period on the periodic table. (6.4) **K/U**
- (a) A particle contains more electrons than protons. What type of charge does the particle have? (6.7) **K/U**
(b) Can the particle described in part (a) be called an atom? Why or why not?
- Which of the following Group 17 elements would you expect to be the most reactive: chlorine, fluorine, or bromine? Explain your choice based on the arrangement of the element's electrons. (6.7) **T/I**

14. The mass number of a certain element is 195. The most common isotope of that element has 117 neutrons in each of its atoms. (6.7) **T/I**
- (a) How many protons does an atom of this element contain? Explain your answer.
- (b) Identify the element.
15. In your own words, explain to a friend the significance of Rutherford's gold foil experiment. (6.6) **C**
16. How many electron orbits would you expect to find in an atom of aluminum? Explain your reasoning. (6.7) **T/I**
17. (a) How did Thomson's and Rutherford's experiments provide evidence that part of Dalton's atomic theory was incorrect?
- (b) Was Dalton's atomic theory discarded after Thomson's and Rutherford's experiments? Why or why not? (6.6) **K/U T/I**
18. Why are electron orbits sometimes referred to as energy levels? (6.6) **T/I**
19. Many pans used for cooking are made of metal because metals easily conduct thermal energy. (6.1) **A**
- (a) Why are the handles of these pots usually not made of metal?
- (b) What kind of material would be suitable for the handles of cookware?
20. Dentists sometimes use gold or silver to fill cavities in teeth caused by tooth decay. (6.1) **A**
- (a) Give at least two reasons why these materials are good choices for tooth fillings.
- (b) Why might these materials not be good choices for tooth fillings?
21. Suppose your science class were to hold an election to decide which element is the most useful chemical element on the periodic table. Choose one element and create an advertisement that illustrates why the chemical element is useful. (6.1, 6.4, 6.8) **C**
22. How many neutrons would you expect to find in the atom of the most common isotope of hydrogen, H-1? Explain your reasoning. (6.7) **K/U T/I**
23. In the past, some airships were filled with hydrogen because hydrogen is less dense than air. An airship filled with hydrogen will rise up and easily float through the air. Now airships are filled with helium, which is also less dense than air. Based on their positions on the periodic table, why is helium a better choice than hydrogen to use in airships? (6.7) **A**