29. An introduction to A Level organic chemistry

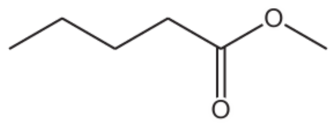
29.1 Formulas, functional groups and the naming of organic compounds

Paper 4

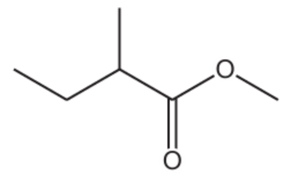
Question Paper

1 Four esters, **A**, **B**, **C** and **D**, with the molecular formula $C_6H_{12}O_2$ are shown in Fig. 7.1.

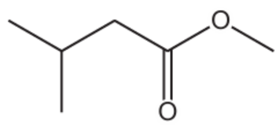
A



B



C



D

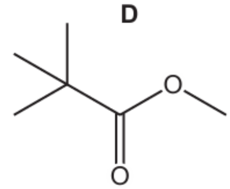


Fig. 7.1

(a) Give the systematic name of ester **A**.

.... [1]

2 Neotame is an artificial sweetener added to some foods.

neotame

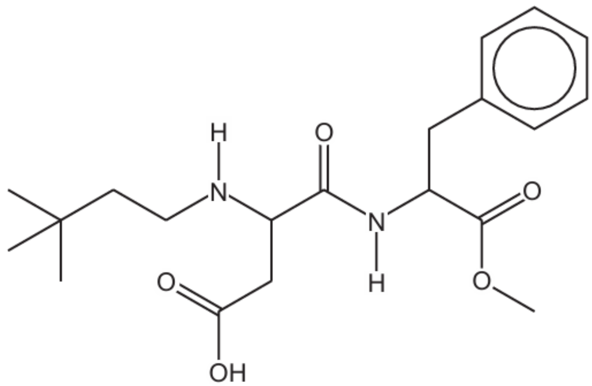


Fig. 8.1

(a) (ii) Neotame contains the arene functional group.

Identify all the **other** functional groups present in neotame.

....

.... [2]

3 (c) Compound **W** is an isomer of **Z**.

W

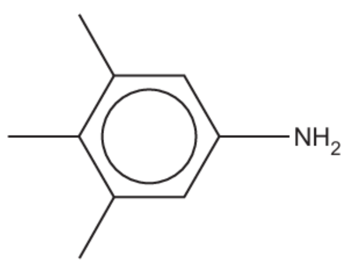


Fig. 4.2

Give the systematic name of **W**.

.... [1]

4 **(a)** Compound **H** has the structural formula $CH_2{=}CHCH(NH_2)COOH$.

(i) Name all the functional groups in **H**.

....

.... [2]

5 **(c)** Glutamic acid is another amino acid that acts as a buffer.

glutamic acid

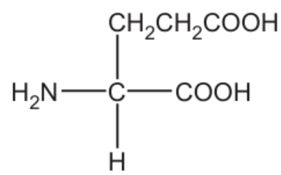


Fig. 7.1

(i) Draw the **skeletal** formula for glutamic acid.

[1]

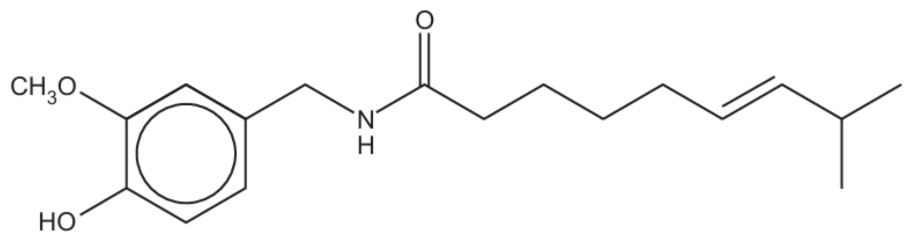
6 **(b)** **(i)** Name all the functional groups in perindopril.

....

.... [2]

7 Capsaicin is found in chilli peppers.

capsaicin



You should assume the CH_3O group is unreactive in the reactions involved in this question.

(a) Name all the functional groups in capsaicin in addition to the CH_3O group.

.... [1]

8 Procaine is used as an anaesthetic in medicine. It can be synthesised from methylbenzene in five steps as shown in Fig. 7.1.

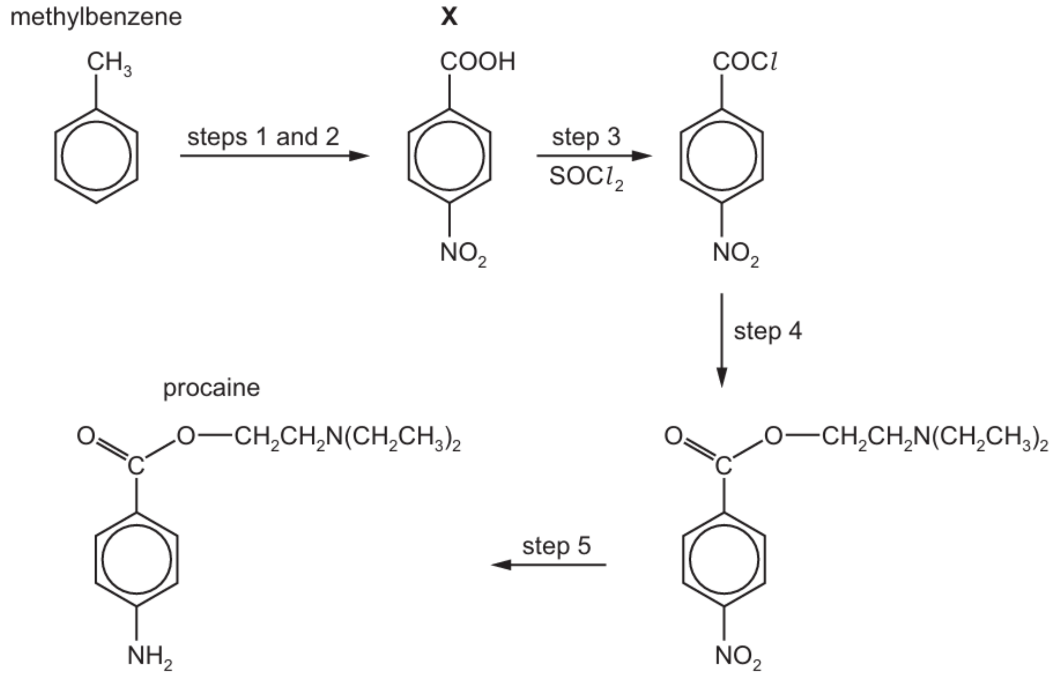


Fig. 7.1

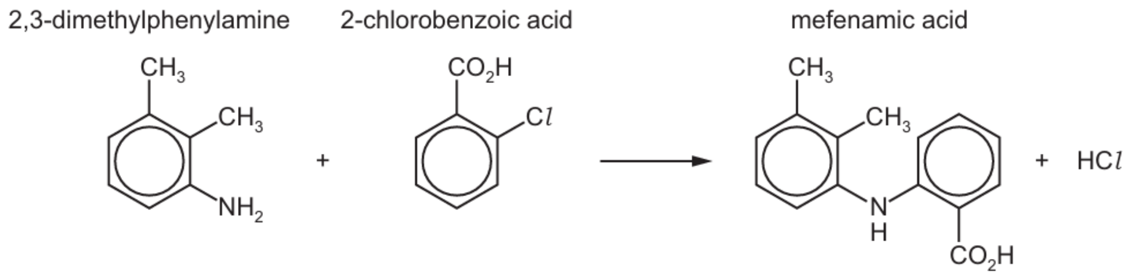
(a) (i) Name all the functional groups present in procaine.

.... [1]

9 (d) (i) Name the functional groups, in addition to the benzene ring, present in a phenolphthalein molecule.

.... [1]

10 **(c)** The drug mefenamic acid can be made using 2,3-dimethylphenylamine in an excess of 2-chlorobenzoic acid.



(i) Deduce the molecular formula of mefenamic acid.

.... [1]

(ii) Name the functional groups, apart from the benzene ring, in mefenamic acid.

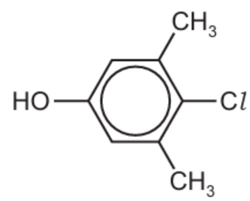
.... [1]

(iii) Calculate the maximum mass of mefenamic acid that could be formed from 5.00 g of 2,3-dimethylphenylamine in this reaction. Give your answer to **three** significant figures.

mass of mefenamic acid = ... g [2]

11 Compound **R** is shown.

R



(a) State the systematic name of compound **R**.

.... [1]