

Acid-Base Equilibria - Questions by Topic

Q1.

This question is about acids.

(a) Calculate the pH of the following acidic solutions. Give your answers to **two** decimal places.

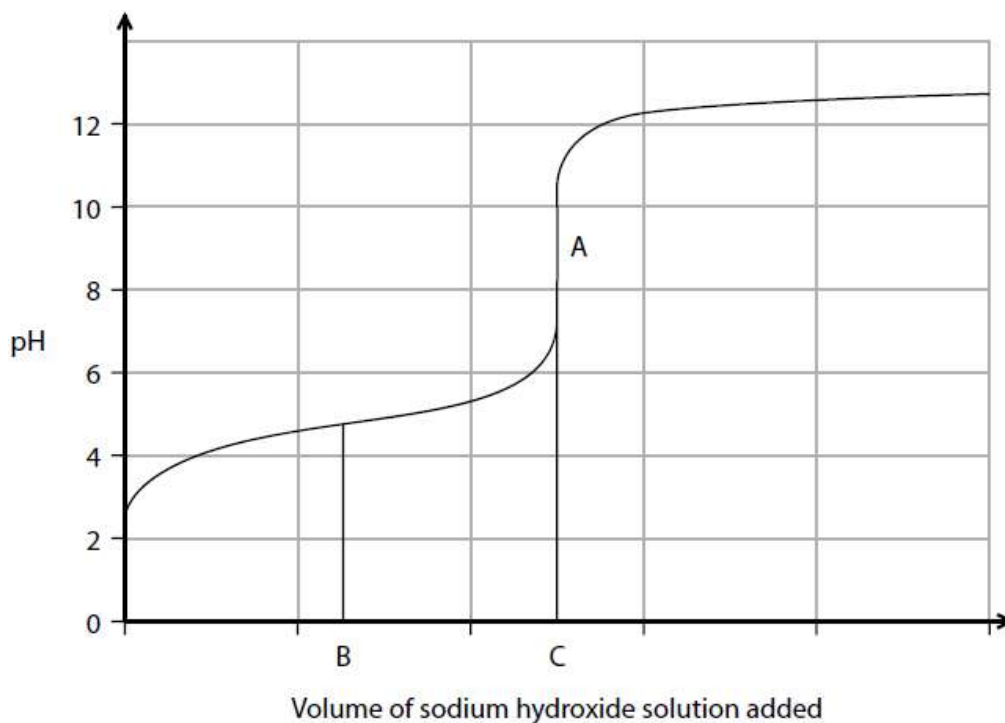
(i) 0.14 mol dm^{-3} solution of hydrochloric acid

(1)

(ii) 0.14 mol dm^{-3} solution of ethanoic acid ($K_a = 1.76 \times 10^{-5} \text{ mol dm}^{-3}$)

(3)

(b) The graph shows the titration curve for a weak acid with a strong base. The equivalence point is A and the volume of alkali added at the equivalence point is C. Volume B is half of volume C.



(i) Use the graph to determine the dissociation constant, K_a , of the weak acid.

(3)

(ii) Explain the rapid rise in pH from 2.8 to 4 at the start of the titration.

(2)

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(c) In another experiment, 10 cm³ of 1.0 mol dm⁻³ sodium hydroxide was added to 30 cm³ 1.0 mol dm⁻³ propanoic acid ($K_a = 1.3 \times 10^{-5}$ mol dm⁻³).

(i) Calculate the pH of the resulting solution.

(3)

(ii) State one assumption you have made in this calculation.

(1)

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(Total for question = 13 marks)

Q2.

Which indicator should be used to determine the end point in a titration of a strong acid with a weak base?

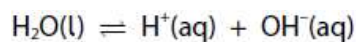
(1)

- A universal indicator
- B methyl orange
- C phenolphthalein
- D litmus

(Total for question = 1 mark)

Q3.

The equation for the dissociation of water is:



The ionic product of water, K_w , varies with temperature.

Temperature/°C	$K_w / \text{mol}^2\text{dm}^{-6}$
25	1.01×10^{-14}
30	1.47×10^{-14}
50	5.48×10^{-14}
100	7.16×10^{-14}

What is the pH of pure water at 60 °C?

(1)

- A** approximately 6.5
- B** exactly 7
- C** approximately 7.4
- D** greater than 7.4

(Total for question = 1 mark)