

# CLASSIFYING THE ELEMENTS

13. Chlorine has the electron configuration  $1s^2 2s^2 2p^6 3s^2 3p^5$ .  
 14. The element in Group 4A, period 3, is gallium.  
 15. There is a relationship between the electron configurations of elements and their chemical and physical properties.

## Section Review

### Objectives

- Describe the information in a periodic table
- Classify elements based on electron configuration
- Distinguish representative elements and transition metals

### Vocabulary

- alkali metals
- alkaline earth metals
- halogens
- noble gases
- representative elements
- transition metals
- inner transition metals

### Part A Completion

Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.

- The periodic table displays the symbols and 1 of the elements along with information about the structures of their 2. The Group 1A elements are called 3, and the Group 2A elements are called 4. The elements in Groups 1A through 7A are called the 5. The nonmetals of Group 7A are 6, and the 7 make up Group 8A. Between Groups 2A and 3A, there are 8 in periods 4 through 7 and 9 in periods 6 and 7.
- The atoms of the noble gas elements have their highest occupied 10 and 11 sublevels filled. The highest occupied 10 and 11 sublevels of the representative elements are 11.

### Part B True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

- ST 12. Group A elements are representative elements.  
 (noble gases not part of rep elements)

### Part C Matching

Match each description in Column B to the correct term in Column A.

Column A

- F 16. alkali metals  
 E 17. inner transition metal  
 G 18. representative element  
 D 19. transition metal  
 B 20. noble gas  
 C 21. alkaline earth metals  
 A 22. halogens

Column B

- a. nonmetals of Group 7A  
 b. an element in which the highest occupied *s* and *p* sublevels are filled  
 c. Group 2A elements  
 d. an element whose highest occupied *s* sublevel and a nearby *d* sublevel contain electrons  
 e. an element whose highest occupied *s* sublevel and a nearby *f* sublevel generally contain electrons  
 f. Group 1A elements  
 g. an element whose highest occupied *s* or *p* sublevels are partially filled

### Part D Questions and Problems

Answer the following in the space provided.

23. List the electron configurations for the highest occupied energy level of the elements in period 3 from left to right.

+1 Na  $3s^1$ , Mg  $3s^2$ , Al  $3s^2 3p^1$ , Si  $3s^2 3p^2$ , P  $3s^2 3p^3$ , S  $3s^2 3p^4$ , Cl  $3s^2 3p^5$ , Ar  $3s^2 3p^6$

24. List the elements of Group 6A. Tell whether each is a solid, liquid, or gas at room temperature and whether it is a metal, nonmetal, or metalloid.

+5 O (Gas + NM), S (Solid NM), Se (Solid NM), Te (Solid + Metalloid), Po (Solid + M)

(5)