

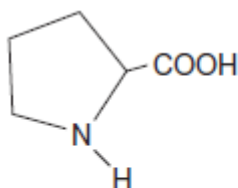
Name of the Student: _____

Max. Marks : 28 Marks

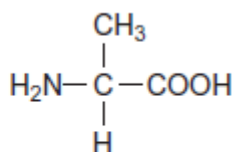
Time : 28 Minutes

Q1.

- (a) The structures and common names of two amino acids are shown.



proline



alanine

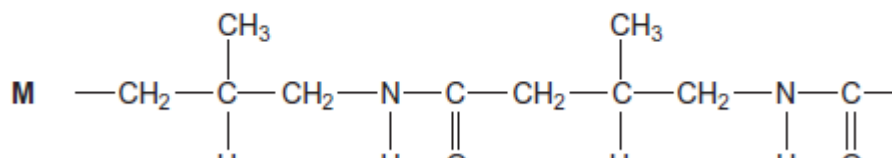
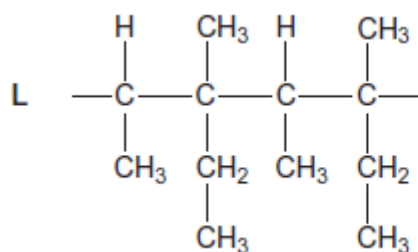
- (i) Draw the structure of the zwitterion of proline.

(1)

- (ii) Draw the structure of the tripeptide formed when a proline molecule bonds to two alanine molecules, one on each side.

(2)

- (b) Sections of two polymers, **L** and **M**, are shown.



- (i) Give the IUPAC name of a monomer that forms polymer **L**.

(1)

- (ii) Give the IUPAC name of the monomer that forms polymer **M**.

(1)

- (iii) Draw the section of a polymer made from a dicarboxylic acid and a diamine that is isomeric with the section of polymer **M** shown.

(1)

- (vi) Explain why polymer **L** is non-biodegradable.

(1)

(Total 7 marks)

Q2.

The following table gives the names and structures of some structural isomers with the molecular formula C_5H_{10} .

	Name of isomer	Structure
Isomer 1	pent-2-ene	$CH_3CH = CHCH_2CH_3$
Isomer 2	cyclopentane	
Isomer 3	3-methylbut-1-ene	$(CH_3)_2CHCH = CH_2$
Isomer 4	2-methylbut-2-ene	$(CH_3)_2C = CHCH_3$
Isomer 5	2-methylbut-1-ene	$H_2C = C(CH_3)CH_2CH_3$

(a) Isomer 1 exists as E and Z stereoisomers.

(i) State the meaning of the term **stereoisomers**.

(2)

(ii) Draw the structure of the E stereoisomer of Isomer 1.

(1)

(b) A chemical test can be used to distinguish between separate samples of Isomer 1 and Isomer 2.

Identify a suitable reagent for the test.

State what you would observe with Isomer 1 and with Isomer 2.

Reagent _____

Observation with Isomer **1** _____

Observation with Isomer **2** _____

(3)

- (c) Use **Table A** on the Data Sheet when answering this question.
Isomer **3** and Isomer **4** have similar structures.

- (i) State the infrared absorption range that shows that Isomer **3** and Isomer **4** contain the same functional group.

(1)

- (ii) State **one** way that the infrared spectrum of Isomer **3** is different from the infrared spectrum of Isomer **4**.

(1)

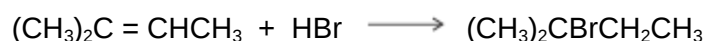
- (d) Two alcohols are formed by the hydration of Isomer **4**.

Draw the **displayed formula** for the alcohol formed that is oxidised readily by acidified potassium dichromate(VI).

(1)

- (e) Isomer **4** reacts with hydrogen bromide to give two structurally isomeric bromoalkanes.

- (i) Name and outline a mechanism for the reaction of Isomer **4** with hydrogen bromide to give 2-bromo-2-methylbutane as the major product.



Name of mechanism _____

Mechanism

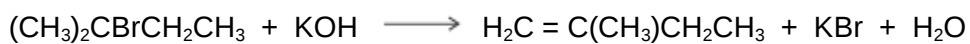
(5)

- (ii) The minor product in this reaction mixture is 2-bromo-3-methylbutane.

Explain why this bromoalkane is formed as a minor product.

(2)

- (f) Name and outline a mechanism for the following reaction to form Isomer 5.
State the role of the hydroxide ion in this reaction.



Name of mechanism _____

Mechanism

Role of hydroxide ion _____

(5)

(Total 21 marks)