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NZQA
NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 1 Chemistry, 2009

90648 Describe properties and reactions of carbon and its compounds

Credits: Three
2.00 pm Friday 27 November 2009

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.

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.

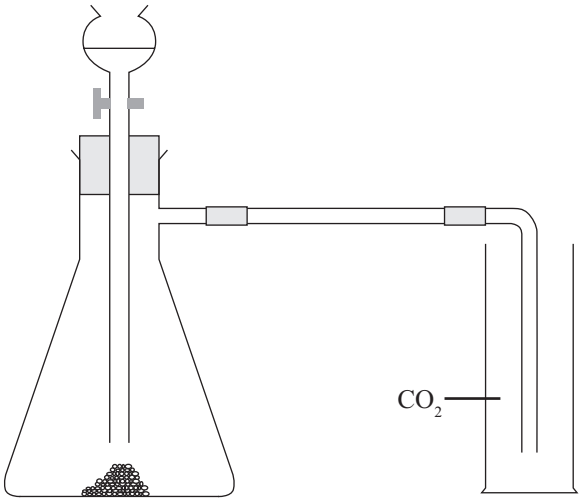
For Assessor's use only	**Achievement Criteria**	
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Describe properties and reactions of carbon and its compounds. ☐	Link properties and reactions of carbon and its compounds. ☐	Apply an understanding of properties and reactions of carbon and its compounds. ☐
Overall Level of Performance ☐		

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

Assessor's use only

QUESTION ONE: CARBON DIOXIDE

A reaction using magnesium carbonate solid and hydrochloric acid was carried out to produce carbon dioxide gas.



The gas in the jar was tested with damp litmus paper and then poured into a test tube containing a chemical solution used to test for the presence of CO_2.

Discuss the chemistry of this reaction.

Include in your answer:

- the observations that would be made for the reaction between magnesium carbonate and hydrochloric acid
- a balanced equation for the reaction between magnesium carbonate and hydrochloric acid
- the expected observations of the two tests on the carbon dioxide gas
- an explanation of the observations in terms of the physical and chemical properties of carbon dioxide.

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The balanced chemical equation is:

QUESTION TWO: ORGANIC COMPOUNDS

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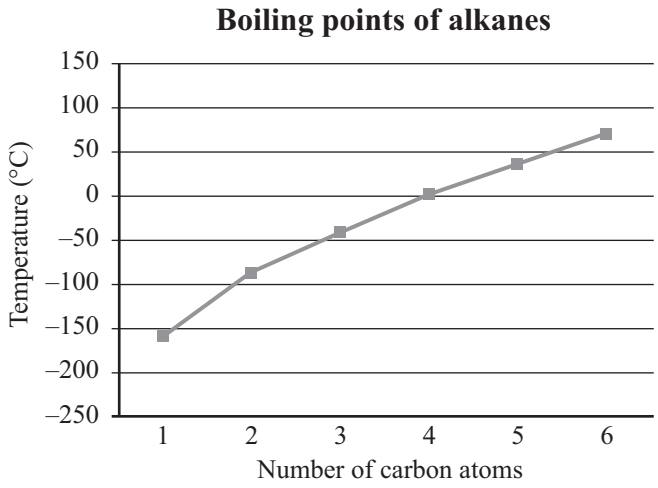
(a) The graph below shows the trend of boiling points for the first six alkanes.



Describe the trend shown in the graph of the boiling points for the first six alkanes and **explain** why this trend occurs.

(b) Name the alkanes with 1, 3 and 5 carbon atoms and draw their structural formulae.

Name:	Name:	Name:

QUESTION THREE: FUELS

Assessor's use only

Pentane and ethanol are two colourless organic liquids that can be used as fuels.

Discuss the similarities and differences for the combustion of both fuels.

Include in your answer:

- the observations made when each fuel is burned
- balanced chemical equations for the **complete** combustion of **each** fuel
- the impact of combustion on the environment for each fuel.

The balanced equations are:

QUESTION FOUR: CARBON ALLOTROPES

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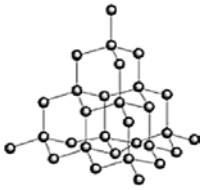
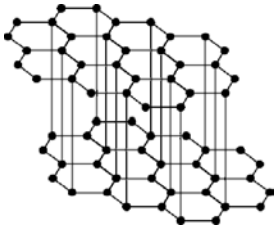
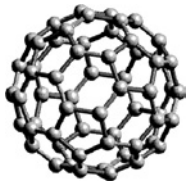
The structures of three allotropes of carbon are shown below.



Diamond



Graphite



Buckminsterfullerene (C_{60})

(a) Complete this table:

Allotrope	Melting point	Electrical conductivity
Diamond	High	Poor
Graphite		
Buckminsterfullerene (C_{60})		Poor

(b) Discuss the similarities and differences in the melting points and electrical conductivities of each allotrope.

In your answer you should include:

- a description of what the term allotrope means
- the structure and bonding of each allotrope.

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

Assessor's use only

Question number