

Advanced Chemistry Fundamentals

Chemistry · Answer Key · 10 Questions

1. Which law states that the total entropy of an isolated system can never decrease over time?

- A) The Zeroth Law of Thermodynamics
- B) The First Law of Thermodynamics
- C) The Second Law of Thermodynamics**
- D) The Third Law of Thermodynamics

2. What is the primary characteristic of a covalent bond?

- A) The transfer of electrons between atoms
- B) The sharing of electron pairs between atoms**
- C) The electrostatic attraction between ions
- D) The delocalization of electrons in a lattice

3. Which hybrid orbitals are involved in the bonding of a carbon atom in a triple bond, such as in acetylene?

- A) sp**
- B) sp²
- C) sp³
- D) dsp²

4. According to the Arrhenius equation, what happens to the reaction rate constant as temperature increases?

- A) It remains constant
- B) It decreases exponentially
- C) It increases exponentially**
- D) It increases linearly

5. Which element has the highest electronegativity value on the Pauling scale?

- A) Oxygen
- B) Fluorine**
- C) Chlorine
- D) Nitrogen

6. What is the formal charge of the oxygen atom in a water molecule (H₂O)?

- A) -2
- B) -1
- C) 0**
- D) +1

7. In an electrochemical cell, which electrode is the site of oxidation?

- A) The anode**
- B) The cathode
- C) The salt bridge
- D) The electrolyte

8. Which type of reaction involves the exchange of ions between two compounds to form two new compounds?

- A) Synthesis reaction
- B) Decomposition reaction
- C) Single replacement reaction

D) Double replacement reaction

9. What is the geometry of a molecule with a central atom surrounded by four bonding pairs and no lone pairs?

- A) Linear
- B) Trigonal planar

C) Tetrahedral

D) Octahedral

10. Which principle states that it is impossible to simultaneously know the exact position and momentum of a particle?

A) Pauli Exclusion Principle

B) Heisenberg Uncertainty Principle

C) Hund's Rule

D) Aufbau Principle