CHEMISTRY 260 BIOCHEMISTRY
PRACTICE QUESTIONS #1.1

1) Textbook Chapter 2 study exercises: 4 5 6 8 11 13
Textbook Chapter 3 study exercises: 2 7 10 12 13 28

2) Given the following "sense strand" from a gene:

3' **TAC CGT GCA CTA TAT CCC GCG CGA TCA ACT** 5'

a) Write down the base sequence of the mRNA coded from this gene.
b) Write down the amino acid sequence of the peptide coded from the mRNA.

3) A carboxylic acid functional group has a pKa = 4.00.

a) What percentage of the groups in water will be negatively charged at pH 3.50, 4.50, and 7.00?

An amino functional group has a pKa = 9.00.

b) What percentage of the groups in water will be positively charged at pH 7.00, 8.75 and 10.00?

4) A weak base with an amino functional group has a pKa = 8.00. What concentrations (M) of the conjugate acid and conjugate base would be needed to produce each of the following buffers?

a) 0.100 M buffer at pH 8.0

b) 0.100 M buffer at pH 7.5

c) 0.050 M buffer at pH 8.25

5) A weak acid with a carboxylic acid functional group has a pKa = 5.00. What concentrations (M) of the conjugate acid and conjugate base would be needed to produce each of the following buffers?

a) 0.050 M buffer at pH 5.0

b) 0.100 M buffer at pH 6.0

c) 0.200 M buffer at pH 4.5