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91165M



SUPERVISOR'S USE ONLY

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

## Te Mātauranga Matū, Kaupae 2, 2019

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

2.00 i te ahiahi Rāhina 11 Whiringa-ā-rangi 2019 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 Puka Rauemi L2-CHEMMR.

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

Tirohia mēnā e tika ana te raupapatanga o ngā whārangi 2–17 kei roto i tēnei pukapuka, ka mutu, kāore tētahi o aua whārangi i te takoto kau.

ME HOATU RAWA KOE I TĒNEI PUKAPUKA KI TE KAIWHAKAHAERE Ā TE MUTUNGA O TE WHAKAMĀTAUTAU.

TAPEKE

### TŪMAHI TUATAHI

MĀ TE KAIMĀKA ANAKE

(a) Whakaotihia te tūtohi e whai ake nei.

Pūhui	Ingoa nahanaha IUPAC
H H O H-C-C-C H H OH	
	amine-2-pōwaro
H H H H H-C=C-C-C-CI H H H H	
	2,3-mewaro-rua pūwaro

(b) Tātuhia ngā poinanaha hanganga e whā o te  $C_4H_{10}O$  he waiwaihā. Whakarōpūhia ngā waiwaihā hei mea tuatahi, tuarua, tuatoru rānei.

1.	2.
Momo waiwaihā:	Momo waiwaihā:
3.	4.
Momo waiwaihā:	Momo waiwaihā:

### **QUESTION ONE**

ASSESSOR'S USE ONLY

(a) Complete the following table.

Compound	IUPAC (systematic name)
H H O H-C-C-C H H OH	
	propan-2-amine
H H H H H-C=C-C-C-CI H H H	
	2,3-dimethylbutane

(b) Draw four structural (constitutional) isomers of  $\rm C_4H_{10}O$  that are alcohols. Classify the alcohols as either primary, secondary or tertiary.

1.	2.
Type of alcohol:	Type of alcohol:
3.	4.
Type of alcohol:	Type of alcohol:

(c) Tirohia ngā pūhui kei te tūtohi i raro hei mahi i ngā wāhanga (i) ki te (iv).

A	CH <sub>3</sub> -CH=CH-CH <sub>3</sub>
В	CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub>

1	(:)	T=4-1: 4.	11	: =	: 1	=11	( - :	\ <i>L</i> _	=1: A
1	11	Lamini me re	- wnakamona	า ทธฺล	noinanana	aniiananga	l CIS-Trans	i e riia o ie	niiniii A
1		Tātuhi me te	c wiiakaiiigoa	1 1154	pomanana	amaamamga	(CIS II alls)	, craa o te	pullul 1x.

(ii)	Whakamāramahia mai he aha i taea ai te pūhui A hei poinanaha āhuahanga (cis-trans)
	engari kīhai a <b>B</b> .

engari kihai a <b>B</b> .		

A	CH <sub>3</sub> -CH=CH-CH <sub>3</sub>
В	CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub>

(i) Draw and name the two geometric (cis-trans) isomers of compound A.

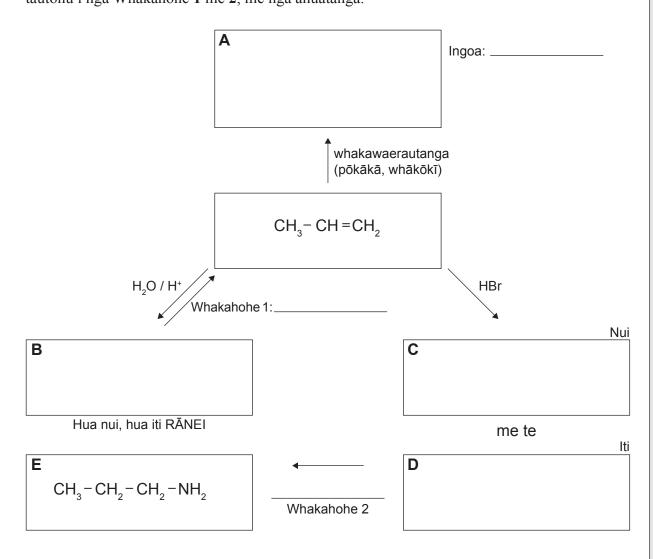
(ii) Explain why compound **A** exists as geometric (*cis-trans*) isomers while compound **B** does not.

(iii)	Whakamāramahia mai he pēhea te whakamahi i te mehanga konurehu pāporo, $KMnO_4/H^+(aq)$ , hei wehewehe i waenga i ngā pūhui <b>A</b> me <b>B</b> .	MĀ TE KAIMĀK ANAKE
	I tō tuhinga me:	
	<ul> <li>tautohu te momo tauhohenga kei te puta</li> </ul>	
	whakaahua ngā kitenga hāngai.	
(iv)	Ka tauhohe ng $\bar{a}$ p $\bar{u}$ hui $A$ me $B$ ki te wai p $\bar{u}$ kane, $\mathrm{Br}_2(aq)$ .	
	Whakatauritea ēnei tauhohenga mā te kōrero mō ngā āhuatanga e hiahiatia ana, ngā kitenga, ngā hua i puta me te momo tauhohenga.	

(iii)	Explain how acidified potassium permanganate solution, $KMnO_4/H^+(aq)$ , can be used to distinguish between compounds <b>A</b> and <b>B</b> .	ASSESSOR'S USE ONLY
	In your answer you should:	
	<ul> <li>identify the type of reaction</li> </ul>	
	describe any relevant observations.	
(iv)	Compounds <b>A</b> and <b>B</b> will both react with bromine water, $Br_2(aq)$ .	
	Compare and contrast these reactions by referring to the conditions required, the observations, the products formed, and the type of reaction.	

(b)

(a) Whakaotihia te hoahoa tauhohenga e whai ake mō te waiwaro rua pōwaro,  $C_3H_6$ , mā te tātuhi i ngā ture tātai hanganga o ngā pūhui whaiwaro  $\bf A$  ki  $\bf D$ , te whakaingoa i te pūhui  $\bf A$  me te tautohu i ngā Whakahohe  $\bf 1$  me  $\bf 2$ , me ngā āhuatanga.



Whakamāramahia i pēhea tō tautohu i ngā hua nui me ngā hua iti ( $C$ me $D$ ) i roto i te tauhohenga o te waiwaro rua pōwaro ki te mehanga hauwai pūkane, $HBr(aq)$ .		

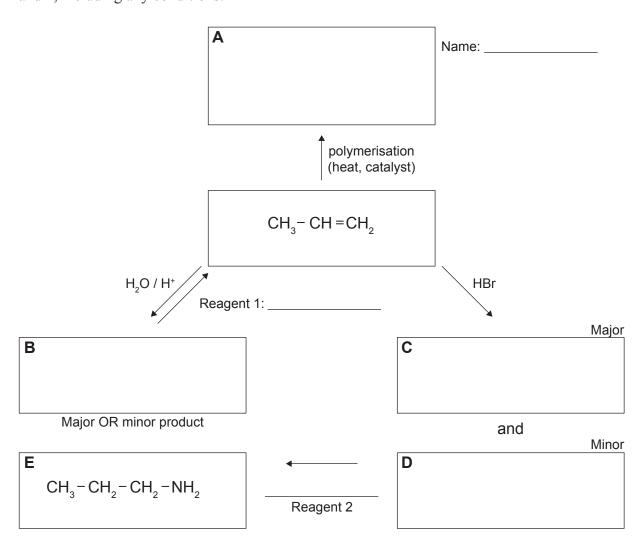
Whakatauri te waiwaro	ea te tauhohenga ka pu rua pōwaro, C <sub>3</sub> H <sub>6</sub> , mai	nta i te pūhui <b>B</b> ki te i te pūhui <b>B</b> .	tauhohenga anga wha	kamuri i puta ai

#### **QUESTION TWO**

(b)

ASSESSOR'S USE ONLY

(a) Complete the following reaction scheme for propene, C<sub>3</sub>H<sub>6</sub>, by drawing the structural formulae for the organic compounds **A** to **D**, naming compound **A** and identifying Reagents **1** and **2**, including any conditions.



Explain how you identified the major and minor products ( $\mathbf{C}$ and $\mathbf{D}$ ) in the reaction of proper with hydrogen bromide solution, $\mathrm{HBr}(aq)$ .		

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( I	Compare and contrast the reaction that forms compound $\bf B$ to the reverse reaction that forms propene, $C_3H_6$ , from compound $\bf B$ .	
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#### **TŪMAHI TUATORU**

MĀ TE KAIMĀKA

(a) Kitea ai ia rōpū mahinga i porowhitatia i roto i ngā rāpoi ngota whaiwaro rerekē e whakamahia noatia ana i roto i ngā taiwhanga pūtaiao kura:

NH<sub>2</sub> HO CH<sub>2</sub>- C COOH A H

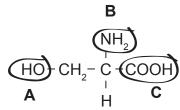
- (i) Mā te whakamahi i te rārangi i raro, kōwhiria tētahi whakahohe ka whakaahua i ngā kitenga e taea ai ia rōpū mahinga nei te tautohu.
  - pepa tohu waikawa whero pepa tohu waikawa kikorangi
  - wai pūkane,  $Br_2(aq)$
- mehanga whakawaikawa pākatirua pūmura,  $\mathrm{H^+/Cr_2O_7^{2-}}(aq)$

	Rōpū Mahinga	Whakamātau matū	Ngā kitenga
A			
В			
C			

#### **QUESTION THREE**

ASSESSOR'S USE ONLY

(a) Each circled functional group is found in different organic molecules commonly used in school laboratories:



- (i) Using the list below, choose a reagent and describe the observations that could identify each of these functional groups.
  - red litmus paper
- blue litmus paper
- bromine water,  $Br_2(aq)$
- acidified dichromate solution, H<sup>+</sup>/Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup>(aq)

	Functional Group	Chemical test	Observations
A			
В			
C			

Describe an alternative method to distinguish between functional groups <b>B</b> and <b>C</b> . Identify the reagent needed, the expected observations, and explain the type of reactions.		
occurring.	ragent needed, the expected observations, and explain the type of reaction	

	MĀ TE KAIMĀKA ANAKE
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-	
-	
-	
-	

(b)	E rua ngā upane mō te whakawhiti i te ewaro pūkane ki te ewaro haumāota, me te waiwaihā
	hei hua takawaenga.

Ewaro pūkane:	
	Whakahohe 1:
	Whakahohe 2:
	<b>→</b>
Ewaro haumāota:	
	orero mo te hoahoa tauhohenga mo tenei whakawhititanga.
Ле whakawhānui ngā k	ōrero mō te hoahoa tauhohenga mō tēnei whakawhititanga.
∕le whakawhānui ngā ko tō tuhinga me tautohu o	
Me whakawhānui ngā ko tō tuhinga me tautohu o ngā āhuatanga e hi	e koe:
Me whakawhānui ngā ko tō tuhinga me tautohu o ngā āhuatanga e hi	e koe: ahiatia ana mō ia upane o te whakawhititanga
Me whakawhānui ngā ko tō tuhinga me tautohu o ngā āhuatanga e hi	e koe: ahiatia ana mō ia upane o te whakawhititanga
Me whakawhānui ngā ko tō tuhinga me tautohu o ngā āhuatanga e hi	e koe: ahiatia ana mō ia upane o te whakawhititanga
Me whakawhānui ngā ko tō tuhinga me tautohu o ngā āhuatanga e hi	e koe: ahiatia ana mō ia upane o te whakawhititanga
Me whakawhānui ngā ko tō tuhinga me tautohu o ngā āhuatanga e hi	e koe: ahiatia ana mō ia upane o te whakawhititanga
Me whakawhānui ngā ko tō tuhinga me tautohu o ngā āhuatanga e hi	e koe: ahiatia ana mō ia upane o te whakawhititanga
Me whakawhānui ngā ko tō tuhinga me tautohu o ngā āhuatanga e hi	e koe: ahiatia ana mō ia upane o te whakawhititanga

(b)

Use this information to complete the reaction scheme below by drawing the structural formulae of each organic molecule and naming the intermediate alcohol and the reagents required.		
Bromoethane:		
	Reagent 1:	
	Reagent 2:	
Chloroethane:		
<ul><li>In your answer, you show</li><li>any conditions nee</li></ul>	and scheme for this conversion.  Suld identify:  Sided for each step of the conversion  an occurring for each step of the conversion.	

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

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

## English translation of the wording on the front cover

## Level 2 Chemistry, 2019

# 91165 Demonstrate understanding of the properties of selected organic compounds

2.00 p.m. Monday 11 November 2019 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 in the Resource Booklet L2–CHEMMR.

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 2–17 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.