

The Maths And Science Tutor

GCSE Physics Exam Questions - Atomic Structure

Date: 30 November 2024

GCSE Physics - Atomic Structure Examination

Answer all questions in the spaces provided. Total marks: 50

1. Calculate the number of neutrons in an atom of carbon-14 given that it has an atomic number of 6.

[2 marks]

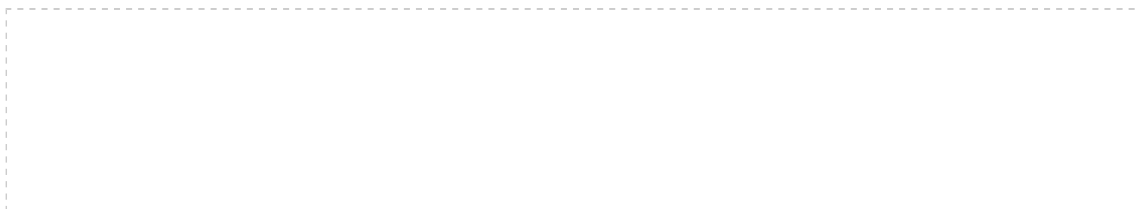
2. Describe why the plum pudding model of the atom was replaced by the nuclear model.

[3 marks]

3. Explain what happens when an electron:

a) absorbs electromagnetic radiation

b) moves to a lower energy level



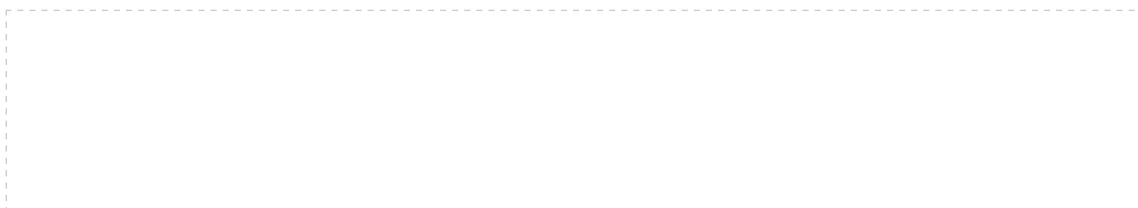
[4 marks]

4. An atom has 47 protons, 61 neutrons, and 45 electrons. State:

a) its atomic number

b) its mass number

c) its ionic charge



[3 marks]

5. Explain in detail how the alpha particle scattering experiment provided evidence for the nuclear model of the atom. Include in your answer:

- The key observations
- What these observations suggested about atomic structure
- Why the results could not be explained by the plum pudding model

[6 marks]

6. A sample of chlorine has an atomic mass of 35.5. Explain what this suggests about the isotopic composition of chlorine.

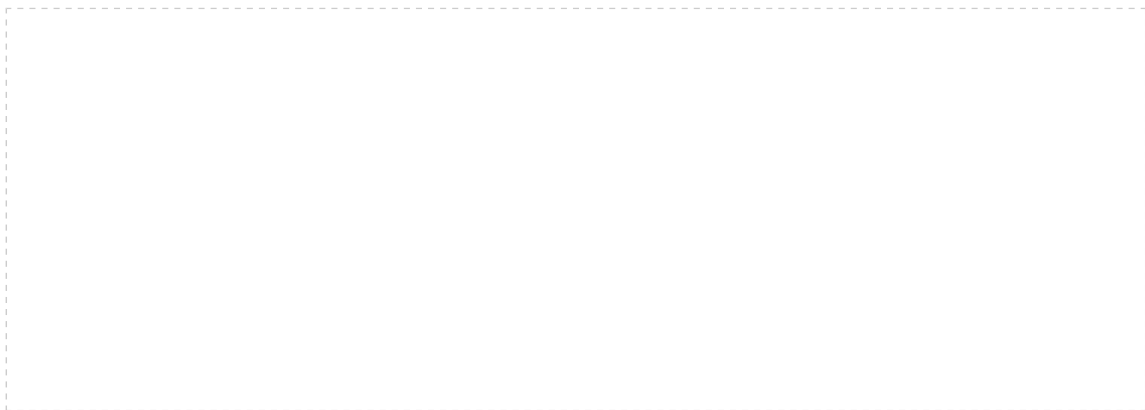
[3 marks]

7. Complete the table below for a neutral atom of sodium:

| Particle | Number | Relative Charge |
|-----------|--------|-----------------|
| Protons | | |
| Neutrons | | |
| Electrons | | |

[3 marks]

8. Describe and explain how the model of atomic structure has developed over time from the plum pudding model to the Bohr model. Include the experimental evidence that led to changes in the model.



[6 marks]

9. Explain why the mass of an electron is considered negligible when calculating the mass number of an atom.

[2 marks]

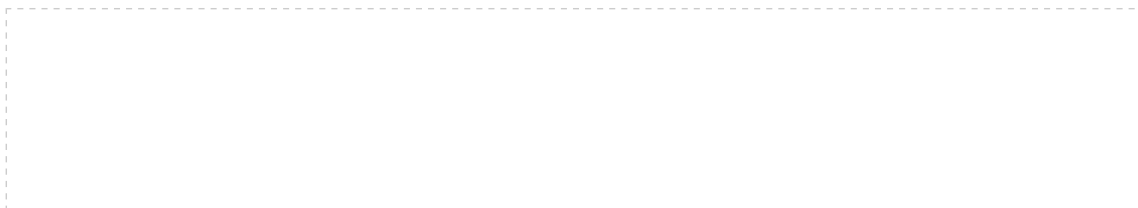
10. An atom forms an ion with a 2+ charge. Explain what this means in terms of subatomic particles.

[3 marks]

11. Calculate the number of protons, neutrons, and electrons in an ion of Fe^{3+} with mass number 56.

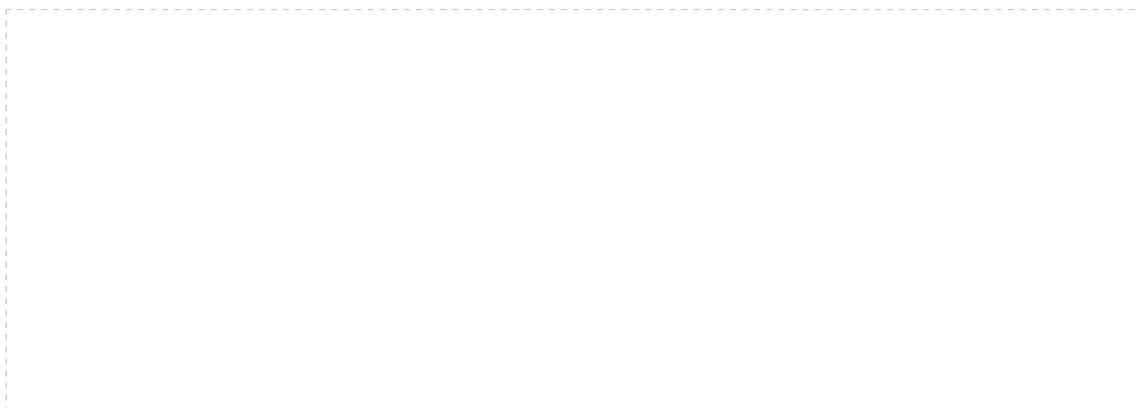
[3 marks]

12. Explain why different isotopes of the same element have the same chemical properties but different physical properties.



[4 marks]

13. Describe and explain the evidence that shows electrons exist in discrete energy levels rather than being able to have any amount of energy.



[6 marks]

14. Beryllium has two naturally occurring isotopes: beryllium-9 and beryllium-10. The relative atomic mass of beryllium is 9.012. Calculate the percentage abundance of each isotope.

[4 marks]

15. Describe how scientists working together and sharing results led to the development of the current model of atomic structure. Include specific examples in your answer.

[3 marks]

End of Examination
