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NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 3 Chemistry, 2008

90698 Describe aspects of organic chemistry

Credits: Five
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 on the Resource Sheet L3–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 2–8 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.

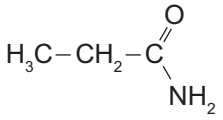
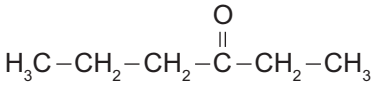
For Assessor's use only	**Achievement Criteria**		
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Describe aspects of organic chemistry. ☐	Explain and apply aspects of organic chemistry. ☐	Discuss aspects of organic chemistry. ☐
Overall Level of Performance ☐		

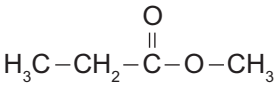
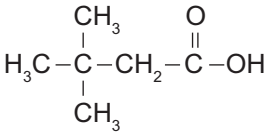
You are advised to spend 45 minutes answering the questions in this booklet.

Assessor's use only

QUESTION ONE

(a) Give the systematic IUPAC names for the following molecules.

(i)	(ii)
	
Name	Name

(iii)	(iv)
	
Name	Name

(b) Draw the structural formula of each of the organic compounds below.

(i)	(ii)
Name 3-aminopentane	Name ethanoyl chloride

(iii)	(iv)
Name 2-chloropropan-1-ol	Name 2-methylbutanal

QUESTION TWO

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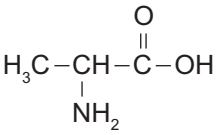
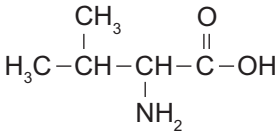
Amino acids are the building blocks that make up proteins. Alanine and valine are amino acids which can combine to form dipeptides.



alanine



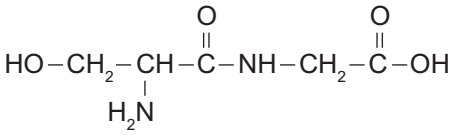
valine

(a) Draw the structure of a possible dipeptide formed from the combination of alanine and valine.

(b) Complete the following reaction scheme to show the organic products of the hydrolysis of the dipeptide below using:

(i) dilute hydrochloric acid solution

(ii) dilute sodium hydroxide solution.



HCl (*aq*) NaOH (*aq*)

Product A + Product B

Product C + Product D

QUESTION THREE

Assessor's use only

(a) Draw structural formulae for all the possible constitutional (structural) isomers of $C_4H_{10}O$ that are alcohols.

(b) (i) Circle any isomer above that can exist as a pair of enantiomers (optical isomers).

(ii) Explain what physical property would allow the two enantiomers to be distinguished.

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(c) Propan-1-ol can be oxidised to produce two different products.

(i) Discuss how to carry out the oxidation of propan-1-ol in the laboratory to obtain two different organic products. The method may use two different samples of propan-1-ol to form each product.

(ii) Discuss how to test each of these products to demonstrate that they are different from each other AND different from the original starting substance, propan-1-ol. Include the observations that would allow each substance to be identified as a result of these tests.

QUESTION FOUR

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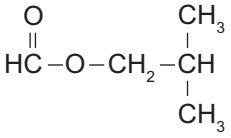
Esters are often responsible for the flavouring of fruit. The compound below is an ester with a raspberry flavour.



Esters can be prepared by *refluxing* the reactants with a small amount of **concentrated sulfuric acid**. After refluxing, the reaction mixture is treated with **potassium carbonate** and *distilled*.

Discuss the preparation of the ester shown above.

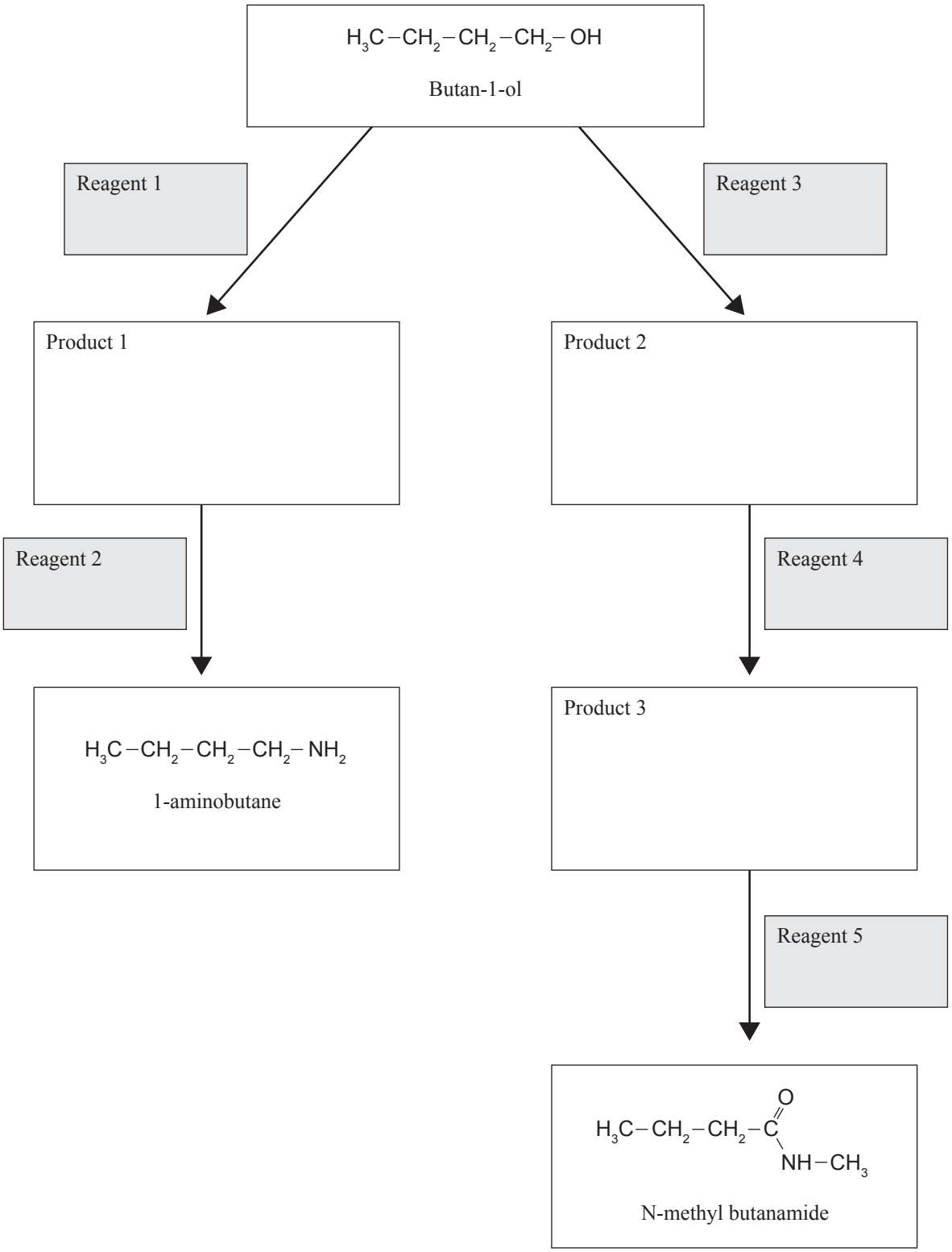
Your answer should include:

- an appropriate chemical equation for the formation of the ester
- the reason for using the chemicals stated in bold above
- a discussion of why reflux and distillation are used in this preparation.

QUESTION FIVE

Assessor's use only

Complete the following reaction scheme by giving the formulae for reagents 1 to 5 and the **structural formulae** for the THREE organic products.



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

Assessor's use only

Question number