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CHEMISTRY

INORGANIC CHEMISTRY II

Level & Board	AQA (A-LEVEL)
TOPIC:	ALDEHYDES AND KETONES
PAPER TYPE:	QUESTION PAPER - 2
TOTAL QUESTIONS	10
TOTAL MARKS	30

Aldehydes and Ketones

1. Butanone is reduced in a two-step reaction using $NaBH_4$ followed by dilute hydrochloric acid.

(a) Write an overall equation for the reduction of butanone using [H] to represent the reductant.

(1)

(b) By considering the mechanism of the reaction, explain why the product has no effect on plane polarised light.

(6)

2. Which one of the following conversions does not represent a reduction?

A. propene → propane
B. propanal → propan-l-ol
C. propanal → propanoic acid

D. propanone → propane

(1)

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

Ethanol → ethanol → 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)

4. Which one of the following reactions involves nucleophilic addition?

I am Sorry !!!!!

A. $CH_3CH = CH_2 + HBr \rightarrow CH_3CHBrCH_3$
B. $CH_3CH_2CH_3 + Cl_2 \rightarrow CH_3CHClCH_3 + HCl$
C. $CH_3CH_2CH_2Br + NaOH \rightarrow CH_3CH_2CH_2OH + NaBr$
D. $CH_3CH_2CHO + HCN \rightarrow CH_3CH_2CH(OH)CN$

(1)

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

(5)

6. Which one of the following is not a suitable method for the preparation of ethanol?

A. oxidation of ethane
B. hydration of ethene
C. reduction of ethanal
D. hydrolysis of bromoethane

(1)

7. 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.

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(2)

8. Which one of the following will undergo nucleophilic addition?

A. hex-3-ene
B. hexan-3-one
C. 3-bromohexane
D. hexan-3-ol

(1)

9. Suggest one reason why Tollens' reagent is used as the oxidising agent in the specific test for aldehydes rather than the less expensive acidified potassium dichromate(VI).

(1)

10. How many structural isomers, which are aldehydes, have the molecular formula $C_5H_{10}O$?

A. 2
B. 3
C. 4
D. 5

(1)

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