1. The elements on the Periodic Table of the Elements are arranged in order of increasing

   A) atomic mass B) formula mass
   C) atomic number D) oxidation number

2. Which list includes elements with the most similar chemical properties?

   A) Br, Ga, Hg B) Cr, Pb, Xe
   C) O, S, Se D) N, O, F

3. Which list of elements contains a metal, a metalloid, and a nonmetal?

   A) Zn, Ga, Ge B) Si, Ge, Sn
   C) Cd, Sb, I D) F, Cl, Br

4. Which element is an alkali metal?

   A) hydrogen B) calcium
   C) sodium D) zinc

5. Which Group 15 element exists as a diatomic molecule at STP?

   A) phosphorus B) nitrogen
   C) bismuth D) arsenic

6. More than two-thirds of the elements of the Periodic Table are classified as

   A) metalloids B) metals
   C) nonmetals D) noble gases

7. Which properties are characteristic of the Group 1 metals?

   A) high reactivity and the formation of stable compounds
   B) high reactivity and the formation of unstable compounds
   C) low reactivity and the formation of stable compounds
   D) low reactivity and the formation of unstable compounds

8. Which property can be defined as the ability of a substance to be hammered into thin sheets?

   A) conductivity B) malleability
   C) melting point D) solubility

9. Which two characteristics are associated with metals?

   A) low first ionization energy and low electronegativity
   B) low first ionization energy and high electronegativity
   C) high first ionization energy and low electronegativity
   D) high first ionization energy and high electronegativity

10. Which element has properties of electrical conductivity and luster and exists as a liquid at STP?

    A) Hg B) Br C) C D) I

11. Which list of symbols represents nonmetals, only?

    A) B, Al, Ga B) Li, Be, B
    C) C, Si, Ge D) P, S, Cl

12. Which property is characteristic of nonmetals?

    A) They have a high electronegativity.
    B) They lose electrons easily.
    C) They have a low first ionization energy.
    D) They are good conductors of electricity.

13. Which element can be brittle or soft in the solid phase and is a *poor* conductor of heat and electricity?

    A) calcium B) sulfur
    C) strontium D) copper

14. Which statement explains why neon is a Group 18 element?

    A) Neon is a gas at STP.
    B) Neon has a low melting point.
    C) Neon atoms have a stable valence electron configuration.
    D) Neon atoms have two electrons in the first shell.

15. Which element is a noble gas?

    A) krypton B) chlorine
    C) antimony D) manganese

16. Pure silicon is chemically classified as a metalloid because silicon

    A) is malleable and ductile
    B) is an excellent conductor of heat and electricity
    C) exhibits metallic and nonmetallic properties
    D) none of the above

17. Which element has the greatest density at STP?

    A) barium B) beryllium
    C) magnesium D) radium

18. Aqueous solutions of compounds containing element *X* are blue. Element *X* could be

    A) carbon B) copper C) sodium D) sulfur

19. The presence of which ion usually produces a colored solution?

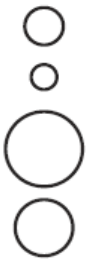
    A) K^+ B) F^- C) Fe^{2+} D) S^{2-}

20. Which general trends in atomic radius and electronegativity are observed as the elements in Period 3 are considered in order of increasing atomic number?

    A) Atomic radius decreases and electronegativity increases.
    B) Atomic radius increases and electronegativity decreases.
    C) Both atomic radius and electronegativity increase.
    D) Both atomic radius and electronegativity decrease.

21. Which grouping of circles, when considered in order from the top to the bottom, best represents the relative size of the atoms of Li, Na, K, and Rb, respectively?

A) 

B) 

C) 

D) 

22. What occurs as the atomic number of the elements in Period 2 increases?

A) The nuclear charge of each successive atom decreases, and the atomic radius decreases.
B) The nuclear charge of each successive atom decreases, and the atomic radius increases.
C) The nuclear charge of each successive atom increases, and the atomic radius decreases.
D) The nuclear charge of each successive atom increases, and the atomic radius increases.

23. Compared to a potassium atom, a potassium ion has

A) a smaller radius B) a larger radius
C) fewer protons D) more protons

24. An Mg atom differs from an Mg^{2+} ion in that the atom has a

A) smaller radius B) larger radius
C) smaller nucleus D) larger nucleus

25. Based on Table *S*, an atom of which element has the strongest attraction for electrons in a chemical bond?

A) chlorine B) nitrogen
C) oxygen D) selenium

26. The strength of an atom's attraction for the electrons in a chemical bond is the atom's

A) electronegativity B) ionization energy
C) heat of reaction D) heat of formation

27. The amount of energy required to remove the outermost electron from a gaseous atom in the ground state is known as

A) first ionization energy B) activation energy
C) conductivity D) electronegativity

28. Which of the following Group 2 elements has the *lowest* first ionization energy?

A) Be B) Mg C) Ca D) Ba

29. As elements of Group 1 of the Periodic Table are considered in order from top to bottom, the ionization energy of each successive element decreases. This decrease is due to

A) decreasing radius and decreasing shielding effect
B) decreasing radius and increasing shielding effect
C) increasing radius and decreasing shielding effect
D) increasing radius and increasing shielding effect

30. Which element in Period 2 of the Periodic Table is the most reactive nonmetal?

A) carbon B) nitrogen
C) oxygen D) fluorine