

3. What volume of acetic acid is contained in the 3.5 mL of vinegar, 5 % (V/V) that Ms. Cormier poured on her French Fries?

$$\frac{5 \text{ mL AA}}{100 \text{ mL VIN}} \times 3.5 \text{ mL VIN} = 0.175 \text{ mL AA}$$

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$$0.18 \text{ mL AA}$$

Answer: 0.18 mL

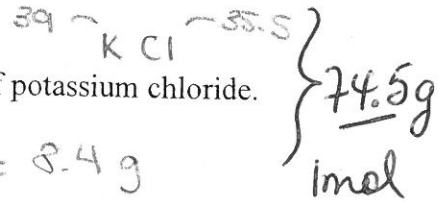
4. What volume of a 50 g/L solution could be prepared using 2.00 g of sugar?

$$\frac{2.00 \text{ g sugar}}{50 \text{ g sugar}} \times 1 \text{ L sol'n} = 0.04 \text{ L sol'n}$$

Answer: 0.04 L sol'n

5. What would a student use to prepare 250 mL of a 0.45 mol/L solution of potassium chloride.

$$250 \text{ mL soln} \times \frac{1 \cancel{\text{L}}}{1000 \cancel{\text{mL}}} \times \frac{0.45 \cancel{\text{mol}}}{1 \cancel{\text{L}}} \times \frac{74.5 \text{g}}{1 \cancel{\text{mol}}} = 8.4 \text{g}$$



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Answer: 8.4g KCl

6. In the lab, a student mixes two liquid. She adds 48 g of ethanol to 110 mL of water. The density of ethanol is 0.78 g/L.

What is the % (m/V) ethanol concentration of this solution?

$$48 \text{g} \times \frac{1 \cancel{\text{L}}}{0.78 \cancel{\text{g}}} = 61.5 \cancel{\text{L}}$$

$$61.5 \cancel{\text{L}} \times \frac{1000 \cancel{\text{mL}}}{1 \cancel{\text{L}}} = 61500 \cancel{\text{mL}}$$

$$61500 \cancel{\text{mL}} + 110 \cancel{\text{mL}} = 61610 \cancel{\text{mL}}$$

$$\text{Conc} = \frac{48 \text{g}}{61610 \cancel{\text{mL}}} \times 100 = 0.078 \% \text{ m/V}$$

Answer: 0.078% m/V

7. A student was asked to make an isotonic solution of sodium chloride, 0.9 % m/V for use as a contact lens saline solution.

Starting with 50 mL of a sterile 5 % m/V salt solution, how much water would he have to use?

$$i) \frac{C_1 V_1}{C_2} = \frac{C_2 V_2}{C_1}$$

$$\frac{(5.0\% \text{ m/V})(50 \text{ mL})}{(0.9\% \text{ m/V})} = V_2$$

$$V_2 = 280 \text{ mL}$$

$$ii) 280 \text{ mL} - 50 \text{ mL} = 230 \text{ mL}$$

Answer: 230 mL ✓

8. A lab technician has 650 mL of a ⁶⁵ ²⁸ ¹ ⁻⁹⁶ 474 g/L Zn(NO₃)₂ solution available to make ^{V₂} 400 mL of a 1 mol/L solution to be used for an electrolysis experiment.

Explain how the technician would make the required solution.

$$\frac{C_1 V_1}{C_2} = \frac{C_2 V_2}{C_1}$$

$$\frac{474 \text{ g}}{16} \times \frac{1 \text{ mol}}{189 \text{ g}} = 2.51 \frac{\text{mol}}{\text{L}}$$

$$V_1 = \frac{(1.0 \text{ M})(400 \text{ mL})}{(2.51 \text{ M})}$$

$$V_1 = 160 \text{ mL} \quad \checkmark$$

1. Put 160 mL of soln 1 in a 400 mL volumetric ✓

2. Fill to line (with water) ✓

3. mix

9. A student required a 2 mol/L solution for an experiment. In the laboratory, the student can only find 300 mL of a 1.5 mol/L solution.

Explain what this student should do in order to obtain a 2 mol/L solution from the available 1.5 mol/L solution.

$$\frac{C_1 V_1}{C_2} = \frac{V_2}{1}$$

$$300 \text{ mL} - 225 \text{ mL} = 75 \text{ mL}$$

$$\frac{(1.5 \text{ M})(300 \text{ mL})}{2.0 \text{ M}} = V_2$$

$$V_2 = 225 \text{ mL}$$

Evaporate 75 mL of water
