



CHEMISTRY ONLINE
— TUITION —

Phone: +442081445350

www.chemistryonlinetuition.com

Email: asherrana@chemistryonlinetuition.com

CHEMISTRY

ORGANIC CHEMISTRY II

Level & Board	AQA (A-LEVEL)
TOPIC:	CARBOXYLIC ACIDS
PAPER TYPE:	QUESTION PAPER - 3
TOTAL QUESTIONS	10
TOTAL MARKS	33

ChemistryOnlineTuition Ltd reserves the right to take legal action against any individual/ company/organization involved in copyright abuse.

Carboxylic Acids and Derivatives - 3

1. The crude aspirin can be purified by recrystallisation using hot ethanol (boiling point = 78 °C) as the solvent.

(a) Describe two important precautions when heating the mixture of ethanol and crude aspirin.

(2)

(b) The pure aspirin is filtered under reduced pressure.

A small amount of cold ethanol is then poured through the Buchner funnel.

Explain the purpose of adding a small amount of cold ethanol.

(1)

(c) A sample of the crude aspirin is kept to compare with the purified aspirin.

Describe one difference in appearance you would expect to see between these two solid samples.

(1)

(d) A 6.01 g sample of salicylic acid ($M_r = 138.0$) is reacted with 10.5 cm^3 of ethanoic anhydride ($M_r = 102.0$).

In the reaction the yield of aspirin is 84.1%

The density of ethanoic anhydride is 1.08 g cm^{-3}

Show by calculation which reagent is in excess.

Calculate the mass, in g, of aspirin ($M_r = 180.0$) produced.



CHEMISTRY ONLINE

(5)

2. Which statement about $(\text{CH}_3)_2\text{CHCH}_2\text{COOH}$ is correct?

- A.** In aqueous solution it reacts with magnesium to form carbon dioxide.
- B.** It can form hydrogen bonds.
- C.** It has optical isomers.
- D.** It has the IUPAC name 2-methylbutanoic acid.

(1)

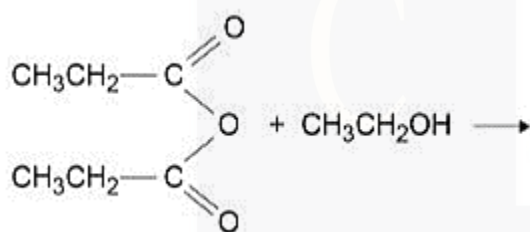
3. This question is about esters including biodiesel.

(a) An ester is formed by the reaction of an acid anhydride with $\text{CH}_3\text{CH}_2\text{OH}$

Complete the equation.

In your answer show clearly the structure of the ester.

Give the IUPAC name of the ester.



(3)

(b) In a reaction to form biodiesel, one mole of a vegetable oil reacts with an excess of methanol to form two moles of an ester with molecular formula $\text{C}_{19}\text{H}_{34}\text{O}_2$ and one mole of an ester with molecular formula $\text{C}_{19}\text{H}_{36}\text{O}_2$

Draw the structure of the vegetable oil showing clearly the ester links.

You should represent the hydrocarbon chains in the form C_xH_y where x and y are the actual numbers of carbon and hydrogen atoms.

(2)

4. Which compound forms a white precipitate when added to aqueous silver nitrate?

- A. Bromoethane
- B. Ethanal
- C. Ethanoic anhydride
- D. Ethanoyl chloride

(1)

5. An ester contains a benzene ring.

The mass spectrum of this ester shows a molecular ion peak at $m/z = 136$.

(a) Deduce the molecular formula of this ester.

(1)

(b) Draw two possible structures for this ester.

(3)

CHEMISTRY ONLINE
— TUITION —

I am Sorry !!!!!

6. Which compound reacts with warm dilute aqueous sodium hydroxide?

- A. C_6H_6
- B. $CH_3CH=CH_2$
- C. $CH_3CH_2CH_2NH_2$
- D. $(CH_3CO)_2O$

(1)

7. Esters can be prepared in several ways including the reactions of alcohols with carboxylic acids, acid anhydrides, acyl chlorides and other esters.

Ethyl butanoate is used as a pineapple flavouring in sweets and cakes.

Write an equation for the preparation of ethyl butanoate from an acid and an alcohol.

Give a catalyst used for the reaction.

(4)

8. Which reaction involves addition-elimination?

- A. $(CH_3)_2CHBr + KOH \rightarrow CH_3CH=CH_2 + KBr + H_2O$
- B. $CH_3COCl + C_6H_5OH \rightarrow CH_3COOC_6H_5 + HCl$
- C. $CH_3CH=CH_2 + Cl_2 \rightarrow CH_3CHClCH_2Cl$
- D. $CH_3CH_2CH_2Br + NaOH \rightarrow CH_3CH_2CH_2OH + NaBr$

(1)

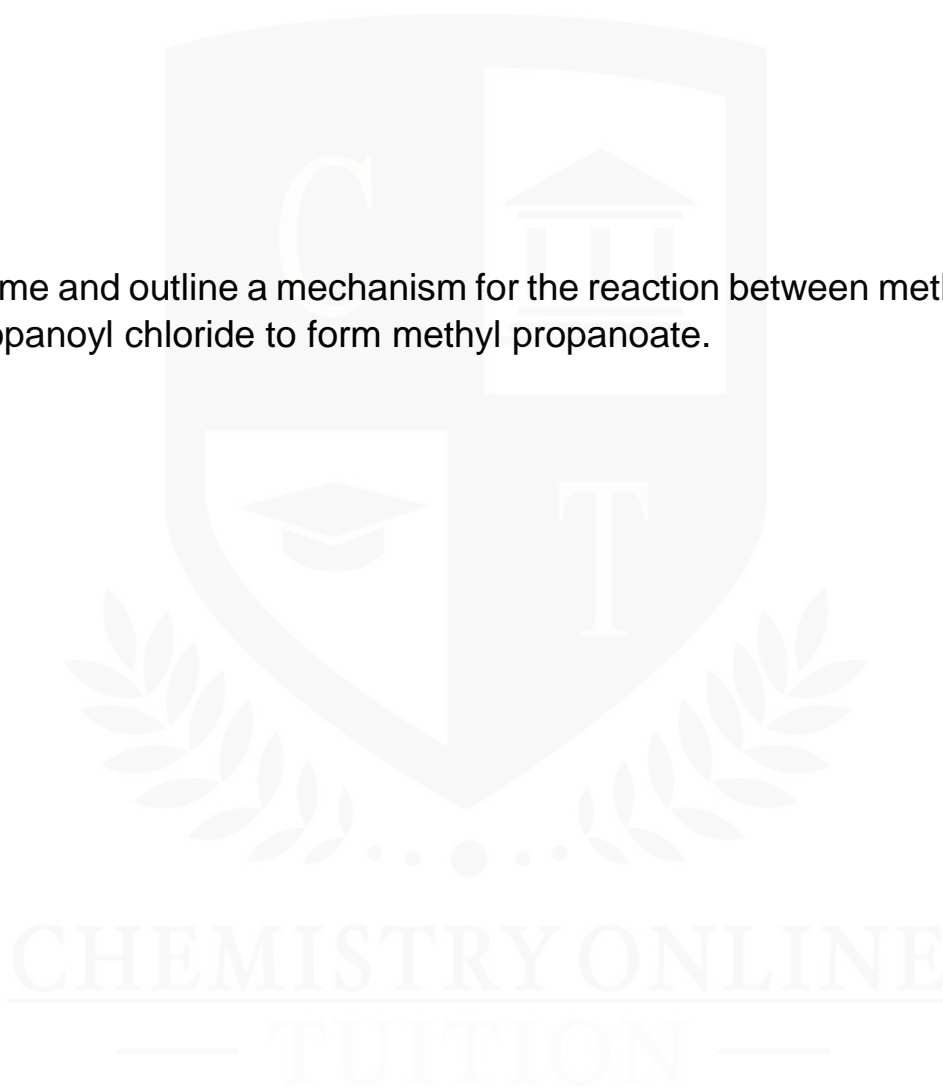
9. This question is about an ester.

(a) Write an equation for the formation of methyl propanoate, $\text{CH}_3\text{CH}_2\text{COOCH}_3$, from methanol and propanoic acid.

(1)

(b) Name and outline a mechanism for the reaction between methanol and propanoyl chloride to form methyl propanoate.

(5)



I am Sorry !!!!!

10. Which compound is formed when phenyl benzenecarboxylate is hydrolysed under acidic conditions?

- A. $C_6H_5CH_2OH$
- B. C_6H_5CHO
- C. $C_6H_5COCH_3$
- D. C_6H_5COOH

(1)



I am Sorry !!!!!



DR. ASHAR RANA



- Founder & CEO of Chemistry Online Tuition Ltd.
- Tutoring students in UK and worldwide since 2008
- 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