# 15-2 Practice Problems

1. What is the molarity of the solution produced when 145-g of Sodium Chloride (NaCl) is dissolved in sufficient water to prepare 2.75-L of solution?

2. How many grams of Potassium Chloride are needed to prepare 0.750-L of a 1.50-$\mathcal{M}$ solution of Potassium Chloride in water?

3. What is the molarity of the solution produced when 85.6-g of Hydrochloric Acid is dissolved in sufficient water to prepare 0.385-L of solution?

4. To produce 3.00-L of a 1.90-$\mathcal{M}$ solution of Sodium hydroxide, how many grams of Sodium Hydroxide must be dissolved?

5. If 8.77-g of Potassium Iodide are dissolved in sufficient water to make 4.75-L of solution, what is the molarity of the solution?

6. In order to prepare 2.00-L of a 3.00-$\mathcal{M}$ solution of Ferric Chloride ($FeCl_3$), how many grams of ferric chloride must be used?

7. What is the molarity of the solution produced when 14.1-g of Ammonia is dissolved in sufficient water to prepare 0.100-L of solution?

8. To prepare 10.5-L of a 2.50-$\mathcal{M}$ solution of Potassium Hydroxide, how many grams of Potassium Hydroxide must be used?

9. What is the molality of a solution containing 75.2-g of Silver Perchlorate dissolved in 885-g of Benzene?

10. What is the molality of a solid solution containing 0.125-g of Chromium and 81.3-g of Iron?

11. If 18.6-g of Methanol is used to dissolve 2.68-g of $Hg(CN)_2$, what is the molality of the solution?

12. What is the molality of solid solder wire if it is made from 68.7-g of Lead dissolved in 117-g of Tin?

# 15-2 Practice Problems (Continued)

13.What is the molality of a solution made by dissolving 8.11-g of Potassium Sulfide ($K_2S$) in 47.6-g of Ethanol?

14. What is the molality of a solution containing 1330-g of Methanol ($CH_3OH$) and 16.6-g of Sodium Bromide (NaBr)?

15. What is the molality of a solid solution containing 867-g of Aluminum and 14.9-g of Copper?

16. Calculate the molality of a solution produced using 15.2-g of Calcium Chloride ($CaCl_2$) and 345-g of Methanol ($CH_3OH$).

17. In order to prepare a 0.523-*m* aqueous solution of Potassium Iodide, how many grams of Potassium Iodide must be added to 2.00-kg of water?

~~18. A gas mixture contains 45.6-g of Carbon Monoxide and 899-g of Carbon Dioxide. What is the mole fraction of Carbon Monoxide?~~

# 15-4 Practice Problems

1. What is the boiling point elevation when 11.4-g of Ammonia is dissolved in 200-g of water?
(The $K_b$ for water is .52-°C/*m*.)

2. How many grams of Benzoic Acid ($C_7H_6O_2$) must be dissolved in 78.1-g of Ethanol to raise the boiling point by 4.00-°C?
(The $K_b$ for Ethanol is 1.20-°C/*m*.)

3. If 67.7-g of Urea ($CH_4N_2O$) is dissolved in 833-g of Chloroform, what is the elevation in the boiling point?
(The $K_b$ for Chloroform is 3.85-°C/*m*.)

4. How many grams of Camphor ($C_{10}H_{16}O$) are needed to raise the boiling point of 43.5-g of Benzene by 2.10-°C?
(The $K_b$ for Benzene is 2.67-°C/*m*.)

5. If 1800-g of ethylene glycol ($C_2H_6O_2$) is added to 1900-g of water, what is the elevation in the boiling point?
(The $K_b$ for water is .52-°C/*m*.)

6. If the boiling point of 69.6-g of Carbon Tetrachloride must be raised by 10.2-°C, how many grams of Pyridine ($C_5H_5N$) must be dissolved in the Carbon Tetrachloride?
(The $K_b$ for $CCl_4$ is 5.02-°C/*m*.)

7. What is the boiling point elevation when 31.5-g of Menthol ($C_{10}H_{20}O$) is dissolved in 258-g of Acetic Acid?
(The $K_b$ for Acetic Acid is 2.93-°C/*m*.)

8. How much will the boiling point of 25.0-g of Acetic Acid be raised if 2.69-g of Picolinic Acid ($C_6H_5N_2$) is dissolved in the Acetic Acid?
(The $K_b$ for Acetic Acid is 2.93-°C/*m*.)

9. Styrene Glycol ($C_8H_{10}O_2$) is a plasticizer. How many grams of Styrene Glycol must be dissolved in 98.7-g of benzene to raise the boiling point by 8.57-°C?
(The $K_b$ for Benzene is 2.67-°C/*m*.)

10. What is the boiling point elevation when 43.5-g of the dye magenta I ($C_{20}H_{20}ClN_3$) is dissolved in 1650-g of ethanol?
(The $K_b$ for Ethanol is 1.20-°C/*m*.)

11. How many grams of Silver would have to be dissolved in 1120-g of Ethanol to lower the freezing point by 0.25-°C?
(The $K_f$ for ethanol is 1.99 °C/*m*.)

12. What is the freezing point depression when 85.3-g of Oxygen is dissolved in 1500-g of water?
(The $K_f$ for water is 1.86-°C/*m*.)

13. Ethylene Glycol ($C_2H_6O_2$) is the principal ingredient in antifreeze. How many grams of Ethylene Glycol will be needed to lower the freezing point of 2100-g of water by 20-°C?
(The $K_f$ for water is 1.86-°C/*m*.)

14. How many grams of Diphenyl ($C_{12}H_{10}$) must be dissolved in 655-g of Benzene to lower the freezing point by 3.20-°C?
(The $K_f$ for Benzene is 5.12-°C/*m*.)

15. Perylene ($C_{20}H_{12}$) is a constituent of coal tar. How many grams of Perylene must be dissolved in 66.9-g of Chloroform in order to lower the freezing point by 2.75-°C?
(The $K_f$ for Chloroform is 4.68-°C/*m*.)

16. How much will the freezing point of 1050-g of Benzene be lowered if 31.1-g of Orcinol ($C_7H_8O_2$) is dissolved in the benzene?
(The $K_f$ for Benzene is 5.12-°C/*m*.)

17. What will be the freezing point depression if 42.0-g of Ibuprofen ($C_{13}H_{18}O_2$) is . dissolved in 975-g of Naphthalene?
(The $K_f$ for Naphthalene is 7.00-°C/*m*.)

18. If 13.4-g of the medication Scopolamine ($C_{17}H_{21}NO_4$) is dissolved in 50.3-g of water, how much will the freezing point be lowered?
(The $K_f$ for water is 1.86-°C/*m*.)

19. How many grams of Pyrazole ($C_3H_4N_2$) must be added to 451-g of benzene to lower the freezing point by 5.00-°C?
(The $K_f$ for Benzene is 5.12-°C/*m*.)

16. If you lower the freezing point of 16.8-g of Chloroform by 2.50-°C by using Chlorine gas, how many grams of Chlorine gas must be dissolved in the Chloroform?
(The $K_f$ for Chloroform is 4.68-°C/*m*.)