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Henderson Hasselbalch Equation Worksheet

Henderson-Hasselbalch Equation Worksheet

Worked example

B.5 Calculate the pH of a solution containing 0.200 mol dm^{-3} ethanoic acid ($K_a = 1.74 \times 10^{-5}$ mol dm^{-3}) and 0.250 mol dm^{-3} sodium ethanoate.

Worked examples

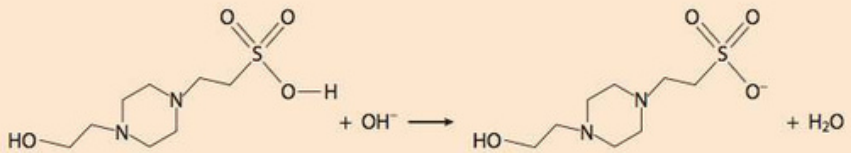
B.6 Calculate the pH of a buffer solution containing 0.0550 mol dm^{-3} $H_2PO_4^-$ ($pK_a = 7.21$) and 0.0450 mol dm^{-3} HPO_4^{2-}.

B.7 Calculate the pH of a solution containing 0.400 mol dm^{-3} ammonia ($pK_b = 4.75$) and 0.200 mol dm^{-3} ammonium chloride.

Worked examples

B.8 A buffer solution is formed when 30.0 cm^3 of 0.100 mol dm^{-3} potassium dihydrogen phosphate (KH_2PO_4) is added to 40.0 cm^3 of 0.110 mol dm^{-3} disodium hydrogen phosphate (Na_2HPO_4). pK_a for $H_2PO_4^-$ is 7.21. Calculate the pH of the mixture.

B.9 HEPES is used in some biological buffers. A buffer solution can be made by dissolving sodium hydroxide in a HEPES solution.



HEPES

Calculate the pH of the buffer solution formed when 20.0 g of sodium hydroxide is added to 1.00 dm^3 of a 1.00 mol dm^{-3} solution of HEPES ($pK_a = 7.5$). Assume that there is no change in volume when the sodium hydroxide is added.

Worked example

B.10 A student wants to make up a buffer solution at pH 7.7 using 0.100 mol dm^{-3} solutions of HEPES ($pK_a = 7.5$) and its sodium salt. Calculate how much of each solution must be used to make 500 cm^3 of a buffer of pH 7.7.