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A' Level Chemistry

Year 2

Unit 15: Condensation Polymerisation

Summer Examination Revision Pack

The questions in this pack should be attempted **AFTER** completing all other revision.

Grade Accelerator

Recall Definitions
Drawing Diagrams
Using Equations
Drawing Graphs

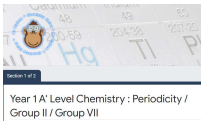
Quizlet

Quizlet Classes

Flashcard Based
Games
Tests & Quizzes
Keyword Spell Checker

Condensed Notes

Keywords & Definitions
Key Concepts
Application
Key Skills



Online Forms

Take Time to Answer
Use Paper & Calculator
Work It Out
Review Missed Marks

Use the 3 Wave Process when completing these revision packs.

1. Complete the questions without assistance
(Can't answer a question? Leave it and move on)
2. Use your notes to fill any gaps after step 1
3. Use the mark scheme to fill in any remaining gaps.

1. Having gaps after step 1 is normal, that's why we are doing revision!
2. If your notes don't help during step 2, they are not good enough!
(Change your note taking method and try to understand the problem)
3. If you don't understand why the mark scheme answer is correct, **see Andy.**

If you struggle with the questions in the pack, **STOP!** and complete some more revision.

If you come to a complete dead-end, **STOP!** and speak to **Andy** asap.

1 0 . 6 The action of heat on 5-hydroxyhexanoic acid can lead to two different products.

On gentle heating, 5-hydroxyhexanoic acid loses water to form a cyclic compound, **T** ($C_6H_{10}O_2$).

Under different conditions, 5-hydroxyhexanoic acid forms a polyester.

Draw the structure of **T**.

Draw the repeating unit of the polyester and name the type of polymerisation.

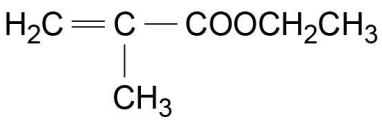
[3 marks]

Structure of **T**

Repeating unit of polyester

Type of polymerisation _____

1 0 . 7 Isomer **U** is shown.



U

The polymer formed by **U** and the polymer formed by 5-hydroxyhexanoic acid in Question **10.6** both contain ester groups that can be hydrolysed.

Draw the repeating unit of the polymer formed by **U**.

Justify the statement that, although both polymer structures contain ester groups, the polymer formed by **U** is not biodegradable.

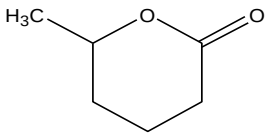
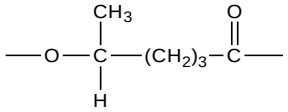
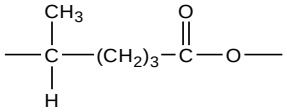
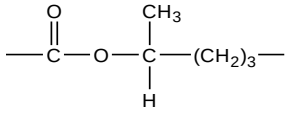
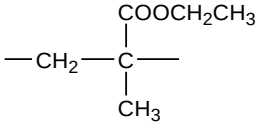
[3 marks]

Repeating unit of polymer formed by **U**.

Justification

21

Turn over for the next question

10.6	  OR   OR condensation	1 1 1	Must have trailing bonds Ignore brackets and *n* Ignore esterification
10.7	 Strong / non-polar C-C bonds (in the chain) cannot be attacked by nucleophiles/acids/cannot be hydrolysed. OR <u>Only</u> polar ester group Can be attacked by nucleophiles/acids/can be hydrolysed	M1 M2 M3 M2 M3	Must have trailing bonds Ignore brackets and *n* M3 dependent on correct *or close M2* Allow 1 mark for in (polar) ester link in side chain/not in main chain therefore polymer chain not broken

Do not write outside the box

Section A

Answer **all** questions in this section.

0 1 This question is about ethanedioic acid (HOOCCOOH) and the ethanedioate ion ($^{-}$OOCCOO^{-}).

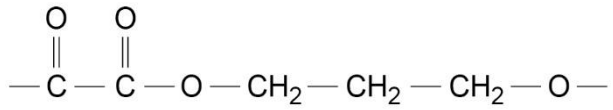
0 1 . 1 Ethanedioic acid reacts with propane-1,3-diol ($HOCH_2CH_2CH_2OH$) to form a polyester.

Draw the repeating unit of this polyester.

[2 marks]

0 1 . 2 Explain why polyesters are biodegradable but polyalkenes are not biodegradable.

[2 marks]

Question	Answers	Additional comments/Guidelines	Mark
1.1	 **M1** ester link including C–O–C **M2** rest of structure including trailing bonds	**ignore** brackets and 'n' **allow** $(CH_2)_3$ –O– at either end but **not** both **not** M2 if more than one repeating unit **allow** for one mark –OOCCOOCH$_2$CH$_2$CH$_2$– as long as trailing bonds included	 1 1

Question	Answers	Additional comments/Guidelines	Mark
1.2	polyesters: C=O/C–O **OR** polar bonds / chain **AND** polyalkenes: (only) C–C **OR** non-polar bonds / chain (polyesters) susceptible to nucleophilic attack / can be hydrolysed	**not** just 'polyesters are polar' **not** M1 if C=C mentioned	 1 1