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translation of this cover

2

91165M



911655



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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Te Mātauranga Matū, Kaupae 2, 2013

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

9.30 i te ata Rātū 19 Whiringa-ā-rangi 2013
Whiwhinga: Whā

Paetae	Paetae Kaiaka	Paetae 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 mehemea e ōrite ana te Tau Ākonga ā-Motu kei tō pepa whakauru ki te tau kei runga ake nei.

Me whakautu e koe ngā pātai KATOA kei roto i te pukapuka nei.

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

Ki te hiahia koe ki ētahi atu wāhi hei tuhituhi whakautu, whakamahia te (ngā) whārangi kei muri i te pukapuka nei, ka āta tohu ai i ngā tau pātai.

Tirohia mēnā kei roto nei ngā whārangi 2–17 e raupapa tika ana, ā, kāore hoki he whārangi wātea.

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

TAPEKE

MĀ TE KAIMĀKA ANAKE

Kia 60 meneti hei whakautu i ngā pātai o tēnei pukapuka.

PĀTAI TUATAHI

- (a) E whakaaturia ana i raro ko ngā hanganga o ētahi pūhui whaiwaro he haumāota kei roto.

A	$\begin{array}{c} \text{Cl} \\ \\ \text{CH}_3\text{CHCH}_2\text{CH}_3 \end{array}$	B	$\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$
C	$\text{CH}_3\text{CH}_2\text{CHCCl}_2$	D	$\text{CH}_3\text{CH}_2\text{CHCHCl}$
E	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CHCl}_2$	F	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$

- (i) Tuhia te pū o te rāpoi ngota he waiwaro tahi haumāota tuarua.

- (ii) Whakaahuahia mai he aha koe i kōwhiri ai i te rāpoi ngota i (i).

- (b) Tautuhia kia rua ngā rāpoi ngota mai i te tūtohi i (a) he poinanaha hanganga o rāua anō.
Tuhia ngā pū ki ngā pouaka i raro.

 me te

Parahau i tō kōwhiringa.

(c) Ka taea e te rāpoi ngota **D** te tīari hei poinanaha āhuahanga (*cis* me *trans*).

(i) Tuhia ngā poinanaha (*cis* me *trans*) āhuahanga mō te rāpoi ngota **D** ki ngā pouaka i raro.

poinanaha <i>cis</i>	poinanaha <i>trans</i>

(ii) Parahautia te take ka taea e te rāpoi ngota **D** te tīari hei poinanaha āhuahanga (*cis* me *trans*).

Me whakauru ki tō whakautu:

- tētahi whakamārama o ngā whakaritenga mō ngā poinanaha *cis* me *trans*
- he kōrero mō te hanganga o te rāpoi ngota **D**.

You are advised to spend 60 minutes answering the questions in this booklet.

QUESTION ONE

- (a) The structures of some organic compounds containing chlorine are shown below.

A	$\begin{array}{c} \text{Cl} \\ \\ \text{CH}_3\text{CHCH}_2\text{CH}_3 \end{array}$	B	$\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$
C	$\text{CH}_3\text{CH}_2\text{CHCCl}_2$	D	$\text{CH}_3\text{CH}_2\text{CHCHCl}$
E	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CHCl}_2$	F	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$

- (i) Write the letter of the molecule that is a secondary chloroalkane.

- (ii) Describe why you chose the molecule in (i).

- (b) Identify two molecules from the table in (a) that are constitutional (structural) isomers of each other.

Write the letters in the boxes below.

 and

Justify your choice.

(c) Molecule **D** can exist as geometric (*cis* and *trans*) isomers.

(i) Draw the geometric (*cis* and *trans*) isomers for molecule **D** in the boxes below.

<i>cis</i> isomer	<i>trans</i> isomer

(ii) Justify why molecule **D** can exist as geometric (*cis* and *trans*) isomers.

Your answer should include:

- an explanation of the requirements for *cis* and *trans* isomers
- reference to the structure of molecule **D**.

- (d) Whakaotihia te tūtohi e whai ake hei whakaatu i te tātai hanganga me te ingoa (nahanaha) IUPAC mō ia pūhui.

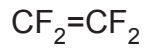
Tātai hanganga	Ingoa (nahanaha) IUPAC
	waikawa pēwaro
	waiwaro rua-1-pūwaro-3-mewaro
$\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$	
$\begin{array}{c} \text{CH}_3\text{CHCH}_2\text{OH} \\ \\ \text{Cl} \end{array}$	
$\begin{array}{c} \text{CH}_2\text{CHCH}_2\text{CH}_2\text{CH}_3 \\ \quad \\ \text{CH}_3 \quad \text{CH}_3 \end{array}$	

- (d) Complete the following table to show the structural formula and IUPAC (systematic) name for each compound.

Structural formula	IUPAC (systematic) name
	pentanoic acid
	3-methylbut-1-ene
$\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$	
$\begin{array}{c} \text{CH}_3\text{CHCH}_2\text{OH} \\ \\ \text{Cl} \end{array}$	
$\begin{array}{c} \text{CH}_2\text{CHCH}_2\text{CH}_2\text{CH}_3 \\ \quad \\ \text{CH}_3\text{CH}_3 \end{array}$	

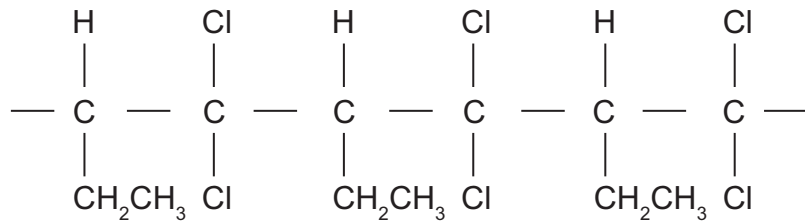
PĀTAI TUARUA

- (a) (i) Ko te rāpoi ngota haukōwhai-whā-waiwaro-rua-ewaro (tetrafluoroethene) e whakaaturia ana i raro, te waetahi mō te waerau e mōhiotia whānuitia ana ko Teflon.



Tuhia kia RUA ngā wae tāruarua mō te waerau Teflon ki te pouaka i raro.

- (ii) E whakaaturia ana i te hoahoa e whai ake nei ngā wāhanga tāruarua e toru o tētahi atu waerau.

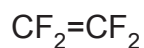


Tuhia te tātai hanganga o te rāpoi ngota waetahi ka whakamahia hei hanga i tēnei waerau.

QUESTION TWO

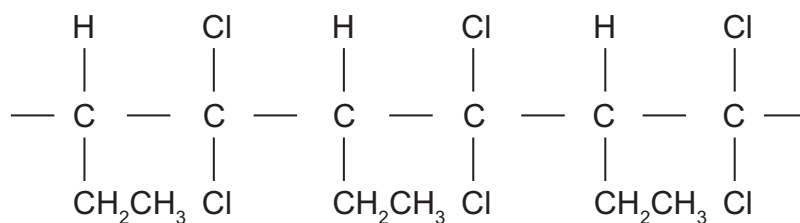
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- (a) (i) The molecule tetrafluoroethene, shown below, is the monomer for the polymer commonly known as Teflon.



Draw TWO repeating units for the Teflon polymer in the box below.

- (ii) The following diagram shows three repeating sections of another polymer.



Draw the structural formula of the monomer molecule used to make this polymer.

- waihā-1-pēwaro
- waihā ewaro
- waiwaro-rua-1-pēwaro
- pēwaro
- amino ewaro (ethanamine).

Kāore e hiahiatia kia whakauru whārite ki roto i tō whakautu.

(b) Five separate colourless organic liquids are known to be:

- pentan-1-ol
- ethanol
- pent-1-ene
- pentane
- ethanamine.

Write a valid method to show how each of these liquids can be identified using **only** water, litmus paper, and bromine water, $\text{Br}_2(aq)$.

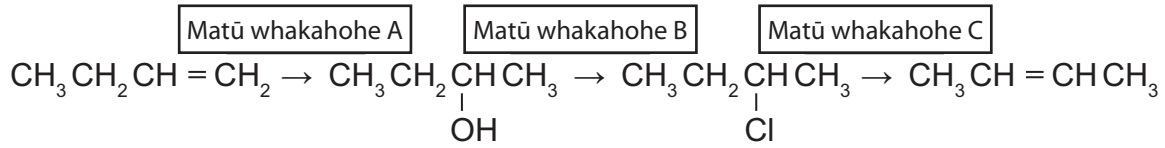
Your method should allow another student to identify these liquids, and include:

- the reagent used
- any observations made.

You do not need to include equations in your answer.

PĀTAI TUATORU

- (a) E whakaatu ana te hoahoa ripo i raro i tētahi mahere tauhohe mō te whakawhitinga o te waiwaro rua-1-pūwaro hei waiwaro rua-2-pūwaro.

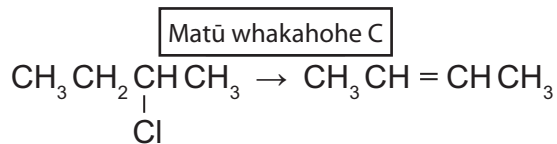


- (i) Whakamahia te mahere tauhohe i runga ake hei whakaoti i te tūtohi e whai ake kia whakaaturia ko:

- te tātai o ia matū whakahohe, me ngā āhuatanga e hiahiatia ana
- te tūmomo tauhohenga e mahi ana.

Matū whakahohe	Tātai o te matū whakahohe/ ngā āhuatanga	Tūmomo tauhohenga
A		
B		
C		

- (ii) Mō te tauhohenga e whai ake ana:



Porohitatia ngā kupu i raro e whakaahua ana i te hua i hangaia.

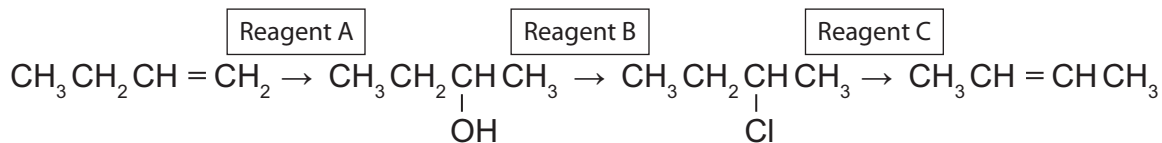
hua mātāmua

hua mātāmuri

Whakamāramahia tō whakautu.

QUESTION THREE

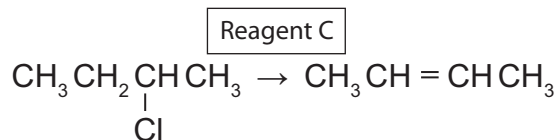
- (a) The flow diagram below shows a reaction scheme for the conversion of but-1-ene into but-2-ene.



- (i) Use the reaction scheme above to complete the following table to show:
- the formula of each reagent, including any necessary conditions
 - the type of reaction occurring.

Reagent	Formula of reagent / conditions	Type of reaction
A		
B		
C		

- (ii) For the following reaction:



Circle the words below that describe the product formed.

major product

minor product

Explain your answer.

- te tūmomo tauhohenga e mahi ana me te pūtake e kīia ana ko taua tūmomo
- te ingoa o te rōpū mahinga ka hangaia i ia hua
- te tātai hanganga o te hua **whaiwaro**.

Elaborate on the reactions of butan-1-ol with each of the three reagents.

- the type of reaction occurring and the reason why it is classified as that type
- the name of the functional group formed in each product
- the structural formula of the **organic** product.

He puka anō mēnā ka hiahiatia.
Tuhia te (ngā) tau pātai mēnā e hāngai ana.

TAU
PĀTAI

MĀ TE
KAIMĀKA
ANAKE

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

QUESTION
NUMBER

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Level 2 Chemistry, 2013

91165 Demonstrate understanding of the properties of selected organic compounds

9.30 am Tuesday 19 November 2013

Credits: Four

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 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 2–17 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.

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