

2.3 Molecules

Molecules of Elements A molecule of an element consists of only one type of an atom. Molecules of elements can be classified as monoatomic, diatomic and polyatomic.

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Examples: He, Ne, Ar, Kr, Xe and Rn are monoatomic molecules

2. Diatomic molecules are molecules that contain two atoms of the element.

Examples: O₂, H₂, F₂, Cl₂, I₂ are diatomic molecules.

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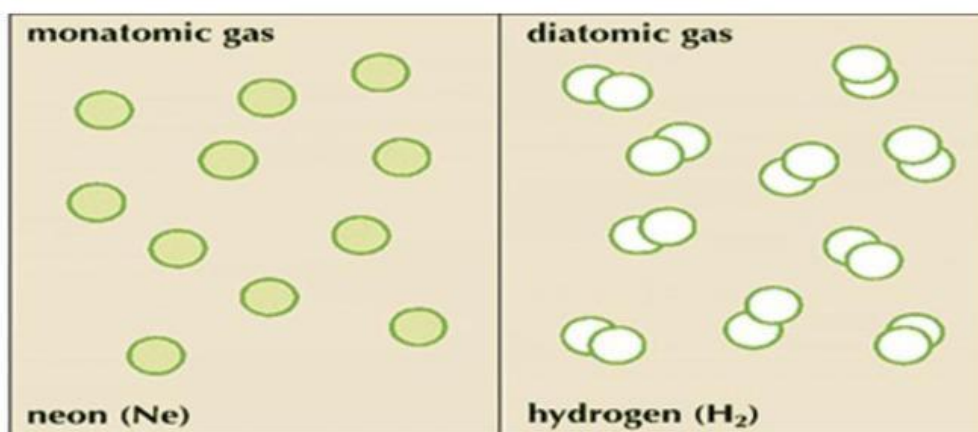


Figure 2.2 Diagrammatical representations of Ne and H₂.

3. **Polyatomic molecules** are molecules that contain more than three atoms of the element.

Examples: O₃, P₄, S₈ are polyatomic molecules.

Molecules of compounds:

A molecule of a compound always contains two or more atoms of different elements combined chemically. Water (H_2O), ammonia (NH_3), carbon dioxide (CO_2), etc. are some examples of molecules of compounds.

Choose the correct answer for the following questions

1. What is a molecule?

- a) A single atom
- b) A group of atoms bonded together
- c) A type of cell
- d) A small particle with no atoms

2. Which of the following is a molecule?

- a) Oxygen (O_2)
- b) Gold (Au)
- c) Hydrogen ion (H^+)
- d) Neutron

3. The smallest unit of a substance that retains its chemical properties is called a:

- a) Atom
- b) Molecule
- c) Compound
- d) Ion

4. Which of the following is a molecule of an element?

- a) H_2O
- b) NaCl
- c) O_2
- d) CO_2

5. Which of the following is a compound?

- a) O_3
- b) H_2O
- c) N_2
- d) Cl_2

6. The molecule O_3 (ozone) is classified as:

- a) Diatomic molecule
- b) Triatomic molecule
- c) Polyatomic molecule
- d) Ionic compound

7. Which of the following is an example of a polyatomic molecule of an element?

- a) H_2
- b) O_2
- c) P_4
- d) CO_2

8. The correct statement about compounds is:

- a) They are mixtures of two or more substances
- b) They can be separated by physical methods
- c) They consist of two or more different elements chemically combined in fixed proportions
- d) They retain the properties of their constituent elements

9. Which one of the following is NOT a diatomic molecule?

- a) H_2
- b) N_2
- c) Cl_2
- d) CO_2

10. Water (H_2O) is classified as:

- a) Molecule of element
- b) Diatomic molecule
- c) Compound
- d) Polyatomic molecule of element

11. Which of the following is a molecular compound?

- a) $NaCl$
- b) $CaCO_3$
- c) CO_2
- d) KCl

12. The substance made of sulfur atoms joined together as S_8 is an example of:
- a) Diatomic molecule
 - b) Triatomic molecule
 - c) Polyatomic molecule of an element
 - d) Compound
13. What holds atoms together in a molecule?
- a) Gravity
 - b) Magnetic force
 - c) Chemical bonds
 - d) Electric current
14. Which of these is a compound molecule?
- a) H_2
 - b) O_2
 - c) CO_2
 - d) N_2
15. What is the smallest part of a compound that still retains its properties?
- a) Atom
 - b) Electron
 - c) Nucleus
 - d) Molecule
16. Water is made of which atoms?
- a) One hydrogen and one oxygen
 - b) Two oxygen and one hydrogen
 - c) Two hydrogen and one oxygen
 - d) Three oxygen
17. Which of the following is not a molecule?
- a) H_2O
 - b) CO_2
 - c) $NaCl$
 - d) O_3
18. What is the molecular formula of carbon dioxide?
- a) CO
 - b) C_2O
 - c) CO_2
 - d) C_2O_2

19. How are molecules different from atoms?

- a) Molecules are smaller than atoms
- b) Molecules are single particles with no charge
- c) Molecules are made of two or more atoms
- d) Molecules are made of only one type of atom

20. Which of the following is a molecular element?

- a) CO_2
- b) H_2
- c) NaCl
- d) CH_4

21. What best defines a molecular compound?

- a) A compound made of metal atoms
- b) A compound formed from ions
- c) A compound made of nonmetal atoms bonded covalently
- d) A mixture of different molecules

22. Which of the following is a molecular compound?

- a) O_2
- b) N_2
- c) HCl
- d) NaOH

23. Which statement is true about molecular elements?

- a) They are always made of different kinds of atoms
- b) They are usually metals

- c) They are made of the same type of atom bonded together
- d) They do not form bonds

24. What is the main difference between a molecular element and a molecular compound?

- a) A molecular element contains different types of atoms, while a molecular compound contains the same type.
- b) A molecular element is made of only one type of atom, while a molecular compound is made of different types of atoms.
- c) A molecular element always contains metals, while a molecular compound does not.
- d) A molecular element is always a solid, while a molecular compound is always a gas.

25. Which of the following is a diatomic molecular element?

- a) He
- b) H₂
- c) C
- d) CO₂

26. Which group of elements typically forms diatomic molecules?

- a) Noble gases
- b) Alkali metals
- c) Halogens
- d) Transition metals

27. Which of the following is not a diatomic molecular element?

- a) N₂
- b) O₂
- c) S₈
- d) F₂

28. Which molecular element is polyatomic?

a) O_2

b) N_2

c) S_8

d) H_2

29. Which of the following correctly matches the type of molecular element with an example?

a) Monoatomic – O_2

b) Diatomic – Cl_2

c) Polyatomic – He

d) Diatomic – S_8

30. The properties of a compound will be:

(a) The same as the properties of the elements that make it up.

(b) Different from the properties of the elements that make it up.

(c) A combination of the properties of the elements that make it up.

(d) More reactive than the elements that make it up.