

This is BCE#9.

I recommend you print out this page and bring it to class. [Click here](#) to show a set of five BCE8 student responses randomly selected from all of the student responses thus far in a new window.

John , here are **your responses** to the BCE and the **Expert's response**.

1. A solution is prepared by mixing 12.0 g of HCl (hydrogen chloride) in 50.0 g of water.

Calculate:

The mol of HCl:

0.329

82%

$$\text{mol HCl} = 12.0 \text{ g HCl} * (1 \text{ mol HCl} / 36.45 \text{ g HCl}) = 0.329 \text{ mol}$$

The mol of water:

2.78

82%

$$\text{mol H}_2\text{O} = 50.0 \text{ g H}_2\text{O} * (1 \text{ mol H}_2\text{O} / 18.0 \text{ g H}_2\text{O}) = 2.78 \text{ mol}$$

2. Weight % is defined as;

$$\text{weight percent} = \frac{\text{weight solute}}{\text{weight solution}} \cdot 100$$

Calculate the weight % HCl in the solution:

19.4

82%

$$\text{weight \% HCl} = 12.0 \text{ g HCl} / (12.0 \text{ g HCl} + 50.0 \text{ g H}_2\text{O}) * 100 = 19.4\%$$

18%

$$\frac{12 \text{ g solute}}{50 \text{ g solvent}} \times 100$$

(80.6% by weight H₂O)

3. Mol fraction is defined as:

$$\text{mol fraction} = \frac{\text{mol solute}}{\text{mol solution}}$$

Calculate the mol fraction of HCl:

0.106

$$\text{mol fraction HCl} = 0.329 \text{ mol HCl} / (0.329 \text{ mol HCl} + 2.78 \text{ mol H}_2\text{O}) = 0.106$$

(mol fraction H₂O is 0.894)

9-14% $\frac{0.329 \text{ mol solute}}{2.78 \text{ mol solvent}}$

59%

9% did a % (*100)

4. Molality is defined as:

$$\text{molality} = \frac{\text{mol solute}}{\text{kg solvent}}$$

Calculate the molality of HCl in the solution:

6.58

$$\text{molality HCl} = 0.329 \text{ mol HCl} / (0.050 \text{ kg H}_2\text{O}) = 6.58 \text{ molal}$$

73%

5. Molarity is defined as:

$$\text{molarity} = \frac{\text{moles of solute}}{\text{liters of solution}}$$

50%

Can you calculate the molarity of the solution from the information provided? Yes/No. explain.

No, I need to know the density of the solution so I can convert the mass of the solution (62.0 g) to milliliters of solution.

We can not calculate the molarity of this solution because we do not know the volume of the solution. We know the mass of the solution (12 g HCl + 50.0 g H₂O), but to determine the volume of the solution we need to know the density of the solution. Although the solution is 80.6% water its density will be different than that of water.

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

nothing

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

nothing

how to figure out the last question.
how to calculate moles