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90648

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Level 1 Chemistry, 2005

90648 Describe properties and reactions of carbon and its compounds

Credits: Three
9.30 am Wednesday 23 November 2005

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.

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

A metal activity series, solubility rules, a table of ions and a periodic table are provided in the Resource Booklet in your Level 1 Chemistry package.

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 properties and reactions of carbon and its compounds.	Link properties and reactions of carbon and its compounds.	Apply an understanding of properties and reactions of carbon and its compounds.
Overall Level of Performance		

You are advised to spend 35 minutes answering the questions in this booklet.

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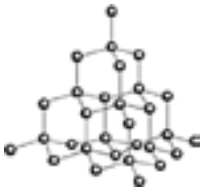
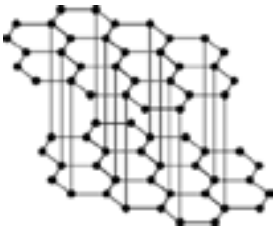
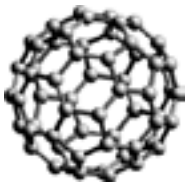
QUESTION ONE: ALLOTROPES OF CARBON

The element carbon exists in three common forms known as allotropes. Some of the properties of these allotropes are outlined in the table below.

Use the information in the table to answer the questions that follow.

PROPERTY	ALLOTROPE		
	A	B	C
Structure			
Melting point	> 3550°C	3367°C (sublimation)	400 – 500°C (sublimes)

(a) Name EACH of the allotropes of carbon shown above.

A: _____

B: _____

C: _____

(b) (i) In what **state** would each of the above three substances be at room temperature?

_____

(ii) Explain why allotrope B is able to be used as a lubricant. Refer to the structure shown in the table above.

_____

_____

_____

_____

_____

QUESTION TWO: ETHENE AND POLYETHENE

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Ethene is a useful chemical. It is used to make many useful products such as polymers.

(a) What is a polymer?

(b) Draw a short section of the polymer chain, polyethene. Show SIX carbon atoms in the chain.

(c) Explain how ethene molecules join together to form polyethene. Include in your answer the **conditions** required for this reaction to occur.

QUESTION THREE: CARBON DIOXIDE

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When the lid of a soft-drink bottle is removed, a gas escapes. When this gas is tested with a piece of damp blue litmus paper, the litmus paper turns red.

Discuss why the gas escapes from the bottle **and** why it turns the litmus paper red. Include an appropriate equation in your discussion.

QUESTION FOUR: ORGANIC COMPOUNDS

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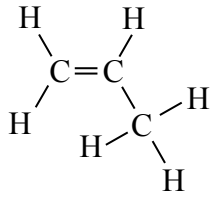
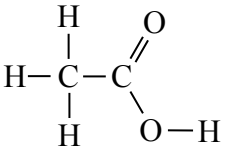
(a) Complete the following table, naming or drawing the structural formulae of the compounds as required.

Structure	Name
1.	Methanol
2. 	
3. 	
4.	Pentane

(b) Name TWO organic compounds in the table above that are **insoluble** in water.

(1) _____ (2) _____

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(c) In Brazil and Canada, ethanol is added to the fuel motorists put into their cars.

(i) Write a balanced equation for the complete combustion of ethanol.

(ii) If insufficient oxygen is available in a car engine, incomplete combustion can occur.

Describe incomplete combustion and **discuss** its impact on human health.

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

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Question number	