

A level Chemistry A

H432/02 Synthesis and analytical techniques

Question Set 10

1. This question is about organic compounds containing nitrogen.

(a) Sodium cyanide, NaCN, can be reacted with many organic compounds to increase the length of a carbon chain.

(i) 1-Chloropropane, $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$, reacts with ethanolic sodium cyanide by nucleophilic substitution.

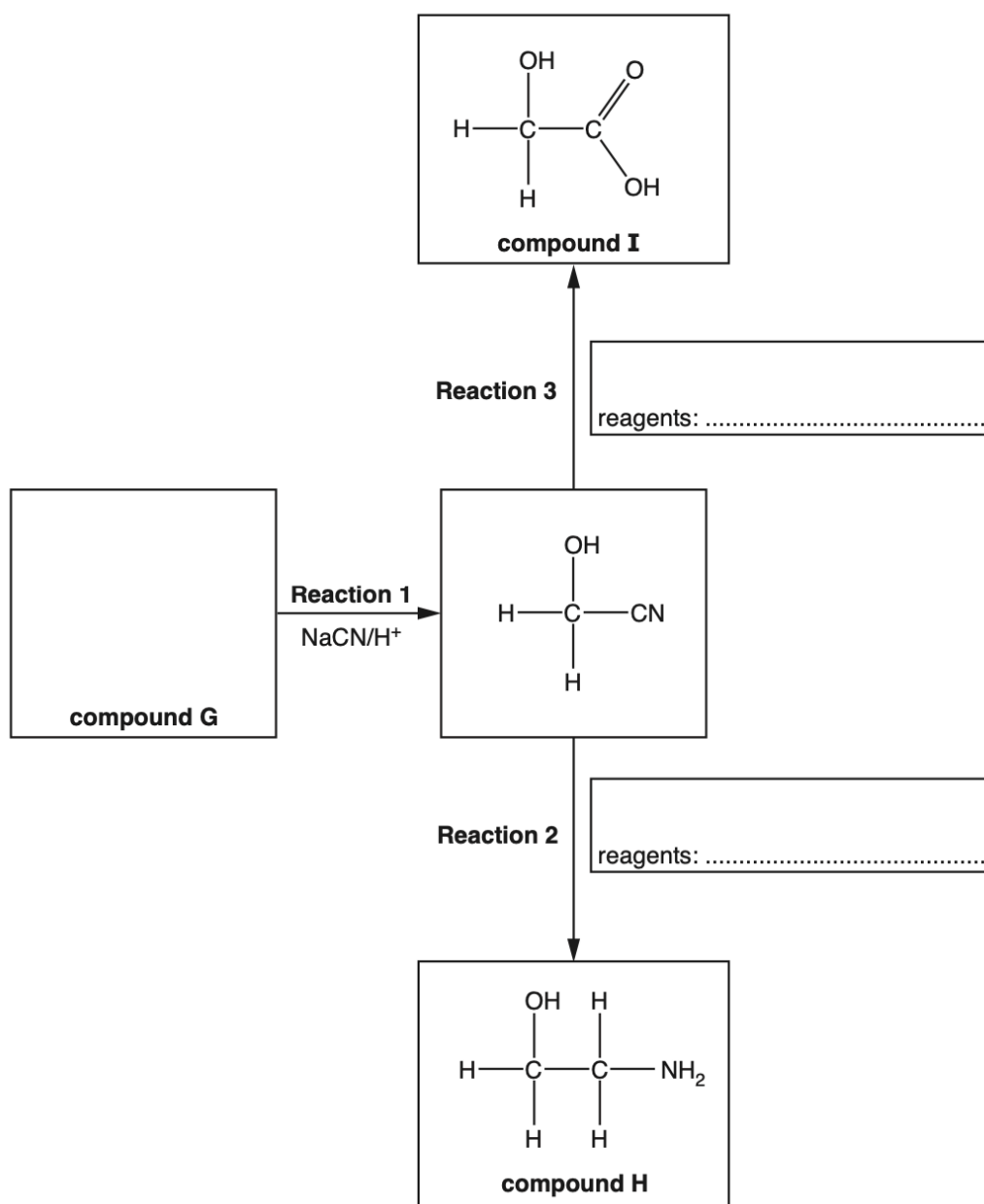
Outline the mechanism for this reaction.

Include curly arrows, relevant dipoles and the structure of the organic product.

[3]

(ii) Compound **G** is used to synthesise compounds **H** and **I** as shown in the flowchart below.

Complete the flowchart showing the structure of compound **G** and the formulae of the reagents for **Reaction 2** and **Reaction 3**.



[3]

Compound **H** reacts with dilute hydrochloric acid to form a salt.

Explain why compound **H** can react with dilute hydrochloric acid and suggest a structure for the salt formed.

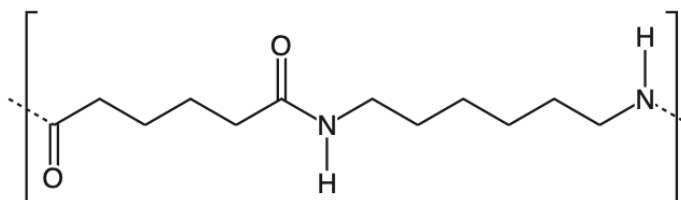
[2]

(iii) Compound **I** is the monomer for the biodegradable polymer **J**.

Draw **two** repeat units of polymer **J** and suggest a reason why it is biodegradable.

[3]

(b) The repeat unit of Nylon 6,6 is shown below.



Nylon 6,6

(i) Draw the structures of **two** monomers that can be used to form Nylon 6,6.

[2]

A sample of Nylon 6,6 has a relative molecular mass of 21500.

(ii) Estimate the number of repeat units in the sample.

Give your answer as a **whole** number.

[1]

Total Marks for Question Set 10: 14

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