

**TEST BANK: CHAP 5****Multiple Choice**

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

- \_\_\_\_\_ 1. The order of elements in the periodic table is based on
- the number of protons in the nucleus.
  - the electric charge of the nucleus.
  - the number of neutrons in the nucleus.
  - atomic mass.
- \_\_\_\_\_ 2. Semiconductors are elements that
- have large atomic masses but small atomic numbers.
  - do not form compounds.
  - can conduct heat and electricity under certain conditions.
  - are extremely hard.
- \_\_\_\_\_ 3. Carbon and other nonmetals are found in which area of the periodic table?
- on the left-most side
  - on the right side
  - in the middle column of the periodic table
  - in the bottom rows
- \_\_\_\_\_ 4. In Mendeleev's periodic table, elements in each column had similar
- atomic masses.
  - properties.
  - atomic numbers
  - symbols.
- \_\_\_\_\_ 5. Magnesium (Mg) is located to the right of sodium (Na) because Mg has
- fewer protons.
  - no neutrons.
  - no protons.
  - more protons.
- \_\_\_\_\_ 6. As you move from left to right across the periodic table, elements
- become less metallic.
  - have a lower atomic number.
  - have a lower atomic weight.
  - become more metallic.
- \_\_\_\_\_ 7. How was Mendeleev's periodic table arranged?
- by increasing atomic mass
  - by decreasing atomic mass
  - by increasing atomic number
  - by decreasing atomic number
- \_\_\_\_\_ 8. What is Mendeleev known for?
- creating today's atomic model
  - discovering protons
  - publishing the first periodic table
  - discovering Mendelevium
- \_\_\_\_\_ 9. When did Mendeleev create a new row in his periodic table?
- when the first atomic mass was doubled
  - when chemical properties were repeated
  - when there were 10 elements in the row
  - when the next element was a nonmetal

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- \_\_\_\_\_ 10. Each column of the periodic table is
- a. an element.
  - b. a group.
  - c. an isotope.
  - d. a period.
- \_\_\_\_\_ 11. The periodic law states that elements that have similar properties appear
- a. to the left of each other.
  - b. to the right of each other.
  - c. at every tenth element.
  - d. at regular intervals.
- \_\_\_\_\_ 12. Elements that belong to the same group have the same number of
- a. valence electrons.
  - b. neutral electrons.
  - c. inner electrons.
  - d. total electrons.
- \_\_\_\_\_ 13. Atoms that gain or lose electrons are called
- a. metals.
  - b. nonmetals.
  - c. ions.
  - d. isotopes.
- \_\_\_\_\_ 14. Elements that have one valence electron tend to
- a. be highly reactive.
  - b. form ions.
  - c. become charged.
  - d. All of the above
- \_\_\_\_\_ 15. Group 17 elements form
- a. anions.
  - b. cations.
  - c. metals.
  - d. semiconductors.
- \_\_\_\_\_ 16. The three main groups of elements are metals, nonmetals, and
- a. inert gases.
  - b. alkali metals.
  - c. radioactive isotopes.
  - d. semiconductors.
- \_\_\_\_\_ 17. Most elements are
- a. metals.
  - b. nonmetals.
  - c. metalloids.
  - d. semiconductors.
- \_\_\_\_\_ 18. Most nonmetals are
- a. brittle.
  - b. good conductors.
  - c. metalloids.
  - d. shiny.
- \_\_\_\_\_ 19. Each element in an element family shares the same
- a. average atomic mass.
  - b. number of protons.
  - c. number of valence electrons.
  - d. atomic number
- \_\_\_\_\_ 20. Elements in an element family have similar
- a. atomic symbols.
  - b. atomic sizes.
  - c. atomic weights.
  - d. chemical properties.
- \_\_\_\_\_ 21. How do you know that potassium, an alkali metal, is highly reactive?
- a. It conducts heat.
  - b. It conducts electricity.
  - c. It is a soft and shiny metal.
  - d. It has one valence electron.
- \_\_\_\_\_ 22. When can semiconductors conduct heat and electricity?
- a. under all conditions
  - b. under almost all conditions
  - c. under some conditions
  - d. under no conditions

- \_\_\_\_\_ 23. In his version of the periodic table, Mendeleev based his arrangement of the elements on an element's
- atomic number.
  - name.
  - chemical symbol.
  - atomic mass.
- \_\_\_\_\_ 24. The order of elements in the modern periodic table is based on an element's
- atomic number.
  - name.
  - chemical symbol.
  - atomic mass.
- \_\_\_\_\_ 25. Elements within the same group in the periodic table have similar properties because they have the same number of
- protons.
  - neutrons.
  - ions.
  - valence electrons.
- \_\_\_\_\_ 26. Ionization refers to the process of
- changing from one period to another.
  - losing or gaining protons.
  - turning lithium into fluorine.
  - losing or gaining electrons.
- \_\_\_\_\_ 27. Elements that share properties of both metals and nonmetals are called
- ions.
  - periods.
  - semiconductors.
  - valences.
- \_\_\_\_\_ 28. Elements in a family often have a similar
- appearance.
  - atomic mass.
  - number of total electrons.
  - number of total protons.
- \_\_\_\_\_ 29. Which statement about the alkali metals is correct?
- They are located in the left-most column of the periodic table.
  - They are extremely nonreactive.
  - They are usually gases.
  - They form negative ions with a 1- charge.
- \_\_\_\_\_ 30. Which statement about noble gases is correct?
- They form compounds with very bright colors.
  - They exist as single atoms rather than as molecules.
  - They are highly reactive with both metals and nonmetals.
  - They are extremely rare in nature.
- \_\_\_\_\_ 31. Group 18 noble gases are relatively inert because
- they readily form positive ions.
  - they can have either a positive or a negative charge.
  - their outermost energy level is missing one electron.
  - their *s* and *p* orbitals are filled.
- \_\_\_\_\_ 32. Which element is a semiconductor?
- carbon
  - silicon
  - sodium
  - uranium
- \_\_\_\_\_ 33. Mendeleev studied the properties of the elements and looked for
- electrons.
  - ions.
  - patterns.
  - protons.

- \_\_\_\_\_ 34. As one moves from left to right across a period in the modern periodic table, elements become
- smaller.
  - lighter.
  - less metallic.
  - more unlike each other.
- \_\_\_\_\_ 35. Elements that are found in the same group have the same number of
- protons.
  - neutrons.
  - valence electrons.
  - protons and neutrons.
- \_\_\_\_\_ 36. Which is not a family of the periodic table?
- alkaline-earth metals
  - anions
  - halogens
  - noble gases
- \_\_\_\_\_ 37. Alkali metals are extremely reactive because they
- have very small atomic masses.
  - are not solid at room temperature.
  - have one valence electron that is easily removed to form a positive ion.
  - have two valence electrons that form compounds with calcium and magnesium.
- \_\_\_\_\_ 38. Most halogens form compounds by
- gaining an electron to form a negative ion
  - losing an electron to form a positive ion.
  - losing protons.
  - joining with both calcium and carbon.
- \_\_\_\_\_ 39. Transition metals such as copper or tungsten form compounds by
- gaining electrons to form negative ions
  - losing electrons to form positive ions.
  - losing neutrons.
  - changing shape and color.
- \_\_\_\_\_ 40. Silicon, a semiconductor, is often found in
- air.
  - computers.
  - steel.
  - wood.

**Completion**

*Complete each statement.*

41. The order of elements in the periodic table is based on the number of \_\_\_\_\_ in the nucleus.
42. Because atoms of elements in the same group of the periodic table have the same number of \_\_\_\_\_, they have similar properties.
43. Neon is an inert gas because its outer \_\_\_\_\_ is full of electrons.
44. Group 17 halogens form compounds by gaining an electron to become \_\_\_\_\_.
45. One of the important ideas about Mendeleev's periodic table was that he predicted new \_\_\_\_\_.

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46. Elements that are usually shiny are \_\_\_\_\_.
47. The elements in a family in the periodic table have similar \_\_\_\_\_ and \_\_\_\_\_ properties.
48. Noble gases are nonreactive gaseous elements that are located in Group \_\_\_\_\_ in the periodic table.
49. Nonmetals are sometimes called \_\_\_\_\_ because they do not conduct heat or electricity well.
50. The metals are divided into three families, based on the number of \_\_\_\_\_ they have.

### Essay

51. What does it mean to say that some elements are reactive and form ions easily whereas others do not?
52. Explain how a chemist defines a metal, and explain the difference between metals and nonmetals.
53. Relate an element's chemical properties to the arrangement of electrons in its atoms. Give at least two examples.
54. Why might a jewelry designer prefer to work with a metal rather than a nonmetal? Explain your answer.
55. Explain why the periodic table is important to chemists.

**TEST BANK: CHAP 5**  
**Answer Section****MULTIPLE CHOICE**

- |                      |        |        |        |
|----------------------|--------|--------|--------|
| 1. ANS: A<br>OBJ: 2  | PTS: 1 | DIF: 1 | REF: 1 |
| 2. ANS: C<br>OBJ: 4  | PTS: 1 | DIF: 1 | REF: 3 |
| 3. ANS: B<br>OBJ: 3  | PTS: 1 | DIF: 1 | REF: 2 |
| 4. ANS: B<br>OBJ: 1  | PTS: 1 | DIF: 1 | REF: 1 |
| 5. ANS: D<br>OBJ: 2  | PTS: 1 | DIF: 1 | REF: 1 |
| 6. ANS: A<br>OBJ: 2  | PTS: 1 | DIF: 1 | REF: 1 |
| 7. ANS: A<br>OBJ: 1  | PTS: 1 | DIF: 1 | REF: 1 |
| 8. ANS: C<br>OBJ: 1  | PTS: 1 | DIF: 1 | REF: 1 |
| 9. ANS: B<br>OBJ: 1  | PTS: 1 | DIF: 1 | REF: 1 |
| 10. ANS: B<br>OBJ: 2 | PTS: 1 | DIF: 1 | REF: 1 |
| 11. ANS: D<br>OBJ: 2 | PTS: 1 | DIF: 1 | REF: 1 |
| 12. ANS: A<br>OBJ: 1 | PTS: 1 | DIF: 1 | REF: 2 |
| 13. ANS: C<br>OBJ: 2 | PTS: 1 | DIF: 1 | REF: 2 |
| 14. ANS: D<br>OBJ: 2 | PTS: 1 | DIF: 1 | REF: 2 |
| 15. ANS: A<br>OBJ: 2 | PTS: 1 | DIF: 1 | REF: 2 |
| 16. ANS: D<br>OBJ: 3 | PTS: 1 | DIF: 1 | REF: 2 |
| 17. ANS: A<br>OBJ: 3 | PTS: 1 | DIF: 1 | REF: 2 |
| 18. ANS: A<br>OBJ: 3 | PTS: 1 | DIF: 1 | REF: 2 |
| 19. ANS: C<br>OBJ: 1 | PTS: 1 | DIF: 1 | REF: 3 |
| 20. ANS: D<br>OBJ: 1 | PTS: 1 | DIF: 1 | REF: 3 |
| 21. ANS: D<br>OBJ: 2 | PTS: 1 | DIF: 1 | REF: 3 |

22.	ANS: C OBJ: 4	PTS: 1	DIF: 1	REF: 3
23.	ANS: D OBJ: 1	PTS: 1	DIF: 1	REF: 1
24.	ANS: A OBJ: 2	PTS: 1	DIF: 1	REF: 1
25.	ANS: D OBJ: 1	PTS: 1	DIF: 1	REF: 2
26.	ANS: D OBJ: 2	PTS: 1	DIF: 1	REF: 2
27.	ANS: C OBJ: 3	PTS: 1	DIF: 1	REF: 2
28.	ANS: A OBJ: 1	PTS: 1	DIF: 1	REF: 3
29.	ANS: A OBJ: 2	PTS: 1	DIF: 1	REF: 3
30.	ANS: B OBJ: 3	PTS: 1	DIF: 1	REF: 3
31.	ANS: D OBJ: 3	PTS: 1	DIF: 1	REF: 3
32.	ANS: B OBJ: 4	PTS: 1	DIF: 1	REF: 3
33.	ANS: C OBJ: 1	PTS: 1	DIF: 1	REF: 1
34.	ANS: C OBJ: 2	PTS: 1	DIF: 1	REF: 1
35.	ANS: C OBJ: 1	PTS: 1	DIF: 1	REF: 2
36.	ANS: B OBJ: 1	PTS: 1	DIF: 1	REF: 3
37.	ANS: C OBJ: 2	PTS: 1	DIF: 1	REF: 3
38.	ANS: A OBJ: 3	PTS: 1	DIF: 1	REF: 3
39.	ANS: B OBJ: 2	PTS: 1	DIF: 1	REF: 3
40.	ANS: B OBJ: 4	PTS: 1	DIF: 1	REF: 3

**COMPLETION**

41.	ANS: protons			
		PTS: 1	DIF: 1	REF: 1
				OBJ: 2
42.	ANS: valence electrons			
		PTS: 1	DIF: 1	REF: 2
				OBJ: 1

43. ANS: energy level  
PTS: 1 DIF: 1 REF: 3 OBJ: 3
44. ANS: negative ions  
PTS: 1 DIF: 1 REF: 3 OBJ: 3
45. ANS: elements  
PTS: 1 DIF: 1 REF: 1 OBJ: 1
46. ANS: metals  
PTS: 1 DIF: 1 REF: 2 OBJ: 3
47. ANS: physical; chemical  
PTS: 1 DIF: 2 REF: 3 OBJ: 1
48. ANS: 18  
PTS: 1 DIF: 1 REF: 3 OBJ: 3
49. ANS: insulators  
PTS: 1 DIF: 2 REF: 2 OBJ: 3
50. ANS: valence electrons  
PTS: 1 DIF: 1 REF: 3 OBJ: 1

**ESSAY**

51. ANS:  
Some elements are reactive because the outermost energy levels of their atoms are only partially filled. Therefore, these atoms can easily gain or lose electrons to form ions. The atoms of nonreactive elements have filled outermost energy levels.  
PTS: 1 DIF: 3 REF: 2 OBJ: 2
52. ANS:  
Metals are elements that exist usually as solids and can conduct heat and electricity. Nonmetals may exist as solids, liquids, or gases and do not conduct heat or electricity.  
PTS: 1 DIF: 3 REF: 3 OBJ: 2
53. ANS:  
Whether an atom's outermost energy level is full determines whether it is reactive or nonreactive. For example, alkali metals such as sodium, which have only one valence electron that can be easily removed, are highly reactive. Alkaline-earth metals, such as calcium and magnesium, which have two valence electrons, are still reactive but not as reactive as alkali metals.  
PTS: 1 DIF: 3 REF: 3 OBJ: 3



54. ANS:

Metals are easily shaped or formed (malleable) and easily drawn into wires (ductile). Nonmetals are not malleable or ductile. Metals are also shiny and nonmetals are not shiny.

PTS: 1

DIF: 2

REF: 2

OBJ: 3

55. ANS:

The periodic table is important to chemists because it organizes the elements by atomic number and by properties. In the periodic table, you can easily find elements with similar physical and chemical properties because they are in the same group, or perhaps in the same family.

PTS: 1

DIF: 2

REF: 1

OBJ: 2