

Exercise walk-through

4.5.3

Carboxylic derivatives and condensation links

Pearson Edexcel · International A-Level · Chemistry

Find the temperature boundary

Your turn

$\Delta H = +36.0 \text{ kJ mol}^{-1}$; $\Delta S(\text{system}) = +120 \text{ J mol}^{-1} \text{ K}^{-1}$. Which condition gives positive total entropy?

- A. T below 300 K
- B. T above 300 K
- C. Every temperature
- D. No temperature

Buffer after neutralisation

Your turn

0.0100 mol HA receives 0.00400 mol OH^- . Which HA:A⁻ ratio enters the buffer expression?

- A. 10:4
- B. 6:4
- C. 4:6
- D. 10:6

Independent structural identification

Your turn

$\text{C}_3\text{H}_6\text{O}$ has two carbon-13 signals, gives iodoform and no Tollens' silver. Which structure fits?

- A. Propanal
- B. Propanone
- C. Propan-1-ol
- D. Ethanoic acid

Exercises 2.1·2.3

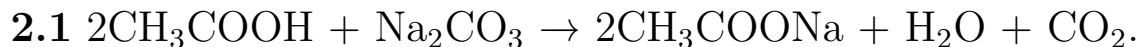
2.1 Write a balanced equation for ethanoic acid with sodium carbonate. [3]

2.2 Name the ester made from propanoic acid and methanol, with reagent conditions. [2]

2.3 Write products of ethanoyl chloride with water and with ethanol. [2]

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2.2 Name the ester made from propanoic acid and methanol, with reagent conditions. [2]

2.2 Methyl propanoate; heat with an acid catalyst.

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Exercises 3.1·3.2

3.1 Write the overall equation for ethanoyl chloride with excess methylamine. Explain why two methylamine molecules appear. [4]

3.2 Compare acid and alkaline hydrolysis of methyl propanoate. Name both organic products in each case and explain why the alkaline process is driven strongly toward products. [4]

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3.1 $\text{CH}_3\text{COCl} + 2\text{CH}_3\text{NH}_2 \rightarrow \text{CH}_3\text{CONHCH}_3 + \text{CH}_3\text{NH}_3\text{Cl}$. One amine forms the amide; the other accepts HCl.

3.2 Compare acid and alkaline hydrolysis of methyl propanoate. Name both organic products in each case and explain why the alkaline process is driven strongly toward products. [4]

3.2 Acid: propanoic acid and methanol, reversible. Alkali: propanoate salt and methanol; formation of carboxylate removes the free acid from the esterification equilibrium and drives the process.

Exercise 3.3

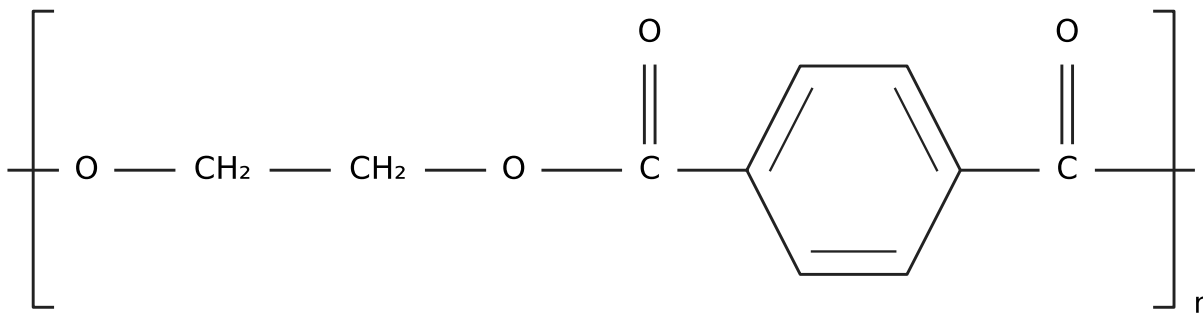
3.3 Draw one terylene repeat unit from ethane-1,2-diol and benzene-1,4-dicarboxylic acid.
Show brackets and open bonds. [4]

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3.3

Terylene: completed repeat unit with para benzene links



From ethane-1,2-diol and benzene-1,4-dicarboxylic acid; ester links form by condensation.

B1 diol skeleton; B1 para aromatic skeleton; B1 correct ester links/carbonyls; B1 brackets with open bonds and n.