Activity 4B: Concentration of diluted solutions

Ans p. 18

1. a. Calculate the concentration when 25.0 mL of 0.156 mol L^{-1} CH_3COOH is diluted to 100 mL.

b. Calculate the concentration when 10 mL of 0.0961 mol L^{-1} $CaCl_2$ solution is diluted to 250 mL of solution.

2. The main ingredient in a commercial bleach is sodium hypochlorite, NaOCl. In the analysis of the concentration of a commercial bleach solution, the original solution needed to be diluted. A 20 mL sample of the original bleach was taken and sufficient water added to make 250 mL of diluted solution. The concentration of the diluted sample was found to be 0.0432 mol L^{-1}.

Calculate the concentration of the bleach in the original sample in mol L^{-1} and g L^{-1}.

M(NaOCl) = 74.1 g mol^{-1}

ESA PUBLICATIONS ISBN 978-0-947504-92-2

Activity 4B: Concentration of diluted solutions (page 17)

1. a. Dilution factor = $\frac{V_O}{V_f} = \frac{25\text{ mL}}{100\text{ mL}} = 0.25$

New concentration = $0.25 \times 0.156\text{ mol L}^{-1} = 0.0390\text{ mol L}^{-1}$

b. Dilution factor = $\frac{V_O}{V_f} = \frac{10\text{ mL}}{250\text{ mL}} = 0.04$

New concentration = $0.04 \times 0.0961\text{ mol L}^{-1} = 0.00384\text{ mol L}^{-1}$

2. 'Undilution factor' = $\frac{V_f}{V_O} = \frac{250\text{ mL}}{20\text{ mL}} = 12.5$

Original concentration = $12.5 \times 0.0432\text{ mol L}^{-1} = 0.540\text{ mol L}^{-1}$

$0.540\text{ mol L}^{-1} \times 74.1\text{ g mol}^{-1} = 40.0\text{ g L}^{-1}$

ESA PUBLICATIONS ISBN 978-0-947504-92-2