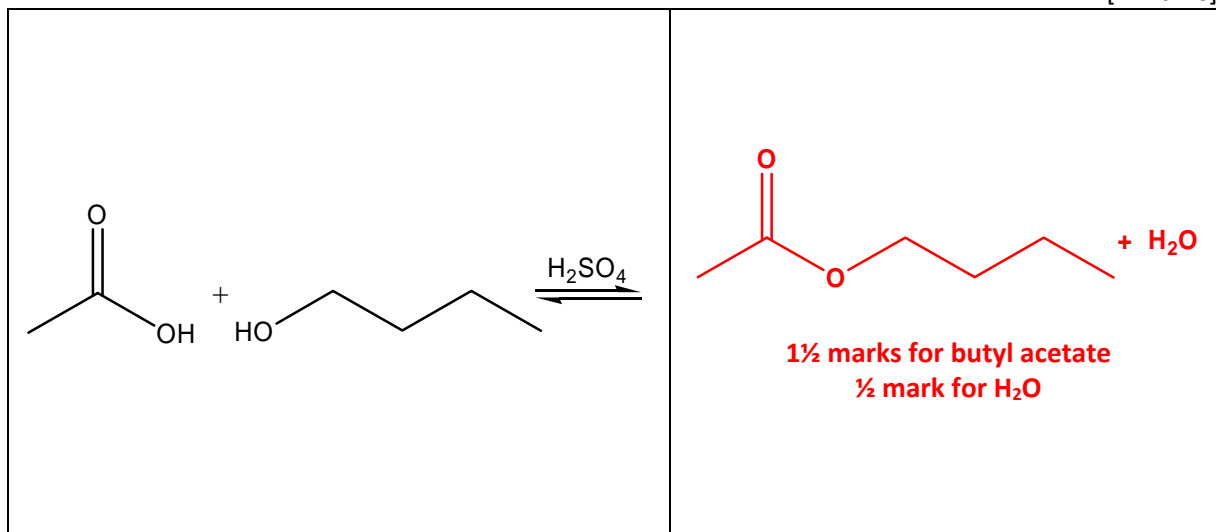


Q14 Carboxylic acids and derivatives

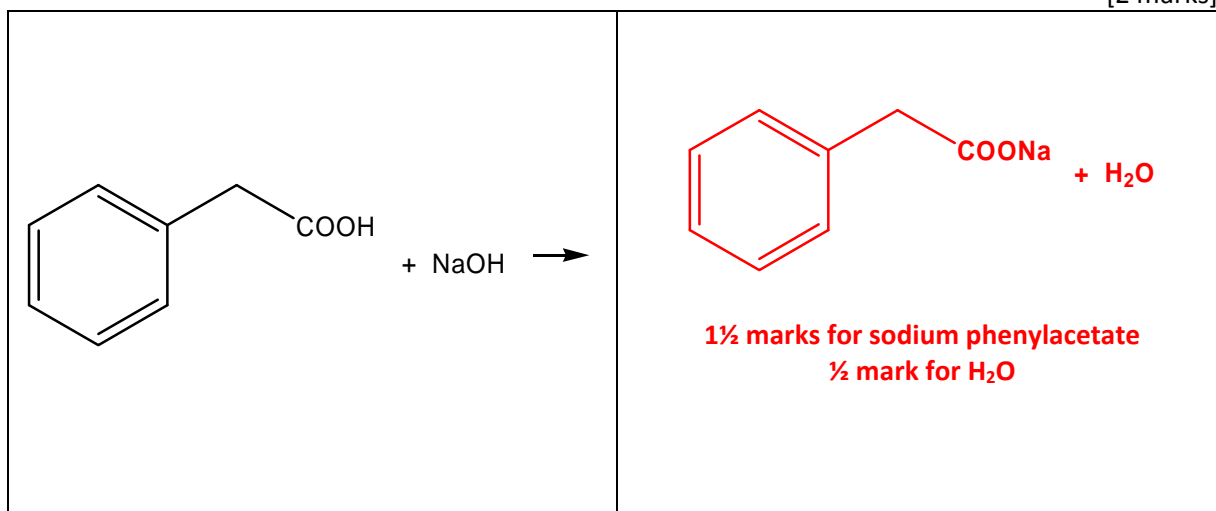
[4 + 2 + 1 = 7 marks]

- a) Draw the structural formula for all of the expected product(s) for the following reactions.
Hint: If no reaction occurs, write "no reaction".
Hint: You do not have to name the products.

[2 marks]



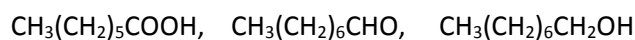
[2 marks]



Q14 (continued) Carboxylic acids and derivatives

[4 + 2 + 1 = 7 marks]

- b) Arrange the compounds in the following set in order of increasing solubility in water. (lowest first)



Briefly explain why you chose this order.

[2 marks]

Lowest **$\text{CH}_3(\text{CH}_2)_6\text{CHO}$** < **$\text{CH}_3(\text{CH}_2)_6\text{CH}_2\text{OH}$** < **$\text{CH}_3(\text{CH}_2)_5\text{COOH}$** highest

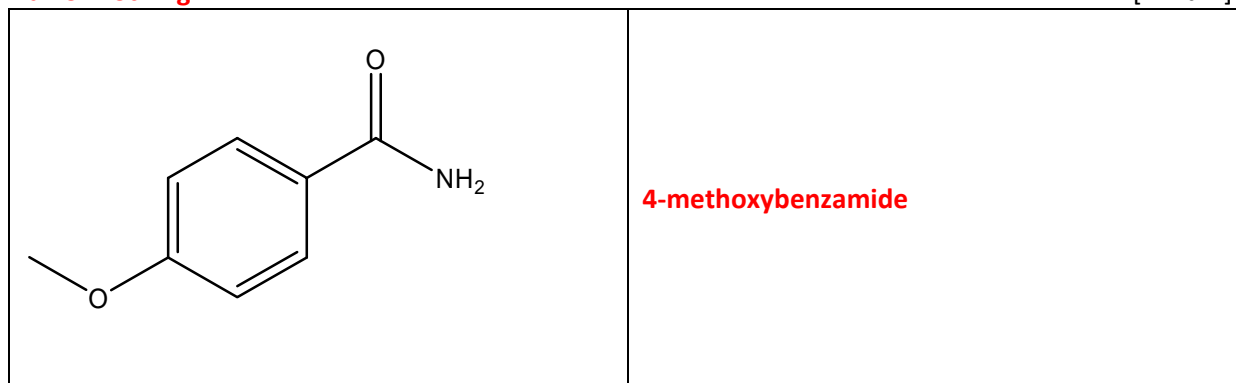
As the hydrogen bonding capability increases, so does the solubility in water. Both carboxylic acids and alcohols act as hydrogen bond donors and acceptors, thus have higher capacities to hydrogen bond with water than do ketones, aldehydes and ethers. Carboxylic acids have a greater degree of hydrogen bonding due to the highly polar nature of the carboxyl group.

1 mark correct order, 1 mark reasonable explanation

- c) Name the following compound:

all or nothing

[1 mark]



END OF QUESTIONS

Data sheets are on the next pages