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BIOLOGY

FOUNDATIONS IN BIOLOGY

Level & Board

OCR (A-LEVEL)

TOPIC:

BIOLOGICAL MOLECULES - PROTEINS

PAPER TYPE:

QUESTION PAPER - 1

TOTAL QUESTIONS

07

TOTAL MARKS

/22

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Biological Molecules – Proteins - 1

1.

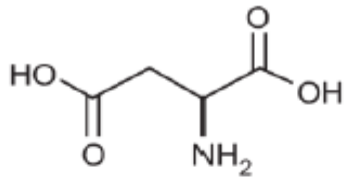
(a) Which of the rows, A through D, accurately sums up the characteristics of the proteins that are named? (1)

Row	Collagen	Insulin	Elastin	Haemoglobin
A	fibrous protein which is flexible but does not stretch	globular protein with specific, fixed shape	fibrous protein which recoils after being deformed	globular protein which cannot change shape
B	fibrous protein which is flexible but does not stretch	globular protein with specific, fixed shape	fibrous protein which recoils after being deformed	globular protein which can change shape
C	fibrous protein which recoils after being deformed	globular protein with specific, fixed shape	fibrous protein which is flexible but does not stretch	globular protein which can change shape
D	fibrous protein which is flexible but does not stretch	globular protein which can change shape	fibrous protein which recoils after being deformed	globular protein with specific, fixed shape

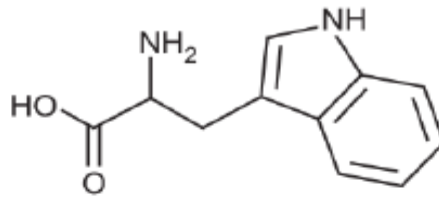
2.

(a) Which of these is not a possible amino acid? (1)

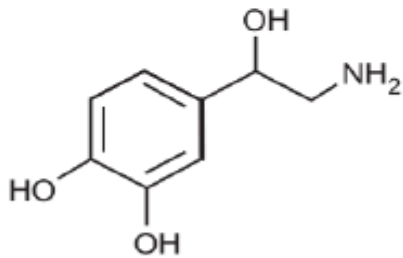
A



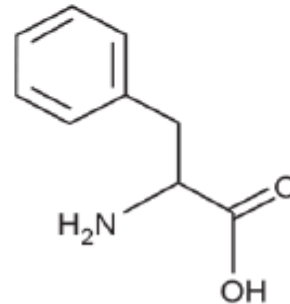
B



C



D



3.

(a) The subsequent list comprises several organic compounds together with the corresponding chemical reactions that transform them into distinct molecules.

Which row, A through D, is accurate? (1)

- A nucleic acid $\xrightarrow{\text{hydrolysis}}$ nucleotide $\xrightarrow{\text{hydrolysis}}$ polynucleotide
- B α -glucose $\xrightarrow{\text{condensation}}$ amylopectin $\xrightarrow{\text{hydrolysis}}$ α -glucose
- C amino acid $\xrightarrow{\text{condensation}}$ dipeptide $\xrightarrow{\text{hydrolysis}}$ polypeptide
- D β -glucose $\xrightarrow{\text{condensation}}$ cellulose $\xrightarrow{\text{condensation}}$ maltose

4.

Sulfate ions (SO_4^{2-}) are necessary for root crops to reach their typical size. During growth, the plant synthesizes biological compounds using the sulfur atoms.

(a) For the creation of which kind of biological molecule are sulfur atoms necessary? **(2)**

5.

The general structure of an amino acid is depicted in Fig. 1.1.

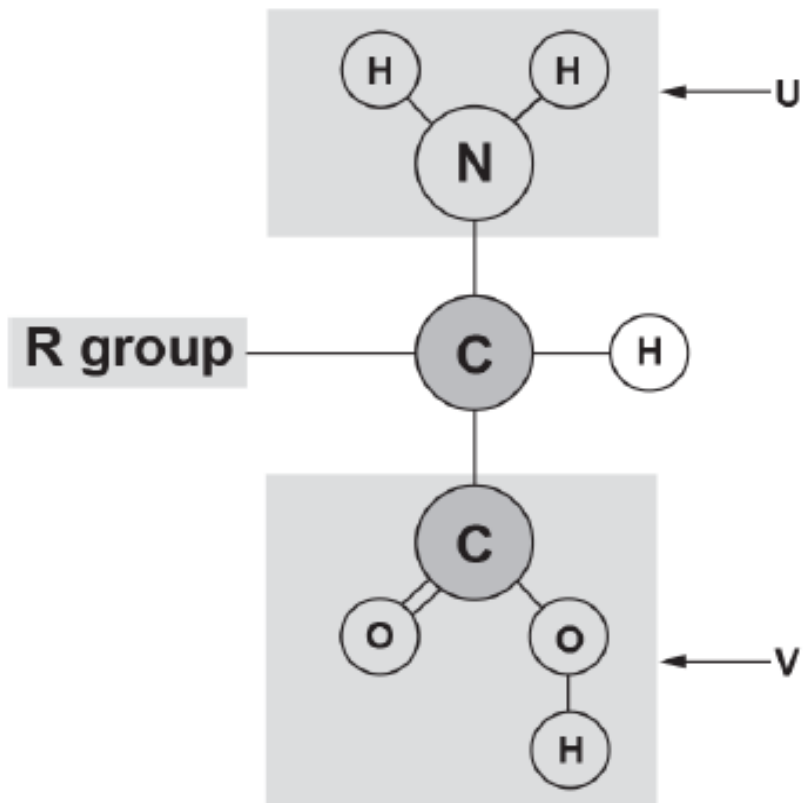


Fig. 1.1

(a) Give the group names that are designated U and V. **(2)**

(b) An illustration of a short polypeptide chain composed of three amino acids can be found in Figure 1.2.

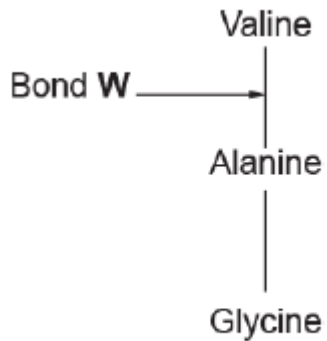


Fig. 1.2

Give bond W its name and describe the reaction that forms it. (2)

6.

Bacteria have a protein called rubredoxin. It has about fifty amino acids in it. Four cysteine amino acid sulfur atoms bind to one iron ion.

In Fig. 20.1, the rubredoxin structure is displayed.

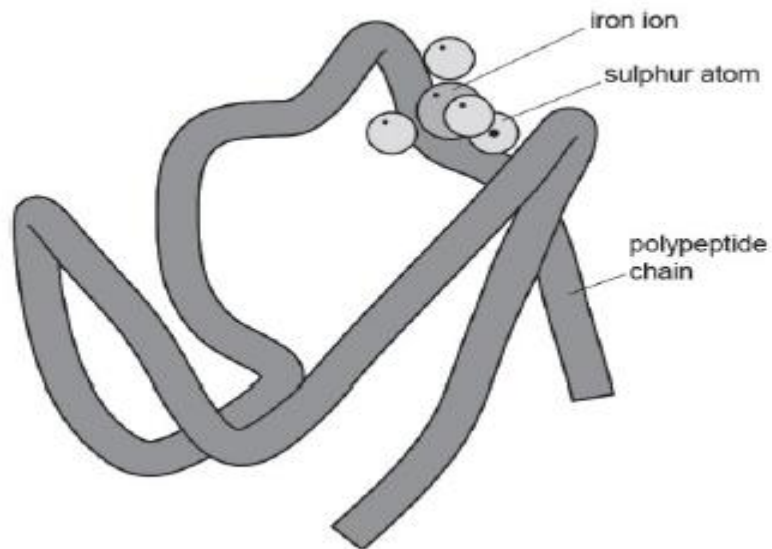


Fig. 20.1

(a) One term for rubredoxin is conjugated protein.

Explain the meaning of the term conjugated protein using Fig. 20.1. **(3)**

(b) Name two structural similarities between rubredoxin and hemoglobin using the information about rubredoxin that has been presented. **(2)**

(c) The secondary and tertiary structures of hemoglobin and redoxin are dissimilar.

Using the rubredoxin information given, list two more structural variations between rubredoxin and hemoglobin. **(2)**

7.

(a) Using the four levels of protein structure as a guide, explain how the structure of llama and camel hemoglobin differs from one another. **(6)**



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