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90172

NZQA
NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 1 Chemistry, 2007

90172 Describe atomic structure and bonding

Credits: Three
9.30 am Monday 19 November 2007

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 metal activity series, solubility rules, a table of ions and a periodic table are provided in 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

Complete the following table.

Symbol	Number of Protons	Number of Neutrons	Number of Electrons	Atomic Number	Mass Number
Mg	12	12	12		
Li		3		3	6
Li			3	3	7
N^{3-}	7	7		7	
		20	18	20	40

QUESTION TWO

Use the Periodic Table provided to answer the following questions on sulfur.

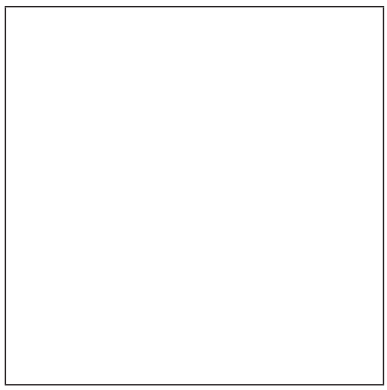
(a) (i) Write the chemical symbol for the sulfur atom. _____

(ii) Write the electron arrangement for the sulfur atom. _____

(iii) Write the chemical symbol for the sulfide ion. _____

(iv) Write the electron arrangement for the sulfide ion. _____

(b) (i) Draw the Lewis structure for the sulfur atom.



(ii) Draw the Lewis structure for hydrogen sulfide, H_2S.

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(c) Discuss the electrical conductivity of sulfur and sodium sulfide as solids and as liquids (when heated to molten).
You should include in your answer information on the types of particles in each substance, and the attractive forces between them.

QUESTION THREE

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Draw the Lewis structures for the molecules given in the box below.

(a) Silicon hydride, SiH_4	(b) Tetrachloromethane, CCl_4
(c) Ammonia, NH_3	(d) Carbon dioxide, CO_2

QUESTION FOUR

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Nitrogen and phosphorus can both form ions with a charge of –3. Nitrogen forms the nitride ion, N^{3-}, and phosphorus forms the phosphide ion, P^{3-}.

Explain why both of these elements form ions with the same charge of –3.

QUESTION FIVE

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Fluorine, F_2, is a gas and bromine, Br_2, is a liquid at room temperature.

Discuss the different states of these elements at room temperature.

You should include in your answer information on particle separation, energy, particle motion and the attractive forces between the particles.

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

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Question number	