6.3B

Solutions for 6.3A Extra Practice Questions: Concentration

Use concentration as a conversion factor to calculate the quantity requested in each question below. Communicate your problem-solving approach, including units and correct certainty.

1. Cow's milk contains 4.5 g of lactose per 100 mL of milk. What mass of lactose is present in 250 mL (one glass) of milk?

$$m_{\text{lactose}} = 250\ \text{mL} \times \frac{4.5\,\text{g}}{100\,\text{mL}} = 11\ \text{g}$$

2. A 10% W/V salt solution is used for making pickles. What mass of salt is present in 750 mL of this solution?

$$m_{\text{NaCl}} = 750\ \text{mL} \times \frac{10\,\text{g}}{100\,\text{mL}} = 75\ \text{g}$$

3. A 250 mL measuring cup of cleaning solution contains 1.2 mol of dissolved ammonia. What is the molar concentration of this solution?

$$C_{NH_3} = \frac{1.2\,\text{mol}}{0.250\ \text{L}} = 4.8\ \text{mol/L}$$

4. Fish require a concentration of about 4.5 ppm (4.5 mg/L) of dissolved oxygen in water. What volume of water would contain 100 mg of oxygen?

$$v_{H_2O} = 100\ \text{mg} \times \frac{1\,\text{L}}{4.5\,\text{mg}} = 22\ \text{L}$$

5. What volume of concentrated, 14.6 mol/L phosphoric acid would contain 2.00 mol of solute?

$$v_{H_3PO_4} = 2.00\ \text{mol} \times \frac{1\,\text{L}}{14.6\,\text{mol}} = 0.137\ \text{L}$$

6. What mass of table salt is needed to prepare 1.20 L of 5.20 mol/L solution?

$$n_{\text{NaCl}} = 1.20\ \text{L} \times \frac{5.20\ \text{mol}}{1\ \text{L}} = 6.24\ \text{L}$$

$$m_{\text{NaCl}} = 6.24\ \text{L} \times \frac{58.44\ \text{g}}{1\ \text{mol}} = 365\ \text{g}$$

7. What is the molar concentration of zinc nitrate if 94.2 g of solute is dissolved to make 2.00 L of solution?

$$n_{Zn(NO_3)_2} = 94.2\ \text{g} \times \frac{1\ \text{mol}}{189.40\ \text{g}} = 0.497\ \text{mol}$$

$$C_{Zn(NO_3)_2} = \frac{0.497\ \text{mol}}{2.00\ \text{L}} = 0.249\ \text{mol/L}$$

Copyright © 2002 Nelson Thomson Learning