



CHEMISTRY 260 BIOCHEMISTRY
PRACTICE QUESTIONS #1.1

- 2) Given the following "sense strand" from a gene:
- 3' TAC CGT GCA CTA TAT CCC GCG CGA TCA ACT 5'**
- a) **5' AUG GCA CGU GAU AUA GGG CGC GCU AGU UGA 3'**
- b) met ala arg asp ile gly arg ala ser (M A R D I G R A S)
- 3) a) negatively charged group is the conjugate base pH 3.50 (24%), pH 4.5 (76%), pH 7 (100%)
b) positively charged group is the conjugate acid pH 7 (99%), pH 8.75 (64%), pH 10 (9%)
- 4) A weak base with an amino functional group has a $pK_a = 8.00$. 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
conjugate acid = $0.100 \text{ M} \times 50\% = 0.050 \text{ M}$ and conjugate base = $0.100 \text{ M} \times 50\% = 0.050 \text{ M}$
- b) 0.100 M buffer at pH 7.5
conjugate acid = $0.100 \text{ M} \times 76\% = 0.076 \text{ M}$ and conjugate base = $0.100 \text{ M} \times 24\% = 0.024 \text{ M}$
- c) 0.050 M buffer at pH 8.25
conjugate acid = $0.050 \text{ M} \times 36\% = 0.018 \text{ M}$ and conjugate base = $0.050 \text{ M} \times 64\% = 0.032 \text{ M}$
- 5) A weak acid with a carboxylic acid functional group has a $pK_a = 5.00$. 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
conjugate acid = $0.050 \text{ M} \times 50\% = 0.025 \text{ M}$ and conjugate base = $0.050 \text{ M} \times 50\% = 0.025 \text{ M}$
- b) 0.100 M buffer at pH 6.0
conjugate acid = $0.100 \text{ M} \times 9\% = 0.009 \text{ M}$ and conjugate base = $0.100 \text{ M} \times 91\% = 0.091 \text{ M}$
- c) 0.200 M buffer at pH 4.5
conjugate acid = $0.200 \text{ M} \times 76\% = 0.152 \text{ M}$ and conjugate base = $0.200 \text{ M} \times 24\% = 0.048 \text{ M}$