

Chemistry

Chapter 1: Basic concepts of chemistry

1. What is the SI unit of mass?

- A) Gram (g)
- B) Kilogram (kg)
- C) Pound (lb)
- D) Ounce (oz)

Answer: B) Kilogram (kg)

2. Which of the following is an example of a chemical change?

- A) Melting of ice
- B) Cutting of paper
- C) Rusting of iron
- D) Boiling of water

Answer: C) Rusting of iron

3. What is Avogadro's number?

- A) 6.022×10^{23}
- B) 3.14×10^{33}
- C) 9.81×10^{29}
- D) 1.67×10^{-24}

Answer: A) 6.022×10^{23}

4. Which of the following elements has the highest electronegativity?

- A) Oxygen (O)
- B) Hydrogen (H)
- C) Fluorine (F)
- D) Carbon (C)

Answer: C) Fluorine (F)

5. What is the chemical formula for water?

- A) CO_2
- B) H_2O
- C) O_2
- D) HCl

Answer: B) H_2O

6. Which of the following is a homogeneous mixture?

- A) Sand and water

- B) Oil and water
 - C) Salt and water
 - D) Iron filings and sulfur
- Answer: C) Salt and water

7. What is the molar mass of carbon dioxide (CO_2)?

- A) 16 g/mol
 - B) 28 g/mol
 - C) 32 g/mol
 - D) 44 g/mol
- Answer: D) 44 g/mol

8. Which of the following is not a state of matter?

- A) Solid
 - B) Liquid
 - C) Gas
 - D) Plasma
- Answer: D) Plasma

9. Which law states that mass is conserved in a chemical reaction?

- A) Law of Definite Proportions
 - B) Law of Conservation of Mass
 - C) Law of Multiple Proportions
 - D) Law of Constant Composition
- Answer: B) Law of Conservation of Mass

10. What is the empirical formula of a compound with 40% carbon, 6.67% hydrogen, and 53.33% oxygen by mass?

- A) $\text{CH}_3 \text{O}$
 - B) $\text{CH}_2 \text{O}$
 - C) $\text{C}_2 \text{H}_4 \text{O}_2$
 - D) CH_4
- Answer: B) $\text{CH}_2 \text{O}$

Chapter 2: Structure of Atom

1. Who proposed the plum pudding model of the atom?

- A) Niels Bohr
- B) J.J. Thomson
- C) Ernest Rutherford
- D) John Dalton

Answer: B) J.J. Thomson

2. What is the charge of a neutron?

- A) Positive
- B) Negative
- C) Neutral
- D) Depends on the isotope

Answer: C) Neutral

3. Which experiment led to the discovery of the nucleus?

- A) Cathode Ray Experiment
- B) Gold Foil Experiment
- C) Oil Drop Experiment
- D) Photoelectric Effect

Answer: B) Gold Foil Experiment

4. What is the maximum number of electrons that can occupy a p-orbital?

- A) 2
- B) 6
- C) 10
- D) 14

Answer: B) 6

5. Who developed the quantum mechanical model of the atom?

- A) Werner Heisenberg
- B) Niels Bohr
- C) Erwin Schrödinger
- D) J.J. Thomson

Answer: C) Erwin Schrödinger

6. What is the principal quantum number primarily associated with?

- A) Shape of the orbital
- B) Energy level of the electron
- C) Spin of the electron
- D) Magnetic orientation

Answer: B) Energy level of the electron

7. In Bohr's model, which property of electrons is quantized?

- A) Mass
- B) Charge
- C) Angular momentum
- D) Magnetic moment

Answer: C) Angular momentum

8. Which particle was discovered first in the atomic model?

- A) Electron
- B) Proton
- C) Neutron
- D) Positron

Answer: A) Electron

9. What is the number of protons in an atom called?

- A) Atomic mass
- B) Isotope number
- C) Atomic number
- D) Mass number

Answer: C) Atomic number

10. How many subshells are there in the 3rd energy level?

- A) 2
- B) 3
- C) 4
- D) 5

Answer: B) 3

Chapter 3: Classification of elements and periodicity

1. Who is credited with creating the modern periodic table?

- A) Dmitri Mendeleev
- B) Henry Moseley
- C) Antoine Lavoisier
- D) J.J. Thomson

Answer: A) Dmitri Mendeleev

2. What is the basis of classification in the modern periodic table?

- A) Atomic mass
- B) Atomic radius
- C) Atomic number
- D) Density

Answer: C) Atomic number

3. Which group of the periodic table contains the noble gases?

- A) Group 1
- B) Group 2
- C) Group 17
- D) Group 18

Answer: D) Group 18

4. Elements in the same group of the periodic table generally have similar...

- A) Atomic numbers
- B) Chemical properties
- C) Isotopes
- D) Mass numbers

Answer: B) Chemical properties

5. What term describes the horizontal rows of the periodic table?

- A) Groups
- B) Periods
- C) Clusters
- D) Series

Answer: B) Periods

6. The alkali metals are found in which group of the periodic table?

- A) Group 1
- B) Group 2
- C) Group 3
- D) Group 17

Answer: A) Group 1

7. What characteristic is common to all elements in Group 17 (halogens)?

- A) They have one valence electron
- B) They have seven valence electrons
- C) They are metals
- D) They are noble gases

Answer: B) They have seven valence electrons

8. Which of the following elements is a transition metal?

- A) Sodium
- B) Magnesium
- C) Iron
- D) Oxygen

Answer: C) Iron

9. What is the general trend for atomic radius as you move down a group in the periodic table?

- A) It decreases
- B) It increases
- C) It remains the same
- D) It varies unpredictably

Answer: B) It increases

10. Which of the following elements is located in Period 3 and Group 16?

- A) Oxygen
- B) Sulfur
- C) Chlorine
- D) Phosphorus

Answer: B) Sulfur

Chapter 4: Chemical Bonding and Molecular Structure

1. Which of the following bonds is the strongest?

- A) Ionic bond
- B) Covalent bond
- C) Hydrogen bond
- D) Van der Waals forces

Answer: A) Ionic bond

2. What is the geometry of a molecule with sp^2 hybridization?

- A) Linear
- B) Trigonal planar
- C) Tetrahedral
- D) Bent

Answer: B) Trigonal planar

3. The bond angle in methane (CH_4) is:

- A) 109.5°
- B) 90°
- C) 120°
- D) 180°

Answer: A) 109.5°

4. Which of the following molecules exhibits resonance?

- A) CH_4
- B) O_3
- C) NH_3
- D) H_2O

Answer: B) O_3

5. Which molecule has the highest dipole moment?

- A) CO_2
- B) H_2O
- C) BF_3
- D) CH_4

Answer: B) H_2O

6. What type of bond exists in the oxygen molecule (O_2)?

- A) Single bond
- B) Double bond
- C) Triple bond

D) Ionic bond

Answer: B) Double bond

7. Which of the following molecules is non-polar?

A) H_2O

B) NH_3

C) CO_2

D) HCl

Answer: C) CO_2

8. In the VSEPR theory, the shape of the SF_6 molecule is:

A) Octahedral

B) Trigonal bipyramidal

C) Tetrahedral

D) Linear

Answer: A) Octahedral

9. The bond order of nitrogen molecule (N_2) is:

A) 1

B) 2

C) 3

D) 4

Answer: C) 3

10. Which of the following compounds is likely to form hydrogen bonds?

A) CH_4

B) NH_3

C) CCl_4

D) CO_2

Answer: B) NH_3

Chapter 5: States of Matter

1. Which of the following is not a characteristic of a gas?

- A) Indefinite shape
- B) Indefinite volume
- C) High density
- D) Compressibility

Answer: C) High density

2. What happens to the particles in a liquid when it is heated?

- A) They slow down
- B) They move farther apart
- C) They stop moving
- D) They become denser

Answer: B) They move farther apart

3. Which of the following processes changes a liquid into a gas?

- A) Condensation
- B) Sublimation
- C) Vaporization
- D) Freezing

Answer: C) Vaporization

4. At what temperature does water typically boil at sea level?

- A) 0°C
- B) 50°C
- C) 100°C
- D) 150°C

Answer: C) 100°C

5. Which state of matter has a definite shape and volume?

- A) Solid
- B) Liquid
- C) Gas
- D) Plasma

Answer: A) Solid

6. What is the process called when a solid changes directly into a gas without passing through the liquid state?

- A) Melting
- B) Evaporation

C) Sublimation

D) Deposition

Answer: C) Sublimation

7. Which of the following statements best describes a liquid?

A) Particles are tightly packed and vibrate in place

B) Particles move freely and have no definite shape or volume

C) Particles are close but can move past one another and have a definite volume

D) Particles are far apart and fill the entire space available

Answer: C) Particles are close but can move past one another and have a definite volume

8. Which phase change occurs when a gas turns into a liquid?

A) Freezing

B) Boiling

C) Condensation

D) Melting

Answer: C) Condensation

9. What happens during the process of melting?

A) A liquid turns into a gas

B) A solid turns into a liquid

C) A gas turns into a liquid

D) A liquid turns into a solid

Answer: B) A solid turns into a liquid

10. Which state of matter is characterized by ionized particles and is found in stars?

A) Solid

B) Liquid

C) Gas

D) Plasma

Answer: D) Plasma