Assignment 3 BB 450 / 550

(Note the video showing the solutions for this assignment refers to it as problem set 4. It is, in fact, assignment 3)

1. What two parts of an amino acid are joined together in making a peptide bond?

2. What parts of a polypeptide backbone behave as if they were a double bond?

3. Name the primary forces stabilizing alpha helices and beta strands.

4. How does a supersecondary structure differ from a secondary structure?

5. Name three fibrous proteins described in class.

6. Name two modified amino acids in collagen and the role each plays in the protein’s structure.

7. Why is Vitamin C essential for strong collagen?

8. You discover a new protein that has numerous alternating regions of high hydropathy interspersed with short regions of high hydrophilicity. Describe a likely structure of such a protein.

9. You discover another protein that has an unusual structure - all of the hydrophobic amino acids are on the outside of the protein and all of the hydrophilic ones are on the inside. Where in the cell might you expect to find such a protein and why?

10. You discover a new protein that can only be denatured when a chelating agent, such as EDTA is present. What would you conclude about its secondary structure?

11. RNase can’t be easily denatured unless a reducing agent, such as mercaptoethanol is present. Interestingly, it can be renatured, but
only to a limited extent. The percentage of renaturation can be increased by addition of a tiny amount of mercaptoethanol. Explain at least two reasons why this might be the case.