5.4 Preparing Solutions /12

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Radiator antifreeze (ethylene glycol) is diluted with an appropriate quantity of water to prevent freezing of the mixture in the radiator. A 4.00 L container of 94% V/V antifreeze is diluted to 9.00 L. Calculate the concentration of the final solution. **(2 marks)**
2. Many solutions are prepared in the laboratory from purchased concentrated solutions. Calculate the volume of concentrated 17.8 mol/L stock solution of sulfuric acid a laboratory technician would need to make 2.00 L of 0.200 mol/L solution by dilution of the original concentrated solution. **(2 marks)**
3. In a study of reaction rates, you need to dilute the copper(II) sulfate solution prepared in Investigation 5.3. You take 5.00 mL of 0.005000 mol/L CuSO4(aq) and dilute it to a final volume of 100.0 mL. **(5 marks)**
   1. Determine the final concentration of the dilute solution.
   2. What mass of CuSO4(s) is present in 10.0 mL of the final dilute solution?
   3. Can this final dilute solution be prepared directly using the pure solid? Defend your answer.
4. A student tries a reaction and finds that the volume of solution that reacts is too small to be measured with any available equipment. The student takes a 10.00 mL volume of the solution with a pipette, transfers it into a clean 250 mL volumetric flask containing some pure water, adds enough pure water to increase the volume to 250.0 mL, and mixes the solution thoroughly. **(3 marks)**
   1. Compare the concentration of the dilute solution to that of the original solution.
   2. Compare the volume that will react now to the volume that reacted initially.
   3. Predict the speed or rate of the reaction using the diluted solution compared with the rate using the original solution. Explain your answer