The following questions (from another textbook) for chapter 4 are in addition to the ones in your textbook.

7. An analyst wishes to add 256 mg of Cl\(^-\) to a reaction mixture. How many milliliters of 0.217 M BaCl\(_2\) should be added?

8. A solution of 0.10 M \(\text{SO}_4^{2-}\) is available. What is the normality of this solution when used in the following reactions?
   a. \(\text{Pb}^{2+}(aq) + \text{SO}_4^{2-}(aq) \rightarrow \text{PbSO}_4(s)\)
   b. \(\text{HCl}(aq) + \text{SO}_4^{2-}(aq) \rightarrow \text{H}_2\text{SO}_4(aq) + \text{Cl}^-\(aq\))
   c. \(\text{SO}_4^{2-} + 4\text{H}_2\text{O}^+(aq) + 2e^- \rightarrow \text{H}_2\text{SO}_4(aq) + 5\text{H}_2\text{O}(l)\)

9. The concentration of lead in an industrial waste stream is 0.28 ppm. What is its molar concentration?

10. Commercially available concentrated hydrochloric acid is 37.0% w/w HCl. Its density is 1.18 g/mL. Using this information calculate (a) the molarity of concentrated HCl, and (b) the mass and volume (in milliliters) of solution containing 0.315 mol of HCl.

11. The density of concentrated ammonia, which is 28.0% w/w \(\text{NH}_3\), is 0.889 g/mL. What volume of this reagent should be diluted to 1.0 \(\times\) 10\(^3\) mL to make a solution that is 0.036 M in \(\text{NH}_3\)?

12. A 250.0-mL aqueous solution contains 45.1 \(\mu\)g of a pesticide. Express the pesticide's concentration in weight percent, parts per million, and parts per billion.

13. A city's water supply is fluoridated by adding NaF. The desired concentration of F\(^-\) is 1.6 ppm. How many milligrams of NaF should be added per gallon of treated water if the water supply already is 0.2 ppm in F\(^-\)?

14. What is the pH of a solution for which the concentration of H\(^+\) is \(6.92 \times 10^{-6}\) M? What is the [H\(^+\)] in a solution whose pH is 8.923?

15. Using conservation principles, write stoichiometric relationships for the following:
   a. The precipitation of Mg\(^{2+}\) as Mg\(_3\)P\(_2\)O\(_7\)
   b. The acid-base reaction between CaCO\(_3\) and HCl in which H\(_2\)CO\(_3\) is formed
   c. The reaction between AgCl and NH\(_3\) to form Ag(NH\(_3\))\(_2^+\)
   d. The redox reaction between Cr\(_2\)O\(_7^{2-}\) and Fe\(^{3+}\) to form Cr\(^{3+}\) and Fe\(^{3+}\)

16. Calculate the molarity of a potassium dichromate solution prepared by placing 9.67 g of K\(_2\)Cr\(_2\)O\(_7\) in a 100-mL volumetric flask, dissolving, and diluting to the calibration mark.

17. For each of the following, explain how you would prepare 1.0 L of a solution that is 0.10 M in K\(^+\). Repeat for concentrations of 1.0 \(\times\) 10\(^2\) ppm K\(^+\) and 1.0% w/w K\(^+\).
   a. KCl
   b. K\(_2\)Cr\(_2\)O\(_7\)
   c. K\(_3\)Fe(CN)\(_6\)