RERESTER SARRESTER SARRESTE

91165M





Te Mātauranga Matū, Kaupae 2, 2017

KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

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 KATOA 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

TŪMAHI TUATAHI

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.

E whakaaturia ana i raro ko tētahi wāhanga o tētahi rāpoi ngota waiwaro rua ewaro pūhaumāota rau.

(i) Tātuhia te waetahi i waihangatia mai ai te waerau waiwaro rua ewaro pūhaumāota rau.

(ii) Whakamāramahia te rerekētanga o ngā hanganga me te tauhohehohe matū o te waetahi me te waerau, ā, he aha i hira ai te rerekētanga mō ngā whakamahinga o te waerau.

QUESTION ONE

ASSESSOR'S USE ONLY

(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.

A section of a polyvinyl chloride molecule is shown below.

	(i)	Draw th	ne monomer	from v	which the	e polyi	ner pol	lyvinyl	chloride	would	be made
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(ii)	Explain the difference in the structures and chemical reactivity of the monomer and
	polymer, and why the difference is important for the uses of the polymer.

3711 1 :		
Whakamaramahia rua ewaro pūhaum	a mai te 'whakawaerautanga tāpiringa' mā te whakamahi i te nāota rau hei tauira.	waiwaro
Whakaurua tētahi	whārite ki tō tuhinga.	
Whārite:		

)	Making polyvinyl chloride (polychloroethene) from its monomer is called 'addition polymerisation'.	ASSESS USE O
	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:

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(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.

ASSESSOR'S USE ONLY

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

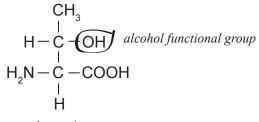
(ii)	Explain how the functional group of the organic product drawn above could be identified.

(iii)	Ka tauhohe anō te 2-pūkane-3-mewaro pūwaro ki te KOH(waiwaihā) kukū. Engari, e RUA ngā hua waro ka puta i tēnei tauhohenga, he hua matua me te hua iti.	MĀ TE KAIMĀK ANAKE					
	Homai he kōrero mō ngā tukanga matū ka puta i tēnei tauhohenga.						
	I tō tuhinga me:						
	 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. 						
	whakamarama ki to whakaaro ko tenea te nua iti o nga nua.						
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		_					
		_					

(iii)	2-bromo-3-methylbutane also reacts with conc. KOH(alc). However, in this reaction TWO organic products are formed, a major and a minor product.	ASSESSOR USE ONLY
	Give an account of the chemical processes that occur in this reaction.	
	In your answer you should:	
	• 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 MĀ TE KAIMĀKA ANAKE

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



threonine

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
$CH_3 - CH_2 - CH_2 - C \equiv CH$	
CH ₃ -CH-CH-CH ₂ -CH ₂ -CH ₃ Br CH ₃	
$\begin{array}{ccc} & \text{OH} & \text{CH}_3 \\ & \text{I} & \text{I} \\ & \text{CH}_3 - \text{CH}_2 - \text{CH} - \text{C} - \text{CH}_3 \\ & \text{I} \\ & \text{CH}_3 \end{array}$	

QUESTION TWO

ASSESSOR'S USE ONLY

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

$$\begin{array}{c|c} CH_3 \\ H-C & OH \end{array} \ alcohol functional group \\ H_2N-C-COOH \\ H \\ H \end{array}$$
 threonine

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
$CH_3 - CH_2 - CH_2 - C \equiv CH$	
CH ₃ -CH-CH-CH ₂ -CH ₂ -CH ₃	
$\begin{array}{ccc} & \text{OH} & \text{CH}_3 \\ & \text{I} & \text{I} \\ & \text{CH}_3 - \text{CH}_2 - \text{CH} - \text{C} - \text{CH}_3 \\ & \text{I} \\ & \text{CH}_3 \end{array}$	

	0.	ia warwaro raa e wha me	te pūhui whaiwaro C_4H_8 ki te tūtohi
1.		2.	
3.		4.	
	tohua ngā pūhui h ga ake.	ne poinanaha (āhuahanga)	cis me te trans mai i te tūtohi i
		cis	trans
Ta	ıu	cis	trans
Parahautia	a ō kōwhiringa, m		a i noho ai ko ēnei pūhui e rua
Parahautia	a ō kōwhiringa, m	ne te whakamārama he ah	

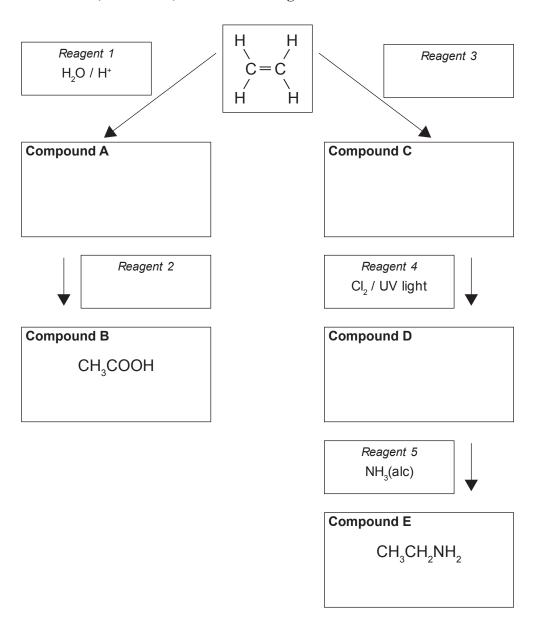
1.	2.			
3.	4.			
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Identify the compounds that are cis and trans (geometric) isomers from the table above.				
	cis	trans		
	cis	trans		
Number	cis	trans		
Number	cis	trans		
	s, and explain why only these two			
Justify your choices	s, and explain why only these two			
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Ka taea ngā waiwaro tahi me ngā waiwaro rua te tautohu mā te tauhohenga ki tētahi mehanga wai pūkane, ${\rm Br}_2$ (waiwai).	
Whakatauritea ngā momo tauhohenga ka pā ki ngā waiwaro tahi me ngā waiwaro rua ki tētahi mehanga wai pūkane.	

	13	
(d)	Alkanes and alkenes can be identified by their reactions with a solution of bromine water, $Br_2(aq)$.	ASSESSOR' USE ONLY
	Contrast the types of reactions an alkane and an alkene will undergo with an orange solution of bromine water.	

MĀ TE KAIMĀKA ANAKE

(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:
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A.____

В. _____

C. _____

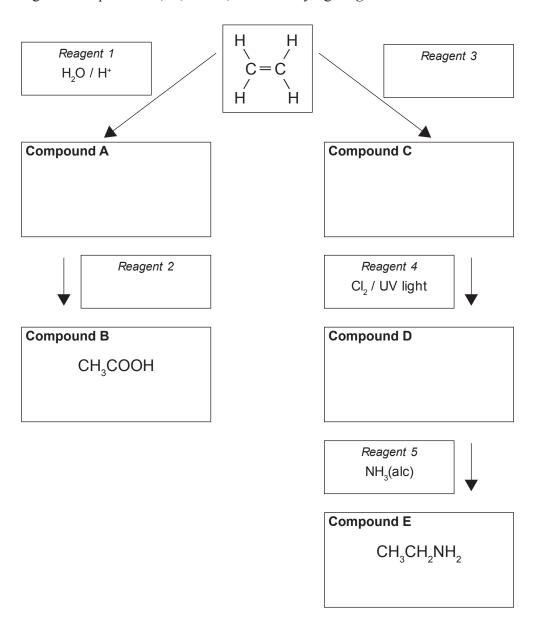
D _____

E. _____

MĀ TE KAIMĀKA ANAKE

Ka ta	auhohe ngā pūhui B me E tētahi ki tētahi.
(i)	Tuhia he whārite taurite mō te tauhohenga ka puta i waenga i ngā pūhui B me E .
(ii)	Tautohua te momo tauhohenga ka puta i waenga i ngā pūhui B me E .
	Parahautia tō tuhinga.

(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*.



1	::\	I dontify the atrue of	af manationa that	occur to produce co	aman ayan da A D	\mathbf{C} \mathbf{D}	and II.
(11)	identity the types	or reactions that	occur to produce co	ombounds A. B.	. C. D.	and r
1.	,		0 0 0 0 - 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 p - 0 0 0 0 0 0	p , ;	, ~, — ,	

A.____

B. _____

C. _____

D.____

E. _____

	d E.
Com	apounds B and E react together.
i)	Write a balanced equation for the reaction that occurs between compounds B and E .
(ii)	Identify the type of reaction that occurs between compounds B and E . Justify your answer.
(ii)	

	20	
Whakam pūhui D .	nāramahia ka pēhea te whakawhiti hāngai i te pūhui A mai i te mahere tauhohe ki te	

Explain how compour compound D .	and A from the reaction	n scheme could be d	directly converted into	4
compound D .				

	He wnarangi ano ki te nianiatia.
TAU TŪMAHI	Tuhia te (ngā) tau tūmahi mēnā e tika ana.
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		Extra paper if required.				
QUESTION NUMBER		Write the question number(s) if applicable.				
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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

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