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VCE Chemistry ½
Models of Atoms [1.1]
Test

20 Marks. 1 Minute Reading. 15 Minutes Writing.

Results:

Test Questions	_____ / 15
Extension	_____ / 5

Section A: Test Questions (15 Marks)

INSTRUCTION: 15 Marks. 1 Minute Reading. 12 Minutes Writing.

Question 1 (3 marks)

Tick whether the following statements are **true** or **false**.

	True	False
a. In $^{37}_{17}$Cl, there are 17 protons and 17 neutrons.		
b. Bohr's model is different from the earlier model proposed by Rutherford, as it said that electrons can only revolve around the nucleus in circular orbits of fixed radii.		
c. In Bohr's model, electrons can occupy any energy level in the atom.		
d. Schrödinger's model predicts the same discrete energy levels for hydrogen as Bohr's model.		
e. Copper's electron configuration is $[Ar]4s^2 3d^9$.		
f. All elements in the same group have identical valence electron configurations.		

Space for Personal Notes

Question 2 (8 marks)

a. Identify the three sub-atomic particles found in an atom and explain where each of them resides. (2 marks)

_____

_____

_____

b. How was the Bohr model different from the earlier model of the atom proposed by Rutherford? (1 mark)

A. Atoms contain a positive nucleus at the centre of the atom.

B. Atoms are mostly empty spaces.

C. Electrons revolve around the nucleus in circular orbits.

D. Electrons can only revolve around the nucleus in circular orbits of fixed radii.

c. Write the Bohr electron configuration for each of the following:

i. Silicon (Si). (1 mark)

_____

ii. Calcium (Ca). (1 mark)

_____

iii. Cobalt (Co). (1 mark)

_____

d. Draw the shell diagrams for each of the following:

i. Chlorine. (1 mark)

ii. Chromium. (1 mark)

Question 3 (3 marks)

Schrodinger's electron configuration is an alternative method of depicting how electrons are arranged within an atom.

a. Write the ground state electron configuration of a potassium atom. (1 mark)

_____

b. Write the electron configuration of Co^{3+}. (1 mark)

_____

c. Write the condensed electron configuration of chromium. (1 mark)

_____

d. Identify the element that has an electron configuration of $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$ in the ground state. (1 mark)

_____

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Section B: Extension (5 Marks)

INSTRUCTION: 5 Marks. 3 Minutes Writing.

Question 4 (5 marks)

Chromium and copper have atypical electron configurations.

a. Write the electron configuration for both elements and explain why their configurations deviate. (3 marks)

b. Predict whether the configuration of gold (Au) will be [Xe] $6s^2 4f^{14} 5d^9$ or [Xe] $6s^1 4f^{14} 5d^{10}$, and justify your answer. (2 marks)

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