

# 2.3 Proteins

## Question Paper

Course	DP IB Biology
Section	2. Molecular Biology
Topic	2.3 Proteins
Difficulty	Medium

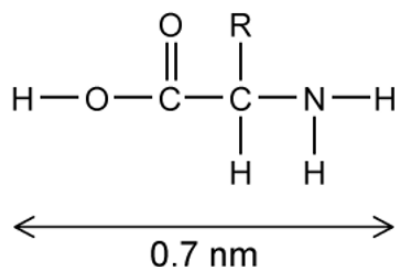
**Time allowed:** 20  
**Score:** /10  
**Percentage:** /100

### Question 1

Amino acids consist primarily of oxygen, hydrogen, carbon and nitrogen atoms. The diameter of each atom when bonded to another atom is shown in the table below.

Atom	Single bond / nm	Double bond / nm
O	0.130	-
H	0.060	0.110
C	0.154	0.120
N	0.140	0.134

Using the figures in the table, the approximate length of one amino acid is 0.7 nm, as shown below.



What would be the approximate length of a dipeptide of this amino acid after a condensation reaction has occurred?

- A** 1.0 nm
- B** 1.2 nm
- C** 1.4 nm
- D** 1.6 nm

[1 mark]

### Question 2

Which of the following chemical groups does **not** bond directly with the central carbon of an amino acid?

- A -OH
- B -NH<sub>2</sub>
- C -COOH
- D -H

[1 mark]

### Question 3

All life (except for a few primitive, prokaryotic species) use the same 20 amino acids joined into polypeptides.

- A Only the 20 amino acids existed when life began, so all life now uses them.
- B All organisms share a common ancestor, so the link between the genetic code and amino acids sequences is already fixed.
- C Polypeptide chains join together to increase the range of possible functions that they can carry out.
- D 20 amino acids is more than enough to give a huge, almost infinite range of characteristics for all life.

Which of the four statements above is **not** a possible hypothesis for why all life uses the same 20 amino acids?

[1 mark]

#### Question 4

Which of the following causes fibrous polypeptides to be insoluble?

- A** They are very long.
- B** Their surface has nonpolar amino acids.
- C** They are usually structural.
- D** They have more than one polypeptide chain.

[1 mark]

#### Question 5

Which row of the table best classifies common proteins with differing numbers of polypeptide chains?

	<b>One polypeptide chain</b>	<b>Two polypeptide chains</b>	<b>Three polypeptide chains</b>
<b>A</b>	Collagen	Insulin	Haemoglobin
<b>B</b>	Lysozyme	Insulin	Collagen
<b>C</b>	Lysozyme	Haemoglobin	Insulin
<b>D</b>	Haemoglobin	Lysozyme	Collagen

[1 mark]

**Question 6**

Which of the following words best describes the structure of a large macromolecule (such as a protein) and its final 3-D shape?

- A** Presentation
- B** Structure
- C** Confirmation
- D** Conformation

[1 mark]

**Question 7**

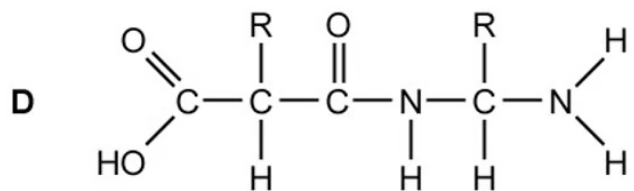
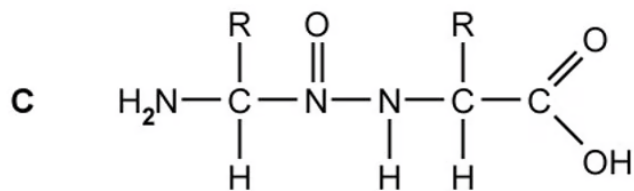
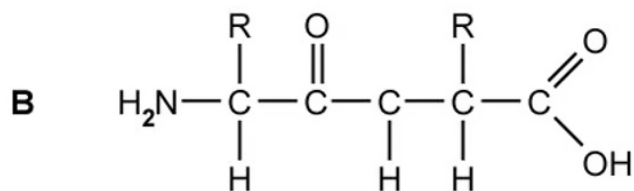
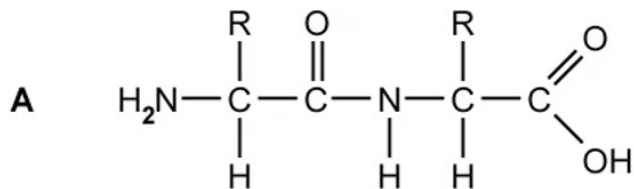
Which of the following statements about the proteome is correct?

- A** The proteome is the full range of proteins that an organism could produce from its genome.
- B** The proteomes of closely related people are identical.
- C** The proteome is usually smaller than the genome of an organism.
- D** The proteome varies during an organism's lifetime.

[1 mark]

Question 8

Which of the following diagrams correctly shows the structure of a dipeptide?

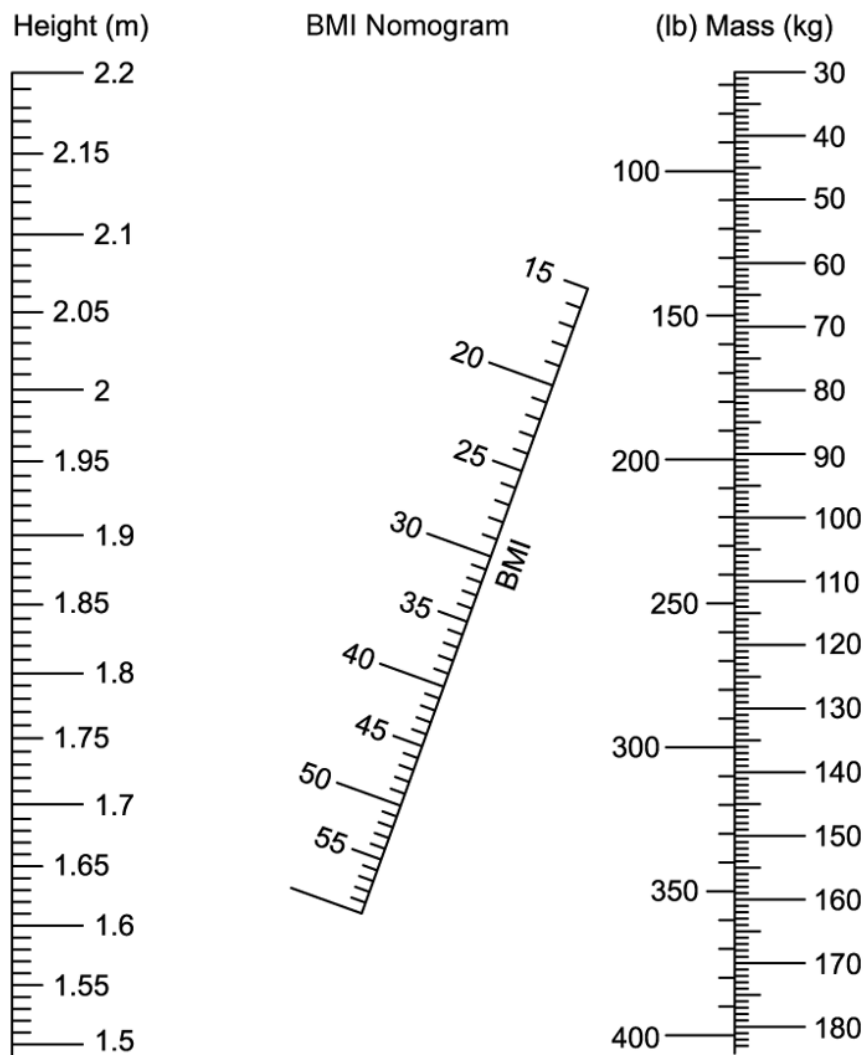


[1 mark]

**Question 9**

Using the nomogram below, what is the Body Mass Index of a person of height 1.65 m and mass 130 lbs?

- A** 24
- B** 22
- C** 20
- D** 25



[1 mark]

**Question 10**

When using molecular visualisation software to represent large biological molecules, which aspect of a macromolecule would not necessarily be distinguishable?

- A** The surface topography (eg. of a cell-surface receptor).
- B** The location of the active site of an enzyme.
- C** The flexing of a molecule when in aqueous solution.
- D** The presence of a cavity to show an ion channel through a membrane protein.

[1 mark]