OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Advanced GCE

CHEMISTRY 2815/02

Biochemistry

Wednesday **30 JANUARY 2002** Afternoon 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

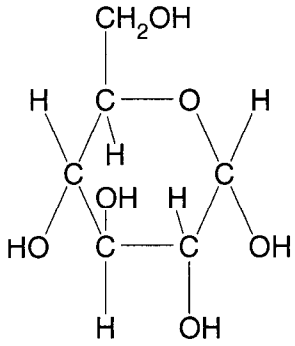
- The number of marks is given in brackets [ ] at the end of each question or part question.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You may use a scientific calculator.
- You may use the *Data Sheet for Chemistry*.
- You are advised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

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

This question paper consists of 10 printed pages and 2 blank pages.

Registered Charity Number: 1066969
[Turn over

1 The structure of a monosaccharide is given below.



(a) What is the correct name for this molecule ?

.....[2]

(b) Indicate on the diagram the carbon atoms 1,4. [1]

(c) Glucose forms a number of polymers.

(i) Name a polymer of glucose.

.....[1]

(ii) Draw a skeletal formula showing two glucose units linked in a length of the polymer you chose in **(i)**. Your diagram should show clearly the link between the two glucose units.

[2]

For Examiner's Use

(iii) Explain how this polymer's structure makes it suitable for its function.

.....

.....

.....

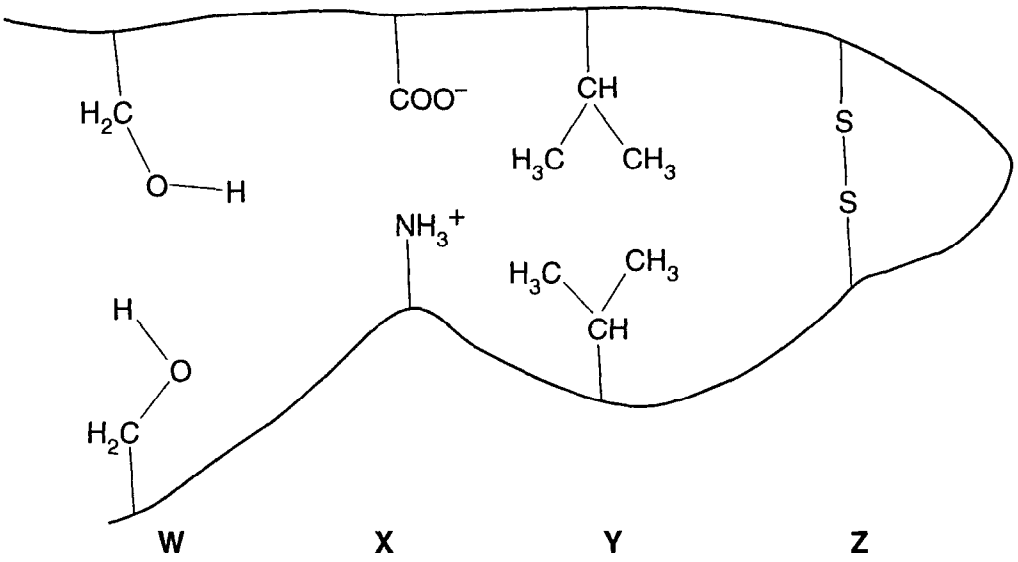
.....

[3]

[Total : 9]

[Turn over

2 The diagram shows a section of polypeptide chain with some sidechains of amino acids which can be involved in maintaining the tertiary protein structure.



(a) State the type of bonding or attraction involved at each of the sites **W** to **Z** shown.

W .....

X .....

Y .....

Z .....

[4]

(b) At which site in the diagram will the bonding be weakest?

.....[1]

(c) Which of **W** to **Z** is most likely to be affected by a change of pH from 7.0 to 10.0? Explain your answer.

.....

.....

.....[2]

For Examiner's Use

(d) Use two molecules of glycine, H_2NCH_2COOH, to show how amino acids are linked in a dipeptide. Show every bond in a displayed structure.

[2]

[Total : 9]

[Turn over

3 A fragment of protein is coded for by the m-RNA sequence

-CGGUUUAGGGUA-

(a) How do you know that this is an RNA sequence and not DNA?

.....[1]

(b) Deduce the amino acid sequence in the protein coded for by this stretch of m-RNA. Use the genetic code provided in **Table 3.1**.

Table 3.1

first base in triplet	second base in triplet				third base in triplet
	U	C	A	G	
U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	Stop	Stop	A
	Leu	Ser	Stop	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

.....

.....[1]

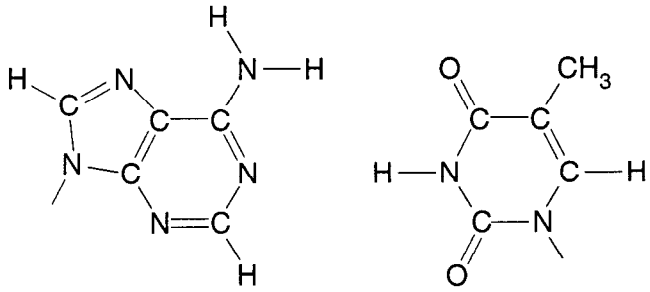
(c) Write the sequence of the part of the DNA strand from which this stretch of m-RNA is obtained by transcription.

.....[2]

(d) Write the sequence of the DNA strand complementary to the one you wrote in part **(c)**.

.....[1]

(e) Complete Fig. 3.1. to show how these two complementary bases are linked in double helical DNA.



[1]

Fig. 3.1

(f) Explain what is meant by the statement that DNA is a *condensation polymer of nucleotides.*
(In this question,1 mark is available for quality of written communication.)

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.....

.....

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.....

.....[5]

[Total : 11]

[Turn over

For Examiner's Use

4 This question is concerned with factors affecting the rates of enzyme catalysed reactions.

(a) What do you understand by the term *active site of an enzyme*?

.....

.....[1]

(b) Fig. 4.1 shows how the rate of an enzyme catalysed reaction changes with substrate concentration.

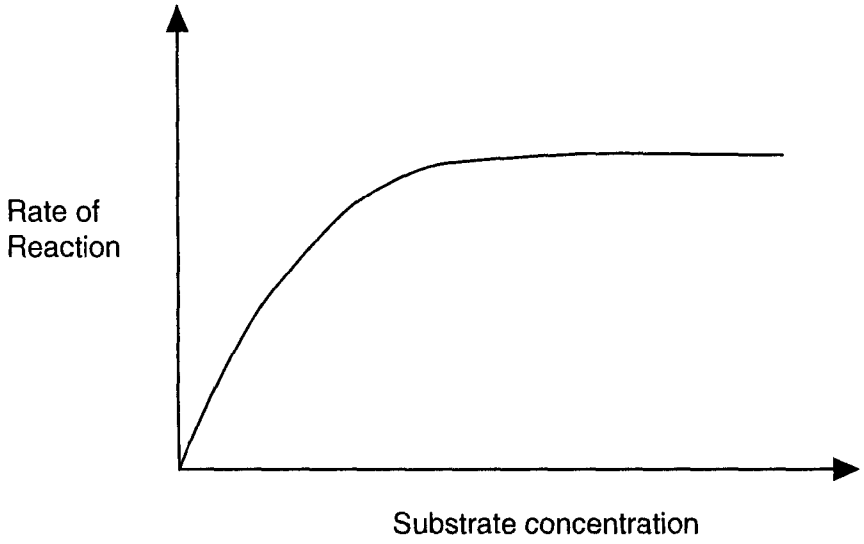

Fig. 4.1

Explain why the rate of reaction changes in the way shown on the graph.

.....

.....

.....

.....

.....[3]

(c) **(i)** State the difference between competitive and non-competitive inhibition.

.....

.....

.....[2]

(ii) Draw a curve on Fig. 4.1 to show how you would expect the rate to change with substrate concentration in the presence of a **competitive** inhibitor. [2]

[Total : 8]

5 This question is about triglycerides.

(a) Draw the structure of the triglyceride made from stearic acid, $CH_3(CH_2)_{16}COOH$, and propane-1,2,3-triol.

[2]

(b) Explain why triglycerides are soluble in non-polar solvents, and suggest why they do not dissolve in water.

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.....

.....[4]

(c) State **two** uses for triglycerides in plants and animals.

.....

.....[2]

[Total : 8]