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91165M



911655



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

SUPERVISOR'S USE ONLY

Te Mātauranga Matū, Kaupae 2, 2017

91165M Te whakaatu māramatanga ki ngā āhuatanga o ētahi pūhui whaiwaro

2.00 i te ahiahi Rāpare 16 Whiringa-ā-rangi 2017
Whiwhinga: Whā

Paetae	Kaiaka	Kairangi
Te whakaatu māramatanga ki ngā āhuatanga o ētahi pūhui whaiwaro.	Te whakaatu māramatanga hōhonu ki ngā āhuatanga o ētahi pūhui whaiwaro.	Te whakaatu māramatanga matawhānui ki ngā āhuatanga o ētahi pūhui whaiwaro.

Tirohia mēnā e rite ana te Tau Ākonga ā-Motu (NSN) kei runga i tō puka whakauru ki te tau kei runga i tēnei whārangi.

Me whakamātau koe i ngā tūmahi KATOAA kei roto i tēnei pukapuka.

He taka pūmotu kua whakaritea ki te Rau Rauemi L2-CHEMMR.

Mēnā ka hiahia whārangi atu anō mō ō tuhinga, whakamahia ngā whārangi wātea kei muri o tēnei pukapuka, ka āta tohu ai i ngā tau tūmahi.

Tirohia mēnā e tika ana te raupapatanga o ngā whārangi 2–23 kei roto i tēnei pukapuka, ā, kāore tētahi o aua whārangi i te takoto kau.

HOATU TE PUKAPUKA NEI KI TE KAIWHAKAHAERE HEI TE MUTUNGA O TE WHAKAMĀTAUTAU.

TAPEKE

MĀ TE KAIMĀKA ANAKE

(a) Whakamahia ai te waiwaro rua ewaro pūhaumāota rau hei mahi kirikau waihanga. Ka taea te whakamahi hei uhi tūru, uhi tūru waka, me te mahi kākahu.

$$\begin{array}{cccccc} \text{H} & \text{Cl} & \text{H} & \text{Cl} & \text{H} & \text{Cl} \\ | & | & | & | & | & | \\ \sim \text{C} - \text{C} - \text{C} - \text{C} - \text{C} - \text{C} \sim \\ | & | & | & | & | & | \\ \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \end{array}$$

- [illegible]

(a) Polyvinyl chloride (polychloroethene) is often used to make artificial leather. This can then be used to cover chairs, cover car seats, and make clothing.

$$\begin{array}{cccccc} \text{H} & \text{Cl} & \text{H} & \text{Cl} & \text{H} & \text{Cl} \\ | & | & | & | & | & | \\ \sim \text{C} - \text{C} - \text{C} - \text{C} - \text{C} - \text{C} \sim \\ | & | & | & | & | & | \\ \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \end{array}$$

- [illegible]

Whakaurua tētahi whārite ki tō tuhinga.

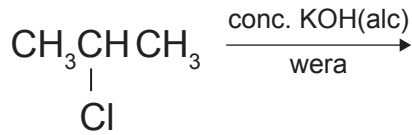
Whārite:

- Explain the term ‘addition polymerisation’ using polyvinyl chloride as an example. Include an equation in your answer.

Equation:

- (b) I te ako tētahi akomanga mātauranga matū mō te mātauranga matū o ngā waiwaro tahi whāpāhare. I rangahau rātou i te pānga o te pōkākā me te konurehu waihā kukū i roto i te waihā ewaro, te KOH(waiwaihā) kukū, ki te waiwaro tahi whāpāhare 2-pōwaro pūhaumāota.

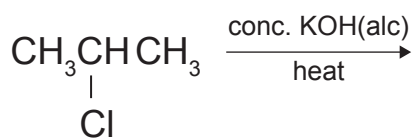
- (i) Tātuhia te hua waro o te tauhohenga e whai ake ana:



- (ii) Whakamāramahia mai he pēhea te tautohu i te rōpū mahinga o te hua waro i tātuhia i runga ake.

- (b) A chemistry class was learning about the chemistry of haloalkanes. They were researching the effect of heat and concentrated potassium hydroxide in ethanol, conc. KOH(alc), on the haloalkane 2-chloropropane.

- (i) Draw the organic product formed in the following reaction.



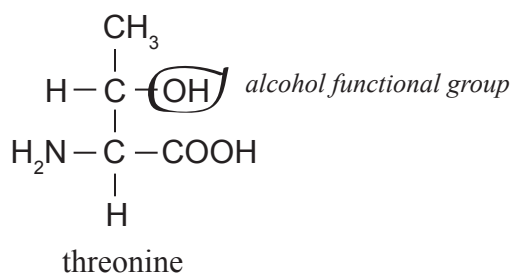
- (ii) Explain how the functional group of the organic product drawn above could be identified.

- tuhi he whārite mō tēnei tauhohenga e whakaatu ana i ngā pūhui whaiwaro
- tuhi i te momo tauhohenga kei te puta
- whakamārama he pēhea te puta o ngā hua
- whakamārama ki tō whakaaro ko tēhea te hua iti o ngā hua.

- write an equation for this reaction showing the organic compounds
- name the type of reaction occurring
- explain how the products form
- explain which product you would expect to be the minor product.

TŪMAHI TUARUA

- (a) E whakaaturia ana te hanganga o tētahi rāpoi ngota o tētahi pūhui whaiwaro, te threonine, i raro nei.



Kua tautohua he rōpū mahinga waiwaihā i roto i te rāpoi ngota threonine i runga.

- (i) Porohitangia, me tapaina hoki i ētahi rōpū mahinga **e rua atu anō** kei te rāpoi ngota threonine i runga ake.
- (ii) Whakarōpūhia te rōpū mahinga waiwaihā hei mea tuatahi, tuarua, tuatoru rānei.

- (iii) Whakamāramahia mai i pēhea tō whakarōpū i te rōpū waiwaihā.

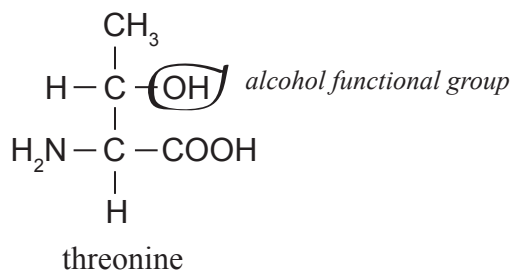
- (b) Tapaina ngā pūhui whaiwaro kei te tūtohi i raro.

Pūhui	Ingoa (nahanaha) IUPAC
$\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{C} \equiv \text{CH}$	
$ \begin{array}{ccccccc} \text{CH}_3 & - & \text{CH} & - & \text{CH} & - & \text{CH}_2 - \text{CH}_2 - \text{CH}_3 \\ & & & & & & \\ & & \text{Br} & & \text{CH}_3 & & \end{array} $	
$ \begin{array}{ccccccc} & & \text{OH} & & \text{CH}_3 & & \\ & & & & & & \\ \text{CH}_3 & - & \text{CH}_2 & - & \text{CH} & - & \text{C} - \text{CH}_3 \\ & & & & & & \\ & & & & & & \text{CH}_3 \end{array} $	

QUESTION TWO

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- (a) The structure of a molecule of an organic compound, threonine, is shown below.



An alcohol functional group has been identified in the threonine molecule above.

- (i) Circle and name **two other** functional groups on the threonine molecule above.
- (ii) Classify the alcohol functional group as primary, secondary, or tertiary.

- (iii) Explain how you classified the alcohol group.

- (b) Name the organic compounds in the table below.

Compound	IUPAC (systematic) name
$\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{C} \equiv \text{CH}$	
$ \begin{array}{ccccccc} \text{CH}_3 & - & \text{CH} & - & \text{CH} & - & \text{CH}_2 - \text{CH}_2 - \text{CH}_3 \\ & & & & & & \\ \text{Br} & & \text{CH}_3 & & & & \end{array} $	
$ \begin{array}{ccccccc} & & \text{OH} & & \text{CH}_3 & & \\ & & & & & & \\ \text{CH}_3 & - & \text{CH}_2 & - & \text{CH} & - & \text{C} - \text{CH}_3 \\ & & & & & & \\ & & & & & & \text{CH}_3 \end{array} $	

- | | |
|----|----|
| 1. | 2. |
| 3. | 4. |

- | | cis | trans |
|------------|-----|-------|
| Tau | | |

- ASSESSOR'S
-
- USE ONLY

1.	2.
3.	4.

- ASSESSOR'S
-
- USE ONLY

	cis	trans
Number		

Justify your choices, and explain why only these two compounds are *cis* and *trans* (geometric) isomers.

- (d) Ka taea ngā waiwaro tahi me ngā waiwaro rua te tautohu mā te tauhohenga ki tētahi mehanga wai pūkane, Br_2 (waiwai).

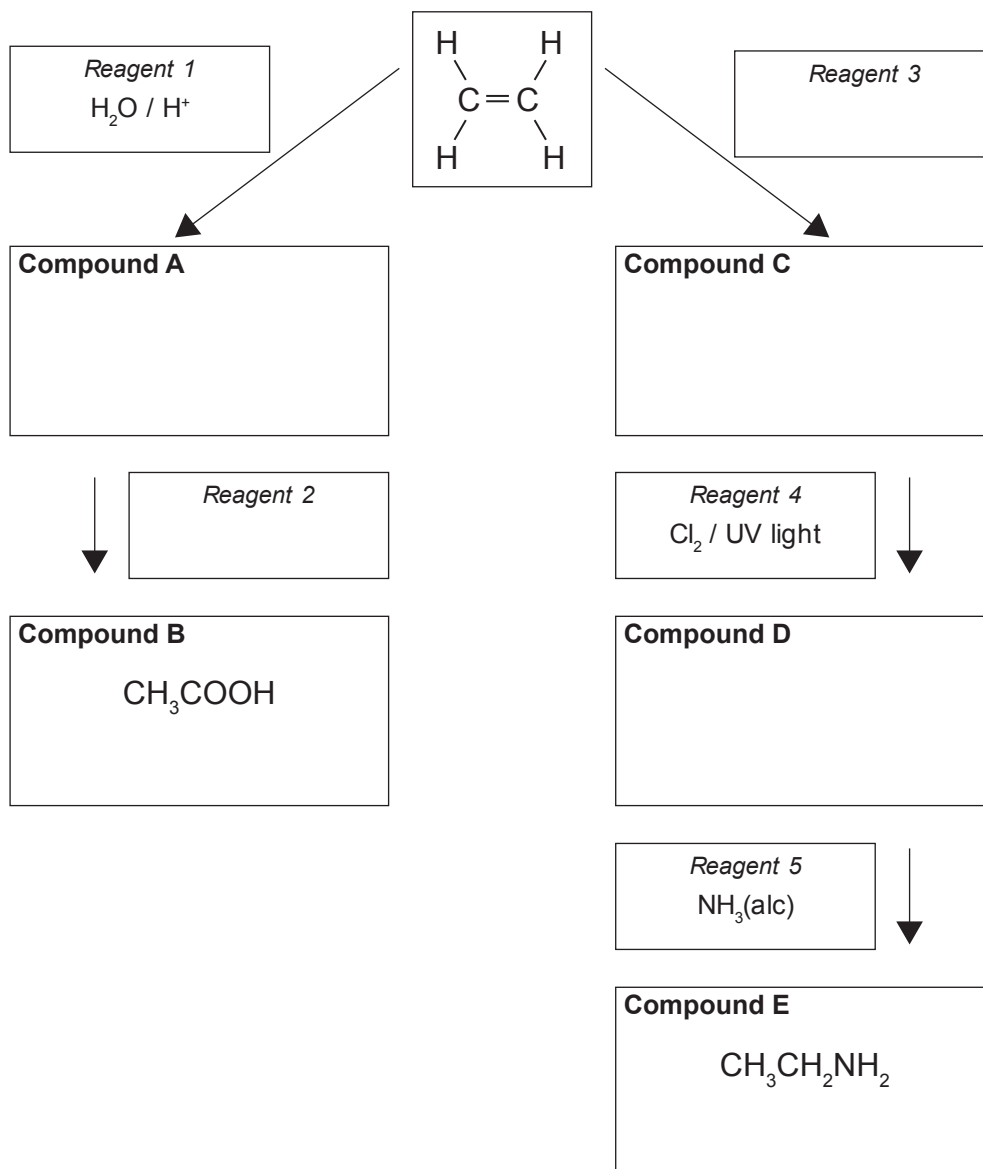
Whakatauritea ngā momo tauhohenga ka pā ki ngā waiwaro tahi me ngā waiwaro rua ki tētahi mehanga wai pūkane.

- (d) Alkanes and alkenes can be identified by their reactions with a solution of bromine water, $\text{Br}_2(\text{aq})$.

Contrast the types of reactions an alkane and an alkene will undergo with an orange solution of bromine water.

TŪMAHI TUATORU

- (a) (i) Whakaotia te mahere tauhohe e whai ake mā te tātuhi i ngā tātai hanganga o ngā pūhui whaiwaro **A**, **C** me te **D**, me te tautohu i ngā whakahohe 2 me te 3.



- (ii) Tautohua ngā momo tauhohenga ka puta hei waihanga i ngā pūhui **A**, **B**, **C**, **D**, me te **E**:

A. _____

B. _____

C. _____

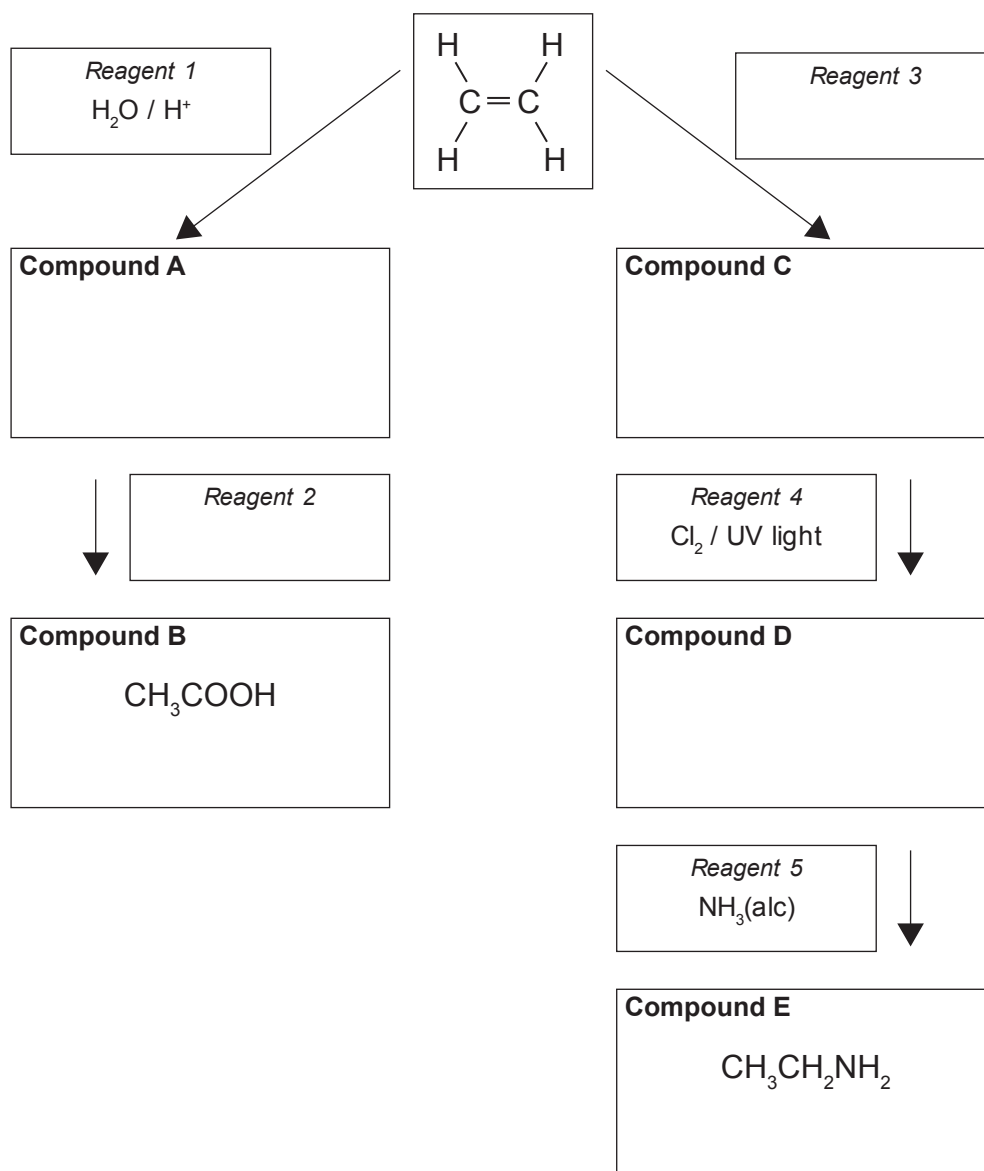
D. _____

E. _____

- | |
|--|
| |
|--|

QUESTION THREE

- (a) (i) Complete the following reaction scheme by drawing the structural formulae for the organic compounds **A**, **C**, and **D**, and identifying *reagents 2 and 3*.



- (ii) Identify the types of reactions that occur to produce compounds **A**, **B**, **C**, **D**, and **E**:

A. _____

B. _____

C. _____

D. _____

E. _____

- (d) Whakamāramahia ka pēhea te whakawhiti hāngai i te pūhui **A** mai i te mahere tauhohe ki te pūhui **D**.

- (d) Explain how compound **A** from the reaction scheme could be directly converted into compound **D**.

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He whārangi anō ki te hiahiatia.
Tuhia te (ngā) tau tūmahi mēnā e tika ana.

TAU TŪMAHI

MĀ TE
KAIMĀKA
ANAKE

Extra paper if required.
Write the question number(s) if applicable.

QUESTION
NUMBER

ASSESSOR'S
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English translation of the wording on the front cover

Level 2 Chemistry, 2017

91165 Demonstrate understanding of the properties of selected organic compounds

2.00 p.m. Thursday 16 November 2017
Credits: Four

91165M

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of the properties of selected organic compounds.	Demonstrate in-depth understanding of the properties of selected organic compounds.	Demonstrate comprehensive understanding of the properties of selected organic compounds.

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 attempt ALL the questions in this booklet.

A periodic table is provided on the Resource Sheet L2-CHEMR.

If you need more room for any answer, use the extra space provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–23 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.