OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Advanced GCE

CHEMISTRY 2815/02

Biochemistry

Tuesday **25 JUNE 2002** Morning 50 minutes

Candidates answer on the question paper.
Additional materials:
Data Sheet for Chemistry
Scientific calculator

Candidate Name	Centre Number	Candidate Number

TIME 50 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers in the spaces on the question paper.
- Read each question carefully and make sure you know what you have to do before starting your answer.

INFORMATION FOR CANDIDATES

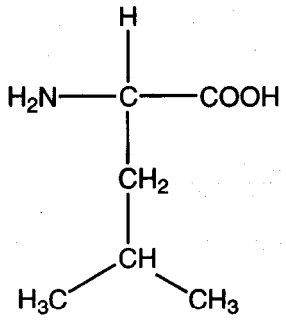
- The number of marks is given in brackets [ ] at the end of each question or part question.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You may use a scientific calculator.
- You may use the *Data Sheet for Chemistry*.
- You are advised to show all the steps in any calculations.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	11	
2	7	
3	9	
4	8	
5	10	
TOTAL	45	

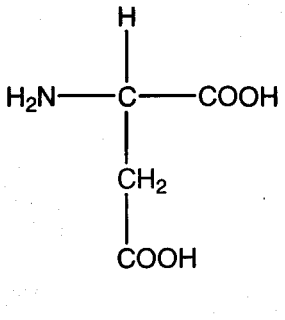
This question paper consists of 8 printed pages.

Registered Charity Number: 1066969
[Turn over

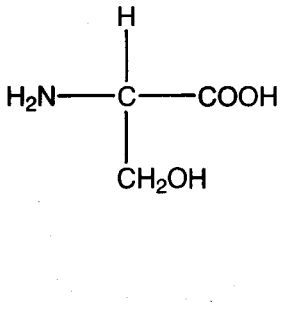
1 The structures of four amino acids may be represented as shown below.



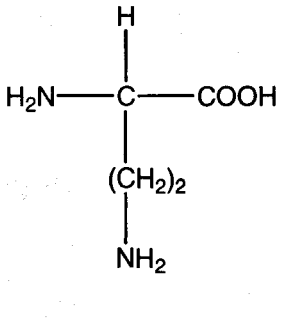
A



B



C



D

(a) (i) Which functional groups are involved when a peptide chain forms from amino acids?

.....[1]

(ii) Draw a diagram to show how these groups are linked in the peptide chain.

[1]

(b) Draw the structure of compound **D** at pH 12.

[2]

(c) Which sidechains in the examples **A** to **D**, are most likely to be involved in the denaturation of proteins by

- changes in pH
- addition of heavy metal ions?

Explain your answer.
(*In this question, 1 mark is available for the quality of written communication.*)

.....

.....

.....

.....

.....

.....

.....

.....[6]

Quality of Written Communication [1]

[Total : 11]

2 **(a)** Enzymes are highly active and specific catalysts.

(i) How does a catalyst speed up a reaction?

.....

.....[1]

(ii) Why is enzyme catalysis specific?

.....

.....[2]

(b) **(i)** Enzymes may be immobilised by, for example, trapping them in beads of a gel.

State **two** advantages and **one** disadvantage of using immobilised enzymes.

Advantages:

.....

.....

.....

Disadvantage:

.....

.....

.....

[3]

(ii) State **one** example of the commercial use of an immobilised enzyme.

.....[1]

[Total : 7]

3 Fig.3.1. shows an incomplete structure of β-D-glucose.

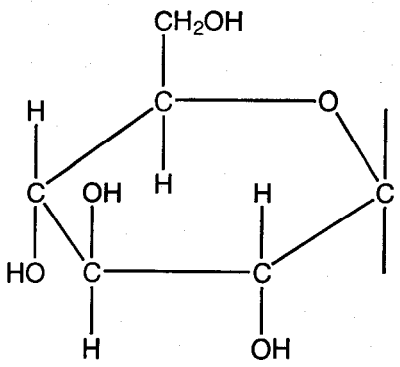


Fig 3.1

(a) Complete Fig.3.1. [2]

(b) Draw a structure of D-glucose in open chain form.

[2]

(c) Glucose is more soluble in water than cyclohexanol.

(i) Explain, with the aid of a diagram, why glucose is soluble in water.

[2]

(ii) Suggest why glucose is more soluble than cyclohexanol in water.

.....

.....

.....[2]

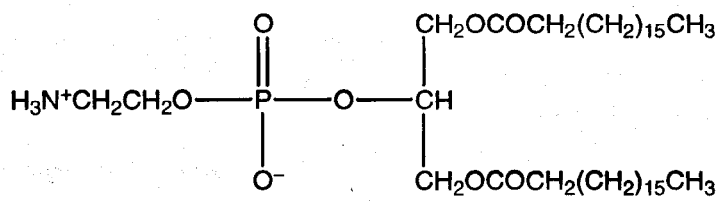
(d) Suggest **one** reason why carbohydrate is stored as a polymer rather than a monomer.

.....

.....[1]

[Total : 9]

4 A phosphoglyceride is one type of lipid. The diagram shows the structure of a phosphoglyceride.



(a) (i) Redraw a $-CH_2OCOCH_2-$ section of the molecule to show every bond.

[1]

(ii) Name the functional group present in $-CH_2OCOCH_2-$.

.....[1]

(b) Describe, with a diagram, how phosphoglycerides are involved in the formation of cell membranes.

[4]

(c) Another function of lipids is as a concentrated energy store. Explain why lipids can release about twice as much energy per gram as carbohydrates on complete oxidation.

.....

.....

.....

.....[2]

[Total : 8]

5 The sequence of bases in a small section of a single strand of DNA is shown below.

-CGTCAT-

(a) **(i)** Write down the base sequence in the complementary strand of this section of DNA.

.....[1]

(ii) Write down the RNA sequence that would be obtained by the transcription of the DNA section which you have written in part **(i)**.

.....[1]

(b) State **three** differences between the structures of DNA and RNA.

.....

.....

.....

.....[3]

(c) Explain how RNA molecules are involved in the formation of proteins by translation. Diagrams may be helpful.

[5]

[Total : 10]