Problems on pH & Buffers

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Q1- Calculate the pH of the following :

A) 0.005 M HNO3 ?

B) 0.02 H2SO4 ?

C) 0.1 M HCOOH (ka = 1.8 x 10^-4) ?

Q2- Determine the pH of a solution made by dissolving 0.01 moles of benzoic acid (C_6H_5COOH; pKa = 4.2) in water to form 1 liter of solution. What is the pH?

Q3- The pKb of a base is 4.5. What is the pH of a 0.01 M solution of the base?

Q4- Calculate the pH of a phosphate buffer that contains 60% monosodium phosphate (NaH_2PO_4) and 40% disodium phosphate (Na_2HPO_4). (pKa = 7.2)

Q5- Predict and calculate the pH of a buffer containing 0.05 M acetic acid (CH_3COOH) and 0.1 M sodium acetate (CH_3COONa), when 0.02 M HCl is added to the solution. (Ka for acetic acid = 1.8 x 10^{-5})

Q6- Calculate the pH of a solution prepared by dissolving 500 mg of a monoprotic acid (with molecular weight 120 g/mol) in 20 mL of 0.2 M NaOH. The pKa of the acid is 6.8.

Q7-

a) Calculate the pH of a solution prepared by dissolving 0.03 moles of formic acid (HCOOH; pKa = 3.75) in water to make 1 liter of solution.

b) After preparing the solution in part (a), 0.01 moles of concentrated sodium hydroxide (NaOH) were added. What is the new pH of the solution? (Assume no volume change due to the addition of NaOH.)

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