3 Step, or less, Concentration Calculations

These calculations are fairly straight forward. They require the use of no more than 3 multiplications, and an understanding of different ways of describing concentrations. You need to be able to do these calculations in order to test and each question should take you less than 5 minutes. The last page of this handout contains numeric answers to these problems.

Molarity Calculations

- 1. What is the molarity of a 5.09L solution that is made with 1.0984 moles of MgSO₄?
- 2. What is the Molarity of a 500.0 ml solution that is made with 0.9870 moles HCl?
- 3. What is the Molarity of a 7.8 L solution that is made with 7.00 grams of CH₃CH₂OH?
- 4. What is the Molarity of a 250.0 ml solution that is made with 18.989 grams of CH₃CH₂OH?
- 5. How many moles of NaCl are in 0.0500L of a 0.98M NaCl solution?
- 6. How many moles of NH_3 are in 89 ml of a 0.13M NH3 solution?
- 7. How many moles of NaOH are in a 0.500 L solution that is made with 1.992 grams NaOH?
- 8. What is the Molarity of this solution?
- 9. How many moles of NaOH would there be in a 25.00ml of this solution?
- 10.If 25.00ml of this solution was added to 75.00 ml of water, what would the molarity of this new solution be?
- 11.If a 250.0 ml solution is made using 5.897 g CaCl₂, what is the molarity of the CaCl₂ in the solution?

12. What is the Molarity of Chloride ion in the solution in problem 11?

Concentration by mass %

- 1. What is the concentration $Mg(NO_3)_2$ in a solution made with 35 grams $Mg(NO_3)_2$ and 1200 grams of water? Give you answer in mass %.
- 2. What is the concentration of Cu in a 2.5 x 10 2 g of Brass that contains 169 g Cu? Give you answer in mass %.
- 3. What would be the mass % of Copper in a 10 gram piece of the Brass mentioned in the earlier problem?
- 4. How many grams of copper are in a 25 gram piece of this metal?

Concentration in ppm

- 1. If a 1.00 gram sample of paint has 0.0000089 grams of lead, what is the concentration of lead in this sample in ppm?
- 2. If a 10.78 grams of orange juice has 6mg Zn, what is the concentration of Zn in the orange juice in ppm? (1000 mg = 1g)
- 3. A sample of paint is found to contain 35 micrograms of lead. The piece of paint weighs 10.89 grams. What is the concentration of lead in this paint in ppm? (10^6 micrograms = 1 gram)
- 4. How much lead would be in 45 grams of the paint in the previous problem?
- 5. If a child were to breath in 15 mg of dust from this paint, how many mg of dust would the child be breathing in?

Concentration in ppb

1. If a 1.00 gram sample of milk has 0.000000178g of melamine in it. What is the concentration of melamine in the milk? Give you answer in ppb.

- 2. A study of Indian Cigaretts showed that they had, on average, 0.06 μ g Hg/g. What is concentration in ppb? (10⁶ μ g = 1g)
- 3. Paint in an older home was found to have a lead content of 10% by mass. What is this concentration in ppb?
- 4. If a child were to breath in 15 mg of dust from this paint, how many mg of lead would the child be breathing in?

Molarity Calculations

- 1. 0.216M MgSO₄
- 2. 1.974M HCl
- 3. 0.019M CH₃CH₂OH
- 4. 1.649M CH₃CH₂OH
- 5. 0.049 moles NaCl
- 6. 0.012 moles NH₃
- 7. 0.04980 moles NaOH
- 8. 0.0996M NaOH
- 9. 2.49x10⁻³ moles NaOH
- 10. 2.49x10⁻² moles NaOH
- 11.0.2125 M CaCl₂
- 12.0.4250 M Cl⁻

Concentration by mass %

- 1. 2.8% Mg(NO₃)₂
- 2. 68% Cu
- 3. 68% Cu
- 4. 17g Cu

Concentration in ppm

- 1. 8.9 ppm lead
- 2. 600 ppm Zinc or 6×10^2 ppm Zinc
- 3. 3.2 ppm lead
- 4. 0.00014 g lead g lead
- 5. 0.000048 mg lead

Concentration in ppb

- 1. 178 ppb melamine
- 2. 60 ppb Hg or 6 x 10 ppb Hg
- 3. 1x10⁸ppb lead or 10⁸ppb lead
- 4. 1.5×10^9 mg lead