

Notice: Undefined variable: rev in
 /var/www/genchem1.chem/1515SP21/Personal/ACARReview/ACA11.php on line 26

This is ACA # 11. It is OK to use your textbook, but if you can answers the questions without it that is OK too.

I recommend you print out this page and bring it to class. [Click here](#) to show a set of five ACA11 student responses, randomly selected from all of the student responses thus far, in a new window.

John , here are [your responses](#) to the ACA and the [Expert's response](#).

1. An aqueous solution is 14.6% $C_6H_{12}O_6$.

a) Calculate the molality of glucose in the solution.

0.950 m $C_6H_{12}O_6$

Assuming 100 grams of solution:

14.6 g are $C_6H_{12}O_6$ and 85.4 g are H_2O

molality is defined as mol $C_6H_{12}O_6$ /kg H_2O

mol $C_6H_{12}O_6$ = 14.6 gram $C_6H_{12}O_6$ * (1 mol $C_6H_{12}O_6$ /180 grams $C_6H_{12}O_6$) = 0.08111 mol $C_6H_{12}O_6$

molality of the solution = 0.08111 mol $C_6H_{12}O_6$ /0.0854 kg H_2O = 0.950 molal

b) Calculate the mol fraction (glucose) in the solution.

0.983 mol fraction $C_6H_{12}O_6$

mol H_2O = 85.4 gram H_2O * (1 mol H_2O /18.0 grams H_2O) = 4.74 mol H_2O

mol fraction $C_6H_{12}O_6$ = mol $C_6H_{12}O_6$ / (mol $C_6H_{12}O_6$ + mol H_2O)

mol fraction $C_6H_{12}O_6$ = 0.08111 mol $C_6H_{12}O_6$ / (0.08111 mol $C_6H_{12}O_6$ + 4.74 mol

$\text{H}_2\text{O}) = 0.0168$ mol fraction $\text{C}_6\text{H}_{12}\text{O}_6$

mol fraction $\text{H}_2\text{O} = 1 - 0.0168$ mol fraction $\text{C}_6\text{H}_{12}\text{O}_6 = 0.9832$ mol fraction H_2O

c) If the solution has a density of 1.062 g mL^{-1} calculate the molarity of glucose in the solution.

0.861

Assuming 100 g solution then,

100 g solution * (1 mL solution/1.062 g solution) = 94.16 mL solution

molarity of $\text{C}_6\text{H}_{12}\text{O}_6 = \text{mol } \text{C}_6\text{H}_{12}\text{O}_6/\text{Liters solution}$

molarity of $\text{C}_6\text{H}_{12}\text{O}_6 = 0.08111 \text{ mol } \text{C}_6\text{H}_{12}\text{O}_6 / 0.09416 \text{ L solution} = 0.861$ molar

2a. Is glucose an electrolyte or a nonelectrolyte when dissolved in water?

non electrolyte

Glucose is a nonelectrolyte.

b) Explain

when glucose dissolves it does not break into ions.

Since glucose is a covalent substance it does not dissociate in water.

3) The vapor pressure of water at 25°C is 23.76 mmHg. Calculate the vapor pressure of water above the solution described in Question 1 at 25°C . Note: Remember

Raoult's Law is $P_{\text{solution}} = \chi_{\text{H}_2\text{O}} P^\circ_{\text{H}_2\text{O}}$

23.36 mmHg

$P_{\text{solution}} = \chi_{\text{H}_2\text{O}} P^\circ_{\text{H}_2\text{O}}$

$P_{\text{solution}} = 0.9832 * 23.76 \text{ mmHg} = 23.36 \text{ mmHg}$

4. Is there anything about the questions that you feel you do not understand? List your concerns/questions.

nothing

5. If there is one question you would like to have answered in lecture, what would that question be?

nothing