

Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Q1.

Acyl chlorides are useful reagents in synthesis. They react with aromatic compounds and also with alcohols.

- (a) $\text{CH}_3\text{CH}_2\text{COCl}$ reacts with benzene in the presence of AlCl_3 in an electrophilic substitution reaction.

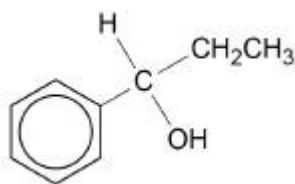
Give an equation for the reaction of $\text{CH}_3\text{CH}_2\text{COCl}$ with AlCl_3 to form the electrophile.
Outline a mechanism for the reaction of this electrophile with benzene.

Equation _____

Mechanism _____

(4)

- (b) The organic product in **part (a)** can be converted into the alcohol shown.



Give the IUPAC name of the alcohol.

Give the reagent needed for this reaction and name the mechanism.

IUPAC name _____

Reagent _____

Name of mechanism _____

(3)

- (c) The alcohol shown in **part (b)** reacts with ethanoyl chloride to form an ester.

Describe what would be observed when the alcohol reacts with ethanoyl chloride.
Name the mechanism for the reaction to form the ester.
Draw the structure of the ester.

Observation _____

Name of mechanism _____

Structure of ester

(3)

(Total 10 marks)

Q2.

Use the Data Booklet to help you answer this question.

This question is about amino acids and peptide (amide) links.

(a) Draw the structure of the zwitterion formed by phenylalanine.

(1)

(b) Draw the structure of serine at high pH.

(1)

(c) Draw the structures of both dipeptides formed when phenylalanine reacts with serine.

In each structure show all the atoms and bonds in the amide link.

(2)

(d) An amide link is also formed when an acyl chloride reacts with a primary amine.

Name and outline a mechanism for the reaction between $\text{CH}_3\text{CH}_2\text{COCl}$ and $\text{CH}_3\text{CH}_2\text{NH}_2$

Give the IUPAC name of the organic product.

Name of mechanism _____

Mechanism

IUPAC name of organic product _____

(6)
(Total 10 marks)