

1.7 Proteins

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS amino acids 氨基酸 • peptide bonds 肽键 • denaturation 变性 • proteins 蛋白质
• polymers 聚合物

Objective

Build the skills to answer exam questions on **proteins**.

You must be able to:

- describe proteins as polymers of **amino acids** 氨基酸 joined by **peptide bonds** 肽键
- name the four levels of protein structure
- explain that **shape determines function** and how **denaturation** 变性 works

1 Worked examples

Study these first. Each one shows the method for a question type used later — follow the steps and you can do the Practice and Exam-style questions yourself.

■ The amino-acid monomer

Proteins are polymers of **amino acids** joined by **peptide bonds**. There are 20 different amino acids; their order determines the protein.

■ Four levels of structure

- **Primary** — the sequence of amino acids.
- **Secondary** — local folds (helices and sheets) from hydrogen bonds.
- **Tertiary** — the overall 3-D shape of one chain.
- **Quaternary** — two or more chains together.

■ Shape determines function

A protein's **specific shape** lets it do its job — as an enzyme, transporter, receptor, or structural part. Change the shape and the function is lost.

■ Denaturation

Heat or a pH change can **denature** a protein — breaking the bonds that hold its shape, so it unfolds and stops working. The primary sequence is unchanged, but the function is lost.

2 Practice

Now apply the methods above.

2.1 Name the monomer of proteins and the bond joining them. [2]

2.2 What is the primary structure of a protein? [1]

2.3 What can denature a protein? [1]

3 Exam-style questions

3.1 A protein's function is determined mainly by its [1]

A	B
C	D

- A** color
- B** three-dimensional shape
- C** mass
- D** charge only

3.2 An enzyme is heated strongly and stops working.

- (a) Name the process that has occurred. [1]
- (b) Explain why the enzyme no longer functions. [2]

3.3 Explain how a change in a single amino acid (primary structure) could affect a protein's function. [2]