

Chapter 4 Assessment - Elements & the Periodic Table

Multiple Choice

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

- _____ 1. In the periodic table, the most reactive metals are found
- in Groups 13 through 16 in the center.
 - in Group 1, the first column on the left.
 - in Period 1, the first row across the top.
 - in Periods 6 and 7 at the bottom.
- _____ 2. Radioactive isotopes called _____ can be used to detect some medical problems.
- gamma radiation
 - alpha particles
 - beta particles
 - tracers
- _____ 3. The elements in a column of the periodic table
- have similar properties.
 - are in the same period.
 - have very similar chemical symbols.
 - have the same atomic mass.
- _____ 4. Which particles in atoms have a negative electric charge?
- neutrons
 - nuclei
 - electrons
 - protons
- _____ 5. Which of the following scientists inferred that an atom's positive charge must be clustered in the nucleus?
- Niels Bohr
 - J.J. Thomson
 - John Dalton
 - Ernest Rutherford
- _____ 6. Which form of nuclear radiation consists of high-energy waves similar to X-rays?
- alpha particles
 - gamma rays
 - beta particles
 - isotopes
- _____ 7. Which of the following statements about transition metals is true?
- They are never found uncombined in nature.
 - They include familiar metals such as gold, silver, copper, and nickel.
 - They are the most reactive of all the types of metals.
 - They are so soft that they can be cut with an ordinary knife.
- _____ 8. How did chemists change Mendeleev's periodic table in the early 1900s?
- They used atomic mass instead of atomic number to organize the elements.
 - They included physical properties such as melting point and density.
 - They used atomic number instead of atomic mass to organize the elements.
 - They included chemical properties such as bonding power.

- _____ 9. Which group contains the most elements?
- transition elements
 - nonmetals
 - semimetals
 - metals
- _____ 10. The elements that do not ordinarily form compounds are
- inert gases.
 - metals.
 - halogens.
 - elements in the carbon family.
- _____ 11. A piece of paper will provide protection from
- beta radiation.
 - gamma rays.
 - gamma radiation.
 - alpha radiation.
- _____ 12. What information in the periodic table indicates the number of protons in an atom?
- the element's chemical symbol
 - the position of the element in its column
 - the element's atomic mass
 - the element's atomic number
- _____ 13. The reason radioactive isotopes can be followed through the steps of a chemical reaction or industrial process is that they
- are stable.
 - do not decay.
 - give off radiation.
 - do not react chemically as nonradioactive isotopes do.
- _____ 14. A material is said to be ductile if it
- can transfer heat or electricity to another material.
 - can be hammered or rolled into flat sheets and other shapes.
 - can be pulled out, or drawn, into a long wire.
 - is a mixture of a metal with at least one other element.
- _____ 15. Most metals are NOT
- ductile.
 - malleable.
 - liquid at room temperature.
 - good conductors of heat and electricity.
- _____ 16. The most useful property of semimetals is their
- varying ability to conduct electric current.
 - softness and malleability.
 - tendency to be unreactive.
 - ability to be pulled out into long wires.
- _____ 17. Which group of elements shares characteristics with both metals and nonmetals?
- halogens
 - lanthanides
 - salts
 - semimetals

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- _____ 18. During radioactive decay, atomic nuclei of unstable isotopes
- form chemical bonds.
 - give off nuclear radiation.
 - are unchanged.
 - are broken down by radioactive bacteria.
- _____ 19. In general, which of the following statements about metals is true?
- Metals show a wide range of chemical properties.
 - Metals are highly reactive substances.
 - Metals need to be stored in sealed containers for safety.
 - Metals do not react with oxygen.
- _____ 20. In 1896, the French scientist Henri Becquerel discovered
- a process to turn natural rubber into a hard, stretchable polymer.
 - light-emitting polymers.
 - radioactive decay.
 - how to make alloys.
- _____ 21. In an atom, the number of protons equals the number of
- neutrons.
 - nuclei.
 - isotopes.
 - electrons.
- _____ 22. Mendeleev created the first periodic table by arranging elements in order of
- increasing atomic mass.
 - decreasing atomic mass.
 - increasing melting points and densities.
 - increasing atomic number.
- _____ 23. Fluorine, chlorine, bromine, and iodine are part of a family called
- alkali metals.
 - semimetals.
 - halogens.
 - inert gases.

Use the diagram to answer each question.

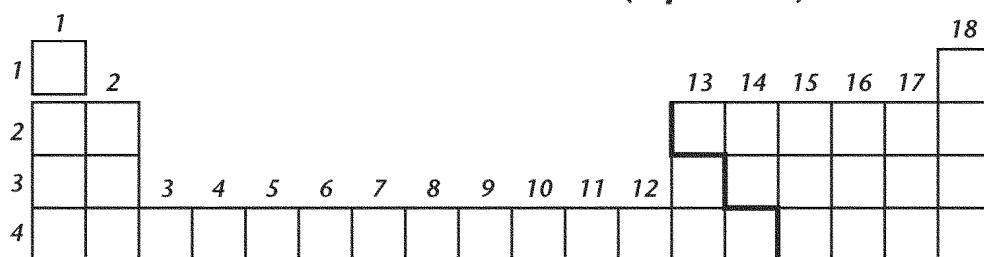
Atoms of Some Common Elements

Element	Atomic Number	Atomic Mass (Mass Number)	Protons	Neutrons	Electrons
Sodium	11	?	11	12	?
Magnesium	12	24	12	?	12
Aluminum	?	27	13	14	13
Phosphorus	15	31	?	16	15

- How many neutrons are in an atom of magnesium?
- What is the atomic number (mass number) of sodium?
- What is the total number of electrons in an atom of sodium?
- What is the atomic number of aluminum?
- How many protons are in an atom of phosphorus?

Use the diagram to answer each question.

Periodic Table of the Elements (Top Section)



- Which group of elements reacts violently with elements from Group 1?
- If a metal reacts violently with water, in which group is it likely to be found?
- Most of the elements that form a zigzag line in the periodic table belong to one major group. What is that group, and what kinds of properties do its elements tend to have?
- What name is given to the elements in Groups 3 through 12? How do their properties tend to compare with the elements to the left and right of these groups?
- Locate the box in Group 18 in the fourth period. Predict the state of matter and the chemical reactivity of the element that belongs in that box.

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Answer Section

MULTIPLE CHOICE

1. B
2. D
3. A
4. C
5. D
6. B
7. B
8. C
9. D
10. A
11. D
12. D
13. C
14. C
15. C
16. A
17. D
18. B
19. A
20. C
21. D
22. A
23. C

SHORT ANSWER

24. 12
25. 23
26. 11
27. 13
28. 15
29. Group 17
30. Group 1
31. Semimetals. Semimetals have some properties of metals and some properties of nonmetals.
32. Transition metals. They are less reactive than the metals in Groups 1 and 2 to their left; they tend to be more reactive than the metals to their right.
33. The element is a gas, one of the inert gases. It does not ordinarily react with other elements to form compounds.