



**CHEMISTRY ONLINE**  
— **TUITION** —

Phone: +442081445350

[www.chemistryonlinetuition.com](http://www.chemistryonlinetuition.com)

Email: [asherrana@chemistryonlinetuition.com](mailto:asherrana@chemistryonlinetuition.com)

# CHEMISTRY

## ORGANIC CHEMISTRY

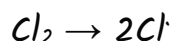
Level & Board	AQA (A-LEVEL)
TOPIC:	INTRODUCTION TO ORGANIC CHEMISTRY
PAPER TYPE:	SOLUTION - 4
TOTAL QUESTIONS	10
TOTAL MARKS	34

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

## Introduction to Organic Chemistry - 4

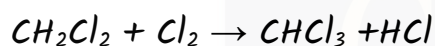
1.

(a)

*Initiation step*

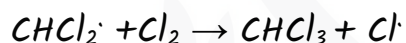
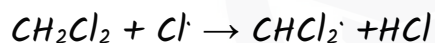
(1)

(b)

*Overall equation for the formation of  $\text{CHCl}_3$* 

(2)

(c)

*Equations for the two propagation steps:*

(2)

(d)

*Effect on rate: increases*

*Explanation:* This is because higher UV intensity results in more chlorine radicals ( $\text{Cl}\cdot$ ) being formed. These radicals play a key role in initiating the reaction, breaking chlorine molecules into free radicals, and subsequently enhancing the rate of methane-chlorine reaction.

(3)

2. c

(1)

I am Sorry !!!!!

3.

(a)

*Name of the mechanism:**Free radical substitution*

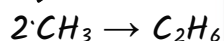
(1)

(b)

*State: initiation**Essential condition: An essential condition for the first step in the mechanism for this reaction is presence of ultra-violet light OR sunlight*

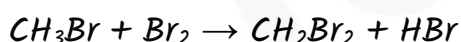
(1)

(c)

*Equation for a termination step:*

(2)

(d)

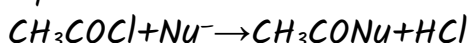
*An overall equation for the reaction between bromomethane and bromine in which dibromomethane is formed can be represented as:*

(2)

4. A

(1)

5.

*The large charge on the carbonyl carbon atom in ethanoyl chloride ( $\text{CH}_3\text{COCl}$ ) is due to the highly electronegative oxygen (O) and chlorine (Cl) atoms that are bonded to it.**The oxygen and chlorine atoms withdraw electron density from the carbonyl carbon, making it electrophilic and highly reactive.**Nucleophiles possess electron pairs that can be donated, and they are attracted to electron-deficient sites, such as the carbonyl carbon in ethanoyl chloride.**The nucleophile donates its electron pair to the carbonyl carbon, initiating the nucleophilic attack.**The equation for one nucleophilic addition-elimination reaction can be represented as follows:*

In this equation:

- $\text{CH}_3\text{COClCH}_3\text{COCl}$  is ethanoyl chloride.
- Nu-Nu- represents a nucleophile.
- $\text{CH}_3\text{CONu}$  is the acylated product.
- HCl is hydrochloric acid, which is eliminated during the reaction.

(4)

6. B

(1)

7.

(a)

Name of compound (Cetrimide): Quaternary (alkyl) ammonium salt / bromide

Reagent to Make Cetrimide from  $\text{CH}_3(\text{CH}_2)_{15}\text{NH}_2$ :

Reagent:  $\text{CH}_3\text{Br}$  or bromomethane

Reaction Conditions:

Use excess of ( $\text{CH}_3\text{Br}$  or bromomethane)

Name the type of mechanism: Nucleophilic substitution ( $\text{S}_{\text{N}}2$ )

(4)

(b)

**Benzene**

Reagent: bromine water **Observation:** no visible change

Reagent: Acidified  $\text{KMnO}_4$  **Observation:** no reaction no (visible) change

**Cyclohexene**

Reagent: bromine water **Observation:** decolourises

Reagent: Acidified  $\text{KMnO}_4$  **Observation:** decolourises

(3)

8. 3

(1)

I am Sorry !!!!!

9.

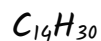
(a)

The molecular formula gives the actual number of atoms of each element or type in a molecule, hydrocarbon, compound, or chemical formula. e.g. methane  $\text{CH}_4$

(1)

(b)

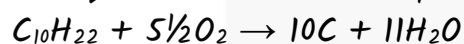
Molecular formula of the alkane which contains 14 carbon atoms is as:



(1)

(c)

An equation for the incomplete combustion of decane is as:



(2)

10. c

(1)

CHEMISTRY ONLINE  
— TUITION —

I am Sorry !!!!!



**DR. ASHAR RANA**  
M.B.B.S / MS. CHEMISTRY



- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
- Tutoring students in UK and worldwide since 2008
- CIE & EDEXCEL Examiner since 2015
- Chemistry, Physics, Math's and Biology Tutor

---

## CONTACT INFORMATION FOR CHEMISTRY ONLINE TUITION

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