

Name of the Student: _____

Max. Marks : 23 Marks

Time : 23 Minutes

Q1.

- (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)

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

Name of mechanism _____

Mechanism

(5)

- (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)

- (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)

- (e) An ester contains a benzene ring. The mass spectrum of this ester shows a molecular ion peak at $m/z = 136$.

- (i) Deduce the molecular formula of this ester.

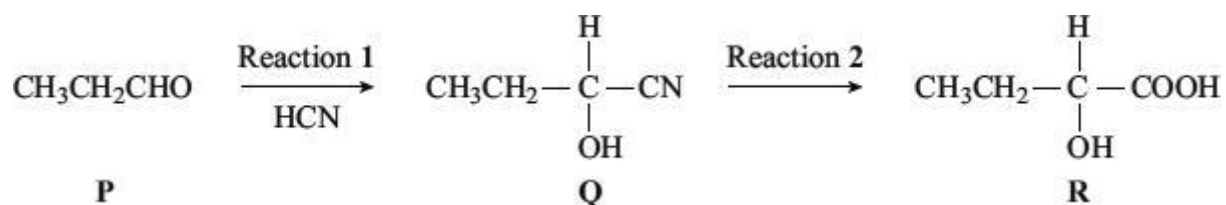
- (ii) Draw **two** possible structures for this ester.

(3)

(Total 12 marks)

Q2.

Consider the sequence of reactions below.



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

Name of mechanism _____

Mechanism

(5)

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

- (ii) The molecular formula of **Q** is $\text{C}_4\text{H}_7\text{NO}$. 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)

- (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)

(Total 11 marks)