CHEMISTRY ONLINE
TUITION

Phone: +442081445350

www.chemistryonlinetuition.com

Email:asherrana@chemistryonlinetuition.com

CHEMISTRY

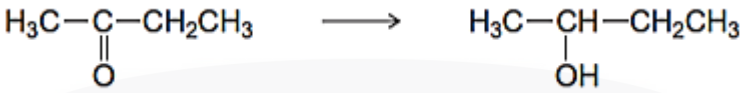
INORGANIC CHEMISTRY II

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

Aldehydes and Ketones - 1

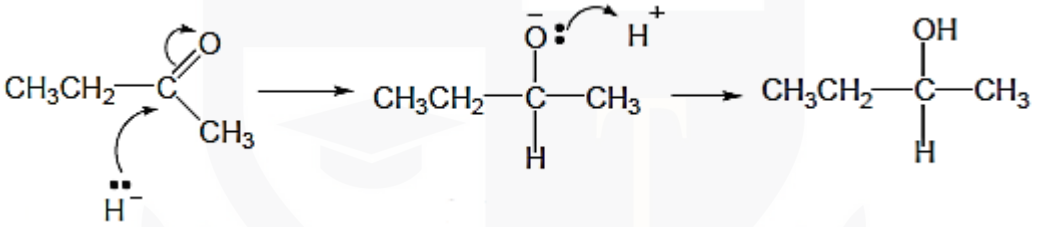
1.

(a)



Name of mechanism: Nucleophilic addition

Mechanism:



(5)

(b)

The optically inactive nature of the product (2-butanol) arises from the planar carbonyl group **C=O** in the starting material, which allows for equally probable attack from both sides.

This results in the formation of a racemic mixture, with each enantiomer equally likely to be present in the product.

(2)

2. A

(1)

3.

- Molar mass of CHI_3 = 393.7 g/mol
- Moles of CHI_3=10g/393.7 g/mol =2.54×10^{-2}mol
- Moles of I_2 = 7.62×10^{-2} mol
- Molar mass of I_2 = 253.8 g/mol

Mass I_2 = $7.62 \times 10^{-2} \times 253.8 = 19.34g$
19.34 / 0.832 = 23.2g

(5)

4. B

(1)

5.

(a)

Equation for the reaction of propanal with HCN:

$CH_3CH_2CHO + HCN \rightarrow CH_3CH_2CH(OH)CN$

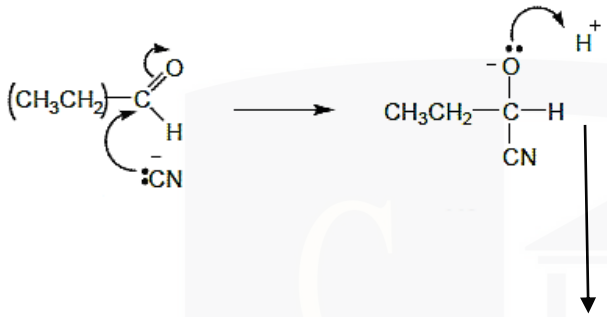
Name the product: 2-hydroxybutanenitrile

(2)

(b)

Name: Nucleophilic addition

Mechanism for the reaction of propanal with HCN:



$CH_3CH_2CH(OH)CN$

(2-hydroxybutanenitrile)

(5)

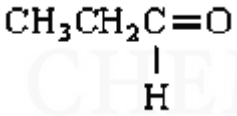
6. **B**

(1)

7.

(a)

Structure of propanal:



(1)

(b)

Reagent:

Tollens' reagent (ammoniacal silver nitrate solution)

Observation:

Propanone: No reaction, clear solution.

Propanal: Formation of a silver mirror.

Propanal (CH_3CHO) is an aldehyde and thus gives positive test with all the reagent whereas propanone(CH_3COCH_3) is a ketone and thus does not give any result with the reagent.

(4)

8. D

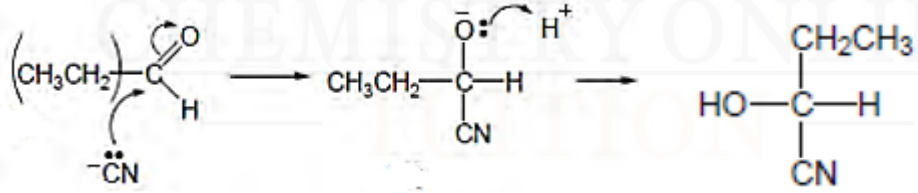
(1)

9.

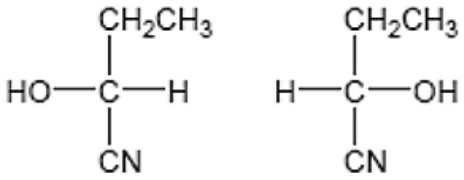
Possible reaction of HCN and a suitable carbonyl compound with molecular formula C_3H_6O is as:

Name of mechanism: Nucleophilic addition

Mechanism:



Structures of the two isomers formed:



Type of isomerism:

Stereoisomerism

(5)

10. **B**

(1)

DR. ASHAR RANA

CHEMISTRY ONLINE TUITION

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