

### Practice Problems - Concentrations of Solutions

1. What is the mass percent of a solution of 7.6 grams sucrose in 83.4 grams of water?
2. How many grams of sucrose must be added to 375 grams of water to prepare a 2.75 % by mass solution of sucrose?
3. A saline solution, NaCl in water, is 0.92 % (m/v). How many grams of NaCl are required to prepare 35.0 mL of this solution?
4. What is the molarity of 4.35 moles  $\text{KMnO}_4$  dissolved in 750 mL of solution?
5. What is the molarity of 20.0 grams of NaOH dissolved in 1.50 L of solution?
6. How many grams of  $\text{KNO}_3$  are present in 185 mL of a 2.50 M solution?
7. How many mL of a 0.10 M  $\text{FeSO}_4$  solution are required to provide 0.35 g of  $\text{FeSO}_4$ ?
8. How many mL of a 0.300 M  $\text{AgNO}_3$  solution will it take to make 500 mL of a 0.100 M  $\text{AgNO}_3$  solution?
9. A solution contains 128 g of  $\text{CH}_3\text{OH}$  and 108 g of water. What is the mole fraction of  $\text{CH}_3\text{OH}$  in the solution?
10. What mass of glucose,  $\text{C}_6\text{H}_{12}\text{O}_6$ , must be dissolved in 150.0 g of water so that the mole fraction of glucose is 0.125?
11. What mass of water must be used to prepare a solution of 25.5 g of  $\text{CaCl}_2$  dissolved in water if the mole fraction of the  $\text{CaCl}_2$  in solution is 0.105?
12. What is the molality of a solution that contains 46 g of  $\text{CH}_3\text{OH}$  dissolved in 348 g of water?
13. What mass of  $\text{AgNO}_3$  must be dissolved in 200 g of water to prepare a 0.250 m solution.
14. If an aqueous solution of urea,  $\text{N}_2\text{H}_4\text{CO}$ , is 26.0 % by mass and has a density of 1.07 g/mL, calculate the molality of urea in solution
15. What is the percent by mass of methanol,  $\text{CH}_3\text{OH}$ , if the mole fraction of methanol dissolved in water is 0.500?
16. Calculate the molarity of a solution that is 39.77 %  $\text{H}_2\text{SO}_4$  by mass. The density of the solution is 1.305 g/mL.
17. What is the molality of a solution that contains 128 grams of  $\text{CH}_3\text{OH}$  in 108 grams of water?
18. Calculate the weight percent of HCl in 3.20 M solution. The density of the solution is 1.10 g/mL.
19. Calculate the molality of  $\text{Ca}(\text{OH})_2$  in a 1.50 M aqueous solution that has a density of 1.320 g/mL.
20. What is the mole fraction of commercial "concentrated" hydrofluoric acid, which is 55.0 % HF by mass?