

Synthetic polymers

Question Paper 1

Level	IGCSE
Subject	Chemistry (0620/0971)
Exam Board	Cambridge International Examinations (CIE)
Topic	Organic chemistry
Sub-Topic	Synthetic polymers
Booklet	Question Paper 1

Time Allowed: 26 minutes

Score: /21

Percentage: /100

Grade Boundaries:

9	8	7	6	5	4	3	2	1
>85%	75%	68%	60%	53%	48%	40%	33%	<25%

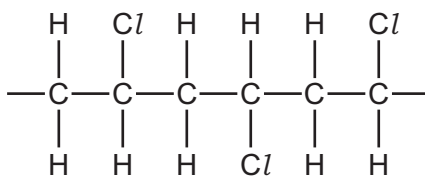
1 A macromolecule is a very large molecule.

Macromolecules can be made by joining smaller molecules together. This is called polymerisation.

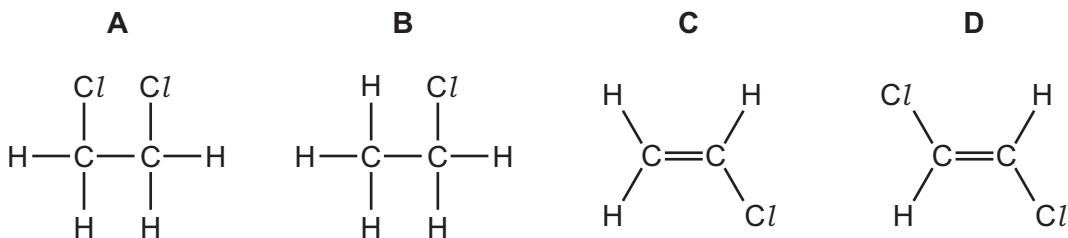
Which row in the table describes the formation of a polymer?

	monomer	polymer
A	ethane	poly(ethane)
B	ethene	poly(ethene)
C	ethane	poly(ethene)
D	ethene	poly(ethane)

2 The diagram shows three repeat units in the structure of an addition polymer.



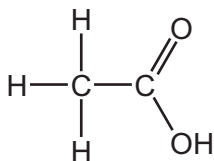
Which alkene monomer is used to make this polymer?



3 Which process does **not** produce carbon dioxide?

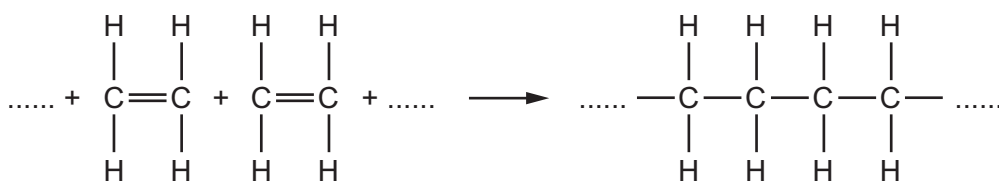
- A** combustion of methane
- B** fermentation of sugar
- C** polymerisation of ethene
- D** respiration

- 4 The diagram shows a molecule of an organic compound W.



Which statement is **not** correct?

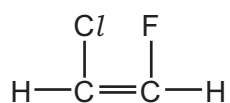
- A A solution of W in water has a pH greater than pH 7.
 - B A solution of W in water reacts with sodium hydroxide solution.
 - C When copper(II) carbonate is added to a solution of W in water, a gas is produced.
 - D When magnesium is added to a solution of W in water, a gas is produced.
- 5 Ethene forms an addition polymer as shown.



Which terms describe this polymer?

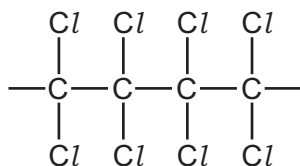
- A a saturated compound called poly(ethane)
- B a saturated compound called poly(ethene)
- C an unsaturated compound called poly(ethane)
- D an unsaturated compound called poly(ethene)

6 The structure of a monomer is shown.

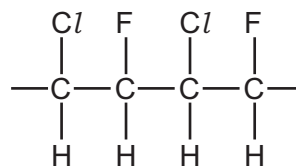


Which polymer can be made from this monomer?

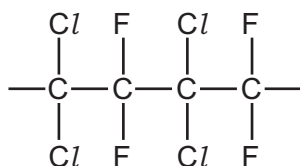
A



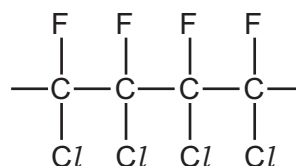
B



C



D



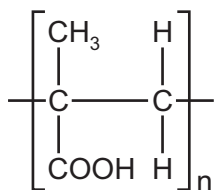
7 In which row are the monomer and polymer chain correctly matched?

	monomer	part of the polymer chain
A	$\text{CH}_3\text{CH}=\text{CHCH}_3$	$-\text{CH}(\text{CH}_3)-\text{CH}(\text{CH}_3)-\text{CH}(\text{CH}_3)-\text{CH}(\text{CH}_3)-$
B	$\text{CH}_2=\text{CHCl}$	$-\text{CHCl}-\text{CHCl}-\text{CHCl}-\text{CHCl}-$
C	$\text{CH}_3\text{CH}=\text{CH}_2$	$-\text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}_3-\text{CH}-\text{CH}_2-$
D	$\text{CH}_2=\text{CHCH}_2\text{CH}_3$	$-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}(\text{CH}_2\text{CH}_3)-$

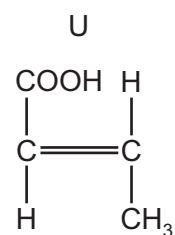
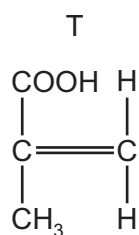
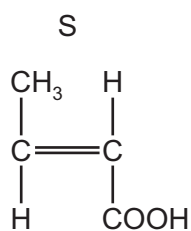
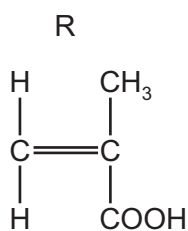
8 Which two polymers have the same linkages bonding the monomers together?

- A** nylon and complex carbohydrate
- B** nylon and protein
- C** *Terylene* and complex carbohydrate
- D** *Terylene* and protein

9 A polymer has the formula shown.



From which monomers can it be formed?



A R and S

B R and T

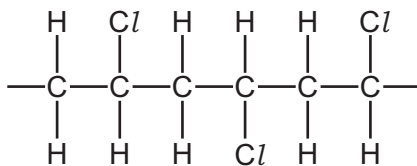
C S and U

D T and U

10 Which row shows a natural polymer with the same linkages as a synthetic polymer?

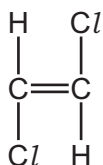
	natural polymer	synthetic polymer
A	complex carbohydrate	nylon
B	complex carbohydrate	<i>Terylene</i>
C	protein	nylon
D	protein	<i>Terylene</i>

11 The partial structure of an addition polymer is shown.

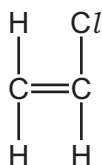


What is the structure of the monomer used to make this polymer?

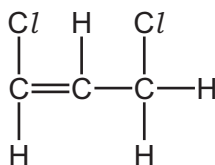
A



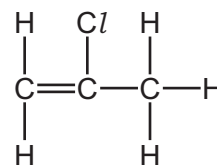
B



C



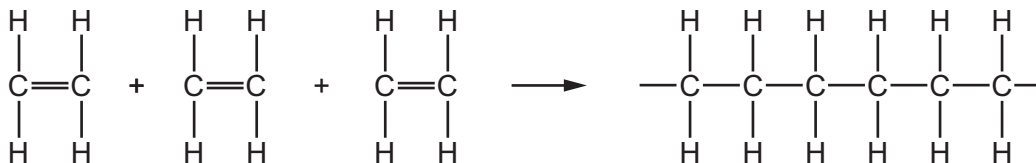
D



12 Which statement about polymers is correct?

- A** Addition polymers are all biodegradable.
- B** Condensation polymers can all be hydrolysed to give amino acids.
- C** Condensation polymers only exist in nature.
- D** Forming addition polymers produces only one product.

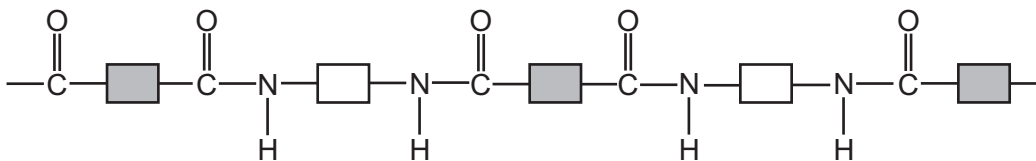
13 Molecules of a substance react together as shown.



Which type of reaction has taken place?

- A cracking
- B oxidation
- C polymerisation
- D reduction

14 The structure of a synthetic polymer is shown.

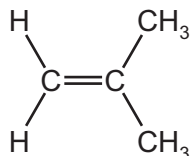


The structure shows that it is a1..... . It is formed by2..... polymerisation.

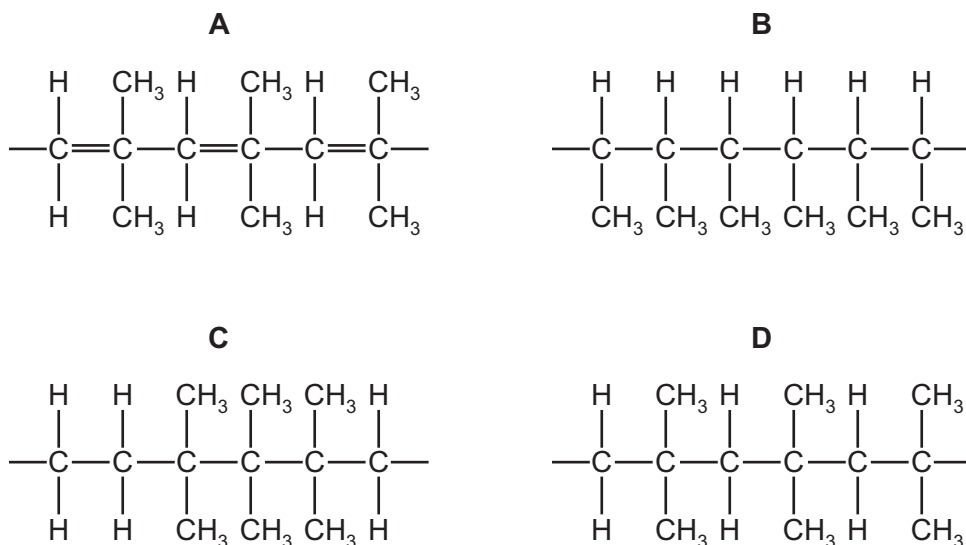
Which words complete gaps 1 and 2?

	1	2
A	polyamide	addition
B	polyamide	condensation
C	polyester	addition
D	polyester	condensation

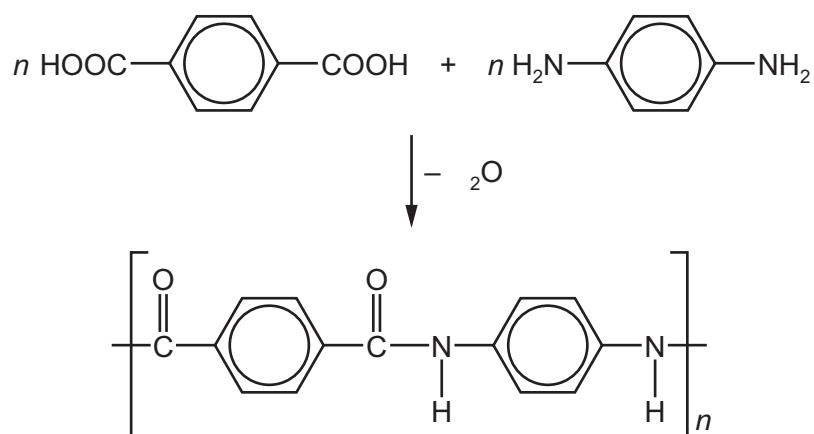
15 A polymer can be made from methyl propene.



Which diagram shows the structure of the polymer?



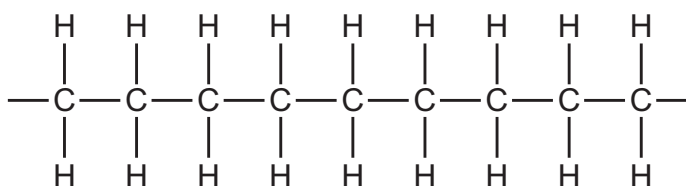
16 The equation shows the formation of a polymer called *Kevlar*.



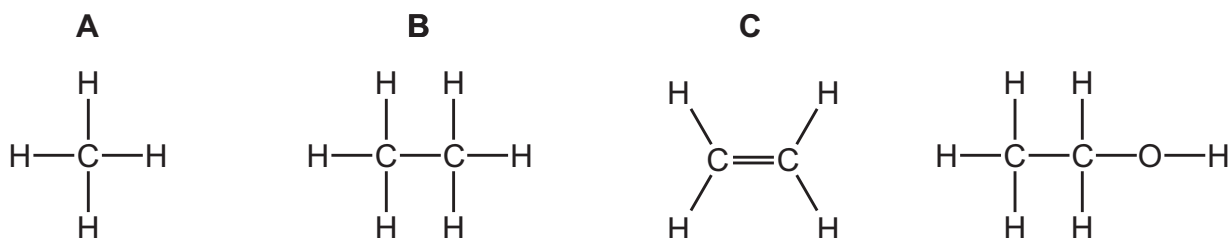
Which row describes *Kevlar*?

	how the polymer is formed	type of polymer
A	addition polymerisation	polyamide
B	addition polymerisation	polyester
C	condensation polymerisation	polyamide
D	condensation polymerisation	⁸ polyester

17 The diagram shows part of the molecule of a polymer



Which diagram shows the monomer from which this polymer could be manufactured?



18 Poly(ethene), nylon and *Terylene* are all polymers.

From which small units are all polymers made?

- A alkenes
- B monomers
- C plastics
- D proteins

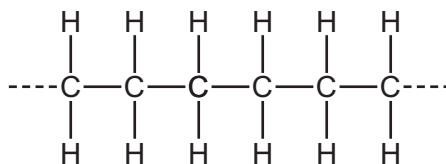
19 Polyesters and polyamides are types of synthetic polymer.

Which statements are correct?

- 1 They are made by addition polymerisation.
- 2 They are made by condensation polymerisation.
- 3 The monomers from which they are made are unsaturated hydrocarbons.
- 4 The monomers from which they are made contain reactive functional groups at their ends.

- A 1 and 3 B 1 and 4 C 2 and 3 D 2 and 4

20 The diagram shows the structure of an important product.



This product is formed by 1 of an 2

Which words complete gaps 1 and 2?

	1	2
A	addition polymerisation	alkane
B	addition polymerisation	alkene
C	cracking	alkane
D	cracking	alkene

21 Which pair of compounds reacts to form a condensation polymer?

- A** CH_3COOH and $\text{C}_2\text{H}_5\text{NH}_2$
- B** HCOOH and $\text{HOC}_2\text{H}_4\text{OH}$
- C** $\text{HOC}_6\text{H}_{12}\text{OH}$ and $\text{HOCC}_3\text{H}_6\text{COOH}$
- D** $\text{H}_2\text{NC}_2\text{H}_4\text{NH}_2$ and $\text{HOC}_3\text{H}_6\text{OH}$