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— **TUITION** —

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CHEMISTRY

ORGANIC CHEMISTRY II

Level & Board

AQA (A-LEVEL)

TOPIC:

OPTICAL ISOMERISM

PAPER TYPE:

QUESTION PAPER - 4

TOTAL QUESTIONS

10

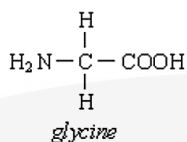
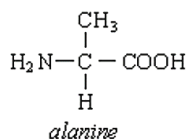
TOTAL MARKS

/40

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Optical Isomerism - 4

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



(a) Give the systematic name for alanine.

(1)

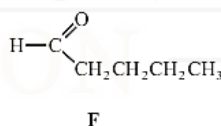
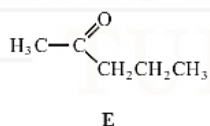
(b) Alanine exists as a pair of stereoisomers. Explain the meaning of the term stereoisomers.

(2)

(c) State how you could distinguish between the stereoisomers.

(2)

2. Consider the following pair of isomers



(a) Name compound E.

(1)

(b) Identify a reagent which could be used in a test-tube reaction to distinguish between E and F.

In each case, state what you would observe.

3. Why is optical isomerism a problem for the drug industry?

(3)

4. Butanone reacts with reagent S to form compound T which exists as a racemic mixture.

(2)

Dehydration of T forms U, C_5H_7N , which can represent a pair of geometrical isomers.

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

(3)

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

(3)

5. But-1-ene and other products can be made by the dehydration of butan-2-ol.

(a) Outline a mechanism for the dehydration of butan-2-ol into but-1-ene.

(3)

(b) Explain why but-1-ene does not show geometrical isomerism.

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(2)

(c) An alternative dehydration of butan-2-ol produces geometrical isomers.

Draw the structure of one of these geometrical isomers and give its full name.

6. What are polarimeters used for? (2)

7. Which one of the following can exhibit both geometrical and optical isomerism? (2)

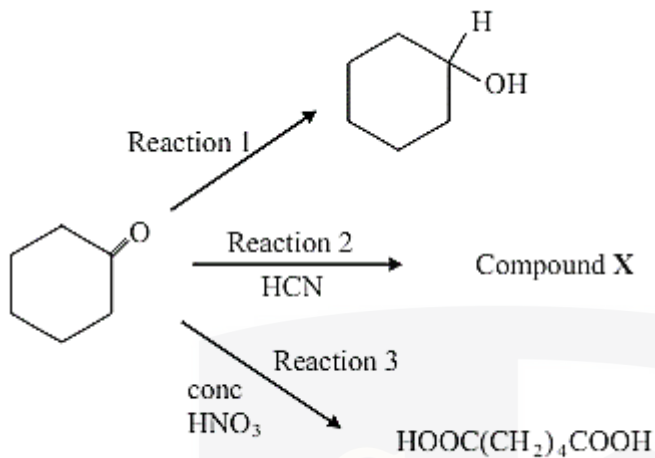
- A. $(\text{CH}_3)_2\text{C}=\text{CHCH}(\text{CH}_3)\text{CH}_2\text{CH}_3$
- B. $\text{CH}_3\text{CH}_2\text{CH}=\text{CHCH}(\text{CH}_3)\text{CH}_2\text{CH}_3$
- C. $(\text{CH}_3)_2\text{C}=\text{C}(\text{CH}_2\text{CH}_3)_2$
- D. $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)\text{C}=\text{CH}_2$

8. Give the name and graphical formula of the amide $\text{C}_2\text{H}_5\text{ON}$. (1)

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9. Consider the following three reactions of cyclohexanone, $\text{C}_6\text{H}_{10}\text{O}$. (2)

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(a) Give a suitable reagent for Reaction 1.

(1)

(b) Name the type of reaction and outline a mechanism for Reaction 2.

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(4)

(c) Name the organic product of Reaction 3.

(1)

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(d) Calculate the maximum mass of this organic product that could be formed if 2.40 g of cyclohexanone were allowed to react in Reaction 3.

(4)

10. Which one of the following reaction mixtures would give a product capable of exhibiting optical isomerism?

- A.** $\text{CH}_3\text{CH}=\text{CH}_2 + \text{HBr}$
- B.** $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br} + \text{NaOH}$
- C.** $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + \text{H}_2\text{SO}_4$
- D.** $\text{CH}_3\text{CH}_2\text{CHO} + \text{HCN}$

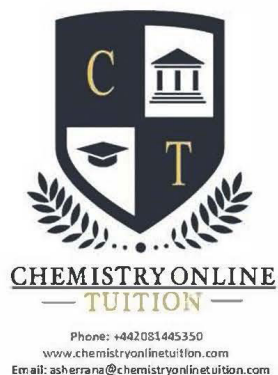
(1)

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DR. ASHAR RANA



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- Tutoring students in UK and worldwide since 2008
- Chemistry, Physics, and Math's Tutor

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