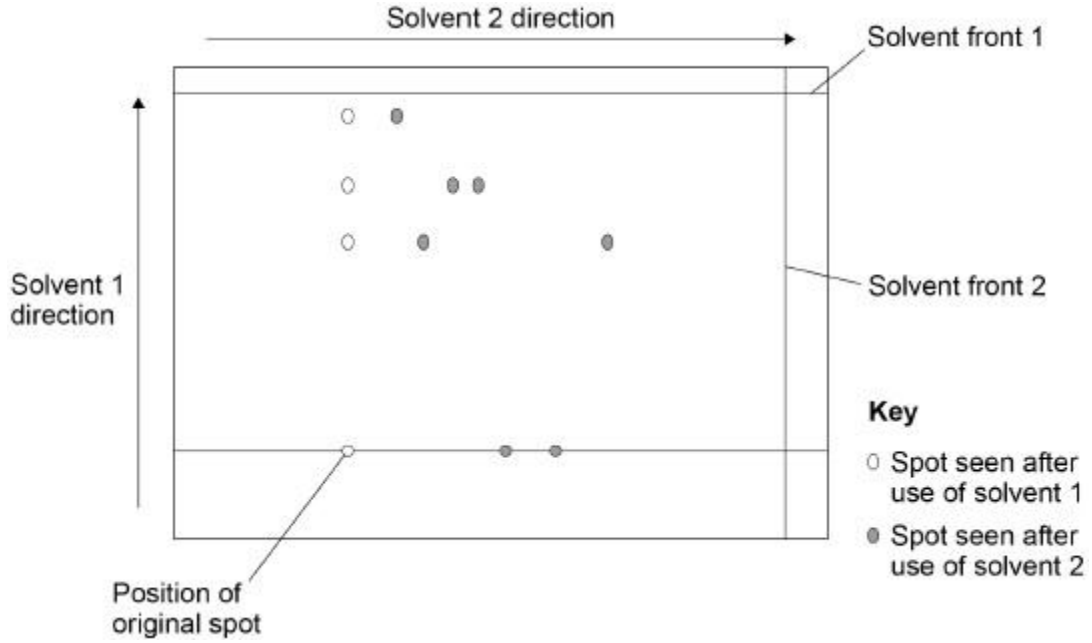
Name of the Student:_____
Max. Marks : 16 Marks **Time : 16 Minutes**

Q1.

This question is about thin-layer chromatography (TLC).

- A protein was hydrolysed to form a mixture of amino acids.
- A spot of this mixture was added to a TLC plate and the plate placed vertically in a small volume of solvent 1.
- When the solvent front reached nearly to the top of the plate, the plate was removed and allowed to dry.
- The plate was turned anticlockwise through 90° and placed vertically in a small volume of solvent 2.
- When the solvent front reached nearly to the top of the plate, the plate was again removed and allowed to dry.
- The diagram shows the final TLC plate.



(a) Suggest a suitable reagent for the hydrolysis of a protein.

_____

_____

(1)

(b) Suggest how the positions of the amino acids on the TLC plate were located.

_____

_____

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(1)

(c) Deduce the minimum number of amino acids present in the original mixture.

_____

_____

(1)

(d) Suggest why it was necessary to use two different solvents.

_____

_____

(1)

(Total 4 marks)

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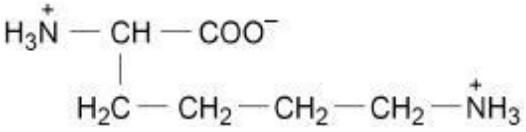
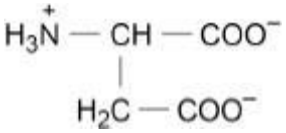
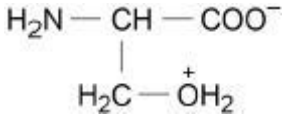
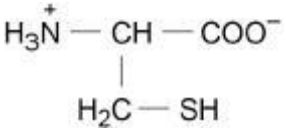
Q2.

Which structure shows the zwitterion of an amino acid?

A  ⬭

B  ⬭

C  ⬭

D  ⬭

(Total 1 mark)

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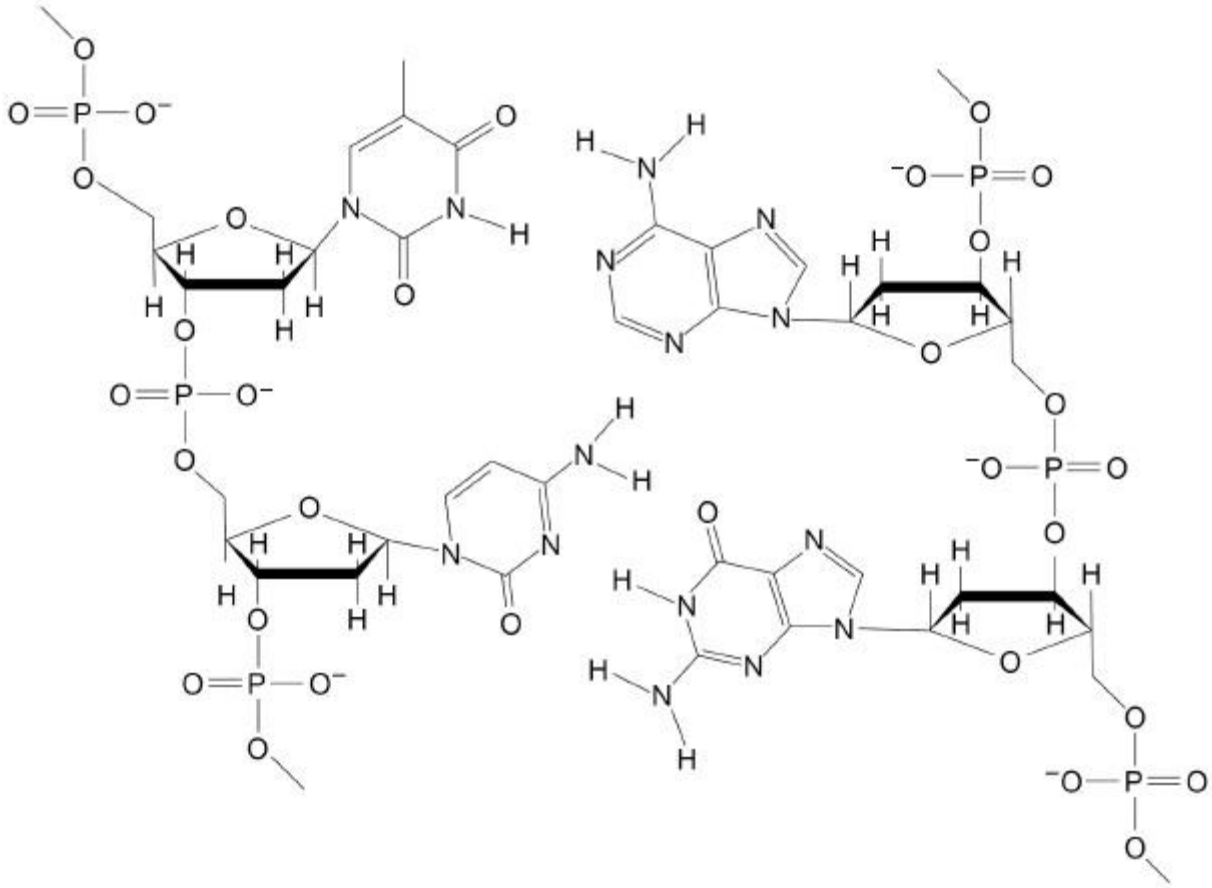
Q3.

The diagram shows two complementary strands in part of a DNA double helix structure.



(a) Draw all the hydrogen bonds between the complementary strandsshown in the diagram.

Use dashed lines to show the hydrogen bonds.
You do **not** need to show lone pairs of electrons or partial charges.

(2)

(b) Draw a ring around each of the component parts that make up the cytosine nucleotide in the section of DNA shown in the diagram above.

(2)

(c) State the meaning of the term complementary when it is used to refer to DNA strands.

_____

_____

_____

(1)

(Total 5 marks)

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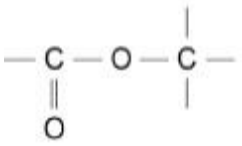
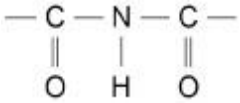
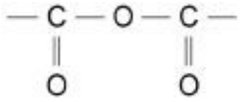
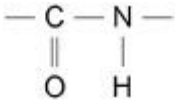
Q4.

Which structure shows part of a peptide link in a protein?

A  ○

B  ○

C  ○

D  ○

(Total 1 mark)

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Q5.

Two strands of DNA are linked together by hydrogen bonding between bases on each strand.
Which row shows the number of hydrogen bonds between the pair of bases?
Use the Data Booklet to help you answer this question.

	Base 1	Base 2	Number of hydrogen bonds	
A	adenine	guanine	2	⬭
B	cytosine	thymine	2	⬭
C	guanine	cytosine	3	⬭
D	adenine	thymine	3	⬭

(Total 1 mark)

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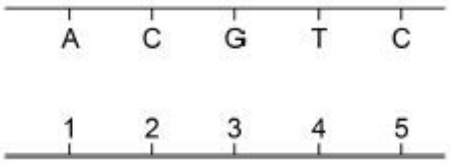
Q6.

Use the Data Booklet to help you answer this question about DNA.
The figure below shows a fragment of a DNA double helix.
The letters A, C, G and T represent the four bases in one strand.
The numbers 1, 2, 3, 4 and 5 represent the bases in the complementary strand.



(a) Complete Table 4 to show the correct sequence of bases in the complementary strand represented by the numbers 1 to 5

1	2	3	4	5

(1)

(b) Deduce the total number of hydrogen bonds formed between the five bases in each strand.

Tick (✔) **one** box.

10	12	13	15

(1)

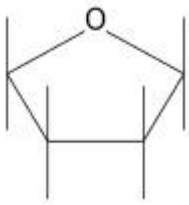
(c) Base A is part of a nucleotide in the DNA strand shown in the figure above.

A nucleotide contains a 2-deoxyribose molecule.

An incomplete 2-deoxyribose molecule is shown.

Complete the structure to show the nucleotide that contains base A.

You should represent base A by the letter A.



(2)
(Total 4 marks)

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