9. HYDRO CARBONS

1 OMQ + 2 VSAQ + 1SAQ + 1LAQ [1 M + 2M + 2M + 4M + 8M = 17 M]

CONCEPTS & DEFINITIONS

1. The compounds of only carbon and hydrogen are known as **Hydrocarbons**.
2. **Alkanes** are saturated hydro carbons having C–C single bonds.
   The general formula is C_nH_{2n+2}.
   Ex: CH_4 Methane, C_2H_6 Ethane
   Alkanes are also known as Paraffins
   (Parafin means lack of ability).
   Alkanes are stable and Inert towards many other substances.
   Alkanes mainly participate in substitution reactions. **Ex :** Chlorination of ethane
3. **Alkenes** are unsaturated hydrocarbons having C=C double bonds.
   The general formula is C_nH_{2n}.
   Ex : C_2H_4Ethene, C_3H_6Propene
   Alkanes are also known as Olefins. Alkenes are unstable and are active.
   Alkenes mainly participate in addition reactions.
4. **Alkynes** are also unsaturated hydrocarbons having C≡C triple bond
   The general formula is C_nH_{2n-2}.
   Ex: C_2H_2 Ethyne , C_3H_4 Propyne
   The hydrogens present on triple bonded carbons are acidic in nature.
   Alkynes mainly participate in addition reactions.
5. **Cyclo alkanes** are cyclic hydrocarbons having general formula C_nH_{2n}.
   Lower cyclo alkanes are unstable due to **Angle strain**.
   Hence they participate in addition reactions which is due to cleavage of ring.
   Higher cyclo alkanes are stable and participate in substitution reactions.
6. The replacement of H - atoms by halogen atoms is called **Halogenation.**
7. The replacement of H - atoms by a nitro group is called **Nitration.**
8. The replacement of H - atoms by a sulphonic acid group is called **Sulphonation.**
9. Replacement of H - atoms by an alkyl group is called **Akylation**.
10. Elimination of halogen molecule is called **dehalogenation**.
11. Elimination of hydrogen and halogen atoms together is called **dehydrohalogenation**.
12. Addition of hydrogen is called **Hydrogenation.**
13. Removal of water molecule is called **dehydration**.
14. Alkyl magnesium halide is called **Grignard reagent. Ex : R Mg X**
15. Cold and dilute alkaline $KMnO_4$ solution is called **Baeyer's reagent.**

16. Alkyl halides on heating with sodium metal in presence of dry ether gives an alkane with twice the number of carbon atoms. This reaction is known as **Wurtz reaction**.

17. Electroysis of a concentrated aqueous solution of sodium or potassium salt of carboxylic acid gives a hydrocarbon at anode. This reaction is called **Kolbe's electrolysis**.

18. A mixture of sodium hydroxide and calcium oxide is called **soda - lime.**

19. **Conformational isomers** of an alkane are obtained by rotation about C - C bond.

20. **Markownikoff's rule** : When HX adds to an unsymmetrical alkene,the halide (X) part of HX attaches itself to the double bonded carbon having less number of hydrogens.

21. Anti Markownikoff's addition takes place, in presence of a peroxide.

    This is called, **Kharsch effect.**

22. A substance which rotates the plane polarised light is called an '**optically active substance**'.

23. Organic compound exhibits optical activity when it is **chiral**.

24. The chiral molecule and its mirror image are **not superimposable**.

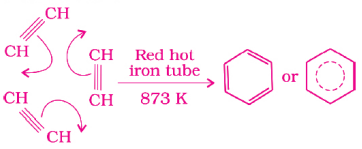
    They are called **enantiomers**.

25. Enantiomers are a pair of isomers which are non-super imposable mirror images of each other.

26. **Polymerisation:** The union of a large number of small molecules of the same substance to form a giant molecule is called polymerisation.

    (a) Linear polymerisation: Ethyne under suitable conditions undergoes linear polymerisation to produce poly acetylene or polyethyne

    (b) Cyclic polymerisation: Ethyne on passing through red hot iron tube at 873K undergoes cyclic polymerization.



27. **Carcinogenicity and Toxicity:**

    Benzene and polynuclear hydrocarbons containing more than two benzene rings fused together are toxic and said to possess cancer producing (carcinogenic) property. Such polynuclear hydrocarbons are formed on incomplete combustion of organic materials like tobacco, coal and petroleum. They enter into human body and undergo various biochemical reactions and finally damage DNA and cause cancer.

☛ For **Chem Beats** of this chapter Refer Page **Nos. 211, 212**