Exercise walk-through

Carboxylic acids ▪ 11.7

eXercise

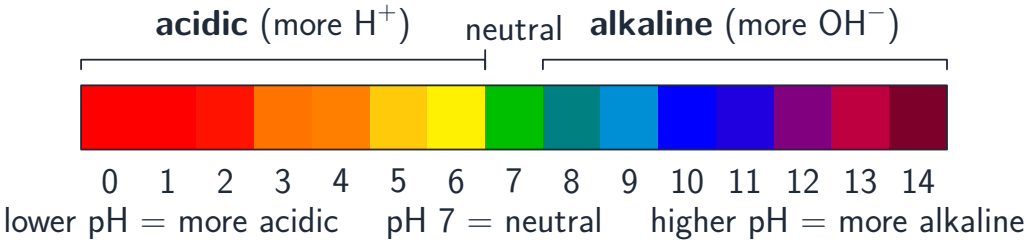
You must be able to

- give the reactions of carboxylic acids (with metals, bases, carbonates)
- describe making ethanoic acid by oxidising ethanol
- describe the formation of an ester

Method — Reactions of ethanoic acid

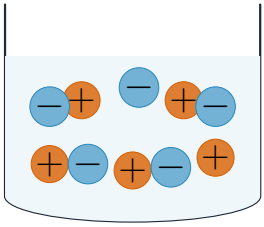
- metal → ethanoate salt + hydrogen.
- base → salt + water; + carbonate → salt + water + CO .
- **made by:** oxidising ethanol (acidified KMnO , or bacteria → vinegar).
- alcohol (acid catalyst) → an **ester**.

Method — Reactions of ethanoic acid

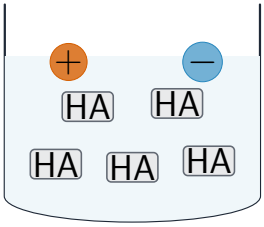


The pH scale — carboxylic acids are weak acids

Method — Reactions of ethanoic acid



strong acid
fully split into ions (e.g. HCl)



weak acid
mostly molecules, few ions (e.g. ethanoic acid)

Carboxylic acids are weak acids

Practice 2.1 ▪ 1 mark

State the functional group in a carboxylic acid.

Solution 2.1

Method: Reactions of ethanoic acid

Worked steps

–COOH (the carboxyl group) B1.

Practice 2.2 ▪ 1 mark

Name the type of compound formed when a carboxylic acid reacts with an alcohol.

Solution 2.2

Method: Reactions of ethanoic acid

Worked steps

an ester B1.

Exam-style 3.1 ▪ 1 mark

Ethanoic acid reacts with a carbonate to give a salt, water and:

A hydrogen

B oxygen

C carbon dioxide

D chlorine

Solution 3.1

Method: Reactions of ethanoic acid

A hydrogen

B oxygen

C carbon dioxide ✓

D chlorine

Worked steps

C. Acid + carbonate → salt + water + carbon dioxide.

Exam-style 3.2 ▪ 1 mark

Ethanoic acid can be made by oxidising ethanol.
(a) Name a reagent that oxidises ethanol to ethanoic acid.
(b) Name the everyday product made when ethanol is oxidised by bacteria.

Solution 3.2

Method: Reactions of ethanoic acid

Worked steps

(a) acidified potassium manganate(VII) B1.
(b) vinegar B1.

Exam-style 3.3 ▪ 2 marks

Magnesium reacts with ethanoic acid. Name the two products.

Solution 3.3

Method: Reactions of ethanoic acid

Worked steps

magnesium ethanoate B1; hydrogen B1.