



CHEMISTRY ONLINE
— **TUITION** —

Phone: +442081445350

www.chemistryonlinetuition.com

Email: asherrana@chemistryonlinetuition.com

CHEMISTRY

ORGANIC CHEMISTRY

Level & Board	AQA (A-LEVEL)
TOPIC:	HALOGENOALKANES
PAPER TYPE:	SOLUTION - 4
TOTAL QUESTIONS	10
TOTAL MARKS	30

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

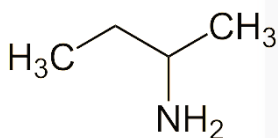
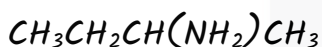
Halogenoalkanes - 4

1.

Structure of the organic product with Mr = 73 made from the reaction between 2-bromobutane and ammonia is as:

Structure:

2-aminobutane



(1)

2.

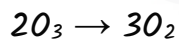
(a)

Cl· / chlorine free radical formed from CClF_3 that is responsible for the catalytic decomposition of ozone in the upper atmosphere.

(1)

(b)

Overall equation to represent the decomposition of ozone into oxygen.

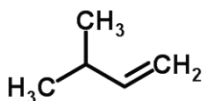


(1)

3.

Structure of the alkene:

Structure: 3-methylbut-1-ene

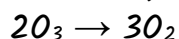


(1)

4.

(a)

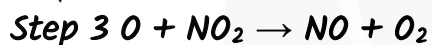
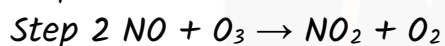
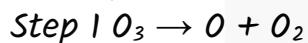
Overall equation for Ozone decomposition



(1)

(b)

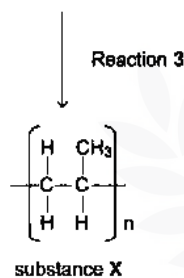
Overall equations showing how nitrogen monoxide catalyses this decomposition



(1)

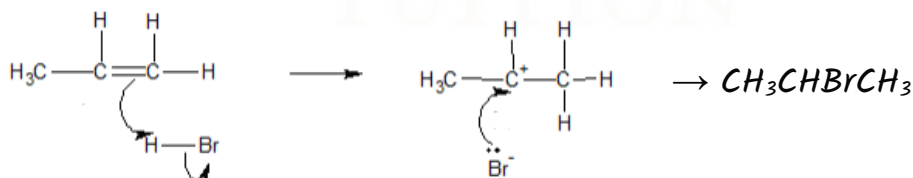
5.

(a)



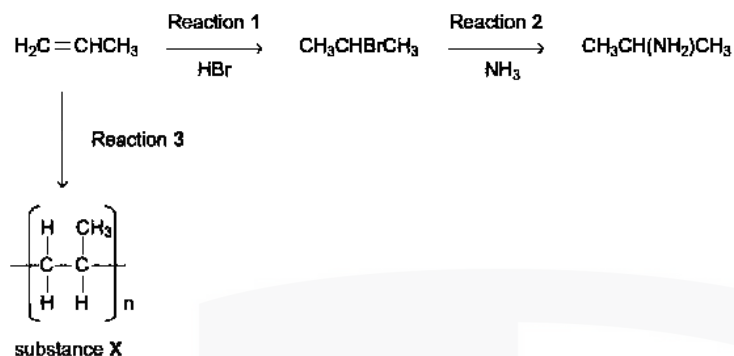
Name of mechanism: Electrophilic addition

Mechanism for Reaction 1:



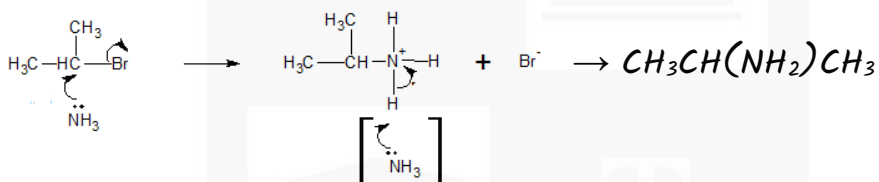
(5)

(b)



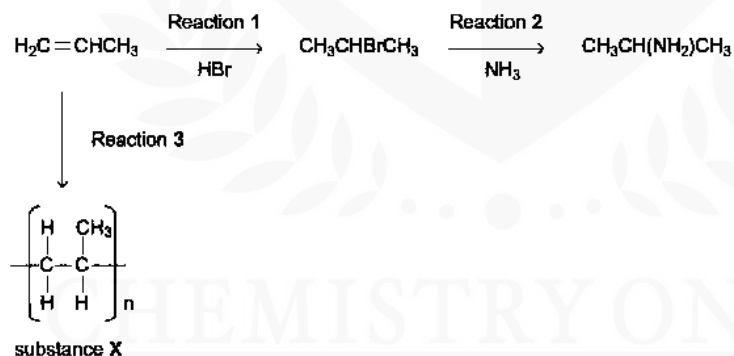
Name of mechanism: Nucleophilic substitution (S_N1)

Mechanism for Reaction 2:



(5)

(c)



Type of reaction in Reaction 3: (addition) polymerisation

Name of substance X : polypropene

(2)

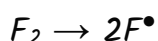
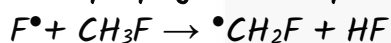
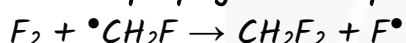
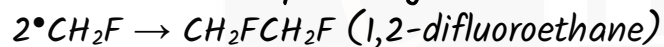
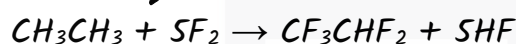
6.

(a)

Name of mechanism : (Free) radical substitution

(1)

(b)

Initiation step:*First propagation step:**Second propagation step:**A termination step leading to the formation of 1,2-difluoroethane.**Overall equation for the reaction:*

(4)

7. D

(1)

8.

*Structure of the alkene:**Structure for propene $H_2C=CHCH_3$*

(1)

9.

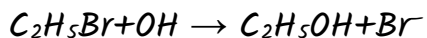
(a)

*A nucleophile is an electron pair donor. It is a chemical species that donates an electron pair during a reaction.**Example: Hydroxide ion (OH^-) acting as a nucleophile in the reaction with a positively charged species.*

(1)

(b)

*Nucleophilic substitution in a haloalkane involves the replacement of a halogen atom with a nucleophile.**For instance, in the reaction between ethyl bromide (C_2H_5Br) and hydroxide ion (OH^-):*



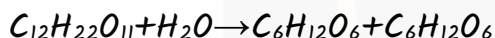
Hydroxide ion is the nucleophile, replacing bromine in ethyl bromide, resulting in the formation of ethanol.

(1)

(c)

Hydrolysis is the process of breaking down molecules by reacting with water.

For example, the hydrolysis of sucrose involves breaking its glycosidic bonds using water, resulting in the formation of glucose and fructose:



(1)

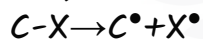
(d)

The bond enthalpy of a carbon-halogen (C-X) bond refers to the heat energy required to break the bond through homolysis, at constant pressure.

So,

"The bond enthalpy of a carbon-halogen bond is the heat energy required for homolysis of the C-X bond at constant pressure."

In equation form:



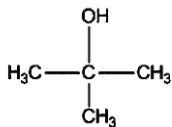
C-Halogen (C-Cl): 328 kJ/mol

(1)

10.

Name: 2-methylpropan-2-ol

Formula: $(CH_3)_3COH$



(1)



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
 - Email: asherrana@chemistryonlinetuition.com
- Address: 210-Old Brompton Road, London SW5 OBS, UK