A-LEVEL CHEMISTRY • EXERCISE SHEET

33.2 Esters

Name: _____ Class: _____ Date: _____ **Total: 22 marks**

KEY WORDS acyl chloride酰氯 • ester酯 • phenol苯酚 • benzoic acid苯甲酸 • alcohol醇

Objective

Build the skills to answer exam questions on **esters** 酯 — how they are made from an acyl chloride, naming them, and recognising the ester link.

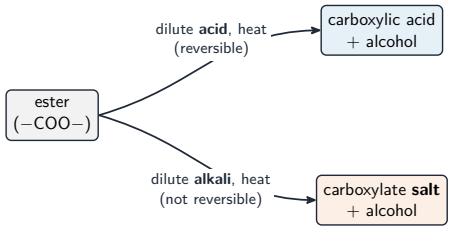
You must be able to:

- make an ester from an alcohol (or phenol) and an acyl chloride
- name an ester from its structure (and vice versa)
- write equations for ester formation

1 Worked examples

■ Making and naming esters

Alcohol (or phenol) + acyl chloride → ester + HCl, at room temperature



Esters are hydrolysed back to acid and alcohol

- **alcohol/phenol + acyl chloride → ester + HCl.**
- e.g. ethanol + ethanoyl chloride → ethyl ethanoate; phenol + benzoyl chloride → phenyl benzoate.

- **naming:** the alcohol part gives the first word ("ethyl"), the acid part gives the second ("…anoate").

2 Practice

2.1 Name the ester $CH_3COOCH_2CH_3$. [1]

2.2 Name the two organic starting materials (an acyl chloride + an alcohol) for ethyl ethanoate. [2]

3 Exam-style questions

3.1 The ester $HCOOCH_3$ is named: [1]

A methyl methanoate
B methyl ethanoate
C ethyl methanoate
D methanoyl methane

3.2 Phenyl benzoate is made from benzoyl chloride and: [1]

A benzene
B phenol
C benzoic acid
D phenylamine

3.3 Methanol reacts with ethanoyl chloride.

(a) Write the equation. [2]

(b) Name the ester formed. [1]

3.4 Draw the structure of propyl methanoate and circle the **ester link**. [2]

3.5 Ethanoyl chloride, CH_3COCl, reacts with propan-1-ol.

(a) Write the equation, name the ester formed, and state one observation. [3]

(b) Explain why an acyl chloride is used rather than the carboxylic acid when a high yield is wanted. [3]

(c) Draw the ester link, and give the systematic name of the ester made from **propanoyl chloride and ethanol**. [3]

(d) The ester in (a) is refluxed with dilute sulfuric acid. Name the two organic products, and explain why an excess of water is used. [3]