Your responses to the rest of the questions in this part of the examination will be graded on the basis of the accuracy and relevance of the information cited. Explanations should be clear and well organized. Examples and equations may be included in your responses where appropriate. Specific answers are preferable to broad, diffuse responses.

Answer BOTH Question 5 below AND Question 6 printed on page 11. Both of these questions will be graded. The Section II score weighting for these questions is 30 percent (15 percent each).

5. An experiment is performed to determine the molar mass of an unknown solid monoprotic acid, HA, by titration with a standardized NaOH solution.

   (a) What measurement(s) must be made to determine the number of moles of NaOH used in the titration?

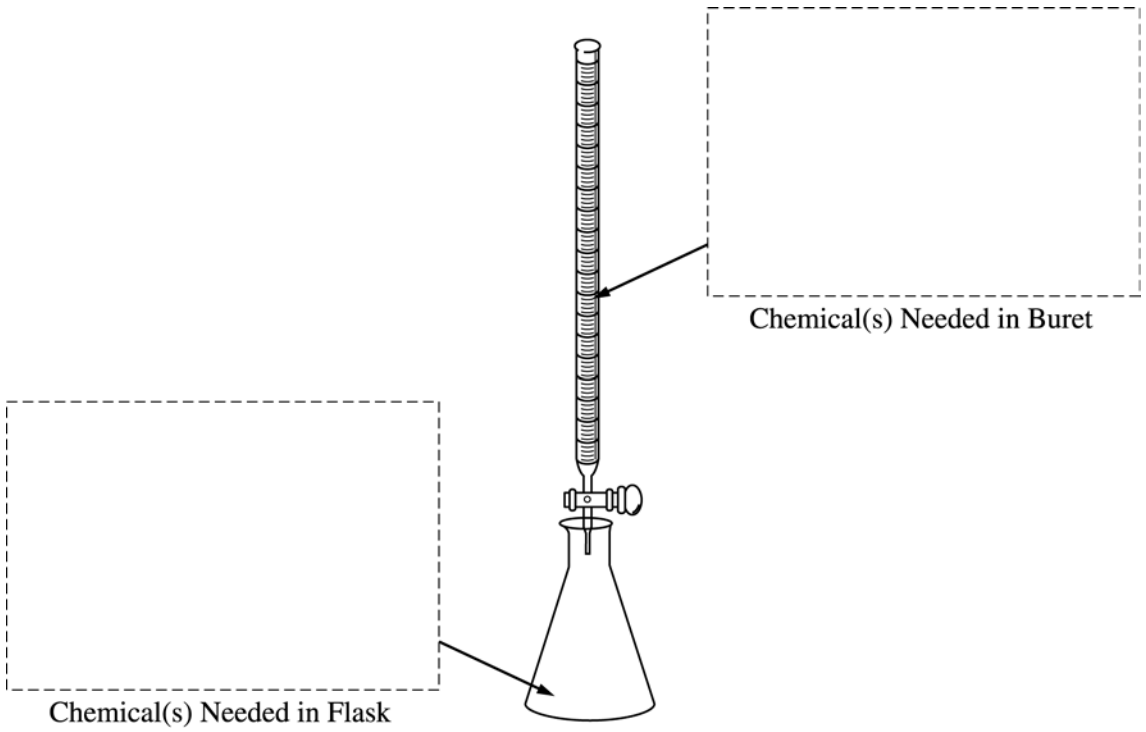
   (b) Write a mathematical expression that can be used to determine the number of moles of NaOH used to reach the endpoint of the titration.

   (c) How can the number of moles of HA consumed in the titration be determined?

   (d) In addition to the measurement(s) made in part (a), what other measurement(s) must be made to determine the molar mass of the acid, HA ?

   (e) Write the mathematical expression that is used to determine the molar mass of HA.

   (f) The following diagram represents the setup for the titration. In the appropriate boxes below, list the chemical(s) needed to perform the titration.



   (g) Explain what effect each of the following would have on the calculated molar mass of HA. Justify your answers.

      (i) The original solid acid, HA, was not completely dry at the beginning of the experiment.

      (ii) The procedure called for 25 mL of H_2O in the Erlenmeyer flask, but a student used 35 mL of H_2O.