

**A level Chemistry B**

**H433/03** Practical skills in chemistry

**Question Set 11**

- 1 (a) A group of students are investigating the properties of weak acids and buffer solutions.

They take measurements of the pH of some solutions before and after adding an equal volume of  $0.01 \text{ mol dm}^{-3}$  sodium hydroxide solution.

Some of the students' results are shown in the table below.

Experiment	Original solution	pH before addition	pH after addition
A	$0.01 \text{ mol dm}^{-3}$ ethanoic acid	3.4	8.2
B	$0.1 \text{ mol dm}^{-3}$ ethanoic acid plus an equal volume of $0.1 \text{ mol dm}^{-3}$ sodium ethanoate	4.8	4.9
C	$0.1 \text{ mol dm}^{-3}$ sodium ethanoate	8.9	11.7
D	Distilled water	7.0	

The solution in experiment B is behaving as a buffer solution.

Explain the meaning of the term **buffer solution** [2]

- 1 (b)  $K_a$  for ethanoic acid is  $1.7 \times 10^{-5} \text{ mol dm}^{-3}$ .

Show by calculation that the initial pH in experiment B is 4.8. [2]

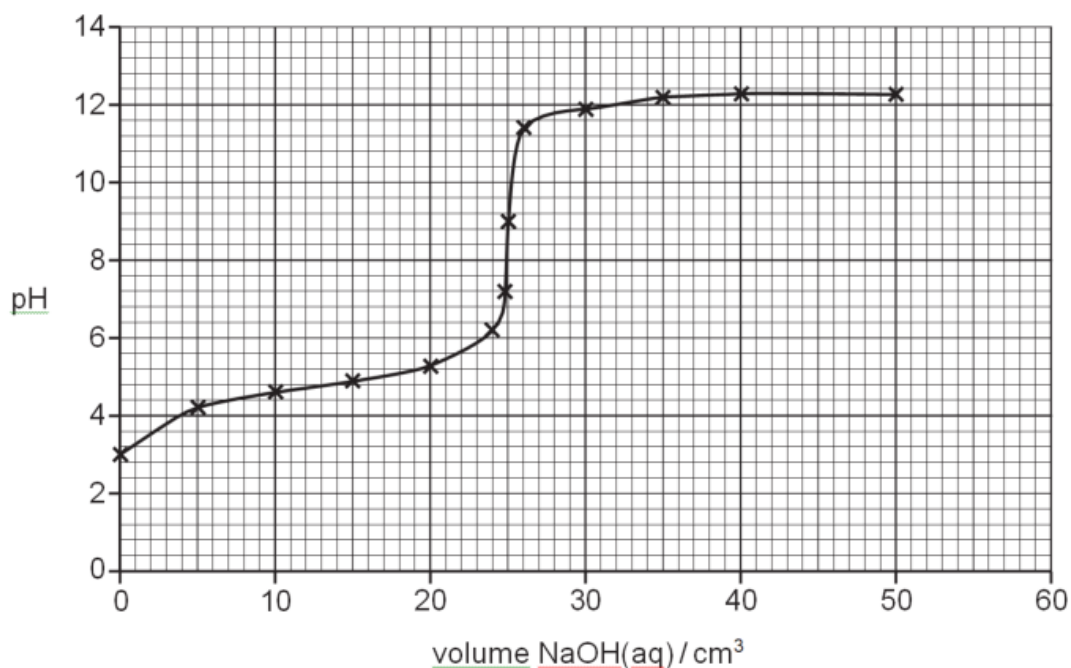
- 1 (c) Explain why the pH of sodium ethanoate in experiment C is alkaline.

Include an equation in your answer. [2]

- 1 (d) Calculate the pH of the solution formed after the addition of sodium hydroxide solution in experiment D.

pH = ..... [3]

- 1 (e) In a follow-up experiment,  $25.0\text{ cm}^3$  of the ethanoic acid solution is titrated with a solution of sodium hydroxide of unknown concentration and the following graph is obtained.



Suggest a suitable practical procedure that would enable this graph to be obtained.

[3]

**Total Marks for Question Set 11 = 12**

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