

Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Optical isomerism

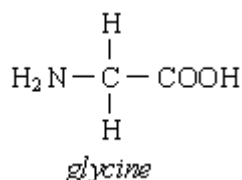
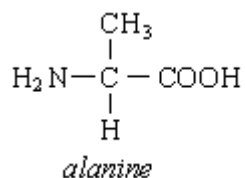
Name of the Student: _____

Max. Marks : 19 Marks

Time : 19 Minutes

Q1.

The structures of the amino acids *alanine* and *glycine* are shown below.



- (a) Give the systematic name for *alanine*.

(1)

- (b) *Alanine* exists as a pair of stereoisomers.

- (i) Explain the meaning of the term *stereoisomers*.

- (ii) State how you could distinguish between the stereoisomers.

(4)

- (c) Give the structural formula of the species formed by *glycine* at pH 14.

(1)

- (d) When two amino acids react together, a dipeptide is formed. Give the structural formulae of the **two** dipeptides which are formed when *alanine* and *glycine* react together.

Dipeptide 1

Dipeptide 2

(2)

- (e) Give the structural formula of the organic compound formed when *glycine* reacts with methanol in the presence of a small amount of concentrated sulphuric acid.

(1)

(Total 9 marks)

Q2.

Which one of the following statements about but-2-enal, $\text{CH}_3\text{CH}=\text{CHCHO}$, is **not** true?

- A** It has stereoisomers.
- B** It shows a strong absorption in the infra-red at about 1700 cm^{-1} .
- C** It will turn an acidified solution of potassium dichromate(VI) green.
- D** It can be dehydrated by concentrated sulphuric acid.

(Total 1 mark)

Q3.

- (a) **P**, **Q** and **R** have the molecular formula C_6H_{12}

All three are branched-chain molecules and none is cyclic.

P can represent a pair of optical isomers.

Q can represent a pair of geometrical isomers.

R can represent another pair of geometrical isomers different from **Q**.

Draw one possible structure for one of the isomers of each of **P**, **Q** and **R**.

Structure of **P**

Structure of **Q**

Structure of **R**

(3)

- (b) Butanone reacts with reagent **S** to form compound **T** which exists as a racemic mixture. Dehydration of **T** forms **U**, C_5H_7N , which can represent a pair of geometrical isomers.

- (i) State the meaning of the term *racemic mixture* and suggest why such a mixture is formed in this reaction.

Racemic mixture _____

Explanation _____

- (ii) Identify reagent **S**, and draw a structural formula for each of **T** and **U**.

Reagent **S** _____

Compound **T**

Compound **U**

