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 - 4
TOTAL QUESTIONS	10
TOTAL MARKS	28

Aldehydes and Ketones - 4

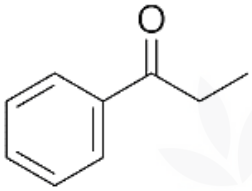
1.

Equation for the reaction of CH_3CH_2COCl with $AlCl_3$ to form the electrophile:

$AlCl_3 + CH_3CH_2COCl \rightarrow CH_3CH_2\text{-}C^+{=}O + AlCl_4^-$

Mechanism:

Product:



(4)

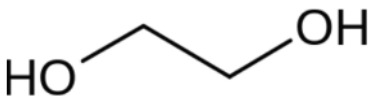
2. **A**

(1)

3.

(a)

The structural formula of the organic product, ethylene glycol ($HOCH_2CH_2OH$), is

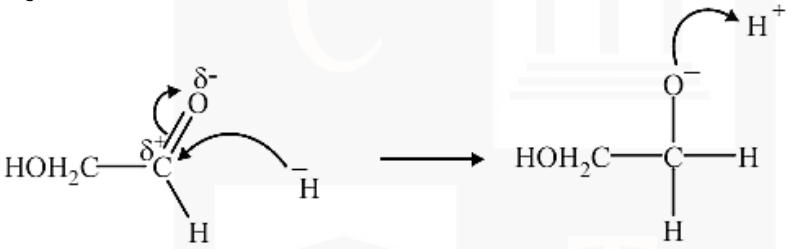


(1)

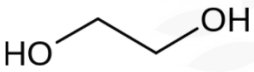
(b)

Mechanism for the reduction:

Using $NaBH_4$:



Product:



(4)

4. **B**

(1)

5.

(a)

The organic compound formed in the reaction between but-2-enal and sodium borohydride ($NaBH_4$) is $CH_3CH=CHCH_2OH$ (but-2-en-1-ol).

(1)

(b)

The type of chemical reaction occurring is reduction, specifically a redox reaction.

(1)

6. D

(1)

7.

(a)

Following is a simple chemical test that shows that but-2-enal is an aldehyde.

- Heat but-2-enal with Tollens' reagent.
- If but-2-enal is an aldehyde, it undergoes oxidation to form a carboxylic acid.
- Simultaneously, silver ions in Tollens' reagent are reduced to metallic silver.
- The reduction of silver ions results in the formation of a silver mirror on the inner surface of the reaction tube.
- The appearance of the silver mirror confirms the presence of the aldehyde functional group in but-2-enal.

(2)

(b)

This test gives a different result with aldehydes than it does with ketones as

- Aldehydes can be oxidized to a carboxylic acid or
- Aldehydes can reduce Ag^+ to Ag

(1)

8.

(a)

Aldehyde / carbonyl functional group is the functional group reacts with the sodium borohydride.

(1)

(b)

Complete equation for the reaction:

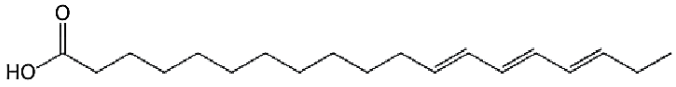
$C_6H_5CHCHCHO + 2[H] \rightarrow C_6H_5CHCHCH_2OH$

(1)

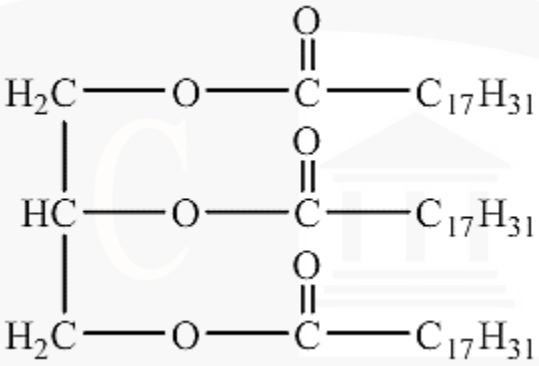
9.

(a)

Linoleic acid, $C_{17}H_{31}COOH$:



Structure of the triglyceride



(2)

(b)

There are 6 the number of double bonds carbon to carbon in a molecule of the triglyceride.

(1)

10.

(a)

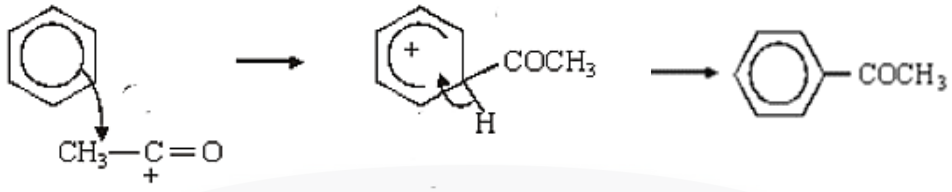
The reactive intermediate formed in this reaction is an acylium ion.

The formula of the acylium ion is represented as RCO^+, where R represents the acyl group.
So, for ethanoyl chloride (CH_3COCl), the acylium ion formed would be CH_3CO^+.

(2)

(b)

Mechanism:



(4)

I am Sorry !!!!!

DR. ASHAR RANA

CHEMISTRY ONLINE TUITION

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

- Founder & CEO of Chemistry Online Tuition Ltd.
- Tutoring students in UK and worldwide since 2008
- CIE & EDEXCEL Examiner since 2015
- Chemistry, Physics, and Math's Tutor

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