1. What is the pH of a soluble solution that has the following H+ concentrations? (Show your work).
   1. 1.75 x 10-5 M
   2. 6.5 X 10-10 M
2. Pyruvate is an important tricarboxylic acid involved in cellular metabolism. You may need to refer to Chapter 18 to answer the following questions regarding pyruvate and its metabolites.
   1. Which metabolic pathway is used for the synthesis of pyruvate?
   2. Provide the net equation for this pathway.
   3. Name three possible metabolic fates of pyruvate?
   4. Under aerobic conditions, pyruvate is converted to citric acid (citrate). Draw a titration curve of citrate (pKa 3.13, 4.76, 6.4).
   5. If the total buffer concentration for citrate is 0.4 M, what are the individual concentrations of the uncharged, diprotonated and triprotonated species at pH 5.2?
   6. Given a 0.1 M solution of citrate at its isoelectric point and ready access to 0.1 M HCl, 0.1M NaOH, and distilled water, describe the preparation of 1L of 0.08 M buffer solution, pH 7.3.