



CHEMISTRY ONLINE
— **TUITION** —

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CHEMISTRY

ORGANIC CHEMISTRY

Level & Board	AQA (A-LEVEL)
TOPIC:	ORGANIC ANALYSIS
PAPER TYPE:	SOLUTION - 2
TOTAL QUESTIONS	10
TOTAL MARKS	26

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Organic Analysis

1.

(a)

Carbon-neutral refers to an activity with no net carbon or overall greenhouse gas emissions to the atmosphere or air. It implies that the carbon released is balanced by an equal amount absorbed or offset, ensuring a neutral impact on atmospheric carbon levels.

(1)

(b)

The primary advantage is the renewable and sustainable nature of glucose from crops, ensuring a continuous and environmentally friendly source for ethanol production.

(1)

(c)

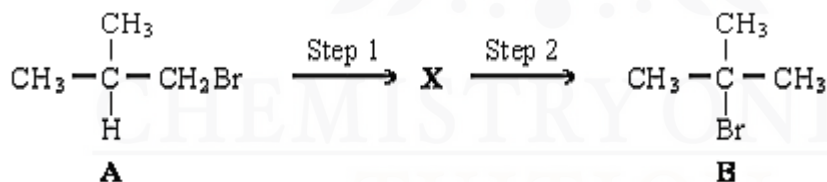
Using crops for ethanol production can deplete food supplies or redirect land use from specified food cultivation, leading to potential food security concerns.

(1)

2. B

(1)

3. The conversion of compound A into compound B can be achieved in two steps as shown below.



The intermediate compound, X, has an absorption at 1650 cm^{-1} in its infrared spectrum.

(a)

X is identified as 2-methylpropene based on the presence of an alkene, indicated by the absorption at 1650 cm^{-1} .

(2)

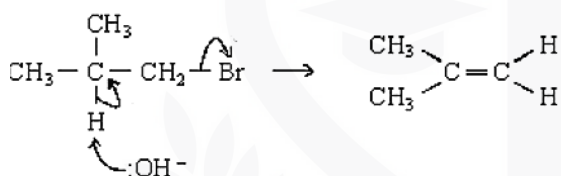
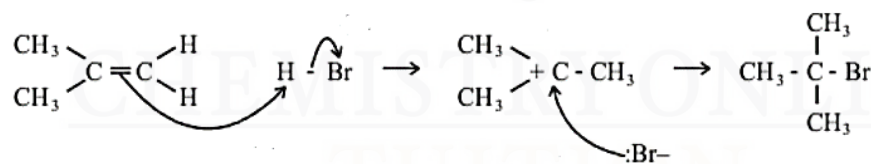
(b)

Step 1:For $A \rightarrow X$ **Reagents:**

- KOH (or $NaOH$)
- Alcoholic solvent
- Warm conditions

Step 2:For $X \rightarrow B$ **Reagent:**

- HBr

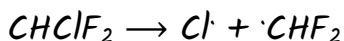
Mechanism:For $A \rightarrow X$ **Mechanism:**For $X \rightarrow B$ 

(6)

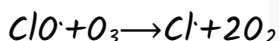
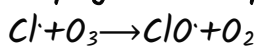
I am Sorry !!! 4. C

(1)

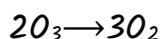
5.

Initiation:UV radiation \rightarrow $\text{Cl}\cdot$ 

Ultraviolet radiation breaks the carbon-chlorine (C-Cl) bond in CHClF_2 , leading to the formation of a chlorine radical ($\text{Cl}\cdot$).

Propagation Steps:

The chlorine radical ($\text{Cl}\cdot$) reacts with ozone (O_3), initiating a chain reaction that ultimately results in the breakdown of ozone molecules.

Overall Reaction:

The overall decomposition of ozone occurs, leading to the formation of molecular oxygen (O_2) without replenishing the ozone layer.

This damage to the ozone layer allows harmful UV radiation to reach the Earth's surface, posing risks such as an increase in skin cancer.

The ban on CHClF_2 and similar substances is essential to prevent further depletion of the ozone layer and protect the Earth's environment.

(4)

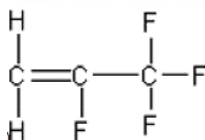
6. B

(1)

7.

(a)

Displayed formula for 2,3,3,3-tetrafluoropropene: _____



(1)

(b)

2,3,3,3-tetrafluoropropene is environmentally preferable to chlorodifluoromethane because it lacks chlorine, preventing the production of chlorine radicals that contribute to ozone depletion. The stronger carbon-fluorine bond in 2,3,3,3-tetrafluoropropene enhances stability compared to the carbon-chlorine bond in chlorodifluoromethane.

(1)

8. C

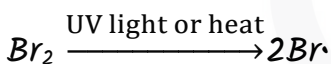
(1)

9.

Name of mechanism: (free-) radical substitution

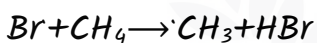
Mechanism:

Initiation:

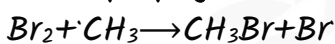


Propagation Steps:

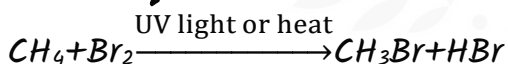
Chain initiation:



Chain propagation:



Overall Equation:



Conditions:

Ultra-violet (UV) light or high temperature ($125^\circ\text{C} \leq T \leq 600^\circ\text{C}$) is required to initiate the reaction.

(5)

10. D

(1)



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- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
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