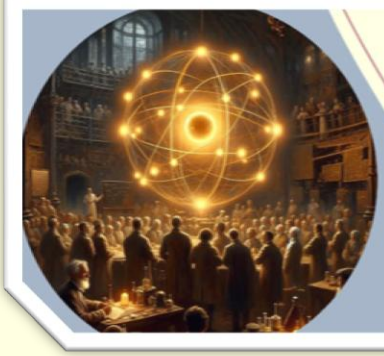


THE NUCLEAR ATOM

RUTHERFORD DISCOVERS THE NUCLEUS

Answer all the questions below then check your answers.

1. What did J.J. Thomson discover?

   A. Neutron

   B. Proton

   C. Electron

   D. Photon

2. Which model of the atom did J.J. Thomson propose?

   A. Nuclear Model

   B. Planetary Model

   C. Plum Pudding Model

   D. Quantum Mechanical Model

3. What was the primary conclusion of Rutherford's gold foil experiment?

   A. Atoms are solid spheres.

   B. Electrons are embedded in a positive sphere.

   C. The atom is mostly empty space with a small, dense nucleus.

   D. Electrons orbit the nucleus in fixed paths.

4. What did Bohr propose about the arrangement of electrons?

A. Electrons move randomly around the nucleus.

B. Electrons are embedded in a positive sphere.

C. Electrons orbit the nucleus in fixed energy levels.

D. Electrons are spread throughout the atom.

5. Fill in the gaps to complete the questions below:

a. J.J. Thomson proposed that the atom is a sphere of positive charge with _____ embedded in it.

b. Rutherford's gold foil experiment showed that most alpha particles passed through the foil, indicating that the atom is mostly _____.

c. Bohr's model of the atom introduced the idea that electrons orbit the nucleus in fixed _____ levels.

d. In the Plum Pudding Model, the positive charge is spread out over the entire _____.

6. Match the scientist with their contribution:

scientist
J.J. Thomson
Ernest Rutherford
Niels Bohr

contribution
Electrons in fixed orbits
Nucleus in the centre of the atom
Plum Pudding Model

7. Describe the Plum Pudding Model of the atom.

8. Explain the main findings of Rutherford's gold foil experiment.

9. How did Bohr's model improve upon Rutherford's model?

10. Explain why Thomson's model was eventually replaced by Rutherford's model.

11. What particles did Rutherford use in his gold foil experiment?

12. What was the source of the alpha particles in Rutherford's experiment?

13. What observation from Rutherford's experiment led to the discovery of the nucleus?

14. Describe one major conclusion Rutherford made from his gold foil experiment.

15. What were the key observations and conclusions of Rutherford's gold foil experiment?

Answers

1. What did J.J. Thomson discover?

   A. Neutron

   B. Proton

   C. Electron

   D. Photon

   Answer: C. Electron

2. Which model of the atom did J.J. Thomson propose?

   A. Nuclear Model

   B. Planetary Model

   C. Plum Pudding Model

   D. Quantum Mechanical Model

   Answer: C. Plum Pudding Model

3. What was the primary conclusion of Rutherford's gold foil experiment?

   A. Atoms are solid spheres.

   B. Electrons are embedded in a positive sphere.

   C. The atom is mostly empty space with a small, dense nucleus.

   D. Electrons orbit the nucleus in fixed paths.

   Answer: C. The atom is mostly empty space with a small, dense nucleus.

4. What did Bohr propose about the arrangement of electrons?

A. Electrons move randomly around the nucleus.

B. Electrons are embedded in a positive sphere.

C. Electrons orbit the nucleus in fixed energy levels.

D. Electrons are spread throughout the atom.

Answer: C. Electrons orbit the nucleus in fixed energy levels.

5. Fill in the gaps to complete the questions below:

a. J.J. Thomson proposed that the atom is a sphere of positive charge with _____ embedded in it.

Answer: electrons

b. Rutherford's gold foil experiment showed that most alpha particles passed through the foil, indicating that the atom is mostly _____.

Answer: empty space

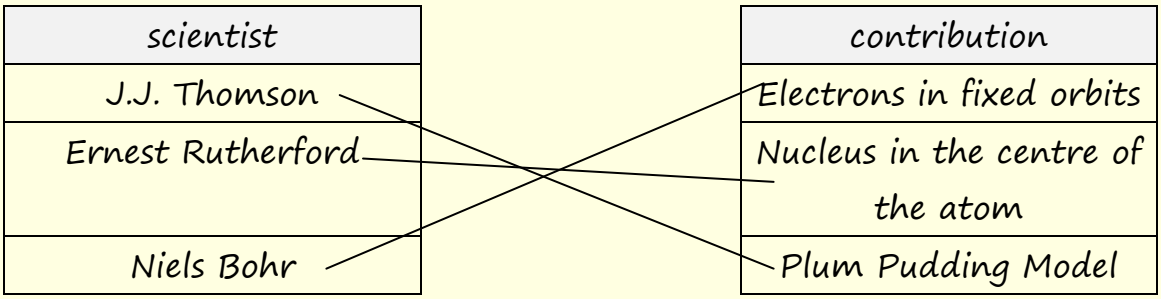
c. Bohr's model of the atom introduced the idea that electrons orbit the nucleus in fixed _____ levels.

Answer: energy

d. In the Plum Pudding Model, the positive charge is spread out over the entire _____.

Answer: atom

6. Match the scientist with their contribution:



7. Describe the Plum Pudding Model of the atom.

Answer: The Plum Pudding Model proposed by J.J. Thomson suggested that the atom is a sphere of positive charge with negatively charged electrons scattered throughout it, similar to plums in a pudding.

8. Explain the main findings of Rutherford's gold foil experiment.

Answer: Rutherford's gold foil experiment revealed that most alpha particles passed through the gold foil without deflection, while a few were deflected at large angles. This led to the conclusion that the atom is mostly empty space with a small, dense, positively charged nucleus at the centre.

9. How did Bohr's model improve upon Rutherford's model?

Answer: Bohr's model improved upon Rutherford's model by introducing the concept of electrons orbiting the nucleus in fixed energy levels or shells, which explained the stability of the atom and the emission spectra of elements.

10. Explain why Thomson's model was eventually replaced by Rutherford's model.

Answer: Thomson's model was replaced because it could not explain the deflection of alpha particles observed in Rutherford's gold foil experiment, which

indicated the presence of a small, dense, positively charged nucleus at the centre of the atom.

11. What particles did Rutherford use in his gold foil experiment?

    Answer: Alpha particles.

12. What was the source of the alpha particles in Rutherford's experiment?

    Answer: A radioactive source such as radium metal.

13. What observation from Rutherford's experiment led to the discovery of the nucleus?

    Most alpha particles passed through the foil, but some were deflected at large angles, indicating a dense, positively charged center.

14. Describe one major conclusion Rutherford made from his gold foil experiment.

    Answer: Rutherford concluded that the atom consists of a small, dense, positively charged nucleus surrounded by electrons, and most of the atom's volume is empty space.

15. What were the key observations and conclusions of Rutherford's gold foil experiment?

    Answer - Observations: - Most alpha particles passed straight through the gold foil. - Some alpha particles were deflected at small angles. - A few alpha particles were deflected back toward the source. –

    Conclusions: - The atom is mostly empty space. - The nucleus is small, dense, and positively charged. - Electrons orbit the nucleus at a distance.