Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Aldehydes & ketones

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Name of the Student:_____
Max. Marks :29 Marks **Time :29 Minutes**

Q1.

Which pair of compounds does **not** form a racemic mixture when the compounds react?

A  + HCl 

B  + HCN 

C  + HCl 

D  + HCN 

(Total 1 mark)

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Q2.

The aldehyde $CH_3CH_2CH_2CH_2CHO$ reacts with KCN followed by dilute acid to form a racemic mixture of the two stereoisomers of $CH_3CH_2CH_2CH_2CH(OH)CN$

(a) Give the IUPAC name of $CH_3CH_2CH_2CH_2CH(OH)CN$

_____

(1)

(b) Describe how you would distinguish between separate samples of the two stereoisomers of $CH_3CH_2CH_2CH_2CH(OH)CN$

_____

_____

_____

_____

_____

(2)

(c) Explain why the reaction produces a racemic mixture.

_____

_____

_____

_____

_____

_____

(3)

(d) An isomer of $CH_3CH_2CH_2CH_2CHO$ reacts with KCN followed by dilute acid to form a compound that does not show stereoisomerism.

Draw the structure of the compound formed and justify why it does not show stereoisomerism.

Structure

Justification

_____

_____

(2)

(Total 8 marks)

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Q3.

How many structural isomers with the molecular formula $C_5H_{10}O$ react with Tollens' reagent?

A 3 ⬭

B 4 ⬭

C 5 ⬭

D 6 ⬭

(Total 1 mark)

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Q4.

Which alcohol could **not** be produced by the reduction of an aldehyde or a ketone?

A 2,2-dimethylpropan-1-ol ⬭

B 2-methylbutan-2-ol ⬭

C 3-methylbutan-2-ol ⬭

D pentan-3-ol ⬭

(Total 1 mark)

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Q5.

Which compound forms a racemic mixture when reacted with KCN followed by dilute acid?

A HCHO ⬭

B CH_3CHO ⬭

C CH_3COCH_3 ⬭

D $(CH_3CH_2)_2CO$ ⬭

(Total 1 mark)

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Q6.

Which alcohol could **not** be produced by the reduction of an aldehyde or a ketone?

A 2-methylbutan-1-ol ⬭

B 2-methylbutan-2-ol ⬭

C 3-methylbutan-1-ol ⬭

D 3-methylbutan-2-ol ⬭

(Total 1 mark)

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Q7.

Ethanol can be oxidised by acidified potassium dichromate(VI) to ethanoic acid in a two-step process.

ethanol ⟶ ethanal ⟶ ethanoic acid

(a) In order to ensure that the oxidation to ethanoic acid is complete, the reaction is carried out under reflux.

Describe what happens when a reaction mixture is refluxed and why it is necessary, in this case, for complete oxidation to ethanoic acid.

(3)

(b) Write a half-equation for the overall oxidation of ethanol into ethanoic acid.

(1)

(c) The boiling points of the organic compounds in a reaction mixture are shown in the following table.

Compound	ethanol	ethanal	ethanoic acid
Boiling point / °C	78	21	118

Use these data to describe how you would obtain a sample of ethanal from a mixture of these three compounds. Include in your answer a description of the apparatus you would use and how you would minimise the loss of ethanal. Your description of the apparatus can be either a description in words or a labelled sketch.

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(5)

(d) Use your knowledge of structure and bonding to explain why it is possible to separate ethanal in this way.

(2)

(e) A student obtained a sample of a liquid using the apparatus in part **(c)**.

Describe how the student could use chemical tests to confirm that the liquid contained ethanal and did **not** contain ethanoic acid.

(5)

(Total 16 marks)

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