Ch6 Test
Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. Which of the following elements is a metal?
   a. Boron
   b. Nitrogen
   c. Magnesium
   d. Carbon

2. According to ____ periodic table, the physical and chemical properties of elements are periodic functions of their atomic weights.
   a. Dmitri Mendeleev’s
   b. John Newlands’
   c. Henry Moseley’s
   d. Lothar Meyer’s

3. Atomic radii cannot be measured directly because the electron cloud surrounding the nucleus does not have a clearly defined ____.
   a. charge.
   b. mass.
   c. outer edge.
   d. probability.

4. Which diagram best represents the group and period trends in atomic radii in the periodic table?
   a. Generally increase → c. Generally decrease →
   b. Generally increase → d. Generally decrease →

5. The general trend in the radius of an atom moving down a group is partially accounted for by the ____.
   a. decrease in the mass of the nucleus.
   b. fewer number of filled orbitals.
   c. increase in the charge of the nucleus.
   d. shielding of the outer electrons by inner electrons.

6. A(n) ____ is an atom, or bonded group of atoms, that has a positive or negative charge.
   a. halogen
   b. ion
   c. isotope
   d. molecule

7. An atom becomes negatively charged by ____.
   a. gaining an electron.
   b. gaining a proton.
   c. losing an electron.
   d. losing a neutron.

8. Which diagram best represents the relationship between the diameter of a sodium atom and the diameter of a positive sodium ion?
   a. Na Na⁺
   b. Na Na⁺
   c. Na Na⁺

9. Elements in the same group have the same ____.
   a. atomic radius.
   c. nuclear charge.
10. Most of the elements in groups 6A–8A are classified as ____.
   a. alkali metals.
   b. inner transition metals.
   c. nonmetals.
   d. alkaline earth metals.

11. Which energy level of the period 4 transition elements is being filled with electrons?
   a. third
   b. fourth
   c. fifth
   d. sixth

12. Identify the period and group of the element that has the electron configuration [Ne]3s²3p³.
   a. period 2, group 2A
   b. period 3, group 1A
   c. period 3, group 3A
   d. period 3, group 5A

13. Which of the following classifications describes the element with the electron configuration [Ar]4s²3d¹⁰4p⁵?
   a. stable metal
   b. stable nonmetal
   c. unstable nonmetal
   d. unstable metal

14. What is the electron configuration of the element in group 4A and period 4 of the periodic table?
   a. [Ne]3s²3p⁴
   b. [Ar]4s²
   c. [Ar]4s²3d¹⁰4p²
   d. [Kr]5s²4d²

15. What is the trend in atomic radii as you move from left-to-right across a period?
   a. generally decreases
   b. generally increases
   c. remains the same
   d. varies randomly

16. The trend in the atomic radii as you move down the group 1A elements is partially due to ____.
   a. decreased distance of outer electrons.
   b. increased nuclear charge.
   c. increased number of electrons in outer energy level.
   d. shielding by inner electrons.

17. In which of the following pair is the second particle listed larger than the first?
   a. K, Ga
   b. Pb, C
   c. Br, Br⁻
   d. Li, Li⁺

18. How many electrons does an atom generally need in its outer level to be the most stable?
   a. 4
   b. 8
   c. 10
   d. 12

19. Which of the following electron configurations represents the most chemically stable atom?
   a. [He]2s²2p⁵
   b. [Ne]3s²3p⁵
   c. [Ne]3s²2p⁶4s²3d⁵
   d. [Ne]3s²2p⁶

Matching

Match the terms below with their correct definitions.

a. metals  
   b. group  
   c. period  
   d. representative elements  
   e. transition elements

20. A column on the periodic table

21. A row on the periodic table

22. Group A elements

23. Elements that are shiny and conduct electricity

24. Group B elements

Use the periodic table on pages 156–157 in your textbook to match each element with the element that has the most similar chemical properties.

a. boron (B)  
   i. platinum (Pt)
b. cesium (Cs)

c. chromium (Cr)

d. cobalt (Co)

e. hafnium (Hf)

f. iodine (I)

g. iron (Fe)

h. nitrogen (N)

i. scandium (Sc)

k. silicon (Si)

l. strontium (Sr)

m. sulfur (S)

n. zinc (Z)

o. xenon (Xe)

25. arsenic (As)

26. bromine (Br)

27. cadmium (Cd)

28. gallium (Ga)

29. germanium (Ge)

30. iridium (Ir)

31. magnesium (Mg)

32. neon (Ne)

33. nickel (Ni)

34. osmium (Os)

35. sodium (Na)

36. tellurium (Te)

37. tungsten (W)

**Match the terms below with their correct definitions.**

a. alkali metals

b. alkaline earth metals

c. electronegativity

d. halogens

e. period

f. ion

g. ionization energy

h. noble gases

i. octet rule

j. periodic law

k. representative elements

l. transition elements

m. group

38. Statement that when the elements are arranged by increasing atomic number, there is a periodic repetition of their chemical and physical properties

39. Group A elements

40. Group B elements

41. Group 1A elements (except for hydrogen)

42. Group 2A elements

43. A column in the periodic table

44. A row in the periodic table

45. Group 7A elements

46. Group 8A elements

47. Atom or bonded group of atoms that has a positive or negative charge

48. Energy required to remove an electron from a gaseous atom

49. Statement that atoms tend to gain, lose, or share electrons to acquire a full set of eight valence electrons

50. Indication of an atom’s ability to attract electrons in a chemical bond

### Ch7 Test

**Multiple Choice**

*Identify the choice that best completes the statement or answers the question.*

1. Which of the following is an alkaline earth metal?
   - a. Sodium
   - b. Potassium
   - c. Iron
   - d. Beryllium
2. Which of the following groups consists of reactive p-block elements?
   a. Group 1A
   b. Group 2A
   c. Group 8A
   d. Group 3A

3. Which allotrope of carbon has a three-dimensional solid structure?
   a. Coal
   b. Diamond
   c. Graphite
   d. Granite

4. Which of the following is an extremely unstable nitrogen compound?
   a. Ammonia
   b. Nitric acid
   c. Nitrogen dioxide
   d. Trinitrotoluene

5. What is the trend in the melting point of d-block elements across a period?
   a. The melting point decreases from left to right.
   b. The melting point increases from left to right.
   c. The melting point remains the same.
   d. The melting point first increases and then decreases from left to right.

6. Which of the following metals can form a permanent magnet?
   a. Copper
   b. Chromium
   c. Iron
   d. Zinc

7. Choose the element that would be the most reactive of the three.
   a. Li
   b. Na
   c. K

8. Choose the element that would be the most reactive of the three.
   a. K
   b. Fr
   c. Na

9. Choose the element that would be the most reactive of the three.
   a. Ba
   b. Mg
   c. Be

10. Choose the element that would be the most reactive of the three.
    a. Li
    b. K
    c. Ba

11. Plants and animals get the nitrogen they need ____.
    a. directly from the air.
    b. from nitrogen-fixing bacteria.
    c. from ammonia compounds.
    d. nitric acid.

12. The major industrial use for nitrogen is to make ____.
    a. ammonia.
    b. nitrous oxide.
    c. nitrous acid.
    d. nitric acid.

13. Some of the uses for phosphorous are ____.
    a. in cleaning products and fertilizers.
    b. in lightweight metals and tools.
    c. in ceramics and food seasonings.
    d. in eyebrow pencils and storage batteries.

14. Oxygen is the most abundant element ____.
    a. in the universe.
    b. in Earth’s atmosphere.
    c. in Earth’s crust.
    d. in living organisms.

15. Ozone is ____.
    a. an isotope of oxygen.
    b. a compound of oxygen.
    c. an allotrope of oxygen
    d. a stable gas.

16. The release of phosphate ions from fertilizers or detergents into bodies of water may lead to depletion of dissolved oxygen because ____.
    a. bacteria in the water decompose phosphate ions.
    b. the phosphate ions form a layer in the water.
c. phosphate ions serve as nutrients for algae.
d. the phosphate ions replace oxygen dissolved in the water.

17. Selenium is used in solar panels because it ____.
   a. can convert light into electricity. c. is heavy.
   b. is a metal. d. can convert light into heat.

18. The most chemically active of all the elements is ____.
   a. sodium. c. fluorine.
   b. carbon. d. bromine.

19. Some of the uses for chlorine are in ____.
   a. metal alloys. c. toothpaste and cookware.
   b. fertilizers and photographic materials. d. bleaches, disinfectants, and plastics.

20. Elements in the same group have similar chemical properties because
   a. their atoms are about the same size.
   b. they have a similar atomic mass.
   c. they have the same number of valence electrons.
   d. they have a diagonal relationship.

21. Which of the following statements does NOT describe the alkali metals?
   a. Most are shiny gray solids that are very soft.
   b. They easily gain an electron to form ions with a charge of –1.
   c. They are not found uncombined in nature.
   d. They react with water to form alkaline solutions.

22. Which statement best describes the relationship between boron and silicon?
   a. They have a diagonal relationship.
   b. They are in the same group.
   c. They are in the same period.
   d. They are both metals.

23. Which group of elements are the most important for living organisms?
   a. carbon, lead, and tin
   b. carbon, nitrogen, and oxygen
   c. boron, aluminum, and nitrogen
   d. arsenic, antimony, and oxygen

24. The final electron in inner transition metals enters the
   a. p sublevel. c. d sublevel.
   b. s sublevel. d. f sublevel.

25. Which of the following is a characteristic common to the transition metals?
   a. Many are soft and easily cut with a knife.
   b. Most are good conductors of electricity and heat.
   c. Most react readily with the oxygen in air and must be stored under oil.
   d. Most form only one common ion.

26. When a substance’s valence electrons are slightly attracted to a magnetic field, the substance displays
   a. paramagnetism. c. ferromagnetism.
   b. diamagnetism. d. a diagonal relationship.

27. Elements with a higher atomic number than uranium are
   a. always found combined in compounds.
   b. found as uncombined elements.
   c. not found in nature.
   d. found both as uncombined elements and in compounds.

Matching

*Match the terms below with their correct definitions. The terms can be used more than once.*

a. tungsten  
   f. platinum  
   b. chromium  
   g. manganese
Match the terms below with their correct definitions.

28. Found in the center of a hemoglobin molecule
29. Provides a protective coating to resist rusting
30. Used in electrical wiring
31. Needed for the development of red blood cells
32. Can control the conditions at which a reaction occurs
33. Involved in cell respiration
34. The main element in steel
35. Are classified as “strategic” metals
36. Found in molecules that help the body digest proteins and eliminate carbon dioxide
37. The best conductor of electricity

Match the terms below with their correct definitions.

a. organic chemistry
e. inorganic chemistry
b. ferromagnetism
f. mineral
c. metallurgy
g. ore
d. alloy
h. allotrope

38. An element or inorganic compound that is found in nature as solid crystals
39. The branch of chemistry that studies most carbon compounds
40. Material from which a mineral can be removed at a reasonable cost
41. A mixture of two or more elements with at least one of the elements being a metal
42. Property of a substance whose ions all align in the direction of a magnetic field
43. The branch of chemistry that deals with all non-organic compounds
44. Forms of an element in the same state with different structures and properties
45. Branch of applied science that designs methods of extracting metals from their ores

Match the terms below with their correct definitions.

a. lead
d. magnesium
b. phosphorus
e. fluorine
c. argon

46. Used in cleaning products and fertilizers.
47. Used in many storage batteries.
48. Used to make lightweight alloys for airplanes.
49. Used in the manufacture of lightbulbs.
50. Used to strengthen teeth.
MULTIPLE CHOICE

1. **ANS: C**
   Metals are elements that are generally shiny when smooth and clean, solid at room temperature, and good conductors of heat and electricity.

<table>
<thead>
<tr>
<th>Feedback</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Boron is a nonmetal and a poor conductor of electricity.</td>
</tr>
<tr>
<td>B</td>
<td>Nitrogen is a nonmetal and gas at room temperature.</td>
</tr>
<tr>
<td>C</td>
<td>Correct! d/ Carbon is a nonmetal and a dull-looking solid.</td>
</tr>
<tr>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

   PTS: 1  DIF: 1  REF: Page 155 | Page 156 | Page 158

   OBJ: 6.1.1 Trace the development and identify key features of the periodic table.
   NAT: G.3 | B.1 | UCP.1
   TOP: Trace the development and identify key features of the periodic table.
   KEY: Metals  MSC: 1

2. **ANS: A**
   Mendeleev noticed that when elements are ordered by their increasing atomic mass, there was a repetition, or periodic pattern, in their properties.

<table>
<thead>
<tr>
<th>Feedback</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Correct!</td>
</tr>
<tr>
<td>B</td>
<td>John Newlands discovered the law of octaves.</td>
</tr>
<tr>
<td>C</td>
<td>Henry Moseley discovered the modern periodic table.</td>
</tr>
<tr>
<td>D</td>
<td>Lothar Meyer discovered the connection between atomic mass and elemental properties.</td>
</tr>
</tbody>
</table>

   PTS: 1  DIF: 1  REF: Page 152

   OBJ: 6.1.1 Trace the development and identify key features of the periodic table.
   NAT: G.3 | B.1 | UCP.1
   TOP: Trace the development and identify key features of the periodic table.
   KEY: Periodic properties  MSC: 1

3. **ANS: C**  PTS: 1
4. **ANS: C**  PTS: 1
5. **ANS: D**  PTS: 1
6. **ANS: B**  PTS: 1
7. **ANS: A**  PTS: 1
8. **ANS: A**  PTS: 1
9. **ANS: D**  PTS: 1
10. **ANS: C**  PTS: 1
11. **ANS: A**  PTS: 1
12. **ANS: D**  PTS: 1
13. **ANS: C**  PTS: 1
14. **ANS: C**  PTS: 1
15. **ANS: A**  PTS: 1
16. ANS: D  PTS: 1
17. ANS: C  PTS: 1
18. ANS: B  PTS: 1
19. ANS: D  PTS: 1

MATCHING

20. ANS: B  PTS: 1
21. ANS: C  PTS: 1
22. ANS: D  PTS: 1
23. ANS: A  PTS: 1
24. ANS: E  PTS: 1
25. ANS: H  PTS: 1
26. ANS: F  PTS: 1
27. ANS: N  PTS: 1
28. ANS: A  PTS: 1
29. ANS: K  PTS: 1
30. ANS: D  PTS: 1
31. ANS: L  PTS: 1
32. ANS: O  PTS: 1
33. ANS: I  PTS: 1
34. ANS: G  PTS: 1
35. ANS: B  PTS: 1
36. ANS: M  PTS: 1
37. ANS: C  PTS: 1
38. ANS: J  PTS: 1
39. ANS: K  PTS: 1
40. ANS: L  PTS: 1
41. ANS: A  PTS: 1
42. ANS: B  PTS: 1
43. ANS: M  PTS: 1
44. ANS: E  PTS: 1
45. ANS: D  PTS: 1
46. ANS: H  PTS: 1
47. ANS: F  PTS: 1
48. ANS: G  PTS: 1
49. ANS: I  PTS: 1
50. ANS: C  PTS: 1
1. ANS: D  
Beryllium is an alkaline earth metal.

<table>
<thead>
<tr>
<th>Feedback</th>
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<tbody>
<tr>
<td>A</td>
<td>Sodium is an alkali metal.</td>
</tr>
<tr>
<td>B</td>
<td>Potassium is an alkali metal.</td>
</tr>
<tr>
<td>C</td>
<td>Iron is a transition element.</td>
</tr>
<tr>
<td>D</td>
<td>Correct!</td>
</tr>
</tbody>
</table>

PTS: 1  DIF: 1  REF: Page 183  
OBJ: 7.1.3 Describe and compare the properties of alkali metals and alkaline earth metals.  
NAT: B.2  TOP: Describe and compare the properties of alkali metals and alkaline earth metals.  
KEY: Alkaline earth metals  MSC: 1

2. ANS: D  
Group 3A consists of only reactive p-block elements.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Group 1A consists of reactive s-block alkali metal.</td>
</tr>
<tr>
<td>B</td>
<td>Group 8A consists of non-reactive elements.</td>
</tr>
<tr>
<td>C</td>
<td>Group 2A consists of reactive s-block alkaline earth metals.</td>
</tr>
<tr>
<td>D</td>
<td>Correct!</td>
</tr>
</tbody>
</table>

PTS: 1  DIF: 1  REF: Page 186  
OBJ: 7.2.1 Describe and compare properties of p-block elements.  
NAT: UCP.1 | B.2  TOP: Describe and compare properties of p-block elements.  
KEY: p-block elements  MSC: 2

3. ANS: B  
Diamond is the allotrope of carbon with a three-dimensional solid structure.

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<thead>
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<tbody>
<tr>
<td>A</td>
<td>Coal is the amorphous form of carbon.</td>
</tr>
<tr>
<td>B</td>
<td>Correct!</td>
</tr>
<tr>
<td>C</td>
<td>Graphite is an allotrope of carbon with flat-layered structure.</td>
</tr>
<tr>
<td>D</td>
<td>Granite is a substance that contains carbon.</td>
</tr>
</tbody>
</table>

PTS: 1  DIF: 1  REF: Page 188  
OBJ: 7.2.2 Define allotropes and provide examples.  
NAT: UCP.5  TOP: Define allotropes and provide examples.  
KEY: Allotropes  MSC: 1

4. ANS: D  
Trinitrotoluene is an extremely unstable nitrogen compound.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>A</td>
<td>Ammonia is a stable compound.</td>
</tr>
<tr>
<td>B</td>
<td>Nitric acid is a stable compound.</td>
</tr>
<tr>
<td>C</td>
<td>Nitrogen dioxide is a stable compound.</td>
</tr>
<tr>
<td>D</td>
<td>Correct!</td>
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</tbody>
</table>
5. The melting point decreases from left to right across a period.

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<td>C</td>
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6. Iron can form a permanent magnet.

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<td>A</td>
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<td>C</td>
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<td>D</td>
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</tbody>
</table>

7. | PTS: 1 DIF: 1 REF: Page 198 |
8. | ANS: B PTS: 1 |
9. | ANS: A PTS: 1 |
10. | ANS: B PTS: 1 |
11. | ANS: B PTS: 1 |
12. | ANS: A PTS: 1 |
13. | ANS: A PTS: 1 |
14. | ANS: C PTS: 1 |
15. | ANS: C PTS: 1 |
16. | ANS: C PTS: 1 |
17. | ANS: A PTS: 1 |
18. | ANS: C PTS: 1 |
19. | ANS: D PTS: 1 |
20. | ANS: C PTS: 1 |
21. | ANS: B PTS: 1 |
22. | ANS: A PTS: 1 |
23. ANS: B  PTS: 1
24. ANS: D  PTS: 1
25. ANS: B  PTS: 1
26. ANS: A  PTS: 1
27. ANS: C  PTS: 1

MATCHING

28. ANS: E  PTS: 1
29. ANS: C  PTS: 1
30. ANS: H  PTS: 1
31. ANS: D  PTS: 1
32. ANS: F  PTS: 1
33. ANS: G  PTS: 1
34. ANS: E  PTS: 1
35. ANS: A  PTS: 1
36. ANS: C  PTS: 1
37. ANS: I  PTS: 1
38. ANS: F  PTS: 1
39. ANS: A  PTS: 1
40. ANS: G  PTS: 1
41. ANS: D  PTS: 1
42. ANS: B  PTS: 1
43. ANS: E  PTS: 1
44. ANS: H  PTS: 1
45. ANS: C  PTS: 1

46. ANS: B  PTS: 1
47. ANS: A  PTS: 1
48. ANS: D  PTS: 1
49. ANS: C  PTS: 1
50. ANS: E  PTS: 1