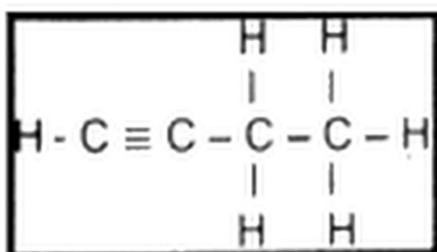


2. Give short answers.

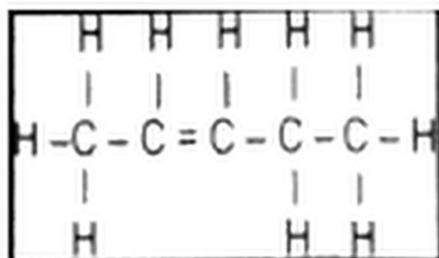
(i) Give three examples of unsaturated hydrocarbons.



i. 1-Butyne:

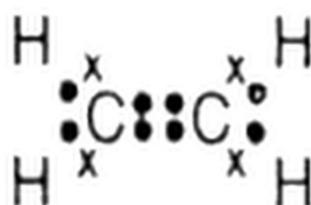


ii. 2-Pentene



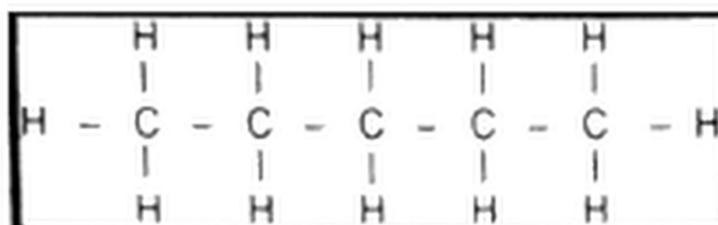
(ii) Draw electron dot and cross structure for Ethene.

Ans: Electron dot and cross structure for Ethene:

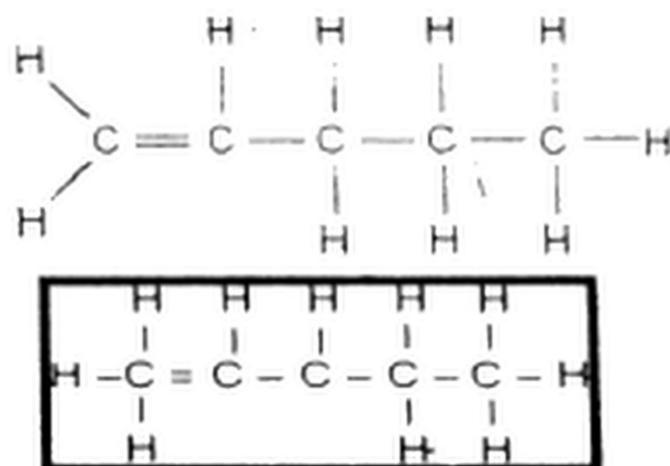


(iii) Draw structural formulas of an alkane, alkene and an alkyne containing five carbon atoms?

Ans: Alkane (pentane):



Alkene (1-Pentene):

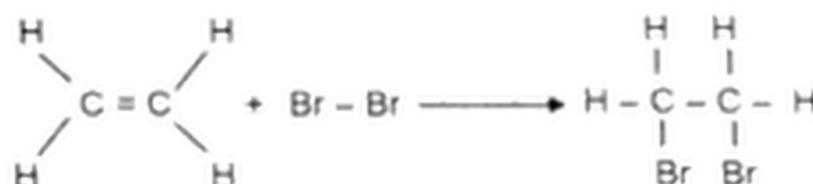


(iv) How can you differentiate ethane from ethene?

Ans: Add a small amount of Bromine water to each jar. Shake the jar containing Ethene will decolor the bromine water. The jar containing the Ethane the bromine water will remain brown.

This is because the Br_2 will add on across the double bond of the unsaturated ethene to produce dibromoethane. The Br_2 is removed from the water which becomes clear.

In the case of Ethane, it is already saturated, so no reaction occurs- Bromine water remains brown.

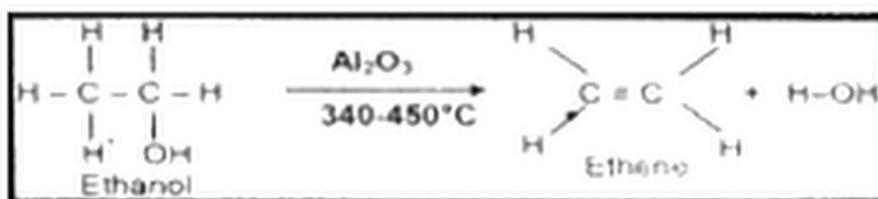


(v) What do you mean by dehydration reaction? Give one example.

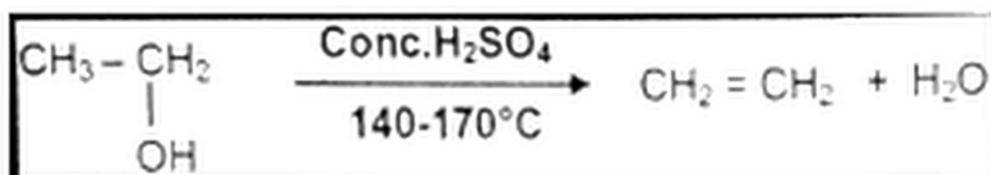
Ans: Dehydration: Dehydration means loss of water.

Examples:

Alcohols dehydrate when their vapors are passed over heated alumina.



Concentrated sulphuric acid is also used for dehydration.

**3. How can you convert**

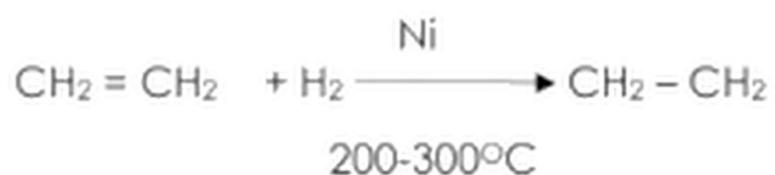
(i) Ethene into Ethane

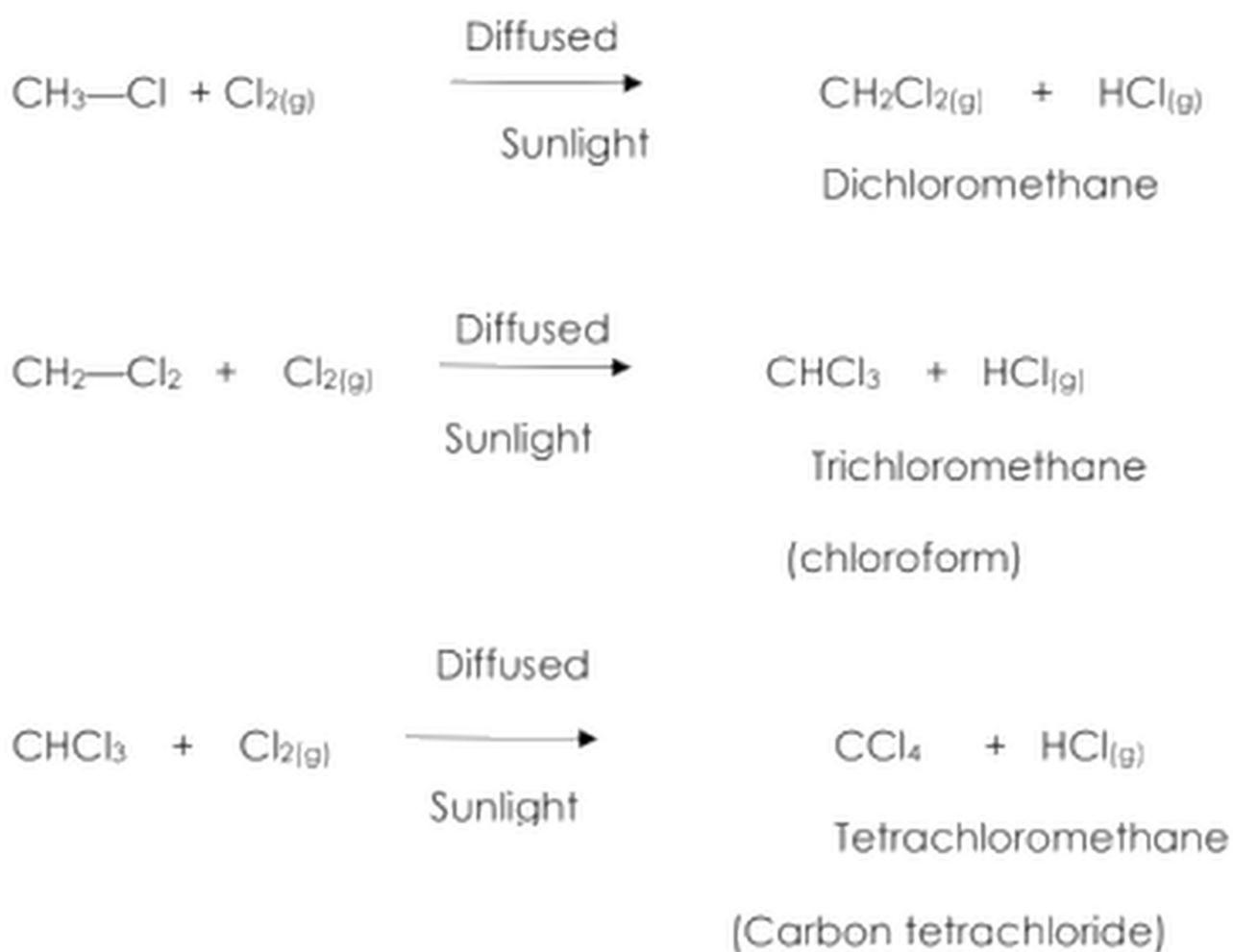
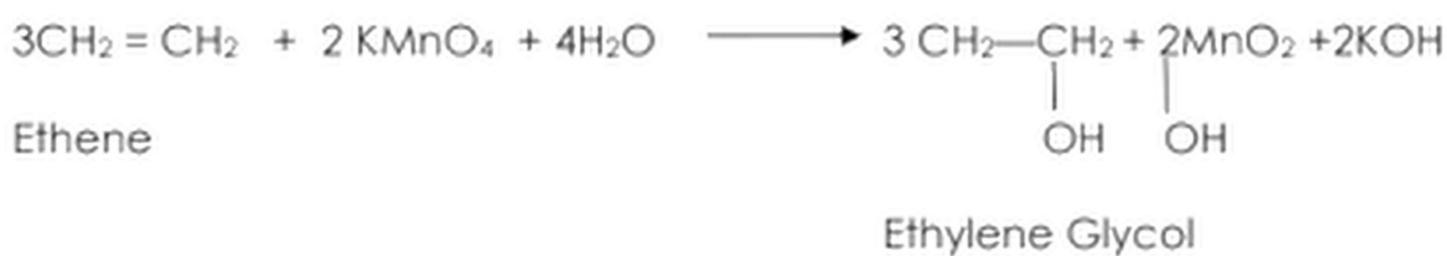
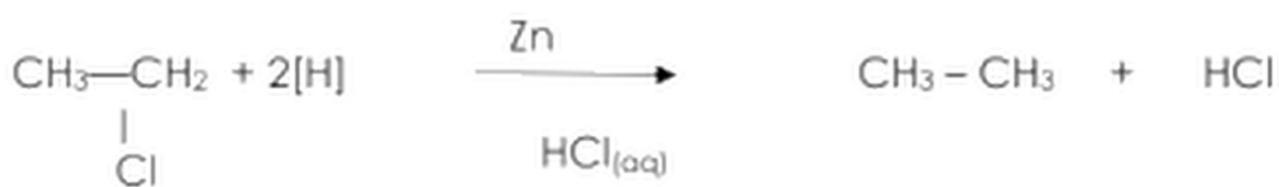
(ii) Methane into Carbon Tetrachloride

(iii) Ethene into Glycol

(iv) Ethyl chloride into Ethane

(v) Ethyl bromide into Ethene

Solution:**(i) Ethene into Ethane****(ii) Methane into Carbon tetrachloride:**

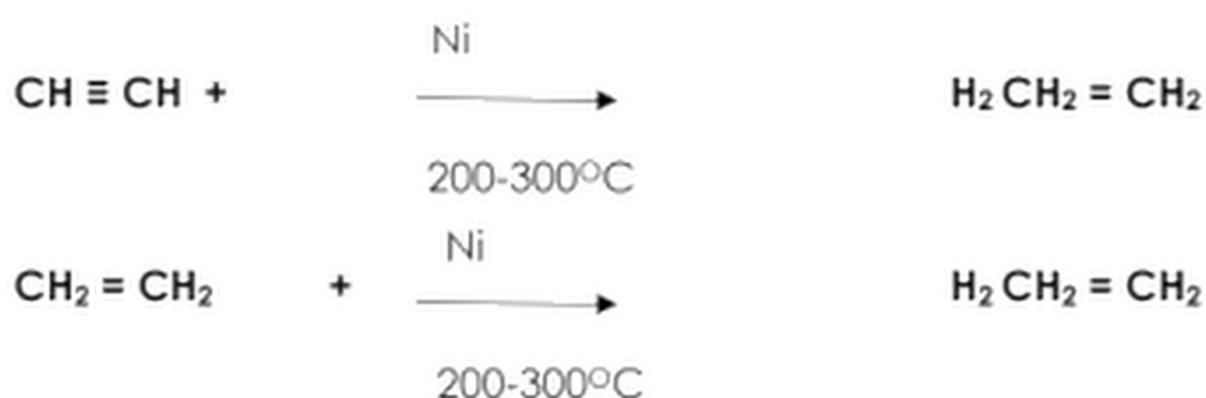
**(i) Ethene into Glycol:****(ii) Ethyl Chloride into Ethane:****(iii) Ethyl bromide into Ethene:**

4. Write a chemical reaction to show the preparation of an alkane from an alkene and an alkyne.

Ans: Preparation of Alkanes:

i. By hydrogenation of alkenes and alkynes

Addition of hydrogen molecules across carbon-carbon multiple bonds is called hydrogenation. Hydrogenation takes place in the presence of finely divided Nickel at 200-300°C at High pressure. Hydrogenation can also be done in the presence of Pt and Pd at room temperature.

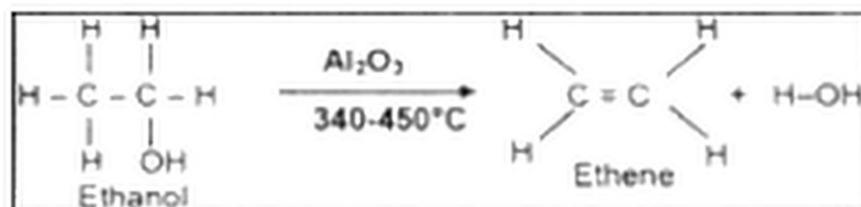


5. Write a chemical reaction to show the preparation of ethene from dehydration of an alcohol and dehydrohalogenation of alkyl halides.

Ans: Preparation of Ethene:

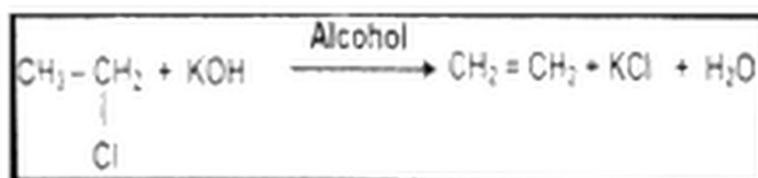
1. By dehydration of Alcohols:

Dehydration means loss of water. Alcohols dehydrate when their vapor are passed over heated Alumina.



2. By Dehydrohalogenation of Alkyl halides:

Dehydrohalogenation means loss of hydrogen halide. Alkyl Halide on heating with alcoholic KOH undergo dehydrohalogenation.

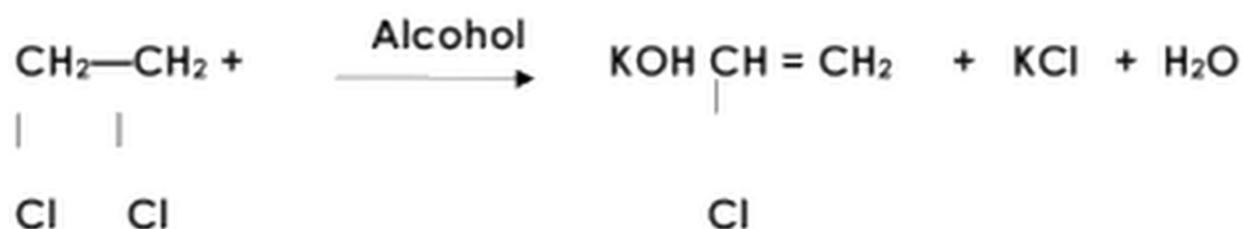


6. Write a chemical reaction to show the preparation of ethyne from dehalogenation of 1,2- dihalide and a Tetrahalide.

Ans: Preparation of Ethyne:

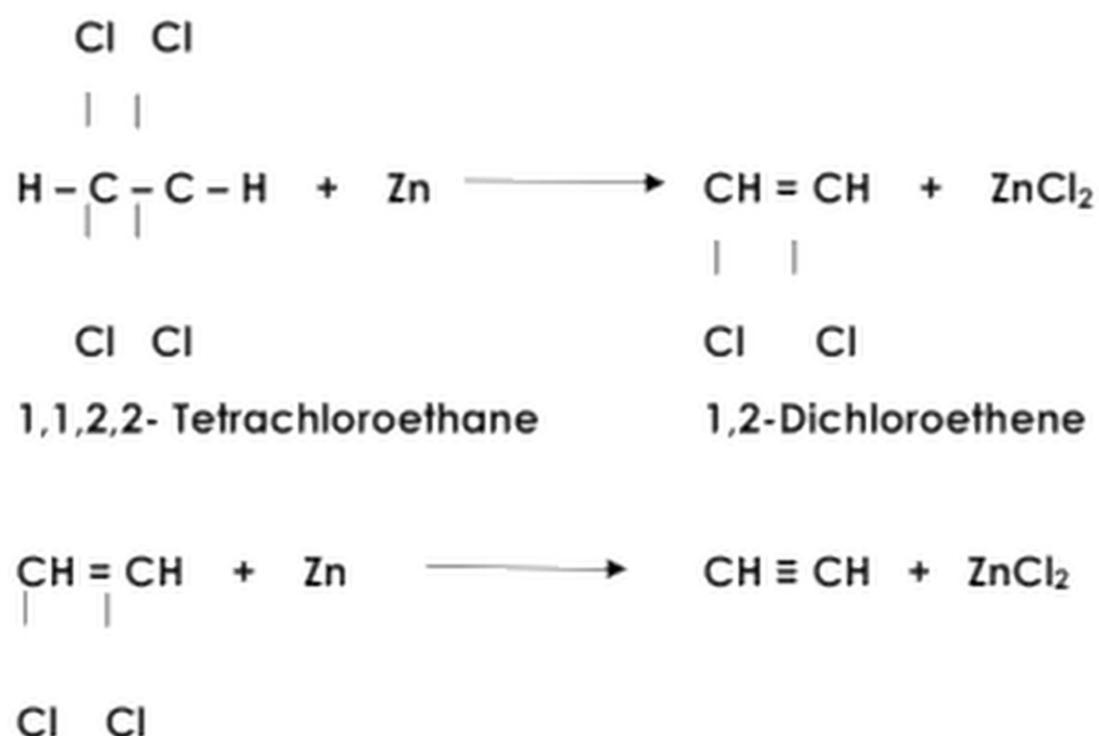
1. By dehydrohalogenation of 1,2 – Dihalide:

Vicinal dihalide on treatment with alcoholic potassium hydroxide eliminates two molecules of hydrogen halides from adjacent carbon atoms. Removal of two molecules forms a triple bond between two carbon atoms. Reaction occurs in two steps.



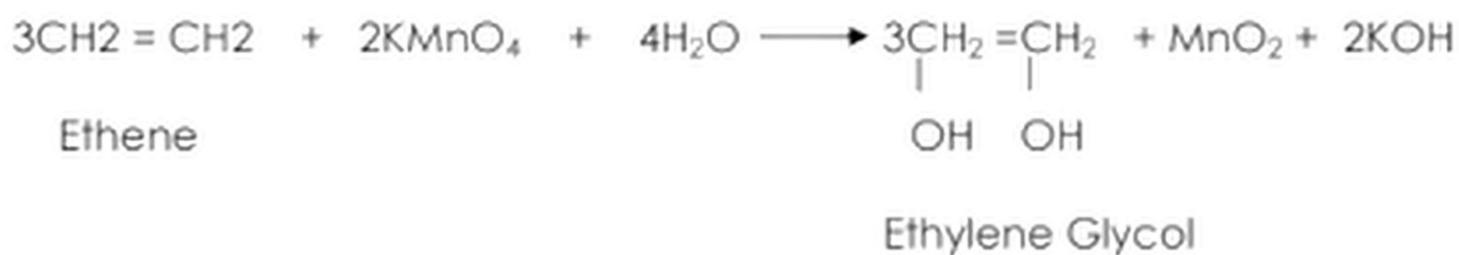
2. By dehalogenation of Tetrahalides:

Tetra Halides on treatment with Zn dust undergo dehalogenation forming an alkyne.



7. Write chemical reaction showing reactions of KMnO_4 with Ethene and Ethyne.

Ans: Reaction of KMnO_4 with Alkenes (Baeyer's Test):



Reaction of KMnO_4 with Ethyne:



8. List some industrial uses of ethene and ethyne.

Ans: Industrial uses of Ethene:

Ethene has two main industrial uses. Ethene is used to accelerate the ripening of fruits and is most commonly used on bananas and also on

citrus fruits, the other use of ethene is the manufacture of plastics, such as packing films, wire coatings and squeeze bottles.

Industrial uses of Ethyne(Acetylene):

Ethyne is used:

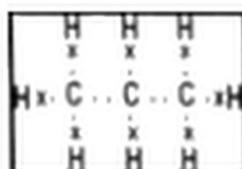
1. In oxy-acetylene torch for welding and cutting metals.
2. For ripening of fruits.
3. For the manufacture of Polyvinyl acetate (PVA), Polyvinyl chloride (PVC), polyvinyl Ethers and rubber.

9. Explain why a systematic method of naming chemical compounds is necessary?

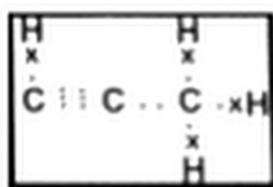
Ans: Millions of organic compounds exist. To understand, recognize and classify these compounds, systematic naming of these compounds is necessary. Organic chemists began in the last century to devise a system of naming organic compounds that depend on their structure. An international body, the **International Union of Pure and Applied Chemistry (IUPAC, pronounced "eye-you-pac")** constantly reviews the rules for naming organic compounds. IUPAC system of naming organic compounds is based on the following principle. Each different organic compound should have a different name.

10. Draw electron dot and cross structure for (a) Propane (b) Propyne (c) propene

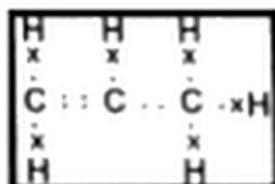
Ans: (a) Propane:



(b) Propyne:

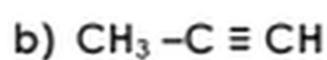


(c) Propene



Think -Tank

11. Write chemical equations for the preparation of Propene from

(a) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{OH}$ (b) $\text{CH}_3 - \text{C} \equiv \text{CH}$ 

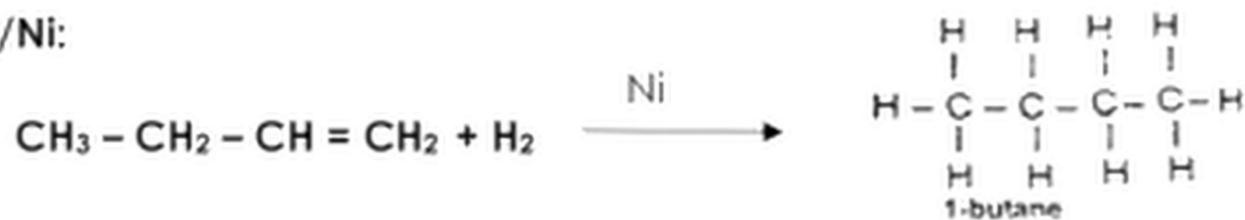
12. Write down structural formulas for the products which are formed when 1-butene is reacted with

(a) H_2/Ni (b) Dilute alkaline aqueous KMnO_4 solution

(c) Bromine water

(d) Chlorine

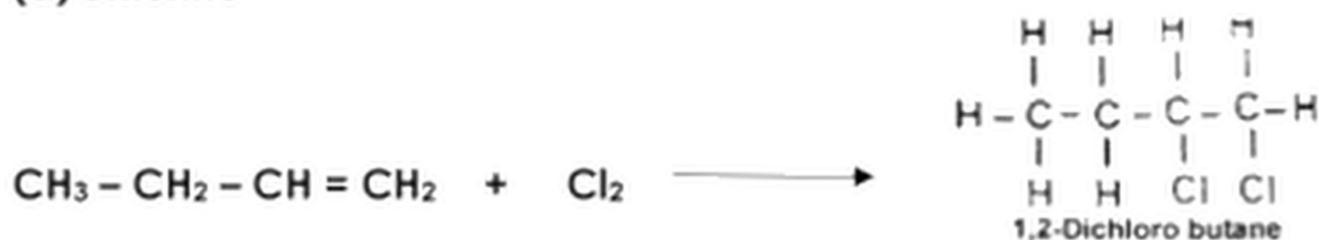
Solution:

(a) H_2/Ni :(b) Dilute alkaline aqueous $KMnO_4$ solution

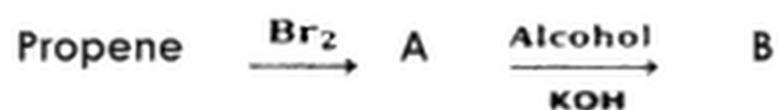
(c) Bromine Water:



(d) Chlorine

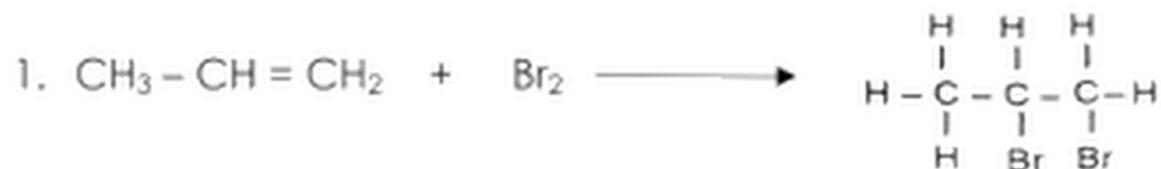


13. Identify A, B, C, D in the following reactions:





Solution:

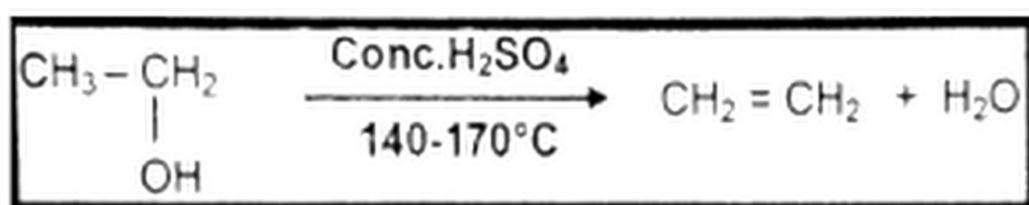
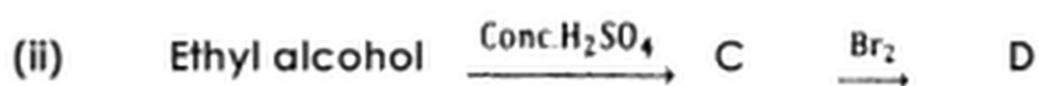


1,2 dibromo propane

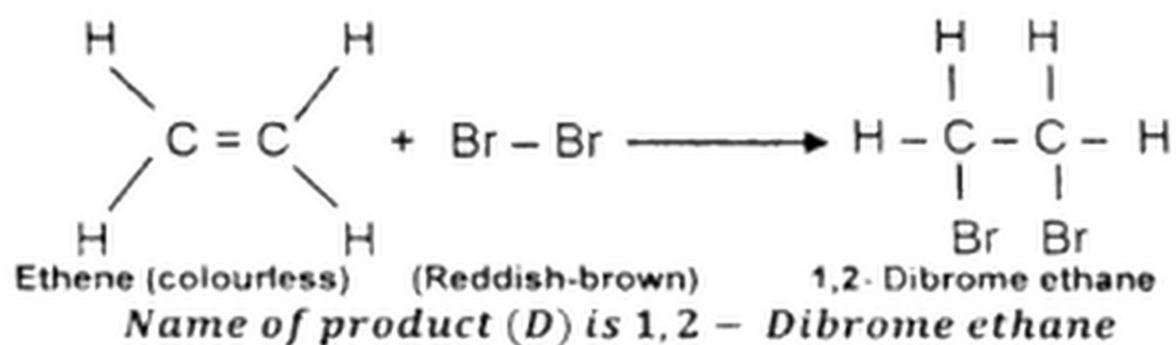
Name of product (A) is is 1,2 – dibromom propane



Name of product (B) is 1- propene



Name of product (C) is ethene



14. How can you convert ethene into ethane?

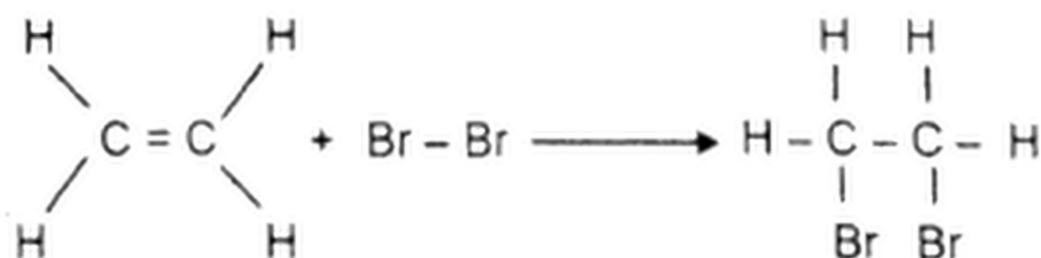


15. You are given two flammable liquid hydrocarbons? One of them is an alkene and the other one is an alkane. How would you find out which is which?

Ans: Add a small amount of bromine water to each jar. Shake the jar containing alkene will decolor the bromine water. The jar containing the alkane the bromine water will remain brown.

This is because the Br₂ will add on across the double bond of unsaturated ethene to produce dibromoethane. The Br₂ is removed from water which becomes clear.

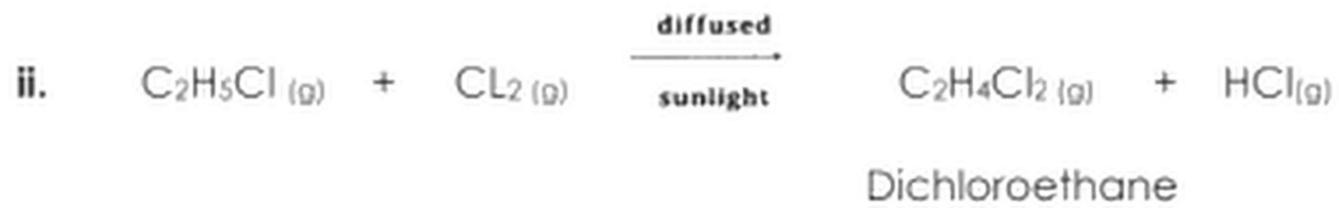
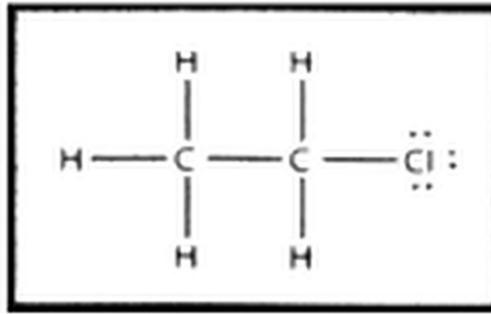
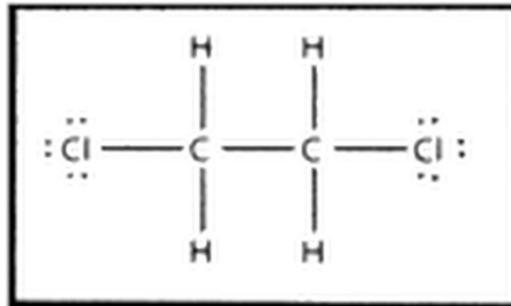
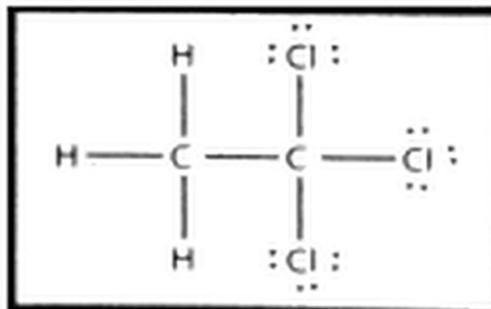
In the case of Ethane this is already saturated, so no reaction occurs – Bromine water will remain brown.

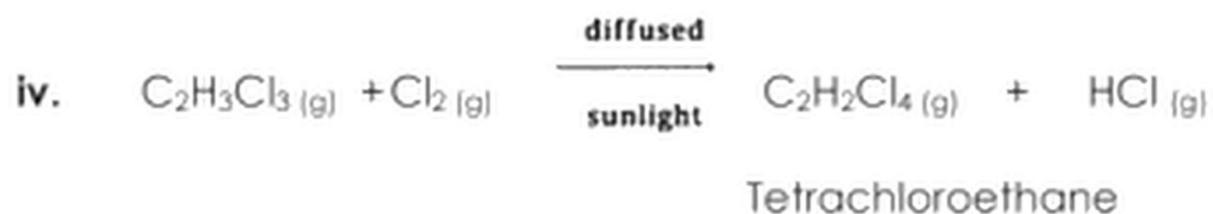


16. How many possible products are there when chlorine reacts with Ethane? Draw them all.

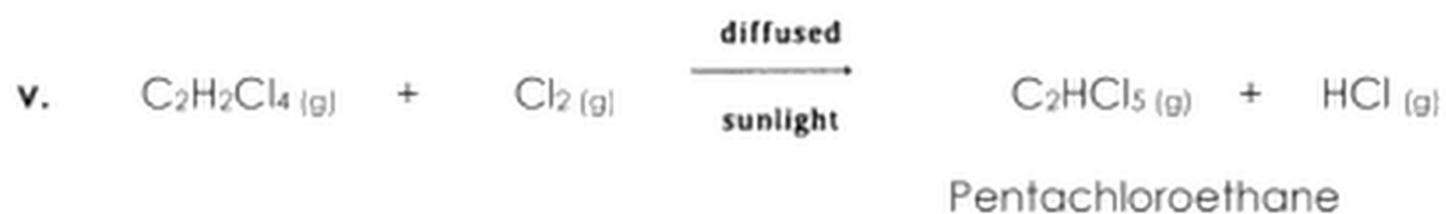
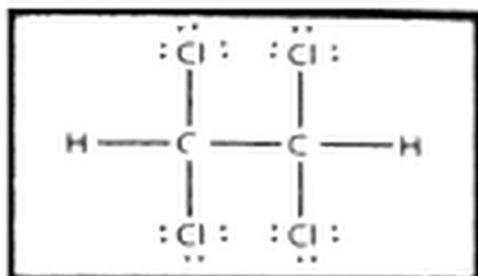
Ans: There are six possible products. The reaction of Ethane and chlorine in diffused sunlight occurs as follows:



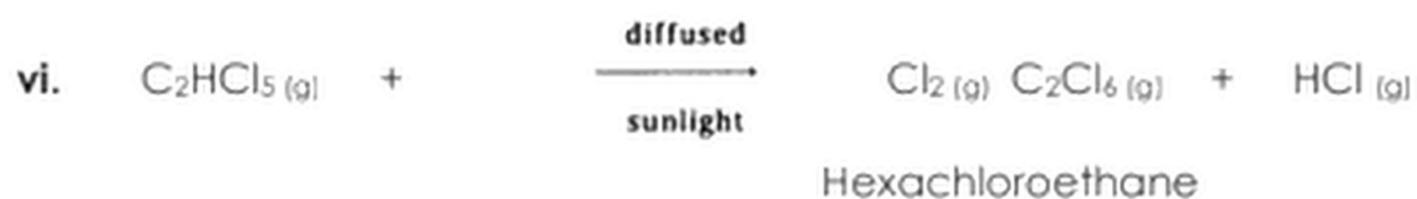
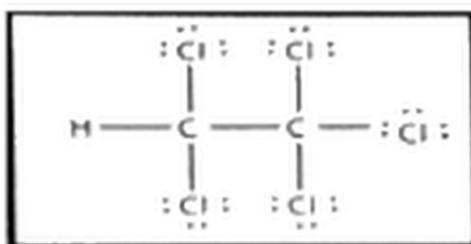
Structure of Chloroethane:**Structure of Dichloroethane:****Structure of Trichloroethane:**



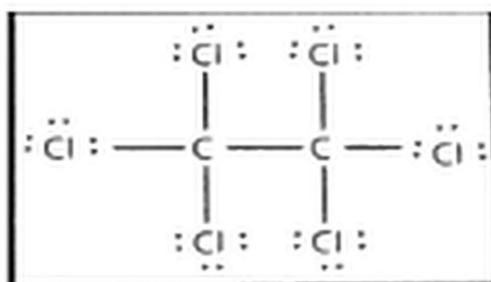
Structure of Tetrachloroethane:



Structure of Pentachloroethane:



Structure of Hexachloroethane:



17. Differentiate between Ethene and ethyne?

Solution: Two tests to distinguish ethene and ethyne are:

(i) Ammonical silver Nitrate test \longrightarrow with ammonical silver nitrate solution (Tollens reagent) alkynes give a white precipitate but alkene does not.

For Example:

Ethyne + Tollens reagent \longrightarrow Silver acetylide (white ppt) + NH_3 + H_2O

Ethene + Tollens reagent \longrightarrow No reaction

(ii) Ammonical cuprous chloride Test \longrightarrow with an ammonical cuprous chloride, alkyne gives a red precipitate while alkene does not react.

For Example:

Ethyne + Ammonical Cuprous Chloride \longrightarrow Copper acetylide (red ppt) + NH_3 + H_2O

Ethene + Ammonical Cuprous Chloride \longrightarrow no reaction

