

Advanced High School Chemistry Challenge

Chemistry · Answer Key · 10 Questions

1. Which element has the highest first ionization energy in the periodic table?

- A) Helium**
- B) Fluorine
- C) Neon
- D) Hydrogen

2. What is the formal name of the process by which a solid transitions directly into a gas without passing through the liquid phase?

- A) Deposition
- B) Condensation
- C) Sublimation**
- D) Evaporation

3. In a voltaic cell, which electrode is defined as the site where reduction occurs?

- A) Anode
- B) Cathode**
- C) Salt bridge
- D) Electrolyte

4. Which scientist is credited with proposing the Law of Octaves, noting that elements exhibit repeating properties every eighth element?

- A) Dmitri Mendeleev
- B) John Newlands**
- C) Henry Moseley
- D) Lothar Meyer

5. What is the molecular geometry of a molecule with a central atom bonded to four other atoms with no lone pairs, such as methane (CH₄)?

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

6. According to the Arrhenius definition, what is produced when an acid dissociates in an aqueous solution?

- A) Hydroxide ions
- B) Hydrogen ions**
- C) Chloride ions
- D) Ammonium ions

7. What is the standard unit used to describe the enthalpy of a chemical reaction?

A) Joules per mole

B) Newtons per square meter

C) Watts

D) Kelvin

8. Which quantum number describes the shape of the orbital in which an electron resides?

A) Principal

B) Magnetic

C) Spin

D) Azimuthal

9. What is the maximum number of electrons that can be held in a 'd' subshell?

A) 2

B) 6

C) 10

D) 14

10. Which law states that the total pressure of a mixture of non-reacting gases is equal to the sum of the partial pressures of the individual gases?

A) Boyle's Law

B) Dalton's Law

C) Charles's Law

D) Avogadro's Law