ACIDS PRACTICE pK_a and pK_b

1 Methanoic acid (HCOOH) is a weak acid with pK_a=3.75.

(a) Calculate the pH of a 0.100 mol dm^{-3} solution of methanoic acid. [3]

(b) Deduce the pK_b value of the methanoate ion [1]

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(c) Calculate the pH of a 0.100 mol dm^{-3} solution of sodium methanoate. [3]

(d) Write an equation for the reaction between sodium hydroxide and methanoic acid. [1]

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(e) 25.00 cm^3 of a 0.100 mol dm^{-3} solution of methanoic acid is reacted with 25.00 cm^3 of a 0.100 mol dm^{-3} solution of sodium hydroxide. Deduce the concentration of sodium methanoate in the resulting solution. [1]

(f) A solution of methanoic acid is titrated with sodium hydroxide solution. 25.00 cm^3 of the methanoic acid solution reacted exactly with 27.40 cm^3 of 0.100 mol dm^{-3} NaOH(aq). Calculate the pH of the resulting solution. [4]

ACIDS PRACTICE pK_a and pK_b

2 Methylamine (CH_3NH_2) is a weak base with pK_b=3.36.

(a) Calculate the pH of a 0.0100 mol dm^{-3} solution of methylamine [3]

(b) Deduce the pK_a value of the methylammonium ion ($CH_3NH_3^+$) [1]

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(c) Calculate the pH of a 0.0100 mol dm^{-3} solution of methylammonium chloride (CH_3NH_3Cl) [3]

(d) Write an equation for the reaction between hydrochloric acid and methylamine. [1]

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(e) A solution of methylamine is titrated with hydrochloric acid. 25.00 cm^3 of the methylamine solution reacted exactly with 23.70 cm^3 of 0.0100 mol dm^{-3} HCl(aq). Calculate the pH of the resulting solution. [5]