

## PROTEIN STRUCTURE – TOPIC TEST 1

### QUESTION 1

The sequencing of amino acids within a protein is called its:

- A. Secondary structure
- B. Tertiary structure
- C. Base structure
- D. Primary structure

### QUESTION 2

The secondary structure of a protein is created by

- A. the hydrogen bonds between various neighbouring regions
- B. sulphur to sulphur linkages
- C. covalent bonds between neighbouring protein chains
- D. the Z groups of the amino acid residues interacting

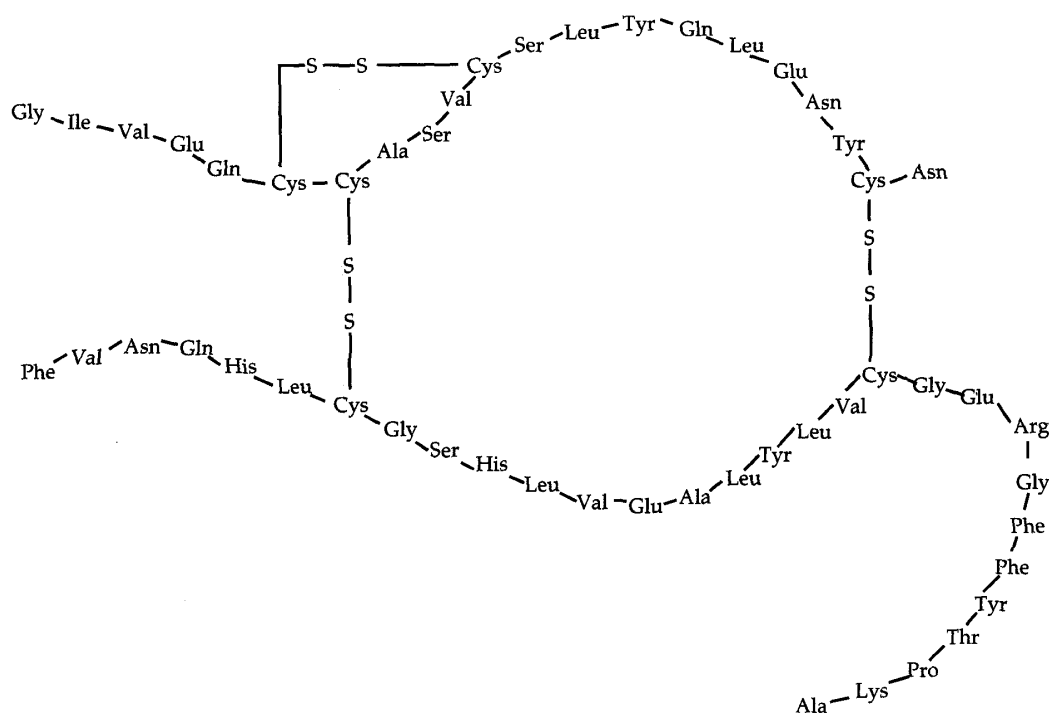
### QUESTION 3

Which one of the following is *not* a factor in maintaining the overall tertiary structure of a protein?

- A. Hydrogen bonding
- B. Disulphide bridges
- C. Ionic interactions
- D. The intertwining of two polypeptide chains

### QUESTION 4

The diagram below shows the primary structure of ox insulin.



The bond between cysteine molecules (Cys) is used to maintain

- A the primary structure of a protein.
- B the secondary structure of a protein.
- C the tertiary structure of a protein.
- D the primary, secondary and tertiary structures of a protein.

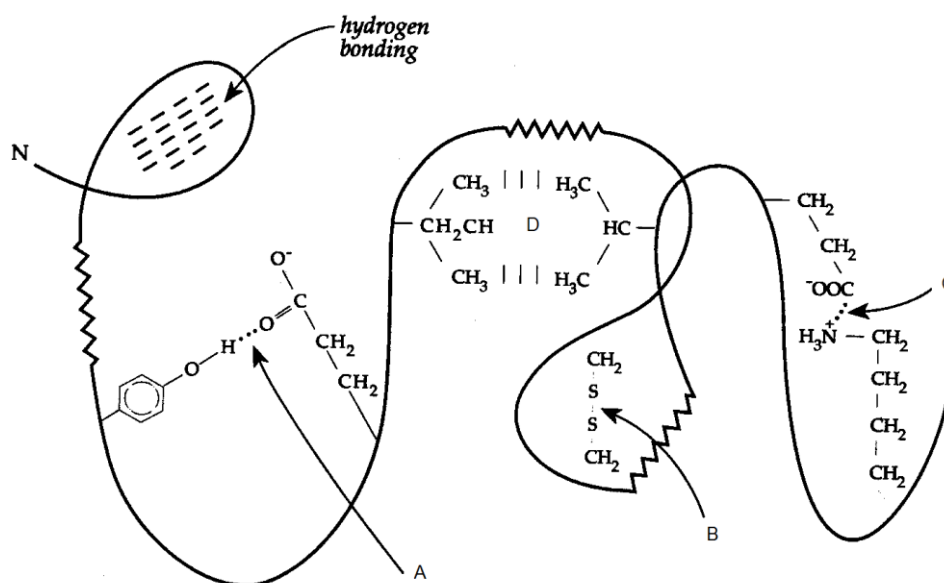
### QUESTION 5

Treating a protein with hot concentrated acid would disrupt the

- A primary structure
- B secondary structure
- C tertiary structure
- D all of the above

### QUESTION 6

The complex structure below is a representation of a protein molecule.



- a. Identify the types of bonds at A, B, C and D.
  
  
  
  
  
  
  
  
  
  
- b. What are these types of bonds responsible for?
  
  
  
  
  
  
  
  
  
  
- c. Between which parts of the protein do these links form?

### QUESTION 7

Pleated sheets and helical shapes are a common feature of the secondary structure of a protein. Why do these repeating shapes occur in proteins? (1 mark)

#### Solution

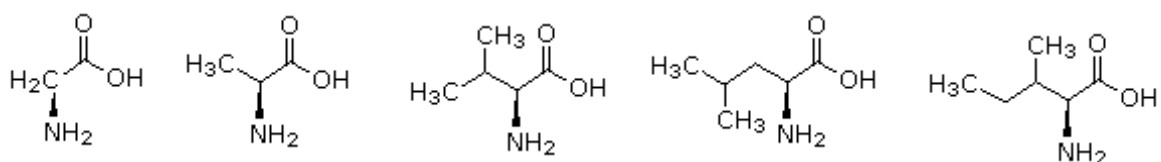
### QUESTION 8

The hydrogen bonding which is responsible for the secondary structure of a protein only occurs between functional groups. Clearly identify these groups. (1 mark)

#### Solution

### QUESTION 9

One section of a protein mainly consists of the amino acids shown below.



What types of interactions would be responsible for maintaining the tertiary structure in this section of the protein? Explain. (2 marks)

#### Solution

## SOLUTIONS

**QUESTION 1** Answer is D

**QUESTION 2** Answer is A

**QUESTION 3** Answer is D

**QUESTION 4** Answer is C

**QUESTION 5** Answer is D

### QUESTION 6

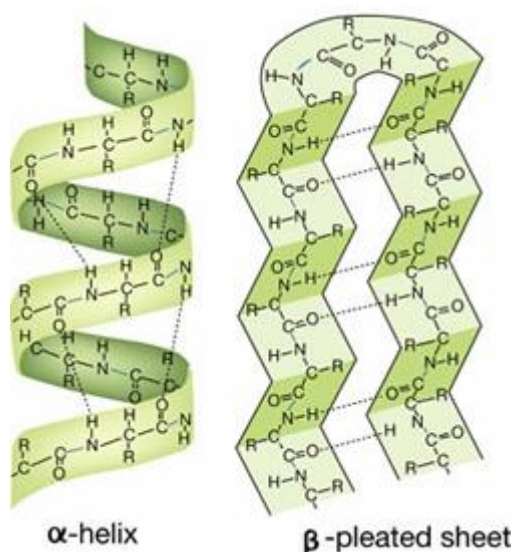
- A – hydrogen bonding  
B – disulphide link  
C – electrostatic forces  
D – dispersion forces (or hydrophobic interactions)
- Maintaining the tertiary structure of the protein.
- Between the Z groups on the amino acids.

### QUESTION 7

Repeated sequences of amino acids along the backbone of the protein cause a repeated pattern of hydrogen bonding. This causes a repeating structure (like a helices or pleated sheet) to form.

### QUESTION 8

The hydrogen bonding occurs between the N-H section of one amide link and the C=O section of a different amide link as shown below.



## QUESTION 9

The tertiary structure of a protein is maintained by interactions between the Z groups of a protein. All of the amino acids shown have Z groups containing hydrocarbon chains (or H). The only interactions that could occur are dispersion forces between the Z groups and hydrophobic interactions.

