

Practice questions and explanations

BIOS 1006

Week 1

Lecture 1: Fundamentals

Functional groups

Question 1: Naming



Answers:

methy, hydroxyl, thiol, carbonyl, carboxyl, amino, phosphate

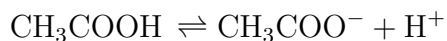
Question 2: Roles of functional groups

1. Amino acids and proteins have amine groups & carboxyl groups.
2. Carbohydrates tend to have an abundance of hydroxyl groups and glycosidic linkages.
3. Lipids vary greatly in structure, but fatty acids typically have carboxyl groups.
4. Each nucleotide in a nucleic acid molecule has phosphodiester linkages.

pH and pKa

Question 3: ICE tables

You make a 0.2 M aqueous solution of propionic acid $\text{CH}_3\text{CH}_2\text{COOH}$ by dissolving an appropriate amount of propionic acid in water. The pH of the resulting solution is 4.88. What is the K_a of propionic acid?



Set up the ICE table:

	CH_3COOH	CH_3COO^-	H^+
Initial	0.2	0	0
Change	-x	+x	+x
End	0.2-x	+x	+x

Lecture 2: Amino acids and peptides

Question 4: Amino acid chemical properties

Which amino acid side chains are ionizable? YECDHKR

Which amino acid has no chiral center? G

Which amino acids have hydrophobic (nonpolar) side chains? AVLIGMPFWY

Which amino acid side chain has an amino group? K

Which amino acids have basic functional groups? RHK

pI of a peptide