

Chemistry Review Problems

$$1) \quad a) \frac{20.0 \text{ g}}{20.0 \text{ g} + 80.0 \text{ g}} \times 100 = 20.0\%$$

$$b) \quad m = \frac{20.0 \text{ g} \cdot \frac{1 \text{ mol}}{92.0 \text{ g}}}{80.0 \text{ g} \cdot \frac{1 \text{ kg}}{1,000 \text{ g}}}$$

$$m = 2.71$$

$$\Delta T_b = k_b \times m \times i$$

$$\Delta T_b = 0.52^\circ\text{C/m} \times 2.71 \times 1$$

$$\Delta T_b = 1.41^\circ\text{C}$$

$$T_b = 101.41^\circ\text{C}$$

$$2) \quad 5.0 = (x)(1)(1.86)$$

$$\frac{5.0}{1.86} = x \quad x = 2.69$$

$$2.69 \text{ m} = \frac{\text{moles}}{1.50 \text{ kg}}$$

$$\text{moles} = 4.03 \text{ mol}$$

$$4.03 \text{ mol} \cdot \frac{32 \text{ g}}{1 \text{ mol}} = \boxed{129.0 \text{ g}}$$

$$3. \quad 3.15 \text{ g} \cdot \frac{1 \text{ mol}}{13.0 \text{ g}} = 0.0500 \text{ mol},$$

$$\frac{0.0500 \text{ mol}}{500.0 \text{ mL} \cdot \frac{1 \text{ L}}{1000 \text{ mL}}} = 0.100 \text{ M}$$

$$4. \quad m = \frac{\text{mol}}{\text{L}}$$

$$2.00 = \frac{x \text{ mol}}{0.300 \text{ L}}$$

$$x \text{ mol} = 0.600$$

$$\frac{0.600 \text{ mol}}{1} \cdot \frac{166 \text{ g}}{1 \text{ mol}} = \boxed{99.6 \text{ g}}$$

$$5. V_i M_i = V_f M_f$$

$$V_i (1.0 M) = (500.0 \text{ mL}) (.250 M)$$

$$V_i = 125 \text{ mL}$$

1. half-fill a 500-mL flask w/ distilled H_2O
2. Under the hood, pipette 125 mL of the acid into the H_2O
3. Add distilled H_2O to the 500-mL mark

$$6. \Delta T = K \cdot M \cdot i$$

$$1.6 = (5.03)(1)(m)$$

$$\frac{1.6}{5.03} = \frac{5.03}{5.03} m$$

$$m = 0.318$$

$$0.318 = \frac{x \text{ mol}}{0.500 \text{ kg}}$$

$$x = 0.0954 \text{ mol}$$

$$mm = \frac{8.10 \text{ g}}{0.0954 \text{ mol}}$$

$$mm = 84.9 \text{ g/mol}$$

$$7a) .16 = (1)(2.53)(x)$$

$$.0632 = x$$

$$.0632 = \frac{x \text{ mol}}{0.0112 \text{ kg}}$$

$$x = .000708 \text{ mol}$$

$$.000708(x) = .255$$

$$x = 360. \text{ g/mol}$$

$$b) 360. \text{ g/mol} \cdot 65.29\% \cdot \frac{1 \text{ mol C}}{12.01 \text{ g C}} = 19.2 \text{ C}$$

$$360. \text{ g/mol} \cdot 4.4\% \cdot \frac{1 \text{ mol H}}{1.008 \text{ g H}} = 16 \text{ H}$$

$$360. \text{ g/mol} \cdot 30.36\% \cdot \frac{1 \text{ mol Fe}}{55.85 \text{ g Fe}} = 2 \text{ Fe}$$

