2027

Worksheet 4: Cathode Rays and Canal Rays

Multiple Choice Questions (MCQs)

1. **Who discovered canal rays?**
   A) Rutherford
   B) J.J. Thomson
   C) Eugen Goldstein
   D) R.A. Millikan
   E) Bohr

2. **Which experiment provided evidence that electrons have mass?**
   A) Maltese cross
   B) Gold foil test
   C) Paddle wheel experiment
   D) Oil drop experiment
   E) Photoelectric effect

3. **Who conducted the oil drop experiment to determine the charge of an electron?**
   A) Thomson
   B) Rutherford
   C) Goldstein
   D) Millikan
   E) Planck

4. **What evidence shows that electrons exhibit wave properties?**
   A) They carry charge
   B) They rotate a paddle wheel
   C) They deflect in magnetic fields
   D) They cast sharp shadows on a Maltese cross
   E) They emit X-rays

5. **Which of the following is NOT a characteristic of X-rays?**
   A) They are electromagnetic waves
   B) They have no charge
   C) They can pass through soft tissue
   D) They are deflected by electric fields
   E) They travel in straight lines

6. **Who first observed positive rays (canal rays)?**
   A) Rutherford
   B) Goldstein
   C) Millikan
   D) Bohr
   E) Chadwick

7. **Positive rays are also known as:**
   A) Alpha particles
   B) Beta rays
   C) Gamma rays
   D) Canal rays
   E) Cathode rays

8. **What most likely to happen when high velocity electrons collide with H_2 molecules?**
   A) Only electrons are produced
   B) H_2 splits into H^+ and e^-
   C) Neutrons are emitted
   D) Protons are absorbed
   E) Gamma radiation is released

9. **According to Thomson's plum pudding model, electrons are:**
   A) Orbiting the nucleus
   B) Scattered evenly in positively charged mass
   C) Found in specific energy levels
   D) Moving randomly in the nucleus
   E) Held together by strong nuclear forces

10. **Why did Rutherford's experiment fail the plum pudding model?**
    A) Most alpha particles passed through the foil
    B) Electrons have no mass
    C) Protons were not yet discovered
    D) X-rays interfered with the experiment
    E) Oil drops did not align

Short Answer Questions

1. Explain the wave-particle duality of an electron with one example each.

2. Describe the generation of positive rays in a discharge tube containing He.

3. What are the main differences between cathode rays and canal rays? (List 3 of them)