Solutions

Each answer shows the steps, then the **result**.

2.1

- $2CH_3COOH + Na_2CO_3 \rightarrow 2CH_3COONa + H_2O + CO_2$

2.2

- add a carbonate (e.g. sodium carbonate); effervescence / fizzing of CO_2 is seen

2.3

- **sodium propanoate**, CH_3CH_2COONa

2.4

- **ethanoic acid**

3.1 B

- $LiAlH_4$ reduces a carboxylic acid to a primary alcohol

3.2 B

- A reactive metal gives a salt and hydrogen

3.3

(a)

- $CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$; neutralisation

(b)

- acidified $K_2Cr_2O_7$ (or $KMnO_4$); heat under reflux

3.4

- carboxylic acids are acidic – they release H^+ which reacts with the carbonate to give CO_2; alcohols are not acidic enough to react with a carbonate

3.5

(a)

- $CH_3COOH + C_2H_5OH \rightleftharpoons CH_3COOC_2H_5 + H_2O$
- **ethyl ethanoate**

(b)

- it is a catalyst

3.6

- both form hydrogen bonds, but ethanoic acid molecules form two hydrogen bonds to each other (dimers), through both the C=O and the O–H
- so the intermolecular forces are stronger and more energy is needed to separate the molecules