EXPERIMENT 3:
UV-VIS Spectrophotometry of Amino Acids, Proteins and Nucleic Acids

1. Name three groups that give rise to UV-Visible absorption in biological systems.

2. Draw the structural formula for each of the following amino acids in their zwitterionic form. Also draw the structural formula for tyrosine that would be expected at pH 12.0.
   - L-tyrosine
   - L-tryptophan
   - L-phenylalanine
   - L-glycine

3. Write the values for the \( \lambda \) \text{max} and the corresponding molar absorption coefficients for each of the amino acids in question #1 at neutral pH. (Give all the values listed and the corresponding wavelengths) Give the literature references for the values obtained.

4. Calculate the concentration of L-tryptophan in mol/L and in mg/mL that would be required to prepare a solution giving an absorbance of approximately 0.800 at 280 nm at neutral pH. Assume that the path length of the cuvette is 1 cm.

5. Write the values for the \( \lambda \) \text{max} and the corresponding molar absorption coefficients for Bovine Serum Albumin (BSA) and myoglobin at neutral pH. (Give all the values listed and the corresponding wavelengths) Give the literature references for the values obtained.

6. Draw a block diagram and label the components of a conventional, single-beam spectrophotometer.