

## 2.3 Molecules

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1. Monoatomic molecules are molecules that contain one atom of the element.

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

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

Examples: O<sub>2</sub>, H<sub>2</sub>, F<sub>2</sub>, Cl<sub>2</sub>, I<sub>2</sub> are diatomic molecules.

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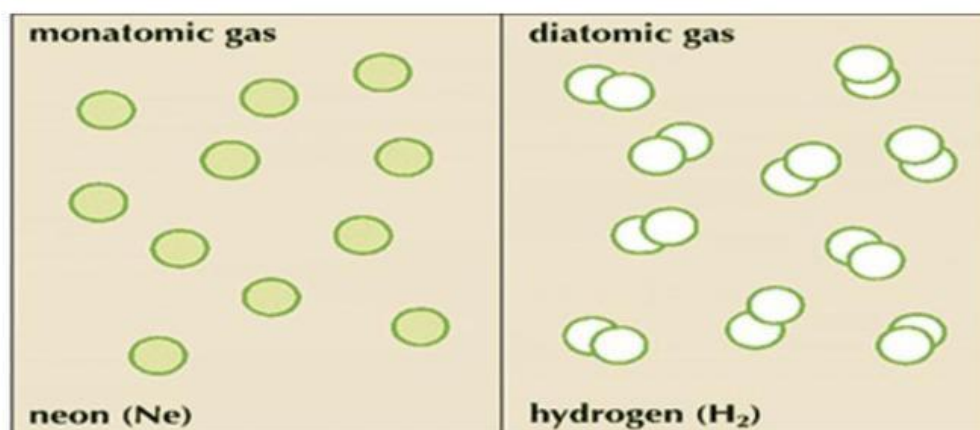


Figure 2.2 Diagrammatical representations of Ne and H<sub>2</sub>.

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

Examples: O<sub>3</sub>, P<sub>4</sub>, S<sub>8</sub> are polyatomic molecules.

## **Molecules of compounds:**

A molecule of a compound always contains two or more atoms of different elements combined chemically. Water ( $\text{H}_2\text{O}$ ), ammonia ( $\text{NH}_3$ ), carbon dioxide ( $\text{CO}_2$ ), 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 ( $\text{O}_2$ )
- b) Gold ( $\text{Au}$ )
- c) Hydrogen ion ( $\text{H}^+$ )
- 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)  $\text{H}_2\text{O}$
- b)  $\text{NaCl}$
- c)  $\text{O}_2$
- d)  $\text{CO}_2$

#### **5. Which of the following is a compound?**

- a)  $\text{O}_3$
- b)  $\text{H}_2\text{O}$
- c)  $\text{N}_2$
- d)  $\text{Cl}_2$

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)  $\text{CO}_2$
- b)  $\text{H}_2$
- c)  $\text{NaCl}$
- d)  $\text{CH}_4$

**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)  $\text{O}_2$
- b)  $\text{N}_2$
- c)  $\text{HCl}$
- d)  $\text{NaOH}$

**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) H<sub>2</sub>
- c) C
- d) CO<sub>2</sub>

**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) N<sub>2</sub>
- b) O<sub>2</sub>
- c) S<sub>8</sub>
- d) F<sub>2</sub>

**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.