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90172

NZQA
NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 1 Chemistry, 2008

90172 Describe atomic structure and bonding

Credits: Three
9.30 am Friday 28 November 2008

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 answer ALL the questions in this booklet.

A periodic table is provided in the Resource Booklet L1–CHEMR.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–7 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.

For Assessor's use only	**Achievement Criteria**	
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Describe atomic structure and bonding. ☐	Link principles of atomic structure, bonding and selected properties. ☐	Discuss selected properties in terms of atomic structure and bonding. ☐
Overall Level of Performance ☐		

You are advised to spend 30 minutes answering the questions in this booklet.

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QUESTION ONE: ELECTRON ARRANGEMENTS

Explain why the electron arrangements for the oxygen atom and the aluminium atom are different, but the electron arrangements for the oxide ion and the aluminium ion are the same.
Give the electron arrangements in your answer.

QUESTION TWO: ISOTOPES

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Two isotopes of hydrogen are hydrogen-2, ^{2}H, and hydrogen-3, ^{3}H.

(a) Describe the atomic structure of these two isotopes.

(b) Use this information to explain ONE physical similarity or difference, **and** ONE chemical similarity or difference, of these two isotopes.

QUESTION THREE: LEWIS STRUCTURES

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Draw the Lewis structures for the following:

CH_3F	PCl_3
OCl_2	$COCl_2$ (C is the central atom)

QUESTION FOUR: STATES OF MATTER

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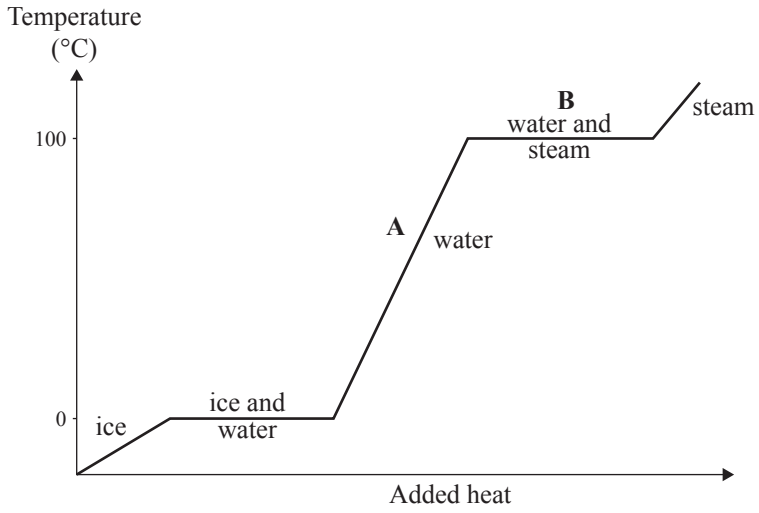
This graph shows the change in temperature (°C) that occurs as heat energy is added to water.

The 'heat curve' for water



(a) Describe the type of particle found in water **and** the attractive forces that occur between these particles.

(b) Discuss, for parts **A** and **B** labelled on the graph above, how particle separation, energy, particle motion and attractive forces between the particles change as water is heated.

QUESTION FIVE: BONDING

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Ammonia, NH_3, and sodium chloride, NaCl, are compounds. Discuss which of these substances is more likely to have the higher melting point.

Your answer should include:

- which compound has the higher melting point
- the type of particle found in each compound
- the attractive forces found in each compound
- the strength of those attractive forces.

Extra paper for continuation of answers if required.
Clearly number the question.

Assessor's use only

Question number