

Baynes: Medical Biochemistry, 3rd Edition

Chapter 1: Amino Acids and Proteins

Test Bank

Multiple Choice

1. Which of the following best describes a unique property of proline?
 - A. It has a high degree of conformational flexibility compared to other amino acid residues.
 - B. It can isomerize between the L- and D-configurations within proteins.
 - C. Its carboxylate group is unusually acidic relative to other amino acids.
 - D. Its α -imino group is bonded to its side chain.
 - E. Peptide bonds to proline are fixed in the cis isomer.ANS: D.
2. Which of the following statements regarding the ionization state of amino acids is true?
 - A. Acidic side chains are predominantly protonated at physiologic pH.
 - B. The pI is the pH at which an amino acid has no net charge.
 - C. Titration of the zwitterion form of a neutral amino acid with alkali will yield a cationic species.
 - D. The pK_a value for the α -amino group is lower than that for the α -carboxyl group.
 - E. The buffering capacity of an ionizable side chain reduces as the pH approaches the pK_a .ANS: B.
3. Which of the following statements regarding protein structure is correct?
 - A. The primary structure of a protein can be disrupted by denaturing agents including urea.
 - B. The secondary structure of a protein is predominantly determined by hydrophobic interactions.
 - C. Salt bridges are most frequently found as buried interactions within a protein's interior.
 - D. Quaternary structure is a feature of protein complexes with multiple subunits.
 - E. Disulfide bonds are considered primary structures.ANS: D.
4. Which of the following statements related to protein purification methods is correct?
 - A. Sodium dodecyl sulfate–polyacrylamide gel electrophoresis (SDS-PAGE) separates proteins on the basis of their mass-to-charge ratio.
 - B. The method of isoelectric focusing (IEF) isolates proteins by exploiting their mass-to-pI ratio.
 - C. Two-dimensional gel electrophoresis purifies polypeptides on the basis of their molecular weight and isoelectric point.

D. In gel filtration chromatography, small proteins tend to elute from the column earlier than large proteins.

ANS: C.

5. You are involved in a research project on high-altitude endurance athletes that is investigating the influence of lactic acid production on the oxygen dissociation curve of blood. As part of the bench work, you prepare a 0.3 M stock solution of lactic acid (pK_a 3.9), but can't get a reliable reading off the pH meter. Using conductometry, you determine that the acidic solution contains 0.25 M in the dissociated form and 0.05 M in the undissociated form. Using this information, which of the following is the most likely pH value of the solution?

A. 2.6

B. 3.2

C. 3.9

D. 4.6

E. 4.9

ANS: D.