

Cell and Molecular Biology Problem Set

1. You have forgotten to label your solutions! Luckily, using your USABO skills, you quickly determine which solution is composed of what type of amino acid. You know that you have created a tryptophan, alanine, and glutamic acid amino acid solutions. You also know that solution A and solution B are prepared in DMSO as opposed to water, while solution C is prepared in water. In addition you know that solution B absorbs colored light well. What amino acids correspond to solution A, B, C?

- A. A-Tryptophan B-Alanine C-Glutamic Acid
- B. A-Alanine B-Tryptophan C-Glutamic Acid
- C. A-Tryptophan B-Glutamic Acid C- Alanine
- D. A-Glutamic Acid B. Tryptophan C-Alanine

2. Suppose that a solution A has an unknown absorbance. By what factor will the absorbance change if the path length is quadrupled and the concentration tripled?

- A. 3
- B. 6
- C. 12
- D. 24

3. What level is DNA packing is Histone 1A most involved with?

- A. 10nm fiber
- B. 30nm fiber
- C. Looped domains
- D. Metaphase Chromosomes

4. Select all of the following compounds would result in the increase of electron transport?

- A. Hydrochloric acid
- B. Dinitrophenol
- C. Citrate
- D. F₀ section of ATP synthase

5. Adjacent bonds are critical to function biological molecules. Select all of the bond types (more than one bond type may be found in certain sugars) that would occur in the following molecules.

- Alpha 1-6 Linkage
- Alpha 1-4 Linkage
- Beta 1-4 Linkage
- Beta 1-6 Linkage

These problems were created by Yilun Du and Varun Mangalick and are the intellectual property of them and their biology tutoring business, Study of Life. If you have any questions, email us at studyoflife.info@gmail.com

Amylose
 Amylopectin
 Glycogen
 Chitin
 Cellulose

6. Which of the following effects contribute most directly to maintenance of protein structure?

- A. Hydrogen bonding between the protein and water
- B. The low entropy of water molecules next to hydrophobic molecules.
- C. Disulfide Linkages
- D. Chaperonins

7. Given that sequence of the mRNA of a protein is the following, construct two 6 nucleotide primers that amplify the complete mRNA sequence for creating the complementary cDNA

mRNA sequence: AUUUUGCCGGCUAAAAAGGCCCAACACA

8. The sequence of a DNA fragment is determined by DD sequencing. Given the results below, what is the sequence of the DNA?

