CHEMISTRY ONLINE
TUITION

Phone: +442081445350

www.chemistryonlinetuition.com

Email:asherrana@chemistryonlinetuition.com

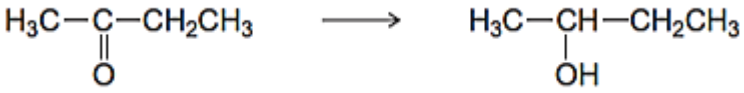
CHEMISTRY

INORGANIC CHEMISTRY II

Level & Board	AQA (A-LEVEL)
TOPIC:	ALDEHYDES AND KETONES
PAPER TYPE:	QUESTION PAPER - 1
TOTAL QUESTIONS	10
TOTAL MARKS	34

Aldehydes and Ketones

1. The reducing agent in the following conversion is $NaBH_4$



(a) Name and outline a mechanism for the reaction.

(5)

(b) By considering the mechanism of this reaction, explain why the product formed is optically inactive.

(2)

2. Which one of the following does not represent an oxidation?

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

(1)

3. The equation for the reaction of ethanal with an alkaline solution of iodine is

$CH_3CHO + 3I_2 + 4NaOH \rightarrow CHI_3 + HCOONa + 3NaI + 3H_2O$

In an experiment using this reaction, the yield of triiodomethane (CHI_3) obtained by a student was 83.2%.

Calculate the minimum mass of iodine that this student would have used to form 10.0 g of triiodomethane.

Give your answer to the appropriate precision.

(5)

4. CH_2O is the empirical formula of:

A. methanol
B. methyl methanoate

C. ethane-1,2-diol
D. butanal

(1)

5. Consider the reaction of propanal with HCN.

(a) Write an equation for the reaction of propanal with HCN and name the product.

(2)

(b) Name and outline a mechanism for the reaction of propanal with HCN

(5)

6. Which one of the following isomers is not oxidised under mild reaction conditions?

A. $(CH_3)_2CHCH(OH)COCH_3$
B. $(CH_3)_2C(OH)CH_2COCH_3$

C. $(CH_3)_2CHCH(OH)CH_2CHO$
D. $(CH_3)_2C(OH)CH_2CH_2CHO$

(1)

7. Propanal is an isomer of propanone.

(a) Draw the structure of propanal.

(1)

(b) A chemical test can be used to distinguish between separate samples of propanone and propanal.

Give a suitable reagent for the test and describe what you would observe with propanone and with propanal.

(4)

8. Which one of the following can act as an oxidising agent but not as a reducing agent?

A. CH_3CHO
B. Fe^{2+}
C. I^-
D. MnO_4^-

(1)

9. Using HCN and a suitable carbonyl compound with molecular formula C_3H_6O, outline a mechanism for an addition reaction in which two isomers are produced.

Give the structures of the two isomers formed and state the type of isomerism shown.

(5)

10. 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

(1)

DR. ASHAR RANA

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Phone: +442081445350
www.chemistryonlinetuition.com
Email: asherrana@chemistryonlinetuition.com

- Founder & CEO of Chemistry Online Tuition Ltd.
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CONTACT INFORMATION FOR **CHEMISTRY ONLINE TUITION**

- UK Contact: 02081445350
- International Phone/WhatsApp: 00442081445350
- Website: www.chemistryonlinetuition.com
- Email: asherrana@chemistryonlinetuition.com
- Address: 210-Old Brompton Road, London SW5 OBS, UK