

PROTEIN MODELING

Division C 2019

Team Name: _____

Names of Participants: _____

Part 1 Subscore:	/20
Part 2 Subscore:	/38
TOTAL SCORE:	/58

PART ONE: MULTIPLE CHOICE (2 points each)

- 1) Anfinsen's dogma states that:
 - a. Proteins are made up of a primary, secondary, tertiary, and quaternary structure
 - b. Proteins' native structure is determined by the protein's amino acid sequence
 - c. Proteins are denatured at high temperatures
 - d. Proteins can fold in a multitude of different ways, depending on their environment
- 2) In protein denaturation, proteins lose their:
 - I. Primary structure
 - II. Secondary structure
 - III. Tertiary structure
 - a. I & II
 - b. I & III
 - c. II & III
 - d. I, II, & III
- 3) Which of the following functions as the START amino acid for translation?
 - a. Valine
 - b. Glutamine
 - c. Methionine
 - d. Arginine
- 4) Which kinds of amino acids are unlikely to be found on portions of a protein facing outwards?
 - a. Hydrophilic amino acids
 - b. Acidic amino acids
 - c. Hydrophobic amino acids
 - d. Essential amino acids
- 5) Which of the following is NOT an essential amino acid?
 - a. Histidine
 - b. Leucine
 - c. Tryptophan
 - d. Alanine
- 6) Of the following amino acids, which can form a disulfide bridge?
 - a. Cysteine
 - b. Methionine
 - c. Threonine
 - d. Lysine
- 7) Which of the CRISPR Cas9 protein domains is responsible for finding and cleaving target DNA?
 - a. Rec I
 - b. Rec II
 - c. PAM Interaction
 - d. Bridge Helix
- 8) How is the inactive CRISPR Cas9 protein converted to its active form?
 - a. Spontaneous activation
 - b. Change in environmental pH

- c. Binding of target DNA
 - d. Presence of guide RNA
- 9) CRISPR Cas9 can be classified as a:
- a. Endonuclease
 - b. Exonuclease
 - c. Restriction enzyme
 - d. Transcription factor
- 10) Bonds that distinguish a protein's secondary structure from its primary structure are:
- a. Covalent bonds
 - b. Hydrogen bonds
 - c. Disulfide bonds
 - d. Peptide bonds

PART TWO: Short Answer

- 1) Explain the primary, secondary, tertiary, and quaternary structures of proteins. BE SPECIFIC! For secondary and tertiary structures, name and explain specific examples of interactions. (10 pts)
- 2) The following questions are about acidic and basic amino acids:
- a. What specific chemical property (functional group, element, or otherwise) makes certain amino acids basic? Explain how it makes the amino acid basic. (2 pts)
 - b. What specific chemical property (functional group, element, or otherwise) makes certain amino acids acidic? Explain how it makes the amino acid acidic. (2 pts)
 - c. Name the three basic amino acids: (3 pts)
 - d. Name the two acidic amino acids: (2 pts)

