

A level Chemistry B

H433/03 Practical skills in chemistry

Question Set 1

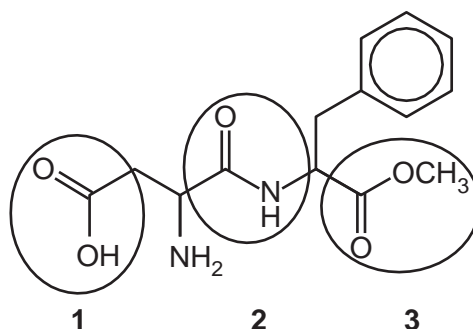
1. (a) A group of students decide to analyse a commercial sweetener. The major component is listed as the dipeptide aspartame. The students crush a sweetener tablet and dissolve it in 1 cm³ of water in a test tube. They add a similar volume of 6.0 mol dm⁻³ hydrochloric acid and some anti-bumping granules. They then cautiously boil the contents for about a minute.

Suggest the purpose of adding the anti-bumping granules.

[1]

- (b) (i) The students expect the aspartame to have been hydrolysed by the hot acid.

The structure of aspartame is given below with three functional groups (1, 2, 3) ringed.



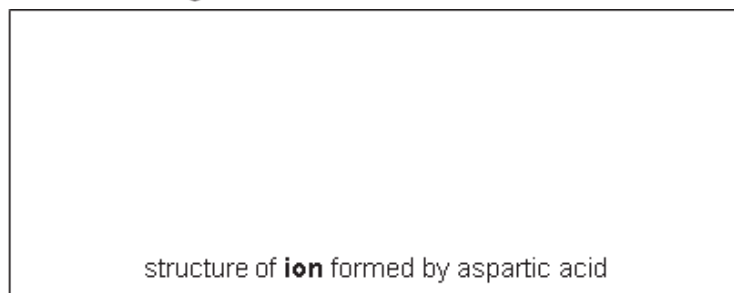
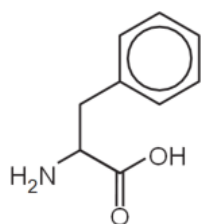
Name the homologous series for the functional groups 1, 2 and 3.

[1]

- (ii) Functional group 2 **and** functional group 3 are hydrolysed under the acid conditions to give three products. The products are methanol, and ions formed by the amino acids phenylalanine and aspartic acid.

The structure of the amino acid phenylalanine is given below.

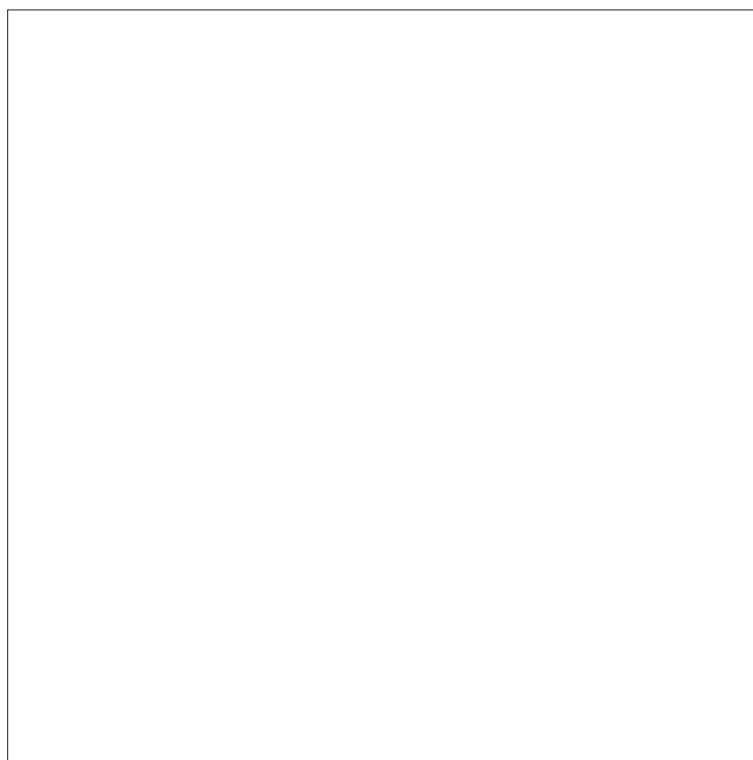
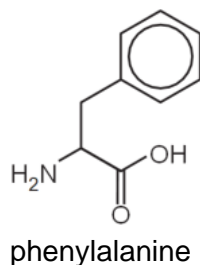
In the box draw the structure of the **ion** formed by **aspartic acid**.



phenylalanine

[2]

- (iii) Amino acids such as phenylalanine exist as *zwitterions*. Use the structure of phenylalanine to help explain how amino acids form zwitterions. Draw the structure of the zwitterion of phenylalanine.



[2]

- (c) The students wanted to confirm that the aspartame had been hydrolysed to produce the two amino acids, aspartic acid and phenylalanine.

They decided the best way was to use paper chromatography on the solution formed after the hydrolysis reaction.

Describe how the students could carry out the chromatography experiment and explain how they could use their results to show hydrolysis had taken place.

You may include a diagram in your answer

[6]

- (d) The students decided to investigate carbonated drinks such as diet and regular cola. These drinks contain phosphoric acid (to increase the flavour) and aspartame. Regular cola has a lower concentration of acid and keeps for longer than diet cola.

Suggest why regular cola keeps for longer

[2]

Total Marks for Question Set 1 = 14

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