

# Hydrocarbons

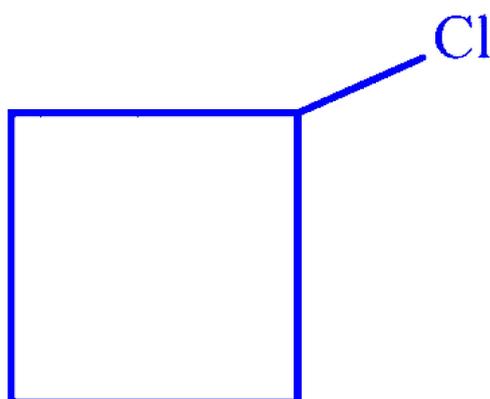
## Question1

The major product formed when 1-Bromo-3-Chlorocyclobutane reacts with metallic sodium in dry ether is

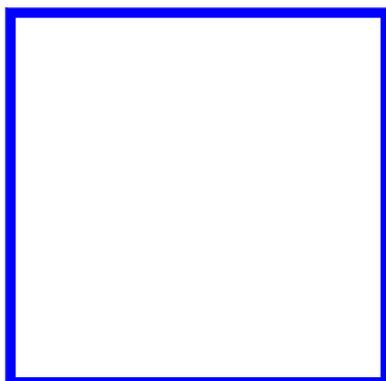
KCET 2025

Options:

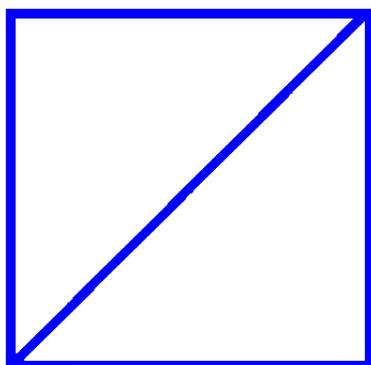
A.

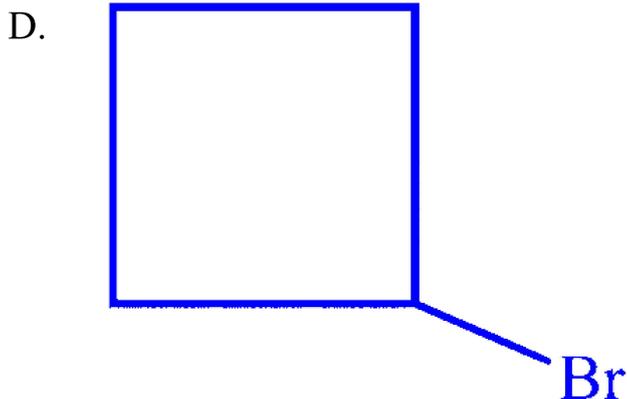


B.



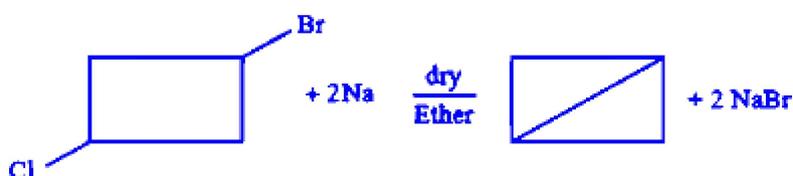
C.





**Answer: C**

**Solution:**



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## Question2

Sodium ethanoate on heating with soda lime gives 'X'. Electrolysis of aqueous solution of sodium ethanoate gives 'Y'. 'X' and 'Y' respectively are

**KCET 2024**

**Options:**

- A. methane and ethane
- B. methane and methane
- C. ethane and methane

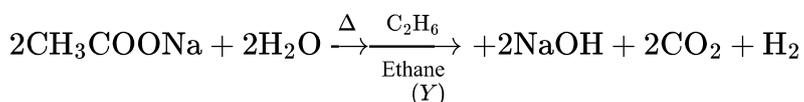
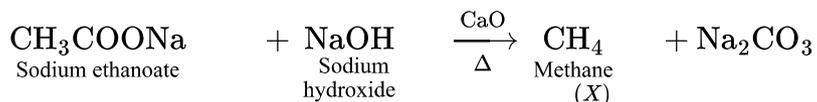


D. ethane and ethane

**Answer: A**

**Solution:**

The complete reaction sequence involved is as follows



Thus, the compounds X and Y are methane and ethane respectively.

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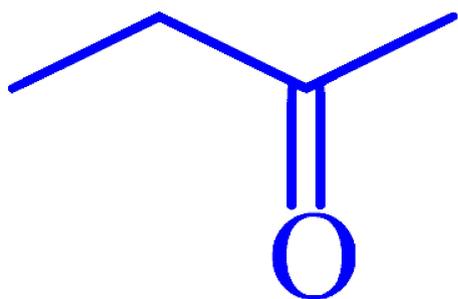
### Question3

**But-1-yne on reaction with dil.  $\text{H}_2\text{SO}_4$  in presence of  $\text{Hg}^{2+}$  ions at 333 K gives**

**KCET 2024**

**Options:**

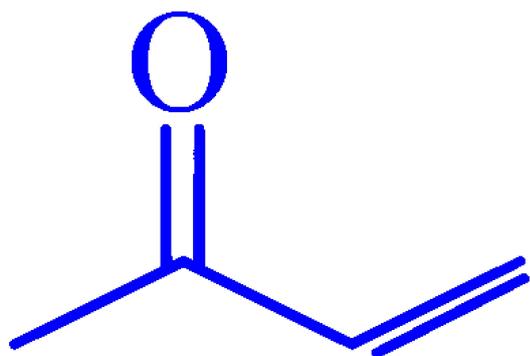
A.



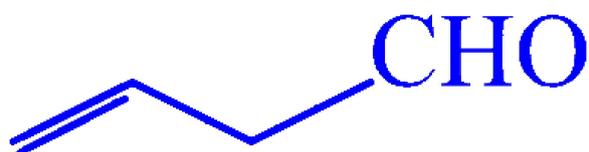
B.



C.



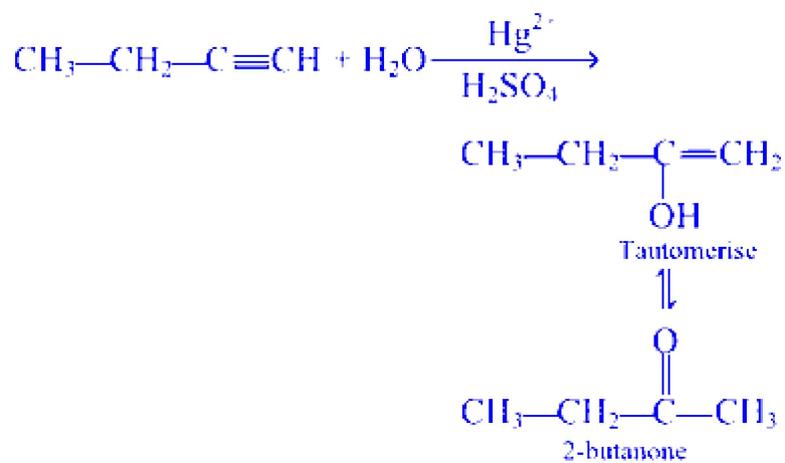
D.



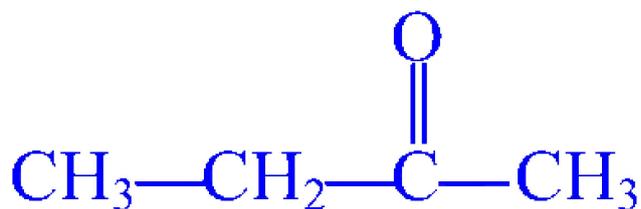
**Answer: A**

**Solution:**

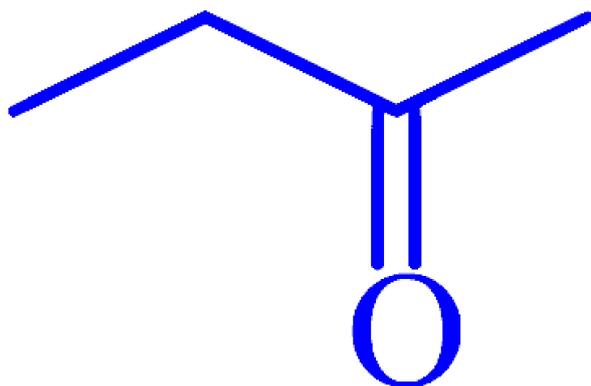
The complete reaction sequence involved is as follows



Thus, the product formed is



or



, i.e. 2-butanone.

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## Question4

**2-methyl propane can be prepared by Wurtz reaction. The haloalkanes taken along with metallic sodium and dry ether are :**

### KCET 2024

**Options:**

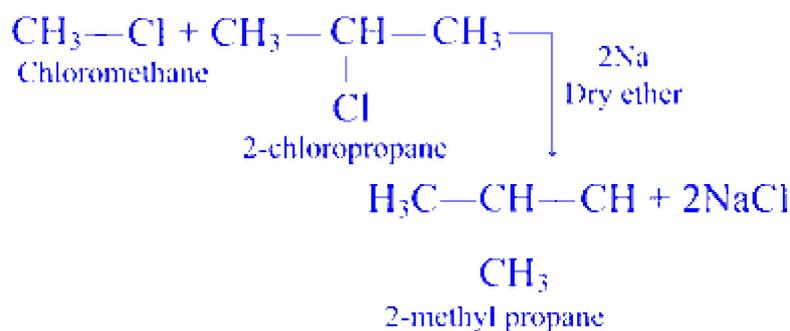
- A. chloromethane and 2-chloropropane
- B. chloroethane and chloromethane
- C. chloroethane and 1-chloropropane
- D. chloromethane and 1-chloropropane

**Answer: A**

**Solution:**

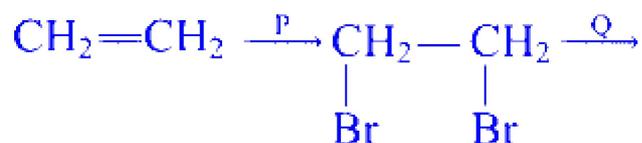


To prepare 2-methyl propane by Wurtz reaction, the haloalkanes that should be taken along with metallic sodium and dry ether are chloromethane and 2-chloropropane. The reaction involved is



## Question5

In the given sequence of reactions, identify ' P', Q', R' and ' S' respectively.



## KCET 2024

Options:

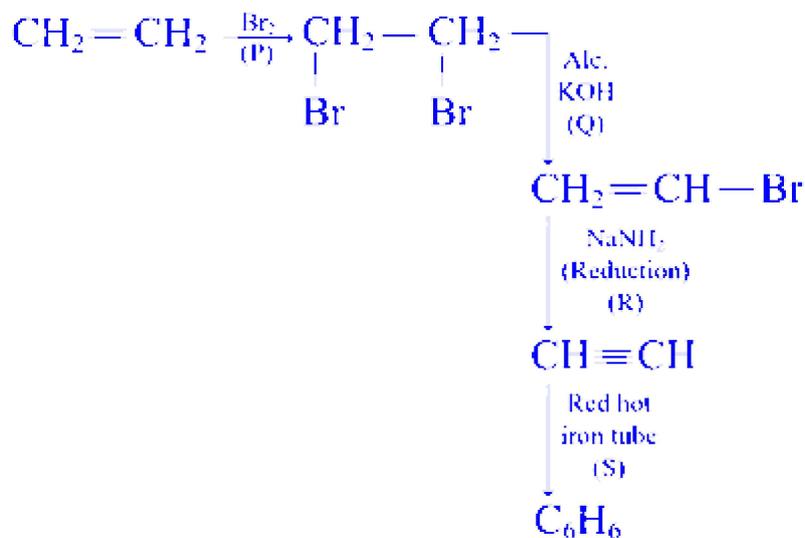
- A. Br<sub>2</sub>, Alc. KOH, NaOH, Al<sub>2</sub>O<sub>3</sub>
- B. HBr, Alc. KOH, CaC<sub>2</sub>, KMnO<sub>4</sub>
- C. HBr, Alc. KOH, NaNH<sub>2</sub>, Red hot iron tube
- D. Br<sub>2</sub>, Alc. KOH, NaNH<sub>2</sub>, Red hot iron tube

**Answer: D**

**Solution:**

The complete reaction sequence involved is as follows

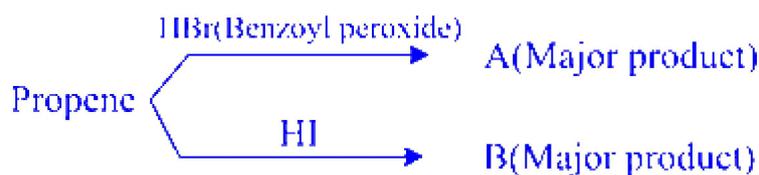




Thus, the reagent  $P$ ,  $Q$ ,  $R$  and  $S$  are  $\text{Br}_2$ , alc.  $\text{KOH}$ ,  $\text{NaNH}_2$ , Red hot iron respectively.

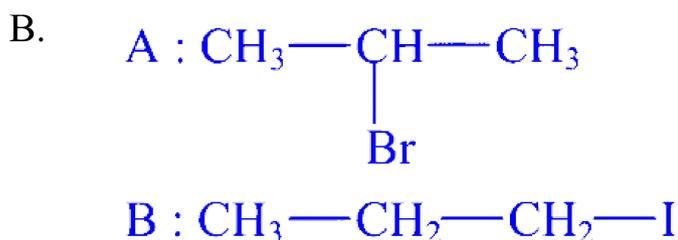
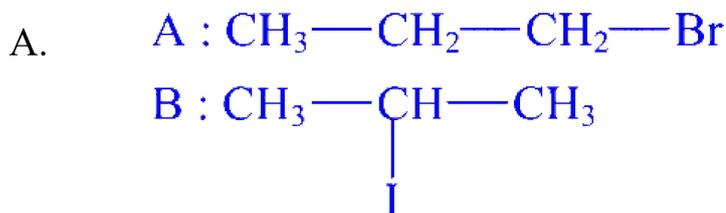
## Question6

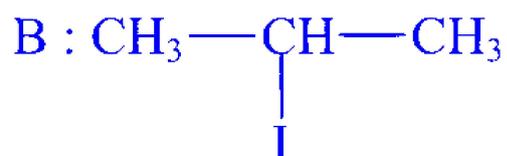
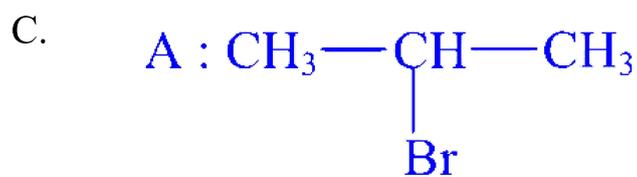
Identify, A and B in the following reaction



## KCET 2022

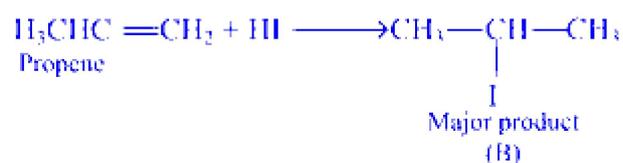
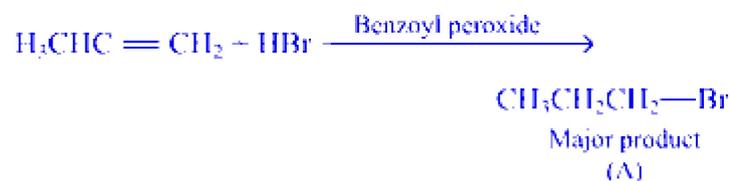
Options:





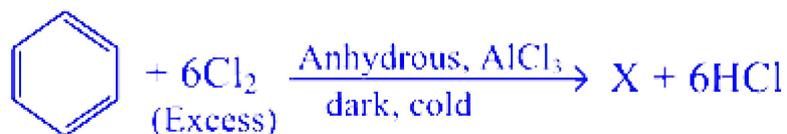
**Answer: A**

**Solution:**



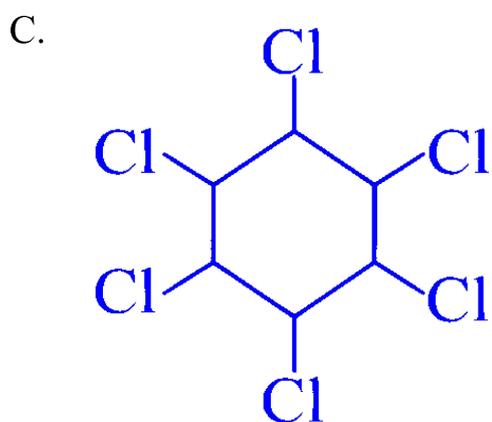
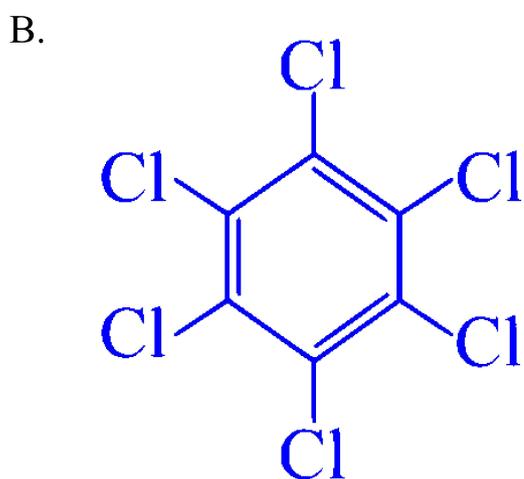
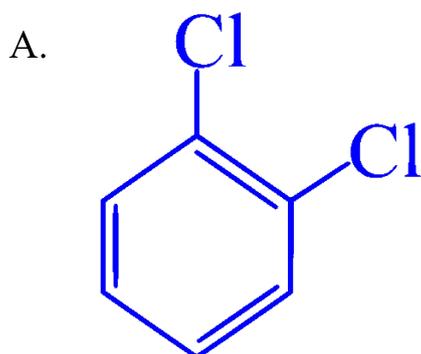
## Question 7

Identify 'X' in the following reaction.

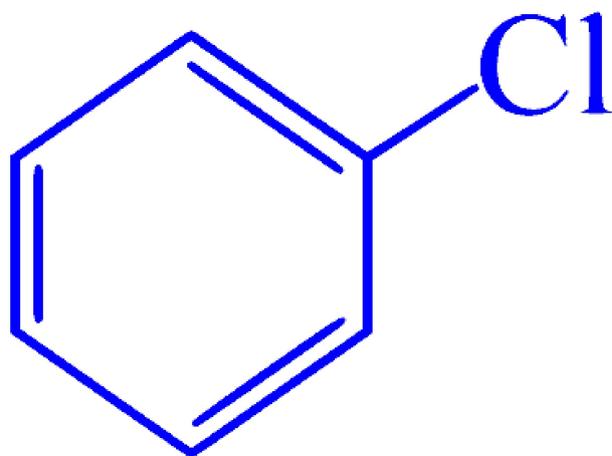


KCET 2020

Options:

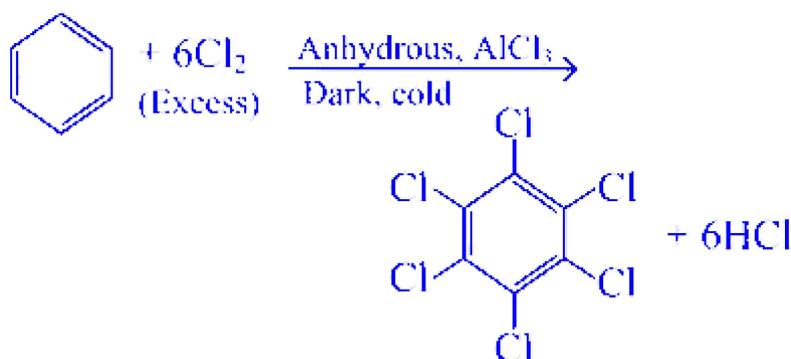


D.



**Answer: B**

**Solution:**



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## Question8

The number of  $\pi$ -bonds and  $\sigma$ -bonds present in naphthalene are respectively

**KCET 2019**

**Options:**

A. 6, 19

B. 5, 19

C. 5, 11

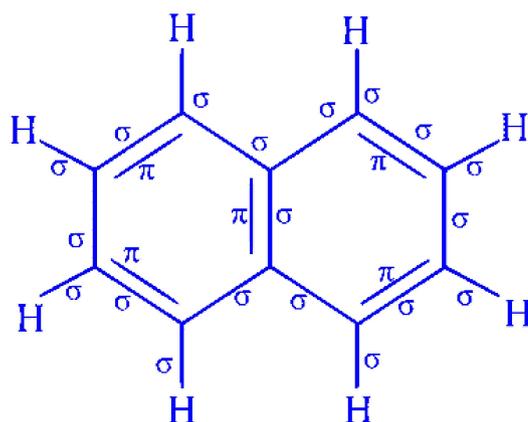


D. 5, 20

**Answer: B**

**Solution:**

Sigma ( $\sigma$ ) bonds are formed by the linear or axial or end to end overlapping of orbitals and pi ( $\pi$ ) bonds are formed by the parallel or sidewise overlapping of orbitals by the given compound (i.e. naphthalene) number of  $\pi$ -bonds and  $\sigma$ -bonds are 5 and 19 respectively.



(19  $\sigma$ -bonds 5  $\pi$ - bonds)

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## Question9

**2-butyne is reduced to trans-but-2-ene using**

**KCET 2019**

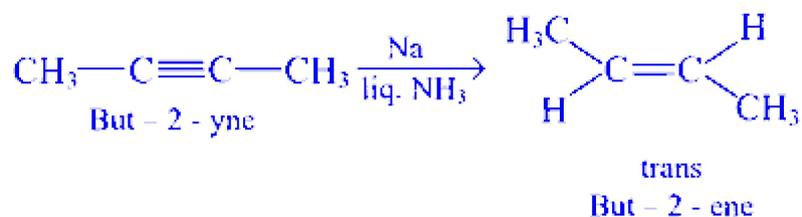
**Options:**

- A.  $H_2$  | Ni
- B. Na in liq.  $NH_3$
- C.  $H_2$  | Pd - C
- D. Zn in dil. HCl

**Answer: B**

**Solution:**

2-butyne is reduced to trans but-2-ene using Na in liq.  $NH_3$ . The reaction is as follows

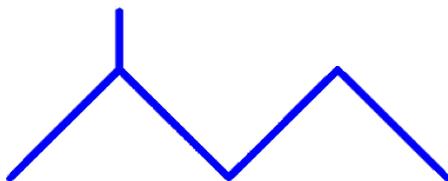


But if  $\text{H}_2/\text{Pd} - \text{C}$  is used then cis-but-2-ene will form. Here, partially deactivated palladised charcoal is known as Lindlar's catalyst.

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## Question10

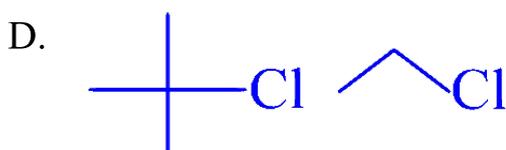
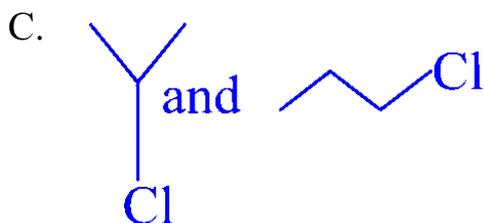
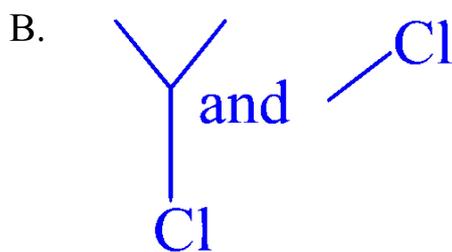
The alkyl halides required to prepare



by Wurtz reaction are

KCET 2019

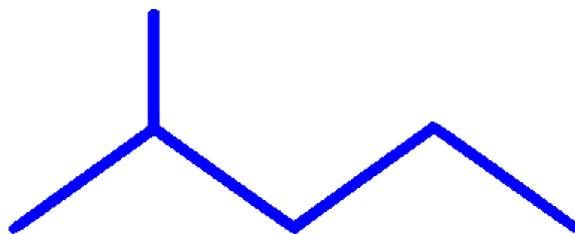
Options:



**Answer: C**

**Solution:**

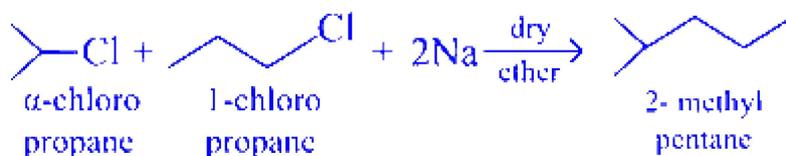
The alkyl halide required to prepare



by Wurtz reaction are



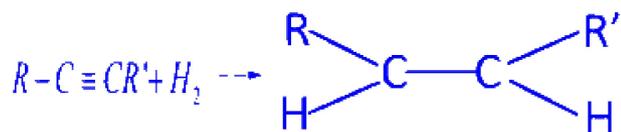
In Wurtz reaction, alkyl halides on treatment with sodium metal in dry ethereal solution give higher alkanes containing even number of carbon atoms.



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## Question11

The reagent  $X$  used for the following reaction is



**KCET 2018**

**Options:**

A. Ni

B. Pd/C

C. LiAlH<sub>4</sub>

D. Na /Liquid NH<sub>3</sub>

**Answer: B**

### Solution:

As, in the given reaction C - C triple bond are changing into C - C single bond and hydrogen is added. Thus, the given reaction is an example of reduction, which is carried out by H<sub>2</sub> in the presence of Pd/C catalyst.

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## Question12

*n*-propyl chloride reacts with sodium metal in dry ether to give

**KCET 2018**

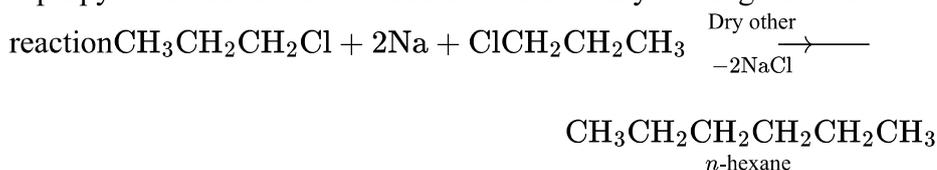
**Options:**

- A. CH<sub>3</sub> - CH<sub>2</sub> - CH<sub>2</sub> - CH<sub>2</sub> - CH<sub>2</sub> - CH<sub>3</sub>
- B. CH<sub>3</sub> - CH<sub>2</sub> - CH<sub>3</sub>
- C. CH<sub>3</sub> - CH<sub>2</sub> - CH<sub>2</sub> - CH<sub>3</sub>
- D. CH<sub>3</sub> - CH<sub>2</sub> - CH<sub>2</sub> - CH<sub>2</sub> - CH<sub>2</sub> - CH<sub>2</sub> - CH<sub>3</sub>

**Answer: A**

### Solution:

*n* propyl chloride reacts with sodium metal in dry ether give *n*-hexane. It is a example of Wurtz



## Question13

When the vapours of tertiary butyl alcohol are passed through heated copper at 573 K , the product formed is

**KCET 2018**

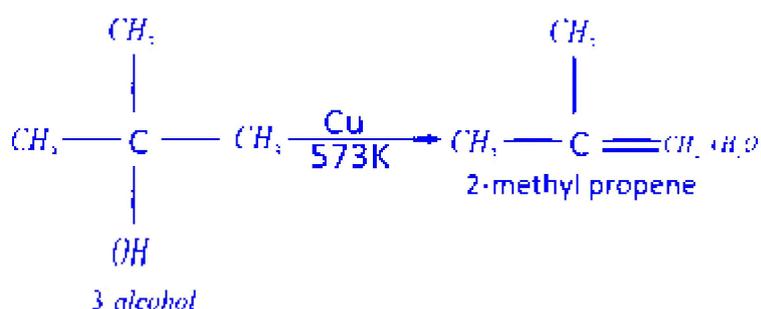
**Options:**

- A. but-2-ene
- B. 2-butanone
- C. 2-methyl propene
- D. butanal

**Answer: C**

### Solution:

When vapours of 3°-alcohols are passed over heated copper at 573 K alkenes are formed.



## Question14

For the preparation of alkanes, aqueous solution of sodium or potassium salt of carboxylic acid is subjected to

**KCET 2017**

**Options:**

- A. hydrolysis
- B. electrolysis
- C. hydrogenation
- D. oxidation

**Answer: B**

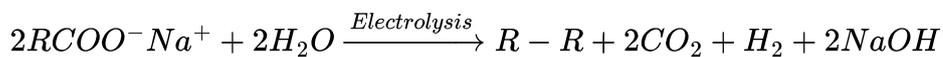


## Solution:

The correct answer is **Option B: electrolysis**. This process is known as Kolbe electrolysis.

Here's why:

**Kolbe Electrolysis:** When an aqueous solution of sodium or potassium salt of a carboxylic acid is electrolyzed, it results in the formation of an alkane.



In this reaction:

The  $RCOO^-$  part comes from the sodium or potassium salt of the carboxylic acid.

Electrolysis involves passing an electric current through the solution.

$R - R$  represents the alkane formed.

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