EXAM PAPERS PRACTICE

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Level: CIE AS and A Level (9701)
Subject: Chemistry
Topic: CIE Chemistry
Type: Topic Question

Chemistry CIE AS & A Level
To be used for all exam preparation for 2025+

CHEMISTRY AS and A

This to be used by all students studying CIE AS and A level Chemistry (9701) But students of other boards may find it useful

Question 1.

(a) This question is about hydrolysis of polymers.

What is meant by a hydrolysis reaction?

_____

(1 mark)

(b) Describe the reaction conditions and state what occurs to the polyester during acid hydrolysis.

_____

_____

(2 marks)

(c) Outline the difference in the product(s) between acid and base hydrolysis of a polyester.

_____

_____

(2 marks)

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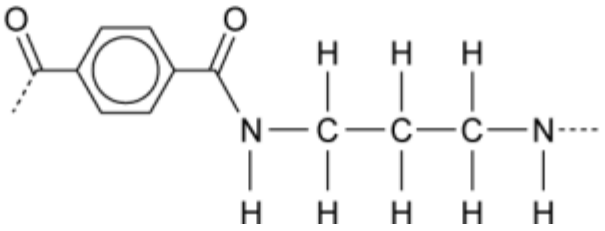
(d) Draw structures for the products of acid and base hydrolysis of the following polymer:



_____

_____

(4 marks)

Question 2.

(a) Nylon is an example of a synthetic polyamide and contains the same links as polypeptides. Nylon is the general name for a family of polyamides. A section of a nylon polymer is shown in Fig. 1.1.

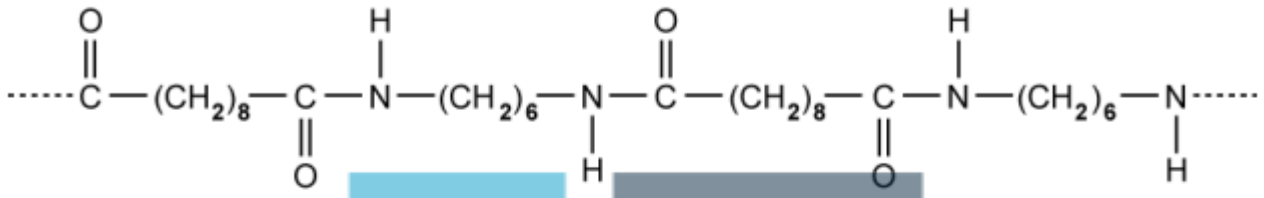


Fig. 1.1

i) Draw the structures of **two** monomers that could be used to make this nylon.

[2]

ii) State the type of polymerisation involved in the formation of this nylon.

[1]

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(3 marks)

(b) Nylon can be used to make clothing. Suggest why nylon should be protected from spillages of strong acids and alkalis.

(5 marks)

(c) Nomex shown in Fig. 1.2 has a higher melting point than nylon and is used to make the flame resistant body suits worn by racing drivers.

Suggest a reason why the melting point of Nomex is higher than that of nylon.

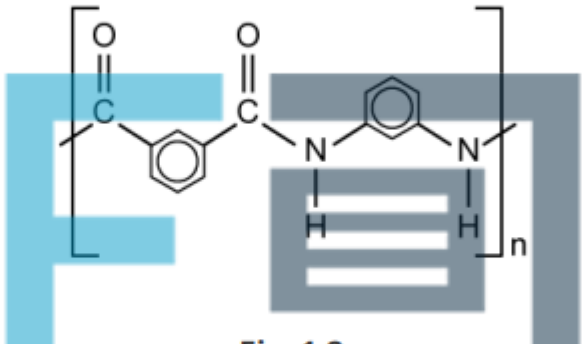

Fig. 1.2

_____

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_____

(2 marks)

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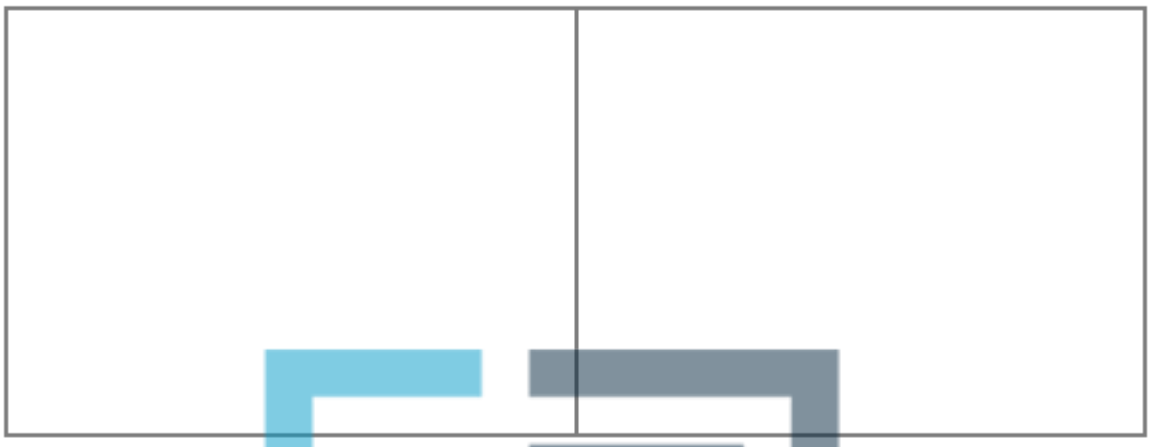
(d) i) Draw the **two** monomers that are used to manufacture Nomex



[2]

ii) State the formula of any by-products produced.

[1]

(3 marks)

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Question 3.

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(a) i) Name an example of a synthetic polyester and a synthetic polyamide.

polyester

[1]

polyamide

[1]

ii) Polyesters and polyamides are formed by condensation reactions.

Name a molecule which is commonly eliminated in such reactions.

[1]

(3 marks)

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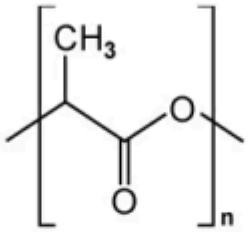
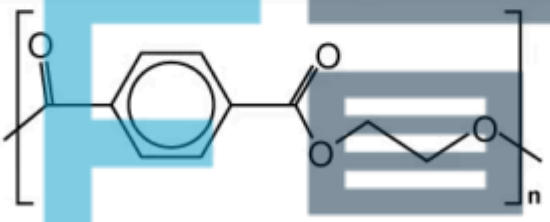
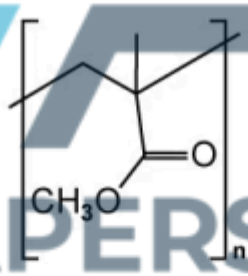
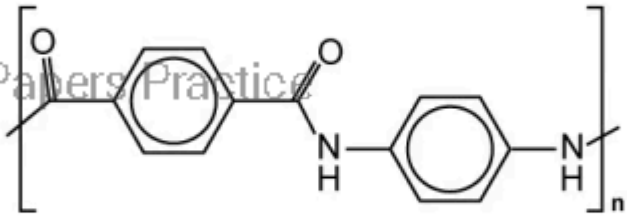
(b) Table 2.1 shows the repeat units of a number of polymers. Place a tick (✓) against the ones which are biodegradable.

Table 2.1

Polymer	Repeat Unit	Biodegradable
A		
B		
C		
D		

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_____

_____

(2 marks)

(c) Draw the structures of **two** monomers used to form polymer **B**.

_____

_____

(2 marks)

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Question 4.

(a) A section of polypeptide was hydrolysed and the amino acids in Table 3.1 were identified.

Table 3.1

Amino Acid	Formula
T	$CH_3CH(NH_2)CO_2H$
U	$C_6H_5CH_2CH(NH_2)CO_2H$
V	$H_2N(CH_2)_4CH(NH_2)CO_2H$

Which of the amino acids **T**, **U** or **V** has the highest pH in an aqueous solution? Explain your answer.

Amino acid .....

.....

(1 mark)

(b) State how many different dipeptides could be formed from a reaction mixture consisting of amino acids **T** and **U**.

.....

(1 mark)

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(c) Polypeptides contain a high proportion of carbon and hydrogen in their structures, yet many are soluble in water. By referring to the structure of a polypeptide, explain why.

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(2 marks)