

# Proteins

## Question Paper

<b>Level</b>	International A Level
<b>Subject</b>	Biology
<b>Exam Board</b>	Edexcel
<b>Topic</b>	Membranes, Proteins, DNA and Gene expression
<b>Sub-Topic</b>	Proteins
<b>Booklet</b>	Question paper

**Time Allowed:** 42 minutes

**Score:** /35

**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

1 Proteomics can be used to study gene expression and to analyse the structure of proteins.

(a) Describe the structure of proteins.

(4)

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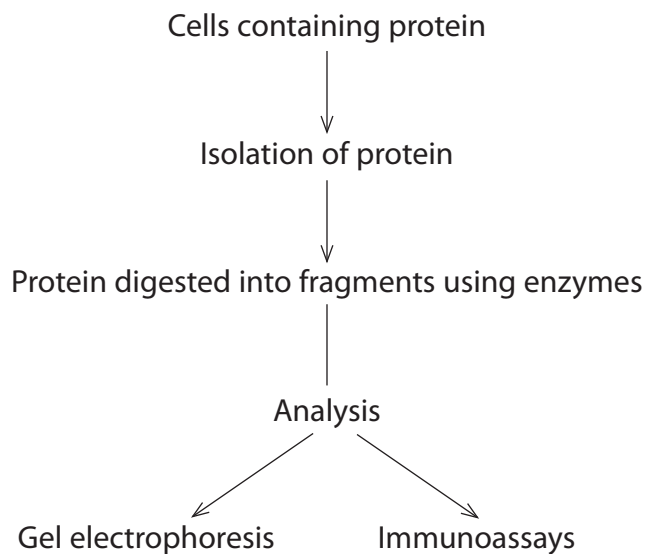
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(b) The diagram below shows some of the steps involved in proteomics.

The analysis uses gel electrophoresis and immunoassays. Immunoassays identify protein fragments using antibodies.





(iv) Immunoassays use antibodies to identify the protein fragments.

Suggest why antibodies are suitable molecules for identifying protein fragments.

(2)

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(c) Gene expression can be analysed by isolating and studying mRNA.

However, the structure and number of mRNA molecules do not always correspond to the proteins in the cell.

Suggest why the mRNA molecules do not always correspond to the proteins in the cell.

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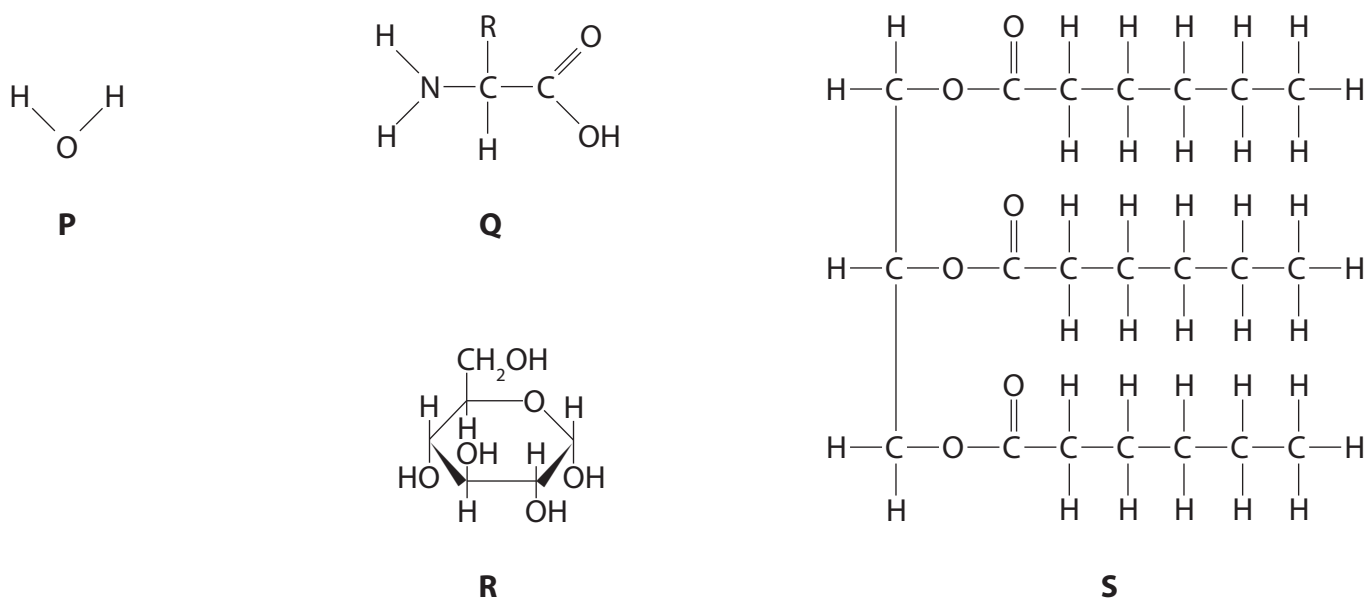
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**(Total for Question 1 = 13 marks)**

2 The diagram below shows four molecules, P, Q, R and S, found in living organisms.



(a) Place a cross ☒ in the box to complete each of the following statements.

(i) Two molecules of **P** can be joined together by

(1)

- A** a hydrogen bond
- B** a hydrophobic interaction
- C** an ionic bond
- D** a peptide bond

(ii) A condensation reaction between two molecules of **Q** forms

(1)

- A** an ester bond
- B** a glycosidic bond
- C** a hydrogen bond
- D** a peptide bond

(iii) Molecule **R** is

(1)

- A** a fatty acid
- B** an amino acid
- C** deoxyribose
- D** glucose

(iv) One of the products of the hydrolysis of molecule **S** is

(1)

- A** a triglyceride
- B** an amino acid
- C** glycerol
- D** water

(b) Name **one** element found in all molecules of **Q** that would not be found in carbohydrates.

(1)

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(c) Draw a diagram to show the molecules produced when **two** molecules of **R** join together during a condensation reaction.

(3)

(d) Explain how the dipolar nature of water is essential for living organisms.

(2)

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**(Total for Question 2 = 10 marks)**





(c) (i) Place a cross ☒ in the box next to the polysaccharides found in plants.

(1)

- A cellulose and glycogen
- B cellulose and starch
- C glycogen and starch
- D cellulose, glycogen and starch

(ii) Describe how the carbon in these polysaccharides is returned to the atmosphere.

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**(Total for Question 3 = 12 marks)**