Standardized Test Prep

Answer the following items on a separate piece of paper.

MULTIPLE CHOICE

1. In the modern periodic table, elements are arranged according to
- **A.** decreasing atomic mass.
- **B.** Mendeleev's original model.
- **C.** increasing atomic number.
- **D.** when they were discovered.

2. Group 17 elements, the halogens, are the most reactive of the nonmetal elements because they
- **A.** require only one electron to fill their outer energy level.
- **B.** have the highest ionization energies.
- **C.** have the largest atomic radii.
- **D.** are the farthest to the right in the periodic table.

3. The periodic law states that
- **A.** the chemical properties of elements can be grouped according to periodicity.
- **B.** the properties of the elements are functions of atomic mass.
- **C.** all elements in the same group have the same number of valence electrons.
- **D.** all elements with the same number of occupied energy levels must be in the same group.

4. As you move left to right across Period 3 from Mg to Cl, the energy needed to remove an electron from an atom
- **A.** generally increases.
- **B.** generally decreases.
- **C.** does not change.
- **D.** varies unpredictably.

5. Which of the following elements has the highest electronegativity?
- **A.** oxygen
- **B.** hydrogen
- **C.** fluorine
- **D.** carbon

6. The noble gases have
- **A.** high ionization energies.
- **B.** high electron affinities.
- **C.** large atomic radii.
- **D.** a tendency to form both cations and anions.

7. Which electron configuration is *not* correct?
- **A.** O^{2-} $[He]2s^22p^6$
- **B.** Mg^{2+} $[He]2s^22p^6$
- **C.** V^{3+} $[Ar]3d^2$
- **D.** Al^{3+} $[Ar]2s^22p^6$

8. Which two elements are more likely to have the same charge on their ions?
- **A.** Se and As
- **B.** Sn and Si
- **C.** Ca and Rb
- **D.** I and Xe

9. Using only the periodic table, choose the list that ranks the elements Sr, Te, Kr, Ru, and Cs in order of increasing ionization energy.
- **A.** Sr < Te < Ru < Cs < Kr
- **B.** Te < Ru < Sr < Cs < Kr
- **C.** Cs < Sr < Ru < Te < Kr
- **D.** Kr < Cs < Sr < Ru < Te

SHORT ANSWER

10. The second ionization energies for the elements S–Ti are listed in a scrambled order below. Assign the correct IE_2 value to each element. (Hint: S has IE_2 = 2251 kJ/mol, and Ti has IE_2 = 1310 kJ/mol.) Explain your reasoning.

IE_2 values (kJ/mol): 2666, 2297, 3051, 1235, 2251, 1310, and 1145

11. What group most commonly forms 2– ions? Explain your reasoning.

EXTENDED RESPONSE

12. An ordered list of atomic radii for 14 consecutive elements is shown below. Without using **Figure 13** on page 151, make a graph of these atomic radii versus the element's atomic number. Explain your reasoning.

Atomic radii (pm): 75, 73, 72, 71, 186, 160, 143, 118, 110, 103, 100, 98, 227, and 197

Test TIP If you are short on time, quickly scan the unanswered questions to see which might be easiest to answer.