

SHORT QUESTIONS

Q.1 Boiling point of straight chain alkane is greater than the boiling point of branched chain hydrocarbons why?

Ans. Boiling point of straight chain hydrocarbon is greater than branched chain hydrocarbon due to greater polarizability and greater intermolecular forces in it. For example, boiling point of n-butane is -0.5°C while isobutane is -11.7°C .

Q.2 Alkanes are less reactive than alkenes. Explain it.

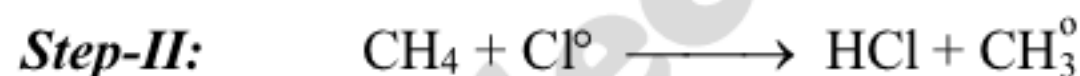
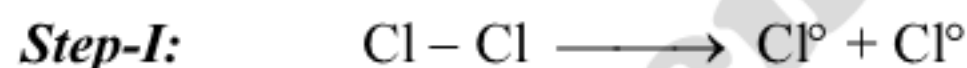
Ans. In alkane, all sigma bonds are present between C – H and C – C atoms. In case of alkenes, Pi bonds are also present. Sigma bond is stronger bond than Pi bond and more energy is required to break this bond. So all alkanes are less reactive than alkenes.

Q.3 Alkenes usually undergo addition reactions while alkanes do not, why?

Ans. Alkenes usually undergo addition reaction due to presence of double bond one sigma and one Pi bond in them. Pi bond is weak and easily break to give electrons to electrophile and acts as nucleophile. Alkanes do not undergo such additions reactions due to lack of Pi bond.

Q.4 What is propagation step in any mechanism?

Ans. Step of mechanism in which same radical is consumed and evolved in the next step is called propagation. For example, in the halogenation of alkane step-II is propagation and step-I is initiation.

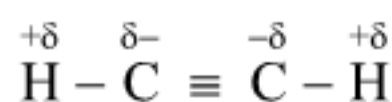
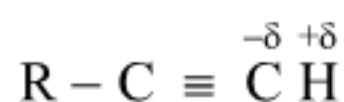


Q.5 Why alkenes are more reactive than alkynes?

Ans. Alkynes are less reactive than alkenes. The electron density between triple bond carbon atoms is high due to the presence of one sigma and two pi-bonds between C-C atoms. Due to high density of electrons in alkynes they are drawn closer to each other and less exposed than alkenes. Therefore, alkynes are less reactive toward electrophilic reagents.

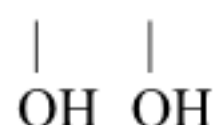
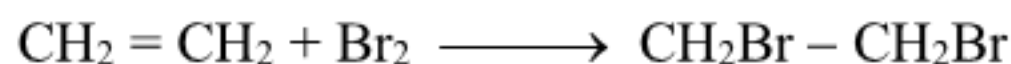
Q.6 Ethyne have acidic hydrogen while ethene does not. Why?

Ans. In alkyne triple bond is present between C-C atoms. Carbon in alkyne is sp-hybridized and have one sigma and two Pi bonds. Due to greater overlapping, distance between C-C is reduced. Due to greater attraction carbon has partial negative charge and hydrogen attached to sp-hybridized carbon is slightly positive.



Q.7 How will you distinguish between ethene and ethane?

Ans. Ethane does not react with Br₂ or aqueous alkaline KMnO₄ solution. Ethene reacts with Br₂ or KMnO₄ and their colour is discharged.



Q.8 How will you distinguish between ethene and ethyne?

Ans. Ethene does not react with ammonical silver nitrate or ammonical cuprous chloride. Ethyne reacts with ammonical silver nitrate to form white precipitate of silver acetylide.

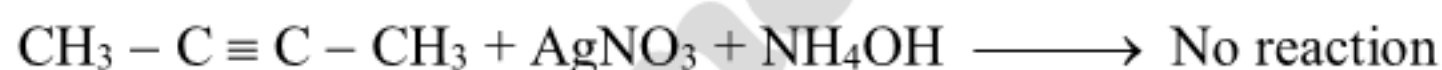


Ethyne also reacts with ammonical cuprous chloride to form red precipitate of copper acetylide.

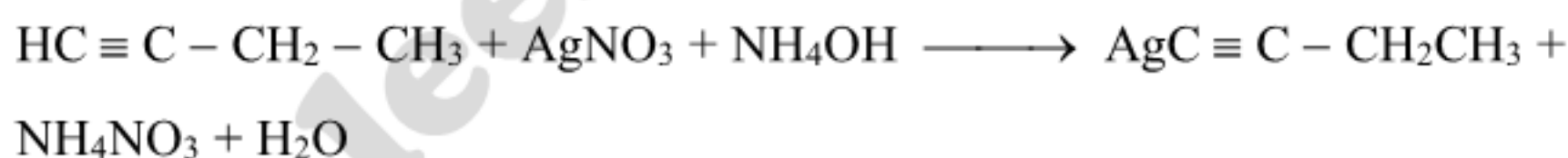


Q.9 How will you distinguish between 1-butyne or 2-butyne, both have triple bond in them?

Ans. In 2-butyne no acidic hydrogen is present and does not react with ammonical silver acetylide.

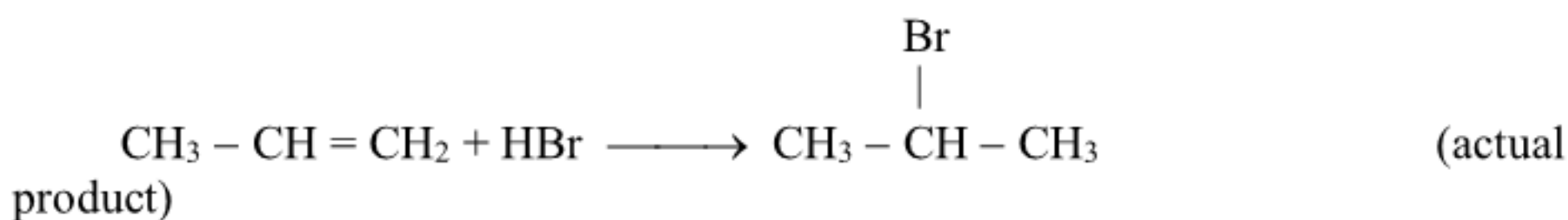


1-butyne reacts with ammonical silver nitrate to form white precipitate of silver acetylide.

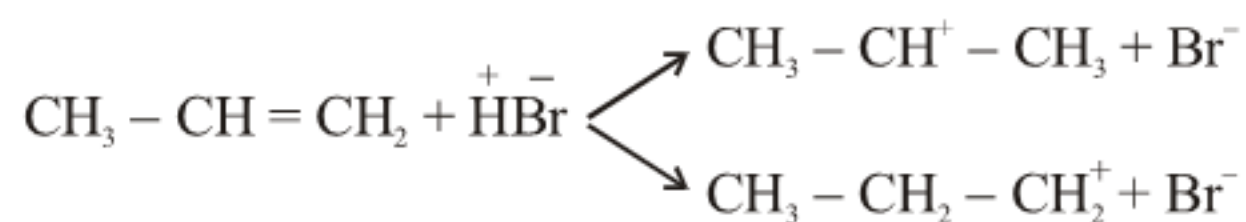


Q.10 If HBr is added to propene, Markonikov's rule is obeyed why?

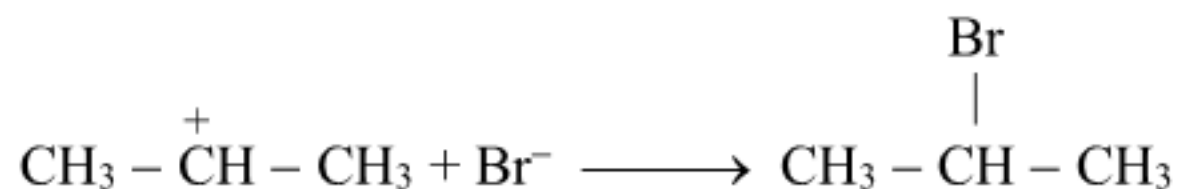
Ans. When HBr is added to propene, 2-bromo propane is formed and 1-bromo-propane is not formed.



When HBr is added to propene, H⁺ is an electrophile and attacks at double bond.



Secondary carbocation is more stable than primary carbocation and the following reaction takes place.

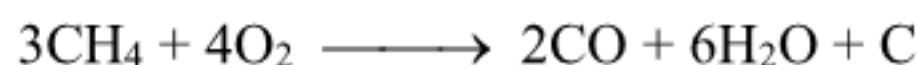


Q.11 What happens when alkanes are burnt in limited supply of oxygen?

Ans. When methane burns in excess oxygen CO_2 is produced.



In limited supply of oxygen, CO is formed. Sometime carbon soot is also formed.



Q.12 How Raney nickel is prepared?

Ans. Raney nickel is prepared by the reaction of dilute caustic soda with Ni – Al alloy.



Q.13 Raney nickel is more effective than ordinary nickel. Why?

Ans. Raney nickel is more effective due to its greater surface area. It is porous and its surface area is greater.

Q.14 How will you bring about the following conversion?

Ans. See Solved Exercise Q.9.

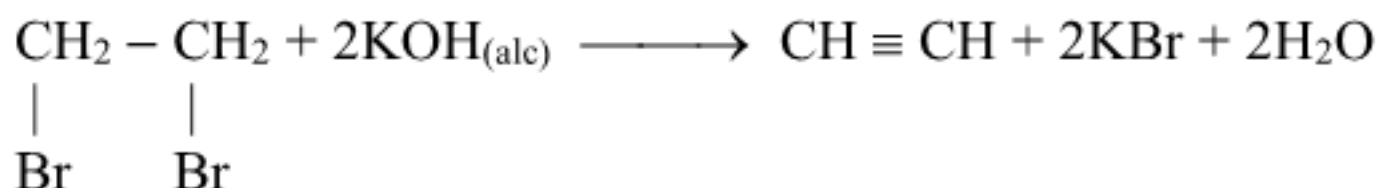
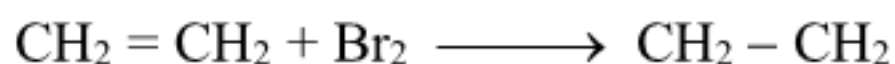
Q.15 How may ethene be converted into following:

Ans

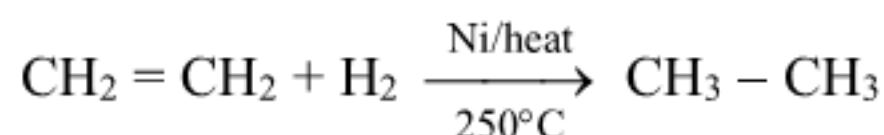
(i) **Ethene to ethylene dibromide:**



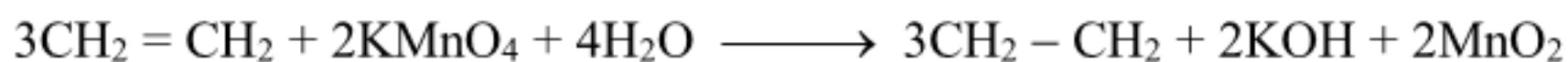
(ii) **Ethene to ethyne:**



(iii) **Ethene to ethane:**

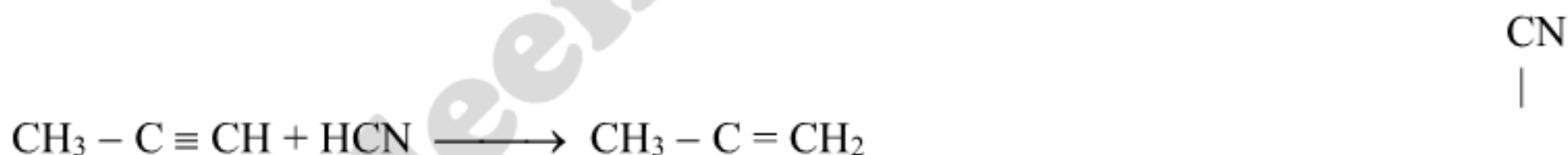
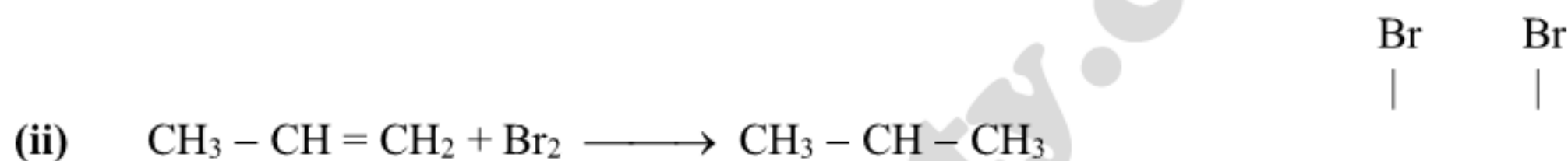
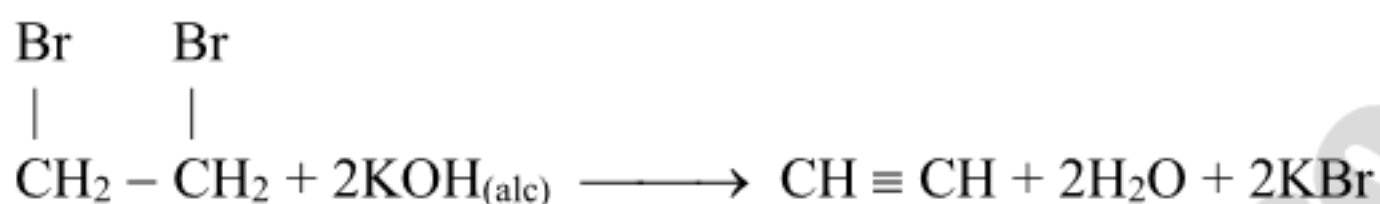
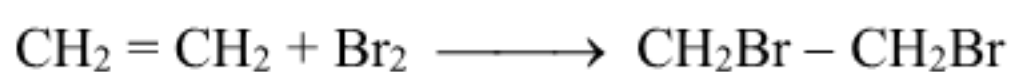
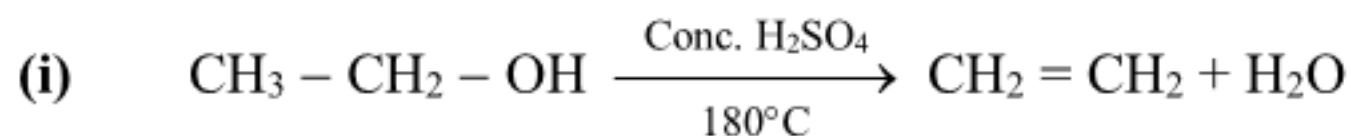


(iv) Ethene to ethylene glycol:



Q.16 Complete the following reactions.

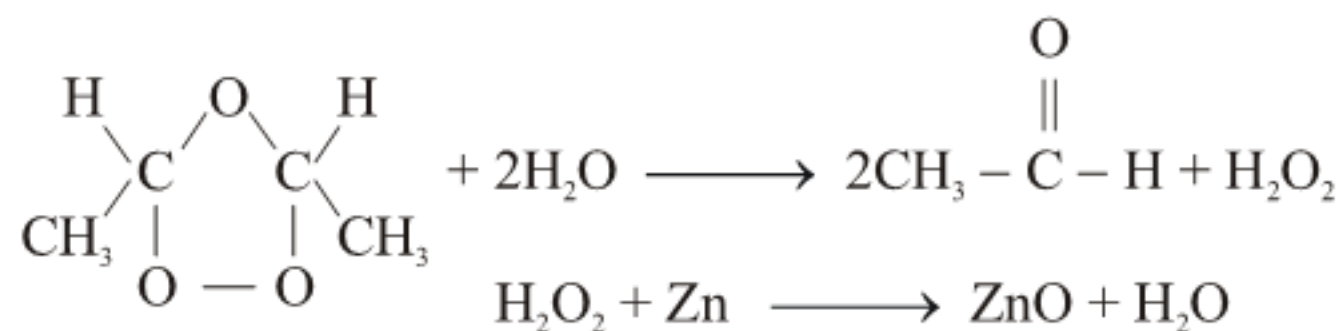
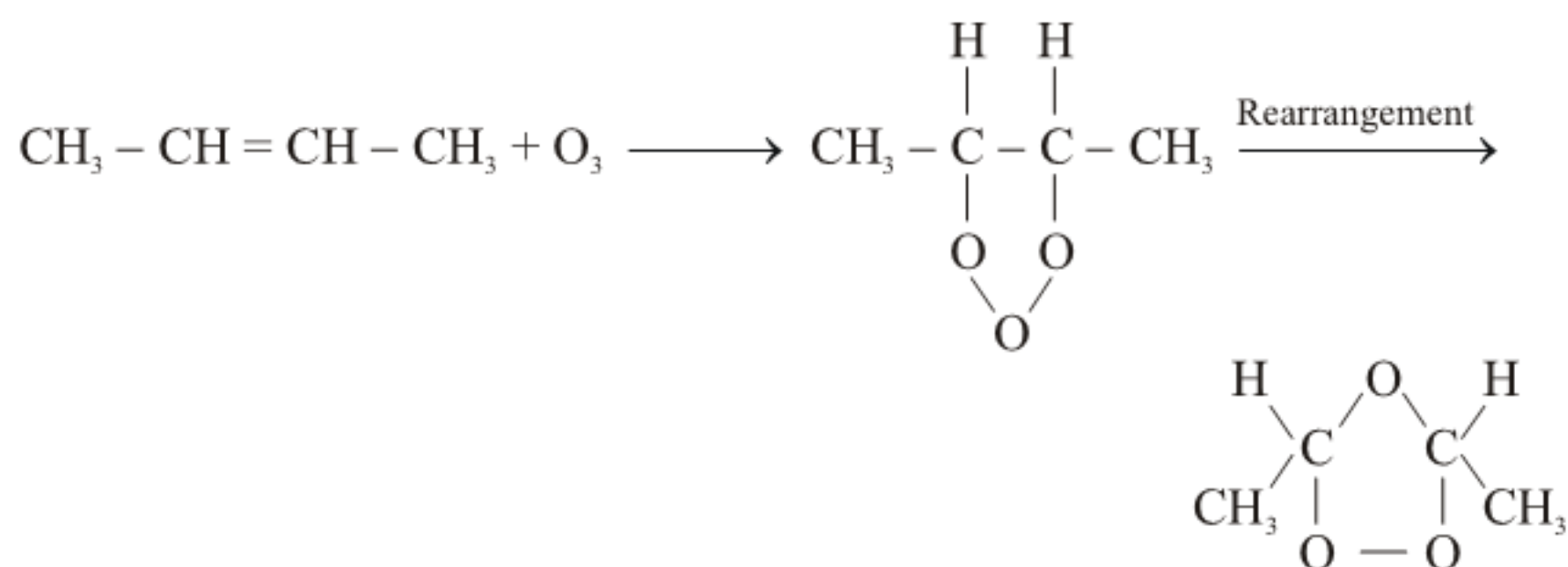
Ans.



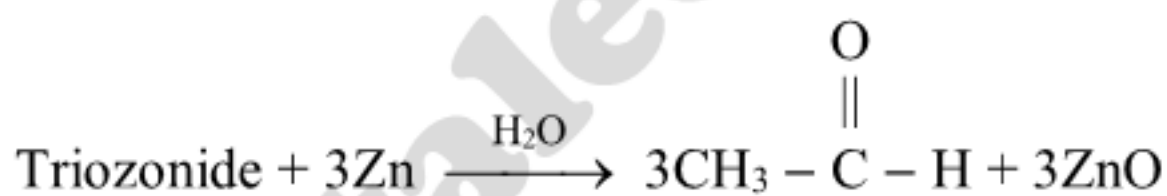
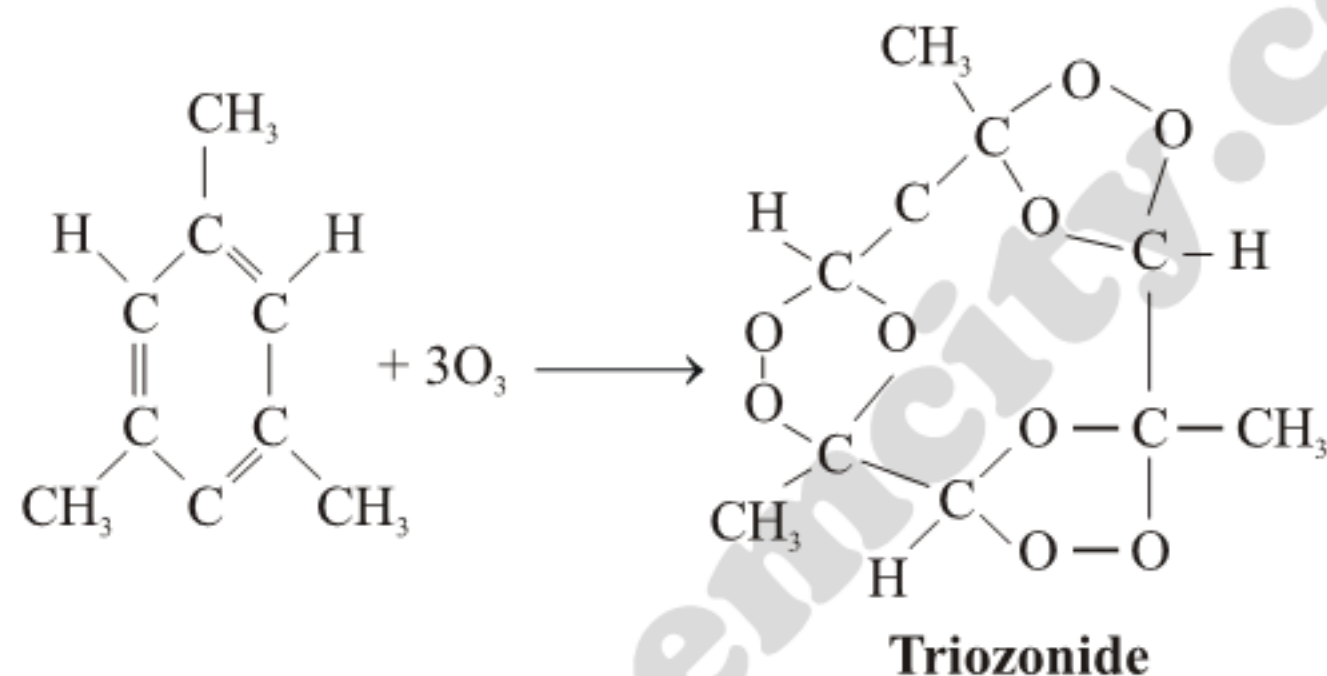
Q.17 After an ozonolysis experiment, the only product obtained was acetaldehyde. The chemist who did the experiment correctly claimed that two possible starting materials could give this product. Can you guess the structural formulas of the compounds?

Ans.

(i) When cis 2-butene or trans 2-butene reacts separately with O_3 the final product will be acetaldehyde.



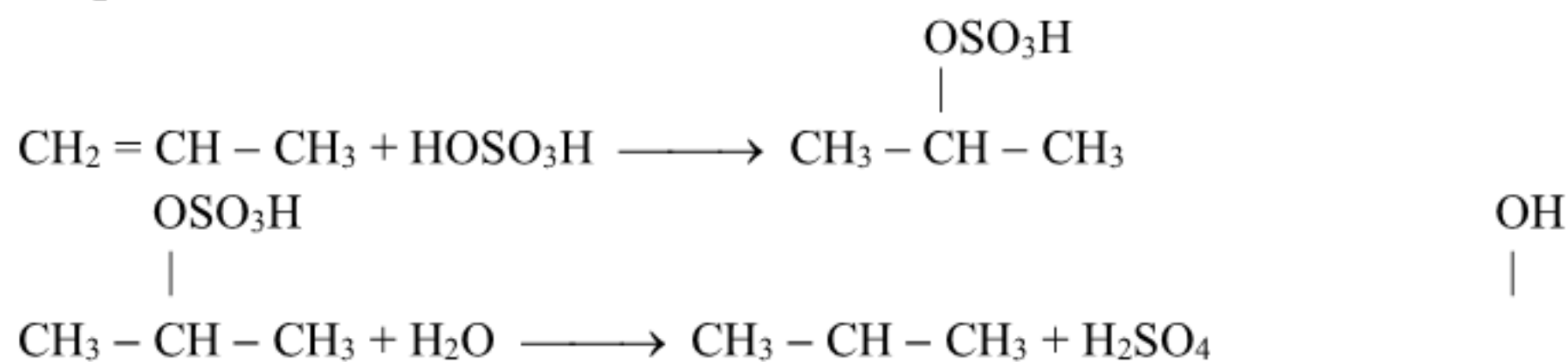
- (ii) When 1, 3, 5 trimethyl benzene reacts with O_3 , the final product is acetaldehyde.



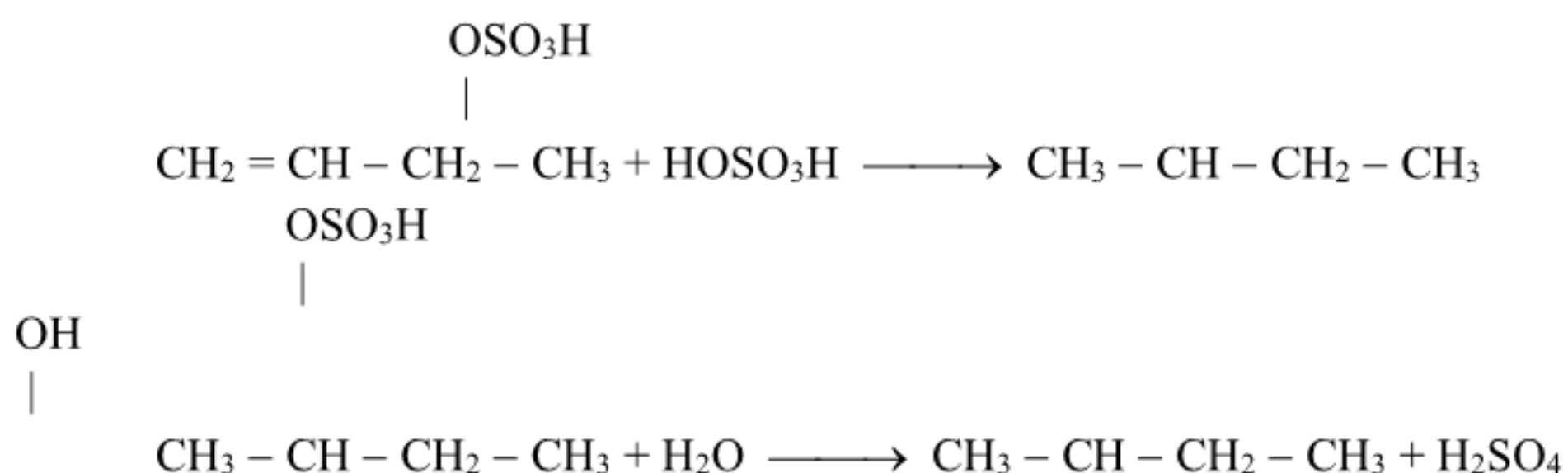
- Q.18** The addition of sulphuric acid to an alkene obeys Markownikov's rule. Predict the structures of the alcohols obtained by the addition of the acid to the following compounds.

Ans.

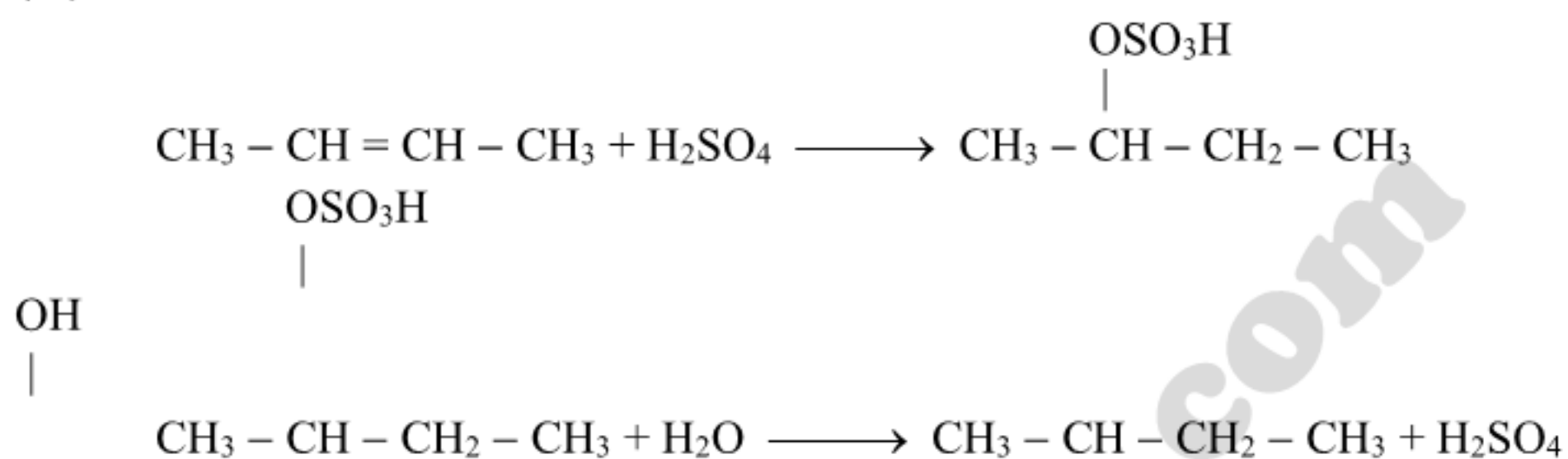
- (i) **Propene:**



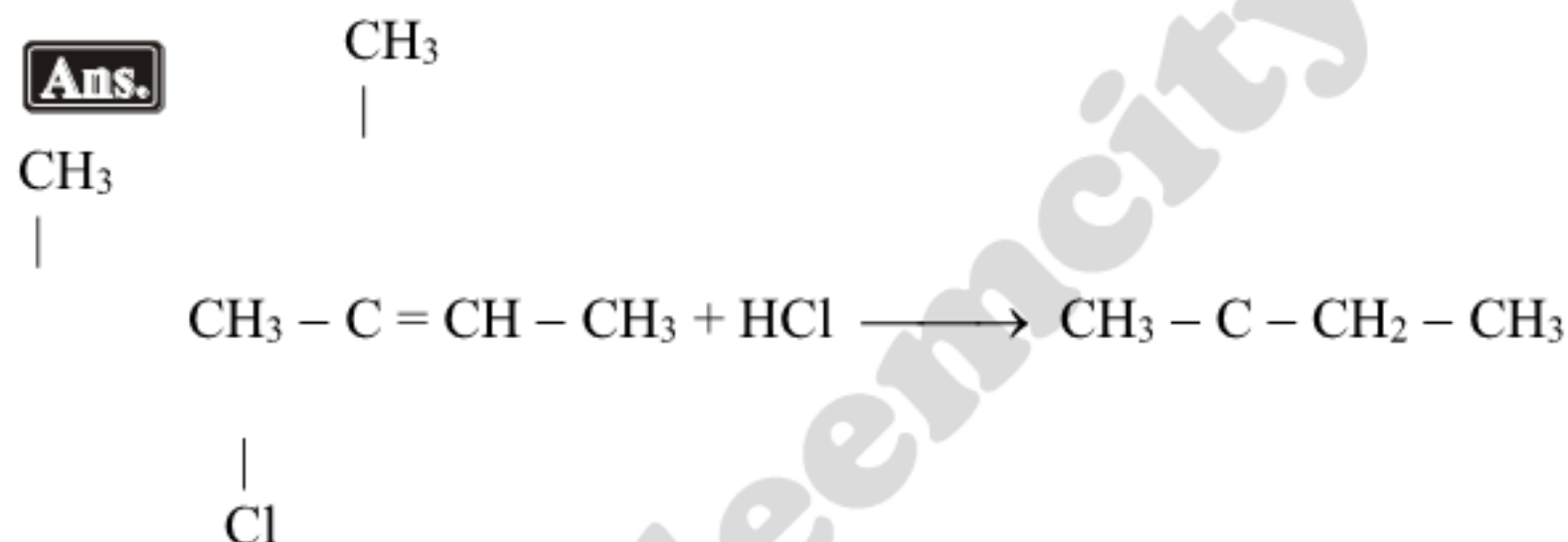
- (ii) **1-butene:**



(iii) **2-butene:**



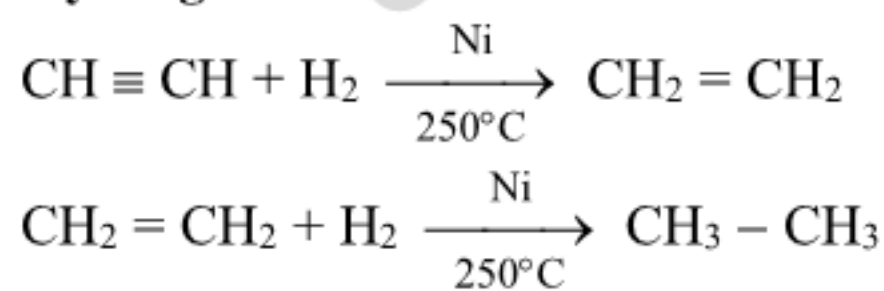
Q.19 Predict the most likely product of addition of HCl to 2 methyl 2-butene.



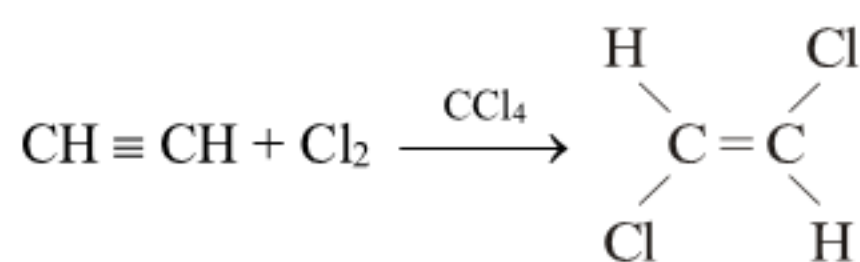
Q.20 How does ethyne react with?

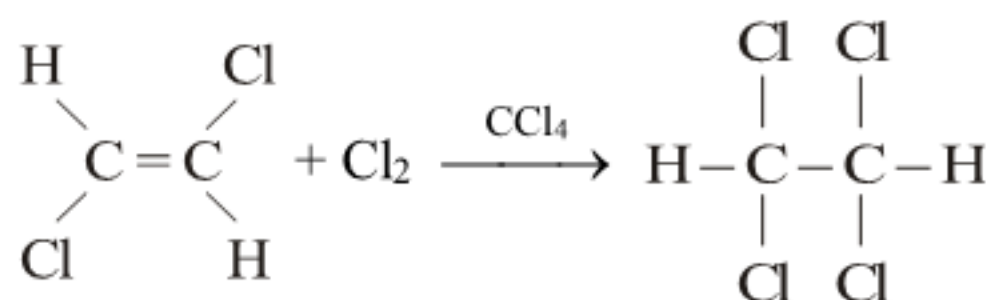
Ans.

(i) **Hydrogen:**

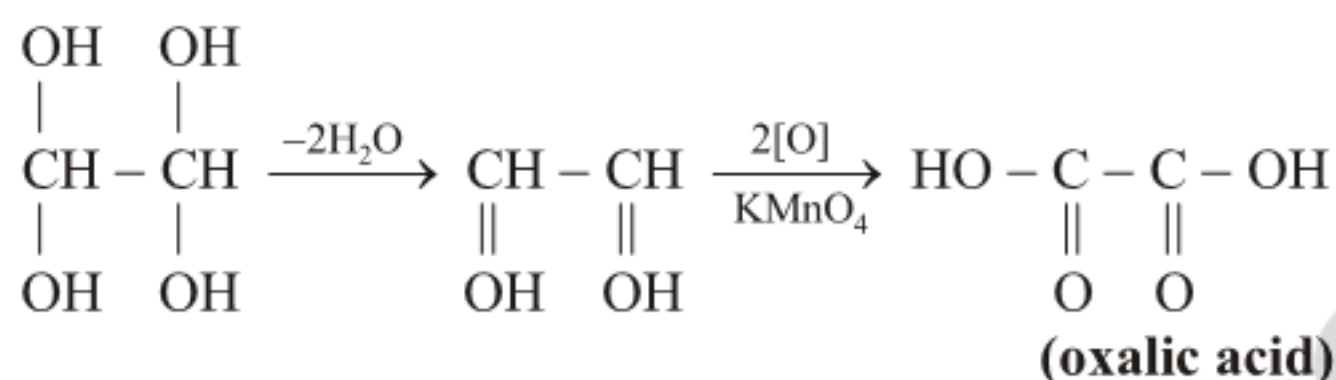
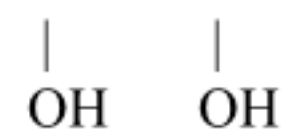
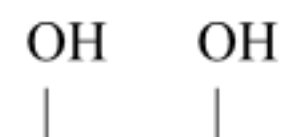
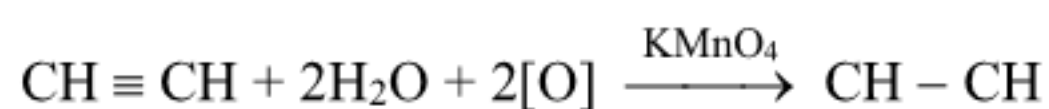


(ii) **Halogen:**

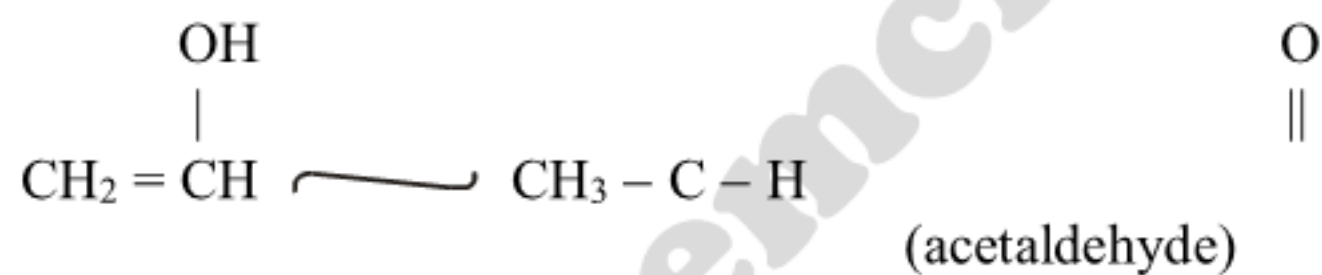
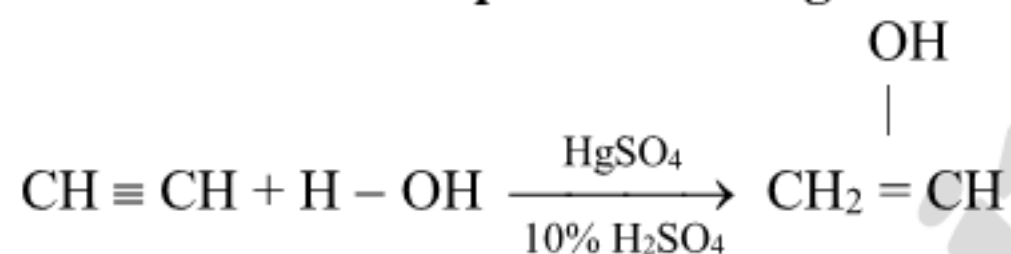




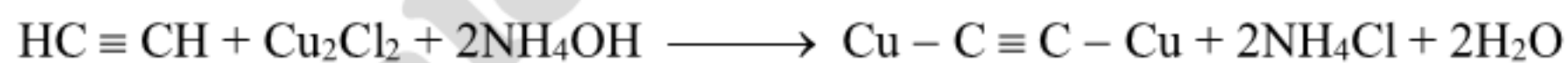
(iii) **Alkaline KMnO_4 :**



(iv) **10% H_2SO_4 in the presence of HgSO_4 :**



(v) **Ammonical cuprous chloride:**



(vi) **Bromine water with:**

