91165M

911655

NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

2

SUPERVISOR'S USE ONLY

Te Mātauranga Matū, Kaupae 2, 2018

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

9.30 i te ata Rāhina 26 Whiringa-ā-rangi 2018
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 2–19 kei roto i tēnei pukapuka, ā, 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.

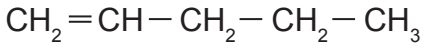
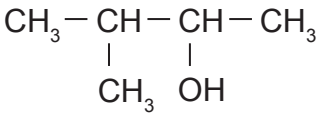
TAPEKE

MĀ TE KAIMĀKA ANAKE

TŪMAHI TUATAHI

MĀ TE KAIMĀKA ANAKE

(a) Whakaotihia te tūtohi e whai ake nei.

Pūhui	Ingoa nahanaha IUPAC
	
	
	waikawa pōwaro 2-waihā

(b) Tātuhia ngā tātai hanganga o ngā rāpoi ngota waiwaro tahi haumāota tuatahi, tuarua me te tuatoru he poinanaha hanganga me te tātai rāpoi ngota C_4H_9Cl.

Whakarōpūtanga o te waiwaro tahi haumāota	Ture tātai hanganga
Tuatahi	
Tuarua	
Tuatoru	

QUESTION ONE

ASSESSOR'S USE ONLY

(a) Complete the following table.

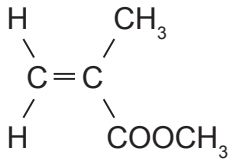
Compound	IUPAC (systematic name)
$CH_2=CH-CH_2-CH_2-CH_3$	
$CH_3-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-\underset{\displaystyle OH}{\underset{\vert}{CH}}-CH_3$	
	2-hydroxypropanoic acid

(b) Draw structural formulae for primary, secondary, and tertiary chloroalkane molecules that are constitutional (structural) isomers with the molecular formula C_4H_9Cl.

Classification of chloroalkane	Structural formula
Primary	
Secondary	
Tertiary	

(c) He waerau te Perspex® e whakamahia ana i tua atu i te karāhe i te mea he pūata, māmā, ā, kāore e pākarukaru. Ka taea te mahi mai i te waetahi e whakaaturia ana i raro.

MĀ TE KAIMĀKA ANAKE

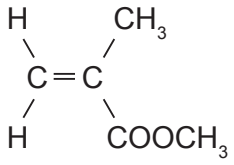


(i) Ki te tapawhā i raro, tātuhia kia TORU ngā wae tāruarua o te waerau ka puta.

(ii) Me parahau mēnā he poinanaha (cis-trans) āhuahanga te **waetahi** i whakamahia hei whakaputa i te Perspex® mā te whakamārama i ngā āhuatanga e hiahiatia ana mō tēnei momo poinanaha.

ASSESSOR'S USE ONLY

(c) Perspex® is a polymer used as an alternative to glass as it is transparent, lightweight, and shatter resistant. It can be made from the monomer shown below.



(i) In the box below, draw THREE repeating units of the polymer formed.

(ii) Justify whether or not the **monomer** used to produce Perspex® is a geometric (cis-trans) isomer by explaining the features required for this type of isomerism.

(d) Ina whakahohea te waiwaro rua-1-pūwaro kia puta ai te pūwaro pūkane, C_4H_9Br, e rua ngā hua whaiwaro ka puta.

MĀ TE KAIMĀKA ANAKE

Tātarihia tēnei tauhohenga mā te:

- tuhi i te whakahohe e hiahiatia ana
- tautohu i te momo tauhohenga me te parahau i tō kōwhiringa
- whakamārama he aha te take he ranunga o ngā hua whaiwaro.

Me tautoko tō whakautu mā te tātuhi i ngā tātai hanganga mō te waiwaro rua-1-pūwaro me ngā hua whaiwaro.

(d) When but-1-ene is reacted to form bromobutane, C_4H_9Br, two organic products are formed.

ASSESSOR'S USE ONLY

Analyse this reaction by:

- stating the reagent required
- identifying the type of reaction and justifying your choice
- explaining why there is a mixture of organic products.

Support your answer by drawing structural formulae for but-1-ene and the organic products.

TŪMAHI TUARUA

MĀ TE KAIMĀKA ANAKE

(a) Kāore he tapanga o ngā pātara e rua o ngā wē whaiwaro kanokore rerekē. E mōhiotia ana ko te amine-1-pōwaro, $CH_3CH_2CH_2NH_2$, me te waikawa ewaro, CH_3COOH.

(i) Me whakamārama me pēhea tō tautohu i ēnei wē e rua mā te whakamahi anake i te konutai hauwai pākawawaro totoka, $NaHCO_3(s)$.

(ii) Tuhia te tātai hanganga me te ingoa mō te hua o te tauhohenga i waenga i te amine-1-pōwaro, $CH_3CH_2CH_2NH_2$, me te waikawa ewaro, CH_3COOH kia puta ai he pāhare.

$CH_3CH_2CH_2NH_2(aq) + CH_3COOH(aq) \searrow$

Ingoa: _____

QUESTION TWO

ASSESSOR'S USE ONLY

(a) Two bottles of different colourless organic liquids are unlabelled. They are known to be propan-1-amine, $CH_3CH_2CH_2NH_2$, and ethanoic acid, CH_3COOH.

(i) Explain how you could identify these two liquids using only solid sodium hydrogen carbonate, $NaHCO_3(s)$.

(ii) Give the structural formula and name for the product of the reaction between propan-1-amine, $CH_3CH_2CH_2NH_2$, and ethanoic acid, CH_3COOH to form a salt.

$CH_3CH_2CH_2NH_2(aq) + CH_3COOH(aq) \searrow$

Name: _____

(b) E toru atu anō ngā pātara kore tapanga o ngā wē whaiwaro kanokore e mōhiotia ana he whai owaro, waiwaro rua-1-owaro, me te waihā ewaro.

MĀ TE KAIMĀKA ANAKE

Tuhia he hātepe hei tautohu i ia wē nei mā te whakamahi anake i te wai pūkane, $Br_2(aq)$, me te wai, H_2O.

I tō whakautu me whakamārama e koe ngā kitenga ka puta.

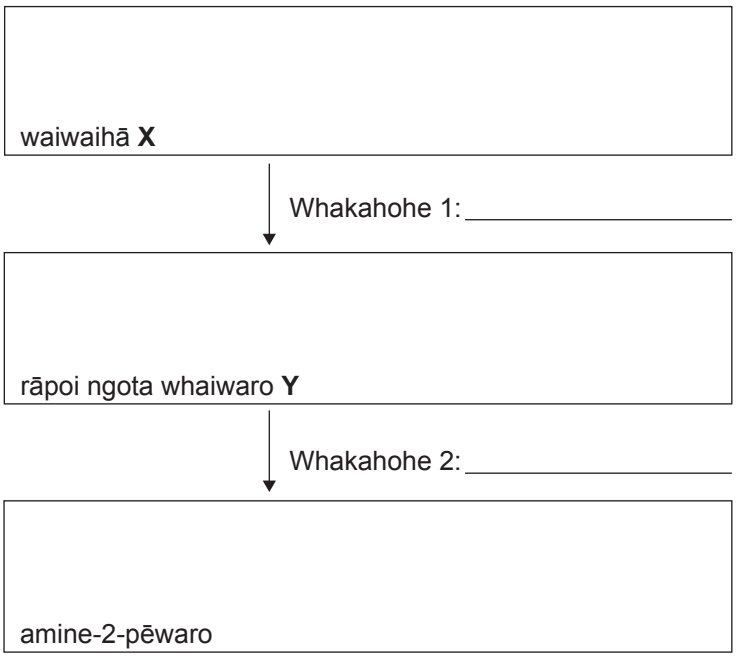
Hei aha te whakauru whārite ki tō whakautu.

(c) Ka nui atu i te kotahi ngā upane mō ngā tauhohenga whaiwaro maha hei whakawhiti mai i tētahi rāpoi ngota whaiwaro ki tētahi atu.

E rua ngā upane e hiahiatia ana hei whakaputa i te amine-2-pēwaro mai i te waiwaihā.

Whakamahia ngā mōhiohio kua tukuna hei tātari i ngā tauhohenga.

(i) Tātuhia ngā tātai hanganga o ngā pūhui, ka tapa i ngā whakahohe kei roto i te tukanga, ki ngā tapawhā kei te whārangi 12.



(ii) Whakamārama whānuitia ngā kōrero mō ngā tauhohenga kei te mahere i runga.

I tō tuhinga me tautohu e koe:

- ngā āhuatanga e hiahiatia ana mō ia upane o te whakawhititanga
- ngā ingoa o te waiwaihā **X** me te rāpoi ngota whaiwaro **Y**
- te momo tauhohenga e puta ana mō ia upane o te whakawhititanga.

ASSESSOR'S USE ONLY

(b) Three more unlabelled bottles of colourless organic liquids are known to contain hexane, hex-1-ene, and ethanol.

Write a procedure to identify each of these liquids using only bromine water, $Br_2(aq)$, and water, H_2O.

In your answer you should explain any observations that would be made.

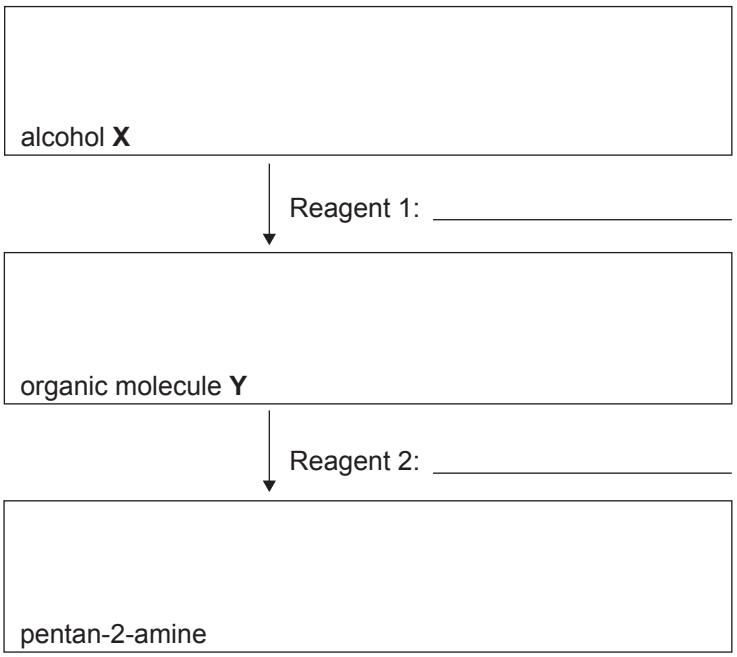
You do not need to include equations in your answer.

(c) Many organic reactions take more than one step in order to convert from one organic molecule to another.

Two steps are required to produce pentan-2-amine from an alcohol.

Use the information given to analyse the reactions.

(i) Draw the structural formulae of the compounds, and name the reagents involved in the process, in the boxes on page 13.



(ii) Elaborate on the reactions in the scheme above.

In your answer you should identify:

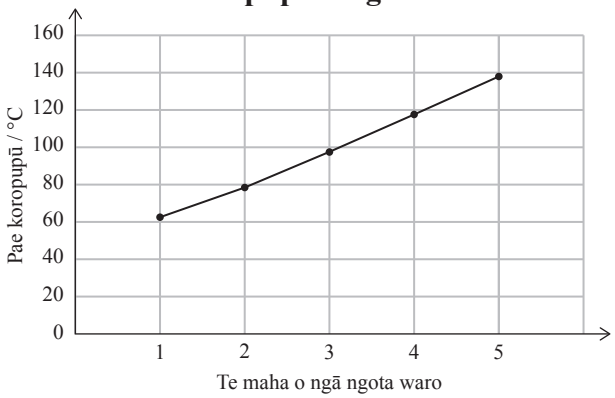
- any conditions needed for each step of the conversion
- the names of alcohol **X** and organic molecule **Y**
- the type of reaction that is occurring for each step of the conversion.

TŪMAHI TUATORU

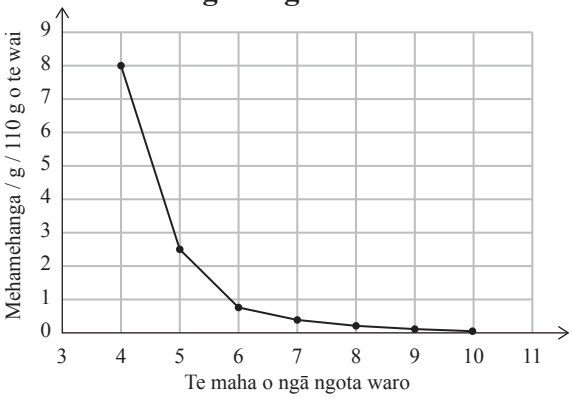
MĀ TE KAIMĀKA ANAKE

E whakaatu ana ngā kauwhata i raro i ngā ia o ngā āhuatanga ōkiko e rua o ngā waiwaihā.

Pae koropupū o ngā waiwaihā



Mehamehanga o ngā waiwaihā i te wai



(a) Tautohua ngā ia e whakaaturia ana ki ngā kauwhata i runga.

(b) Ka puta i te whakahohe i te pōwaro 2-haumāota ki te konurehu waihā, KOH, ko ngā hua rerekē nā ngā tauhohenga rerekē e puta ana.

(i) Whakamārama whānuitia ngā tauhohenga o te pōwaro 2-haumāota ki te konurehu waihā, KOH.

I tō tuhinga me:

- tautohu ngā āhuatanga o te whakahohe KOH
- whakamārama ngā momo tauhohenga ka puta i te whakahohe kei ia āhuatanga
- tātuhia ngā tātai hanganga o ngā hua whaiwaro.

MĀ TE KAIMĀKA ANAKE

(ii) Whakamārama whānuitia ngā whakamātautau matū ka taea te whakamahi hei tautohu i ngā rōpū mahinga o ngā hua whaiwaro i puta i te wāhanga (i).

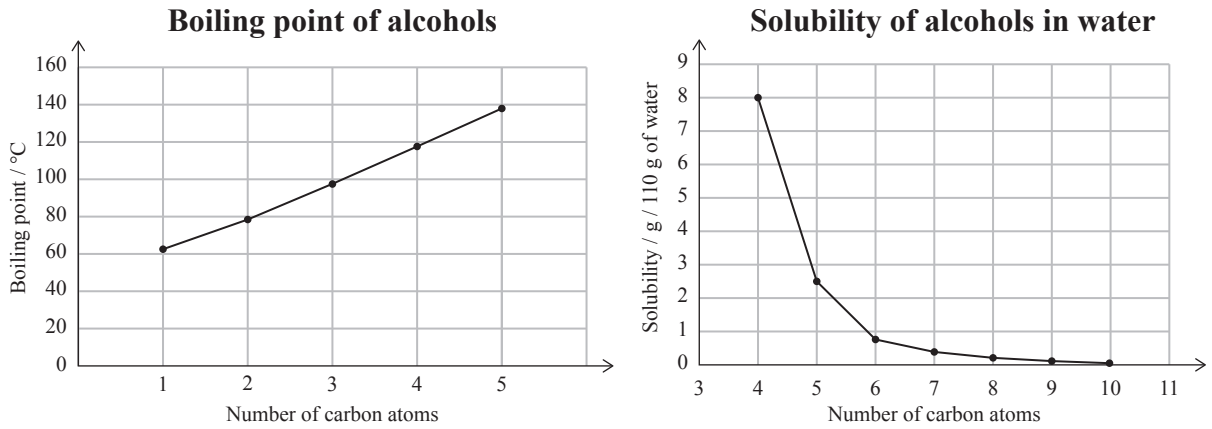
I tō tuhinga, me:

- tautohu ngā matū me ngā āhuatanga e hiahiatia ana
- whakaahua ngā kitenga
- tuhi te momo tauhohenga kei te puta
- whakamārama te take kāore e taea te mehanga konurehu pāporo, $KMnO_4(aq)$, te whakakamahi hei wehewehe i waenga i ēnei hua whaiwaro.

QUESTION THREE

ASSESSOR'S USE ONLY

The graphs below show trends in two physical properties of alcohols.



(a) Identify the trends shown on the graphs above.

(b) Reacting 2-chloropropane with potassium hydroxide, KOH, can produce different products due to different reactions occurring.

(i) Elaborate on the reactions of 2-chloropropane with potassium hydroxide, KOH.

In your answer you should:

- identify the conditions of the reagent KOH
- explain the types of reaction that occur with the reagent in each condition
- draw structural formulae of the organic products.

ASSESSOR'S USE ONLY

(ii) Elaborate on chemical tests that could be used to identify the functional groups of the organic products formed in part (i).

In your answer, you should:

- identify chemicals and conditions required
- describe any observations
- state the type of reaction occurring
- explain why potassium permanganate solution, $KMnO_4(aq)$, cannot be used to distinguish between these organic products.

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

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English translation of the wording on the front cover

Level 2 Chemistry, 2018

91165 Demonstrate understanding of the properties of selected organic compounds

9.30 a.m. Monday 26 November 2018
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 in the Resource Booklet 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 2–19 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.