

90933



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Level 1 Chemistry 2020

90933 Demonstrate understanding of aspects of selected elements

9.30 a.m. Friday 4 December 2020
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of aspects of selected elements.	Demonstrate in-depth understanding of aspects of selected elements.	Demonstrate comprehensive understanding of aspects of selected elements.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

A periodic table and other reference material are provided in the Resource Booklet L1–CHEMR.

If you need more room for any answer, use the extra space provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–11 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

TOTAL

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(b) Nitrogen is a non-metal.

(i) Give the electron arrangement of nitrogen and its ion.

Electron arrangement of nitrogen atom: _____

Electron arrangement of nitrogen ion, N^{3-} : _____

(ii) How does the formation of non-metal ions differ from the formation of metal ions?

In your answer, you should:

- use nitrogen and an element from group II or III to illustrate your answer
- refer to the positions of non-metals and metals on the periodic table.

(iii) Nitrogen is often used in the food industry. It has a melting point of $-210.0\text{ }^{\circ}\text{C}$ and a boiling point of $-195.8\text{ }^{\circ}\text{C}$.

Describe the appearance of nitrogen at room temperature ($25\text{ }^{\circ}\text{C}$).

Colour: _____

State: _____

(iv) Give one use of nitrogen in the food industry, and link the use to the relevant properties of nitrogen.

QUESTION THREE

Several metal elements are involved in the manufacture of a mobile phone.

(a) Mobile phone glass is made by replacing the sodium ions in standard glass with potassium ions, resulting in much stronger glass.

(i) Write the electron arrangements for sodium ions and potassium ions.

sodium ion: _____

potassium ion: _____

(ii) What is the relationship between the charges of sodium and potassium ions, and the position of their atoms on the periodic table?

(iii) Sodium and potassium metals are not used for metal components such as wiring and casings in phones.

Why are they not suitable for these uses?

In your answer, you should refer to your knowledge of the chemical properties of sodium and potassium metals.

(b) Table A below shows the purpose of some of the metals and alloys used in mobile phones.

Table A

Metal/metal alloy	Use in mobile phone
copper	wiring
lead	component of solder (tin and lead) for joining other metal parts
aluminium	battery casing
magnesium alloy	phone casing

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