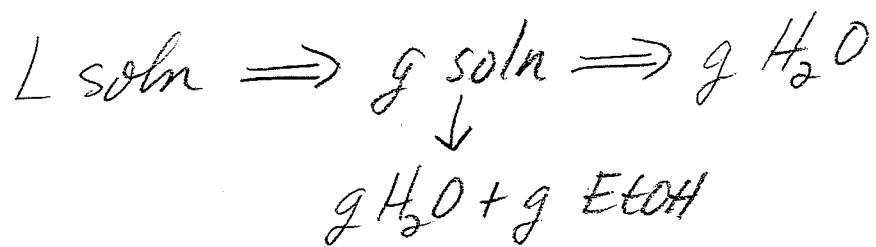


b) Ex 2: An aqueous soln. of ethanol (C_2H_5OH) is 14.1 M C_2H_5OH . The density of the soln. is 0.853 g/cm³. What is the molality of ethanol in the soln.?

$$14.1 \text{ M EtOH} = \frac{14.1 \text{ mol EtOH}}{1 \text{ L soln}}$$

$$m = \frac{\text{mol EtOH}}{\text{kg H}_2\text{O}}$$



Assume 1 L soln
 \Rightarrow 14.1 mol EtOH

$$? \text{ g soln} = 10^3 \frac{\text{mL}}{\text{soln}} \times \frac{0.853 \text{ g soln}}{1 \text{ mL soln}} = 853 \frac{\text{g}}{\text{soln}}$$

$$\begin{aligned} ? \text{ g EtOH} &= 14.1 \frac{\text{mol}}{\text{EtOH}} \times \frac{46.08 \text{ g EtOH}}{1 \text{ mol EtOH}} \\ &= 649.76 \text{ g EtOH} \end{aligned}$$

$$\begin{aligned} ? \text{ g H}_2\text{O} &= 853 \text{ g soln} - 649.76 \text{ g EtOH} \\ &= 203.24 \text{ g H}_2\text{O} \\ &= 0.2032 \text{ kg H}_2\text{O} \end{aligned}$$

$$\begin{aligned} m &= \frac{14.1 \text{ mol EtOH}}{0.2032 \text{ kg H}_2\text{O}} \\ &= 69.4 \text{ m} \end{aligned}$$