Use your Periodic Table and Ion List and calculator to answer questions on this quiz.

1. An air sample has 21 g nitrogen and 7 grams oxygen. Which is the solvent?

   { air | carbon dioxide | (nitrogen) | oxygen | gases cannot be a solvent }

2. A 0.5 Liter sample is 92% water (1.00 $^g/_{mL}$, 18. $^g/_{mol}$) by volume and 8% vinegar (1.05 $^g/_{mL}$, 60. $^g/_{mol}$).

   a) what volume of vinegar is in the sample?

   $$V_{vinegar} = 0.5L \times \frac{8 \, vinegar}{100 \, total} = 0.04 \, L$$

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   b) to obtain a 6% solution, I should {(add) | remove | convert } how much water?

   $$\frac{6 \, vinegar}{100 \, total} = \frac{.04 \, L}{V_{new}} \Rightarrow V_{new} = \frac{.04 \, L}{.06} = .666 \, L \ldots \Delta V = .166 \, L$$

   c) how many moles of vinegar was in the original sample?

   $$\cancel{.04L} \, \frac{40mL}{\cancel{}} \, vinegar \times \frac{1.05 \, g}{1 \, mL} \times \frac{1 \, mol}{60 \, g} = 0.70 \, mole$$

   d) how many moles of water was in the original sample?

   $$.5L - .04L = 0.46 \, L \\ \underset{water}{\longrightarrow} 460mL \times \frac{1.000g}{1mL} \times \frac{1 \, mol}{18.02 \, g} = 25.5 \, moles$$

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   e) what was the molarity of the original sample?

   $$M_{vinegar} = \frac{moles}{L} = \frac{0.70 \, mol}{0.5 \, L} = 1.4 \, \frac{mol}{L}$$

3. I need to make 2.0 L of a 0.001 M solution of HCl .

   a) How many moles HCl do I dissolve?

   $$.001 \, \frac{mol}{L} \times 2L = .002 \, moles \, HCl$$

   b) how much mass HCl do I dissolve?

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   $$.002 \, moles \, HCl \times \frac{36.46 \, gHCl}{1 mol \, HCl} = .0729 \, grams \, HCl$$

   c) what pH should the solution have?

   $$.001 \, \frac{mole \, H^+}{1 \, L \, sol'n} \ldots .001_{\underset{1 \, 2 \, 3}{}} \Rightarrow pH = 3$$

   d) this solution will be an { (acid) | base | buffer | none of these }

$$\frac{8.0 \pm 4.6}{21} \quad \frac{6 \times .5}{6 \times 1} \Rightarrow \frac{6.5 \pm 2.5}{10}$$