**Question 22** (6 marks)

A student prepared the compound methyl propanoate in a school laboratory.

(a) Give a common use for the class of compounds to which methyl propanoate belongs.

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Methyl propanoate is an ester (alkanol + alkanonic acid) and is used in cosmetics and perfumes.
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(b) In the preparation of this compound a few drops of concentrated sulfuric acid were added to the starting materials. The mixture was then refluxed for a period of time.

Why was it necessary to reflux the mixture?

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Refluxing ensures that no volatile gases are escape into the atmosphere.
Refluxing also allows the reaction to be carried out at higher temperatures.
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(c) Name the TWO reactants used in preparing the methyl propanoate and draw their structural formulae.

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methanol and propanoic acid are needed to form an ester.

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\text{H}_3\text{C} & \quad \text{O} - \text{H} \\
\text{H} - \text{C} & \quad \text{O} - \text{H} \\
\text{H} - \text{C} - \text{C} & \quad \text{O} - \text{H}
\]

Methanol \((\text{CH}_3\text{OH})\) and propanoic acid \((\text{C}_3\text{H}_7\text{COOH})\).
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