

CHAPTER 26 CARBONYL CONTAINING COMPOUNDS

- 1 (a) Write an equation for the formation of methyl propanoate, $\text{CH}_3\text{CH}_2\text{COOCH}_3$, from methanol and propanoic acid.

.....
(1 mark)

- (b) Name and outline a mechanism for the reaction between methanol and propanoyl chloride to form methyl propanoate.

Name of mechanism

Mechanism

(5 marks)

- (c) Propanoic anhydride could be used instead of propanoyl chloride in the preparation of methyl propanoate from methanol. Draw the structure of propanoic anhydride.

(1 mark)

- (d) (i) Give **one** advantage of the use of propanoyl chloride instead of propanoic acid in the laboratory preparation of methyl propanoate from methanol.

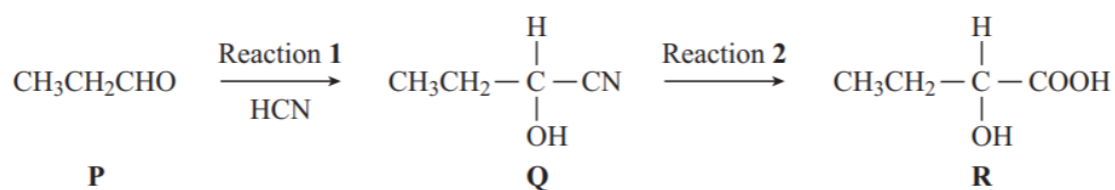
.....
.....

- (ii) Give **one** advantage of the use of propanoic anhydride instead of propanoyl chloride in the industrial manufacture of methyl propanoate from methanol.

.....
.....

(2 marks)

2 Consider the sequence of reactions below.



- (a) Name and outline a mechanism for Reaction 1.

Name of mechanism

Mechanism

(5 marks)

(b) (i) Name compound **Q**

.....

(ii) The molecular formula of **Q** is C_4H_7NO . Draw the structure of the isomer of **Q** which shows geometrical isomerism and is formed by the reaction of ammonia with an acyl chloride.

(3 marks)

(c) Draw the structure of the main organic product formed in each case when **R** reacts separately with the following substances:

(i) methanol in the presence of a few drops of concentrated sulphuric acid;

(ii) acidified potassium dichromate(VI);

(iii) concentrated sulphuric acid in an elimination reaction.

(3 marks)

- 3 (a) Name and outline a mechanism for the reaction between propanoyl chloride, $\text{CH}_3\text{CH}_2\text{COCl}$, and methylamine, CH_3NH_2

Name of mechanism

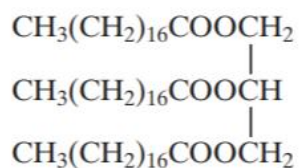
Mechanism

(5 marks)

- (b) Draw the structure of the organic product.

(1 mark)

- 4 A naturally-occurring triester, shown below, was heated under reflux with an excess of aqueous sodium hydroxide and the mixture produced was then distilled. One of the products distilled off and the other was left in the distillation flask.



- (a) Draw the structure of the product distilled off and give its name.

Structure

Name

- (b) Give the formula of the product left in the distillation flask and give a use for it.

Formula

Use

(4 marks)