

Chemistry and Electromagnetism Fundamentals

Physical Sciences · Answer Key · 15 Questions

1. What does Boyle's Law state regarding the volume of an enclosed gas at a constant temperature?

- A) Directly proportional to pressure
- B) Inversely proportional to pressure**
- C) Independent of pressure
- D) Equal to the pressure

2. What are the conditions for Standard Temperature and Pressure (STP)?

- A) 25°C and 101.3 kPa
- B) 0°C and 101.3 kPa**
- C) 273°C and 101.3 kPa
- D) 0°C and 1 kPa

3. According to Faraday's Law, the induced EMF is directly proportional to what?

- A) The resistance of the coil
- B) The rate of change of magnetic flux**
- C) The speed of the magnet
- D) The number of turns

4. Which rule is used to determine the direction of the magnetic field around a straight current-carrying wire?

- A) Left-hand rule
- B) Right-hand thumb rule**
- C) Lenz's Law
- D) Fleming's rule

5. What does Lenz's Law state about the direction of an induced current?

- A) It flows to increase the magnetic flux
- B) It flows to oppose the change in magnetic flux**
- C) It is always clockwise
- D) It is independent of flux changes

6. In Collision Theory, what is the minimum energy required for a chemical reaction to occur?

- A) Internal energy
- B) Enthalpy
- C) Activation energy**
- D) Kinetic energy

7. What is the effect of a catalyst on a chemical reaction?

- A) It increases activation energy
- B) It decreases activation energy**
- C) It is consumed in the reaction
- D) It changes the products

8. What is the enthalpy change formula for a reaction?

- A) $H = H_{\text{reactants}} - H_{\text{products}}$
- B) $H = H_{\text{products}} + H_{\text{reactants}}$
- C) $H = H_{\text{products}} - H_{\text{reactants}}$**
- D) $H = H_{\text{reactants}} / H_{\text{products}}$

9. What is the molar volume of an ideal gas at STP?

- A) 22.4 dm³/mol**
- B) 24 dm³/mol
- C) 10 dm³/mol
- D) 1 mol/dm³

10. Which of the following is true for an exothermic reaction?

- A) Energy is absorbed from surroundings
- B) Energy is released to surroundings**
- C) Temperature decreases
- D) No energy change occurs

11. How is percentage purity calculated?

- A) $(\text{Mass of pure substance} / \text{Mass of sample}) \times 100$**
- B) $(\text{Mass of sample} / \text{Mass of pure substance}) \times 100$
- C) $(\text{Mass of impurities} / \text{Mass of sample}) \times 100$
- D) $(\text{Mass of pure substance} \times \text{Mass of sample}) / 100$

12. What happens to the magnetic field when current passes through a conductor?

- A) It is destroyed
- B) It is induced around the conductor**
- C) It remains static
- D) It becomes gravitational

13. What is the unit of magnetic flux?

- A) Tesla
- B) Weber**
- C) Ampere
- D) Volt

14. Particles in an ideal gas are assumed to have what type of collisions?

- A) Inelastic
- B) Elastic**
- C) Permanent
- D) Slow

15. Which factor does NOT increase the rate of a chemical reaction?

- A) Increasing temperature
- B) Adding a catalyst
- C) Increasing activation energy**
- D) Increasing concentration