

## Chemguide – questions

### AMINO ACIDS: ACID-BASE BEHAVIOUR

1. Although the formula of an amino acid is often shown as



in solution (and in the solid) it actually exists as a zwitterion. The group R here is assumed to contain no acidic or basic groups.

- Draw the structure of the zwitterion.
- Draw the structure of the ion formed if you added an alkali such as sodium hydroxide solution to a solution of the amino acid.
- Draw the structure of the ion formed if you added an acid such as dilute hydrochloric acid to a solution of the amino acid.
- The overall charge on the ions produced in parts (b) and (c) can be investigated using *electrophoresis*. Describe how you would carry out simple electrophoresis on a solution containing one of these ions.
- The final result of the electrophoresis you have described will probably be a spot on a piece of paper. How does this spot give you information about the charge on the ion? Illustrate your answer by referring to the products in parts (b) and (c).
- By adjusting the pH carefully, you can produce a solution in which there is no overall charge on the amino acid. This is known as the *isoelectric point*. If you carried out electrophoresis on such a solution, what would happen?

I am not going to ask any questions about why the isoelectric point isn't at pH 7. If you are doing a syllabus that needs it, check past papers and mark schemes to find out exactly what your examiners are asking, and what they expect you to say about it.