CARBON AND ITS COMPOUNDS
CLASS 10 – SCIENCE

MODULE 2/3

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VERSATILE NATURE OF CARBON

Formation of a very large number of carbon compounds:

Carbon forms a very large number of compounds. The number of carbon compounds is more than three million. It is more than the number of compounds formed by all other elements. This is because of:-

1) TETRAVALENCY:

Since carbon has a valency of four, it is capable of bonding with four other atoms of carbon or atoms of some other mono-valent element. Compounds of carbon are formed with oxygen, hydrogen, nitrogen, sulphur, chlorine, etc.

2) CATENATION:

Carbon has the unique ability to form bonds with other atoms of carbon, giving rise to large molecules. This property is called catenation.

This results in the formation of:

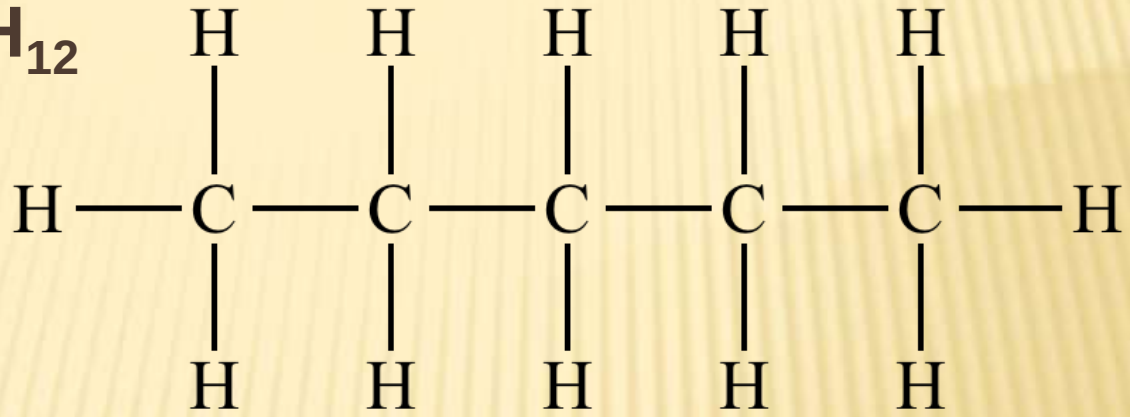
a) Long chains of carbon

b) Branched chains of carbon

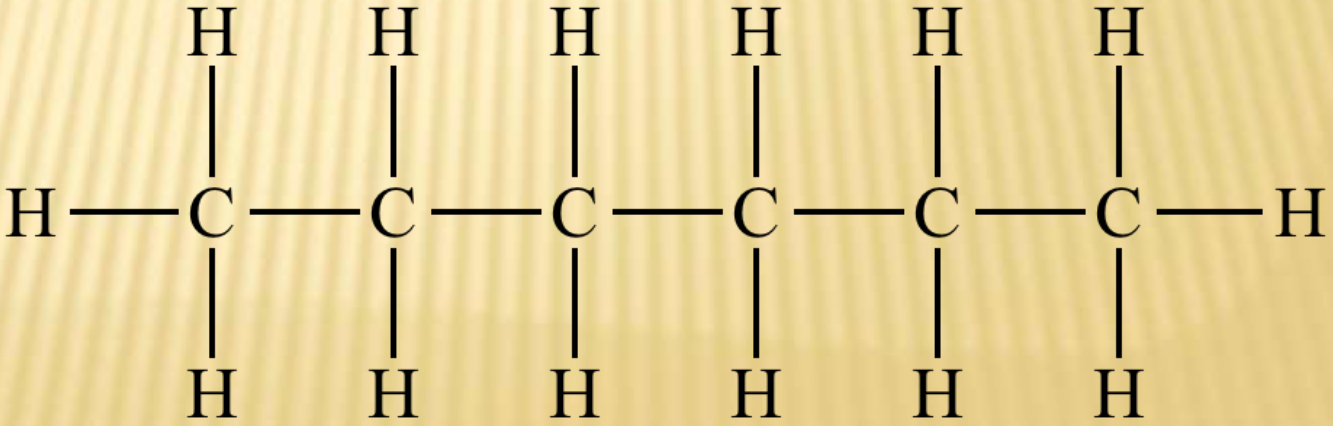
c) carbon atoms arranged in rings

EXAMPLES OF LONG CHAINS OF CARBON

Pentane – C_5H_{12}



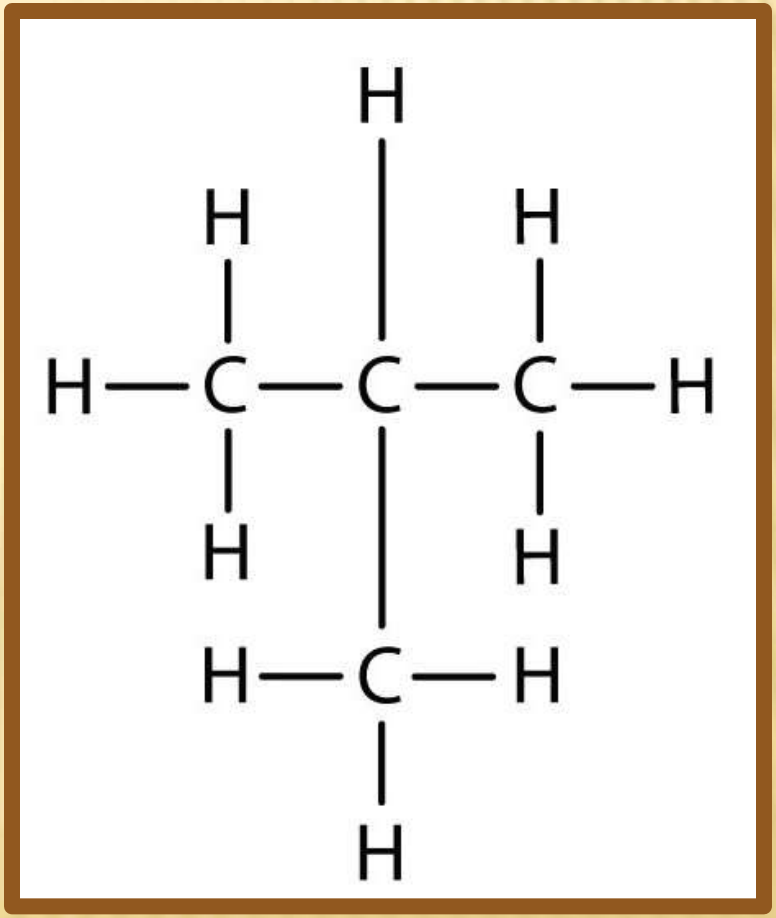
Hexane – C_6H_{14}



EXAMPLES OF BRANCHED CHAINS OF CARBON

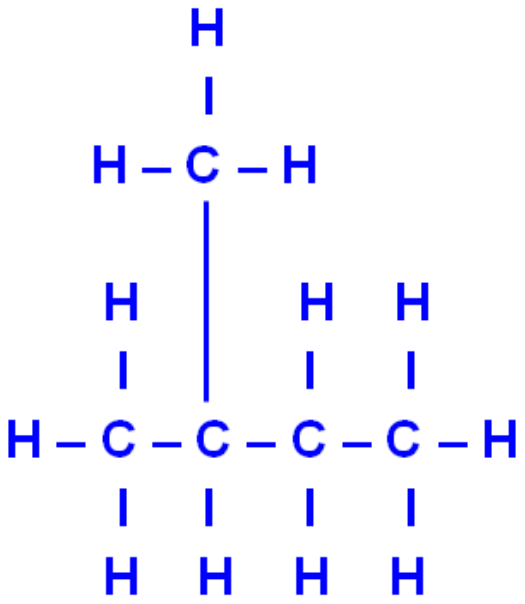
Butane – C_4H_{10}

Structure of
Iso butane:

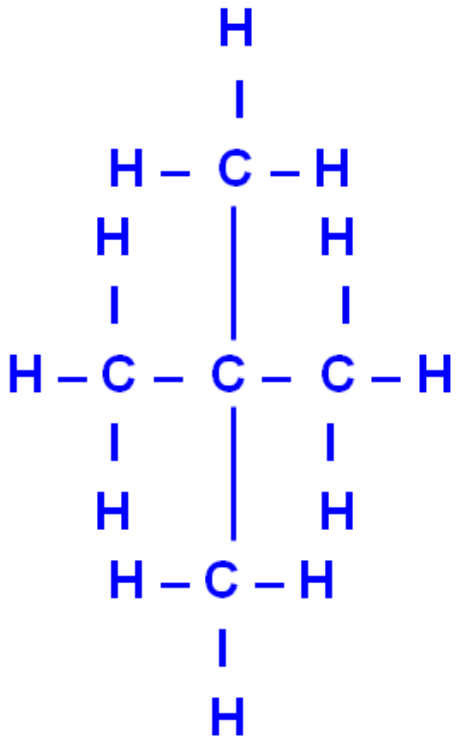


PENTANE – C_5H_{12}

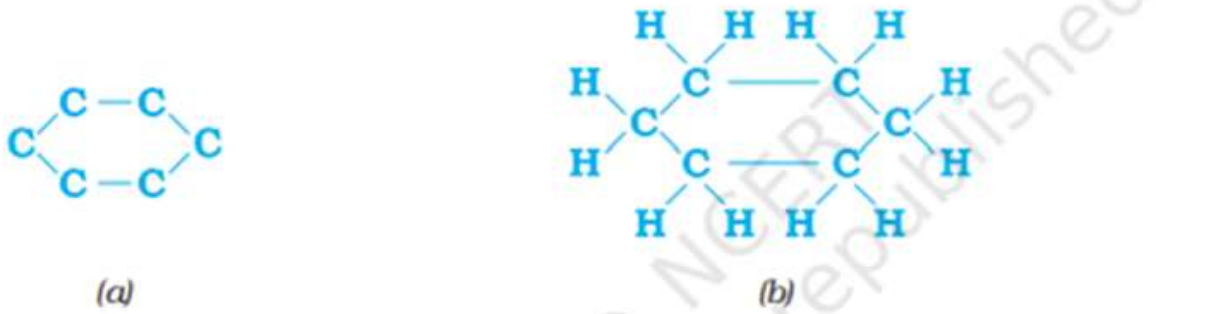
Iso pentane



Neo pentane

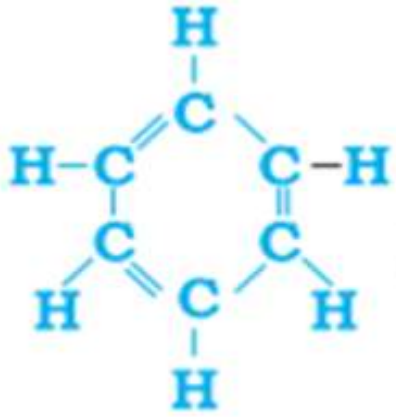


EXAMPLES OF CARBON ATOMS ARRANGED IN RINGS



(a) (b)

Structure of cyclohexane (a) carbon skeleton (b) complete molecule



Benzene — C_6H_6

Structure of benzene

HYDROCARBONS

Hydrocarbons:

Hydrocarbons are compounds containing carbon and hydrogen atoms.

Types of Hydrocarbons:

a) Saturated Hydrocarbons – are hydrocarbons having all single covalent bonds between the carbon atoms.

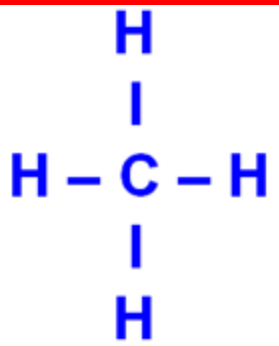
b) Unsaturated Hydrocarbons – are hydrocarbons having a double or triple covalent bond between two carbon atoms.

SATURATED HYDROCARBONS

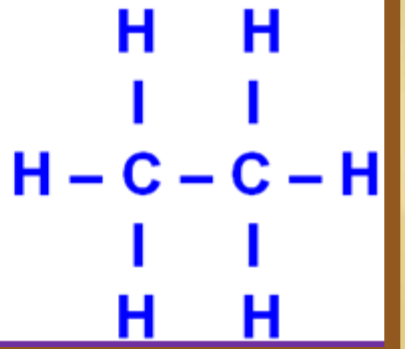
Alkanes:

have all single bonds between the carbon atoms and their names end with – ane.

Methane – CH_4



Ethane – C_2H_6



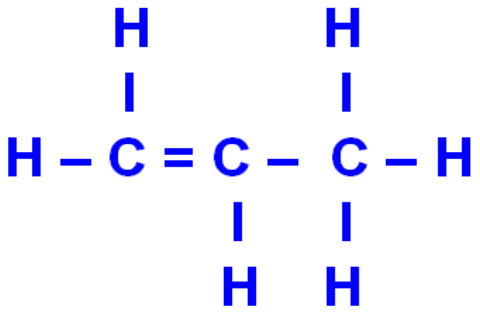
UNSATURATED COMPOUNDS

Alkenes:

have a double covalent bond between two carbon atoms and their names end with – ene.

Ethene - C_2H_4

Propene – C_3H_6

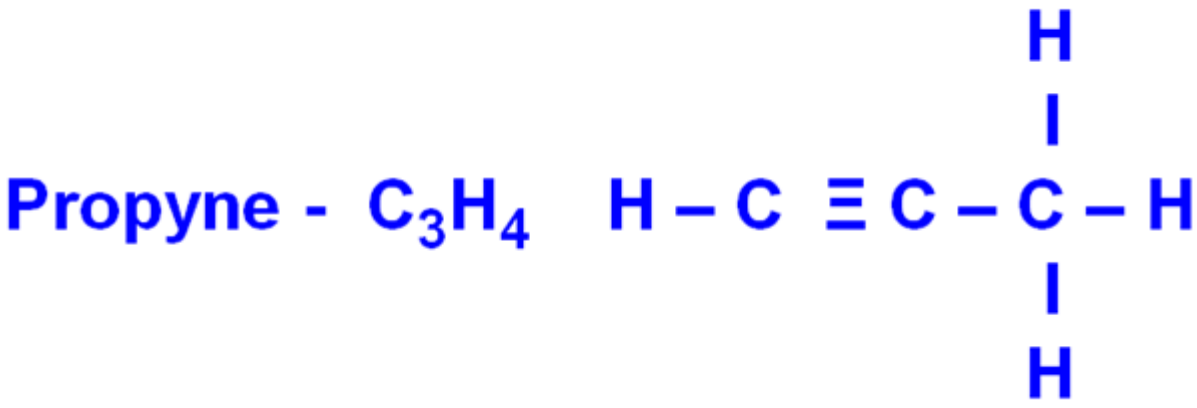


Alkynes:

have a triple covalent bond between two carbon atoms and names end with – yne.

Ethyne – C_2H_2 H – C ≡ C – H

Propyne - C_3H_4




thank
you