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NZQA

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MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 2 Chemistry, 2007

90308 Describe the nature of structure and bonding in different substances

Credits: Four
2.00 pm 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.

A Periodic Table is provided on the RESOURCE SHEET in your Level 2 Chemistry package.

You should answer ALL the questions in this booklet.

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 2–8 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 the bonding in simple molecules and the nature of types of solids. ☐	Link selected properties of simple molecules and different types of solids to their structure. ☐	Discuss properties of substances in terms of structure and bonding. ☐
Overall Level of Performance ☐		

You are advised to spend 45 minutes answering the questions in this booklet.

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QUESTION ONE

(a) Complete the table below by:

(i) drawing the Lewis structure (electron dot diagram) for each molecule
(ii) naming the shape of the molecule.

Molecule	(i) Lewis diagram	(ii) Name of shape
CH_3Cl		
NCl_3		
CH_2O		

(b) For each of the molecules in the table, explain why it has the shape you have identified.

(i) CH_3Cl

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(ii) NCl_3

(iii) CH_2O

QUESTION TWO

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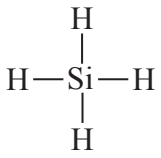
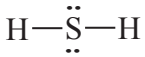
The Lewis structures of two molecules are shown below.

SiH_4	H_2S
	

For each of the molecules, **circle** the correct answer to state whether the molecule is **polar** or **non-polar**, and discuss the reasons for your choice.

(a) SiH_4

polar **non-polar**

(b) H_2S

polar **non-polar**

QUESTION THREE

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(a) Identify the type of particle and describe the bonding (attractive forces between the particles) for each of the solids in the table below.

	Solid	Type of solid	Type of particle	Description of bonding
(i)	Silver (Ag)	metallic		
(ii)	Sulfur (S_8)	molecular		
(iii)	Silicon dioxide (SiO_2)	covalent network		

(b) Silicon dioxide (SiO_2) has a melting point of 1700ºC and sulfur (S_8) has a melting point of 113ºC.

Explain the difference in the melting points of these two substances in terms of structure and bonding.

QUESTION FOUR

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Discuss the following properties of lithium chloride (LiCl), with reference to the **particles in the solid** and **forces between the particles**.

- Solid will not conduct electricity.
- Melting point of solid is 610ºC.
- Solid dissolves in water but not in cyclohexane.

QUESTION FIVE

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Use your knowledge of structure and bonding to discuss the following physical properties of diamond and graphite.

- Hardness
- Electrical conductivity
- Melting point

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

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Question number

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