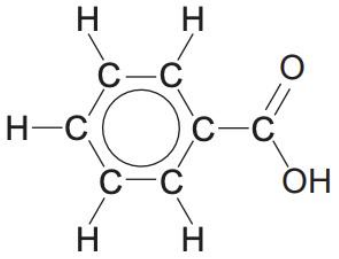
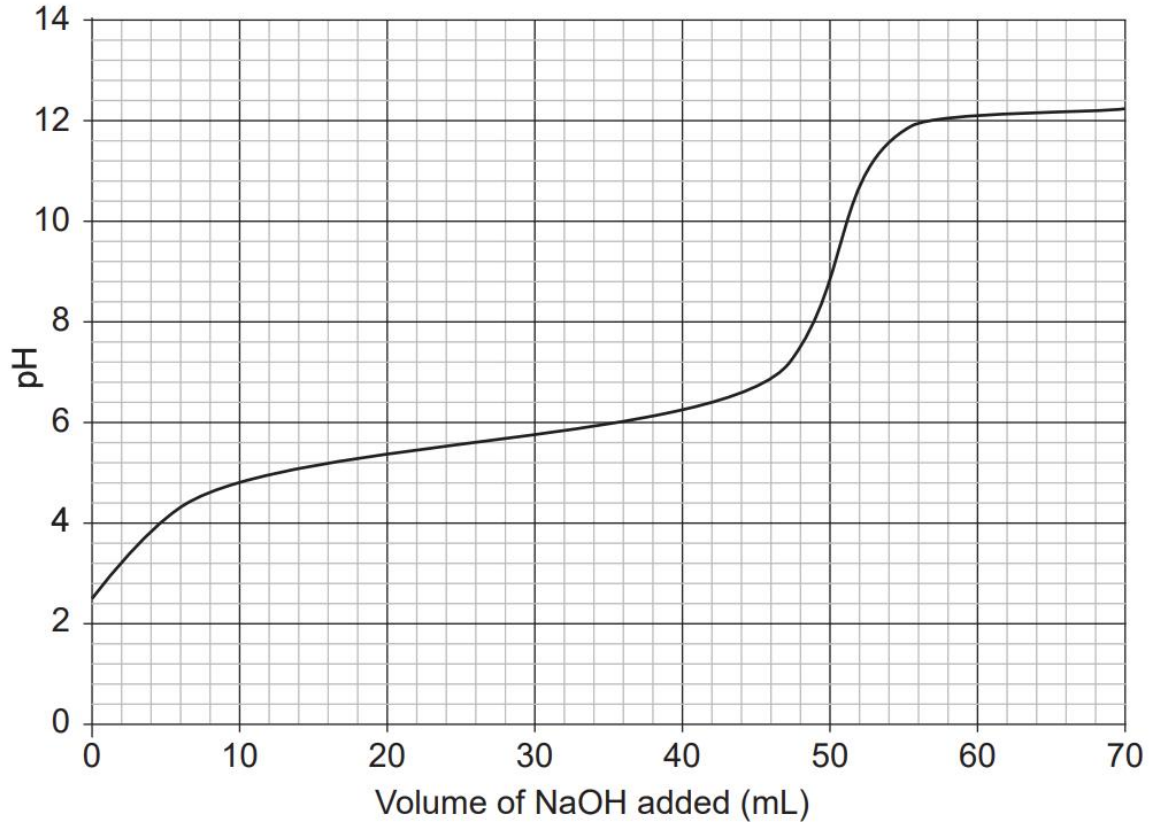
Question 28 **(9 marks)**

Benzoic acid (C_6H_5COOH) is a weak acid. Its structural formula is shown below.



Benzoic acid has a range of uses, including the manufacture of dyes, perfumes and insect repellents. The benzoic acid content of these products can be determined by titration with sodium hydroxide. The salt produced in the titration reaction is sodium benzoate, C_6H_5COONa.

The following graph shows a typical acid-base titration curve for benzoic acid and sodium hydroxide.



(a) Which of the indicators listed in the following table would be most suitable for use in this titration? With reference to the above titration curve, explain your choice. (3 marks)

Name of Indicator	pH Range
Bromocresol green	3.8 – 5.4
Azolitmin	4.5 – 8.3
Cresolphthalein	8.2 – 9.8
Indigo carmine	11.4 – 13.0

(b) Buffering is observed during this titration.

(i) Circle the region on the titration curve on page 14 to show where the buffering occurs. (1 mark)

(ii) Define the term buffering and explain why it occurs during this titration in the region that you circled in part (b)(i). Include an equation to support your explanation. (5 marks)