

Carbon

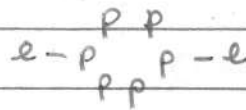
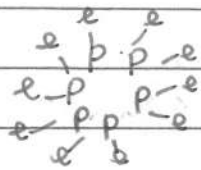
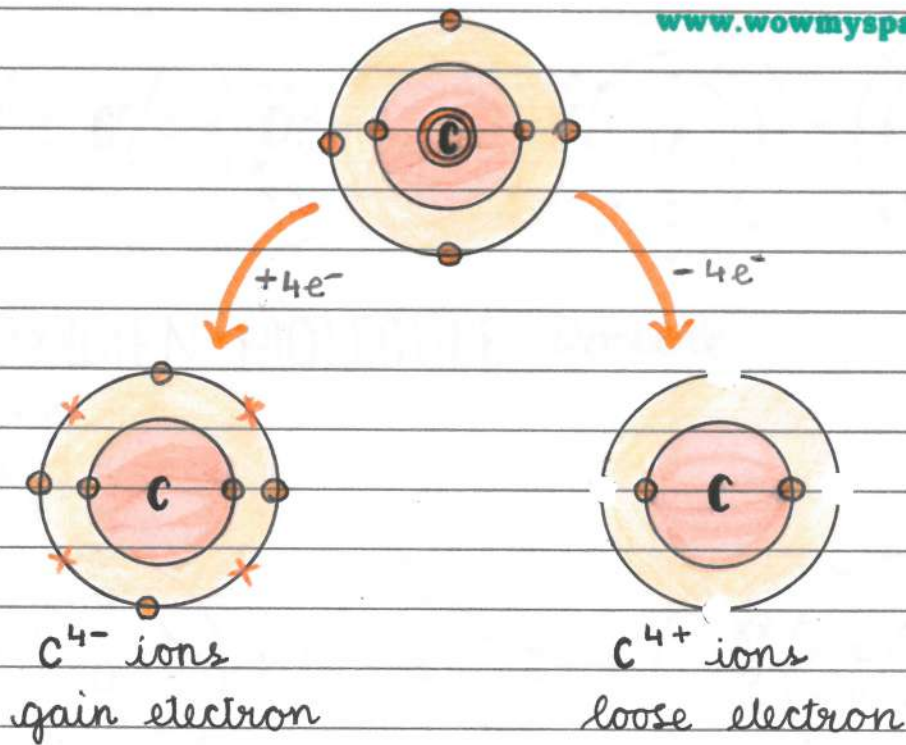
COVALENT BOND

→ sharing of an electron pair between the atoms

→ Atomic number : 6

Electronic Configuration : 2, 4

→



excess energy needed to hold 4 extra electrons
↑ e-e⁻ repulsion

NOT POSSIBLE

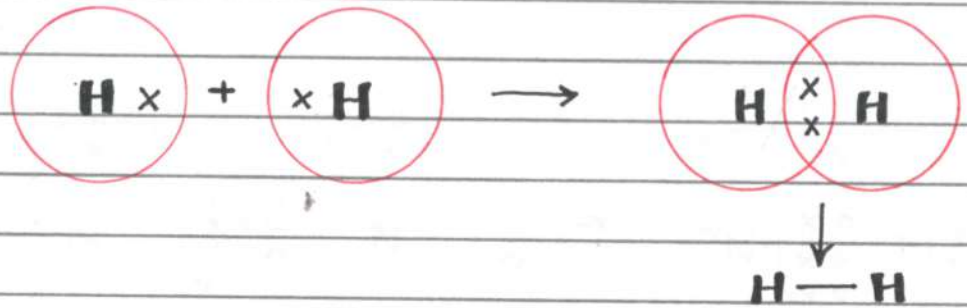
∴ ↓ no. of electrons, nucleus holds e⁻ even more tightly

∴ mutual sharing - both - noble gas configuration



store
67

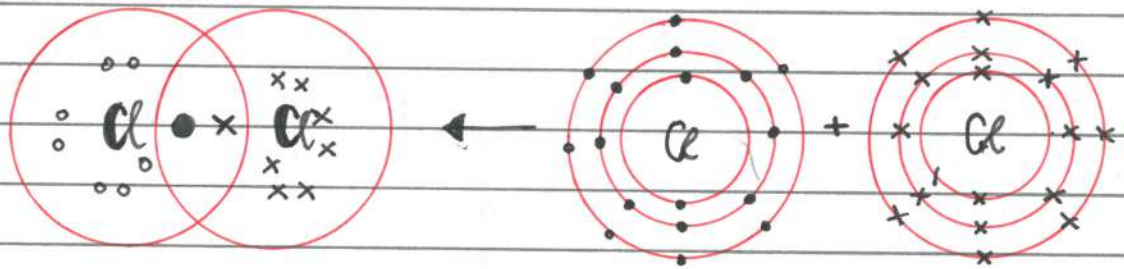
H₂ HYDROGEN MOLECULE *Single*



Cl₂ CHLORINE MOLECULE *Single*

$$\text{A.N} = 17$$

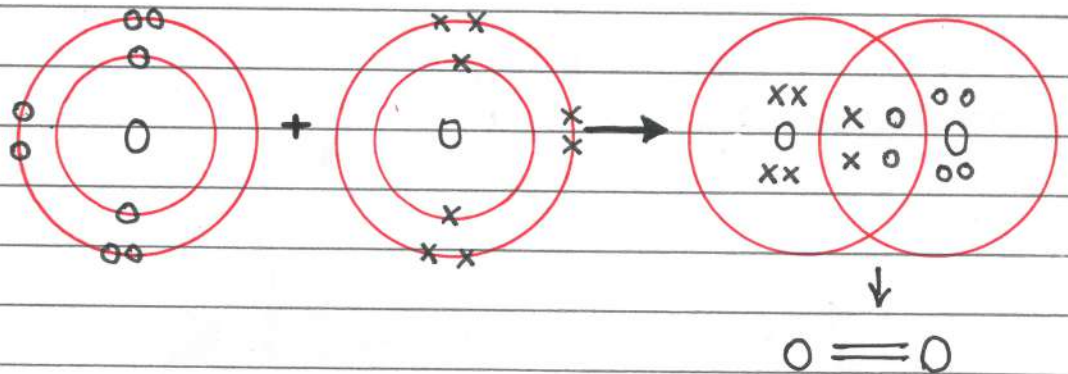
$$\text{E.C} = 2, 8, 7$$



O₂ OXYGEN MOLECULE *Double*

$$\text{A.N} = 8$$

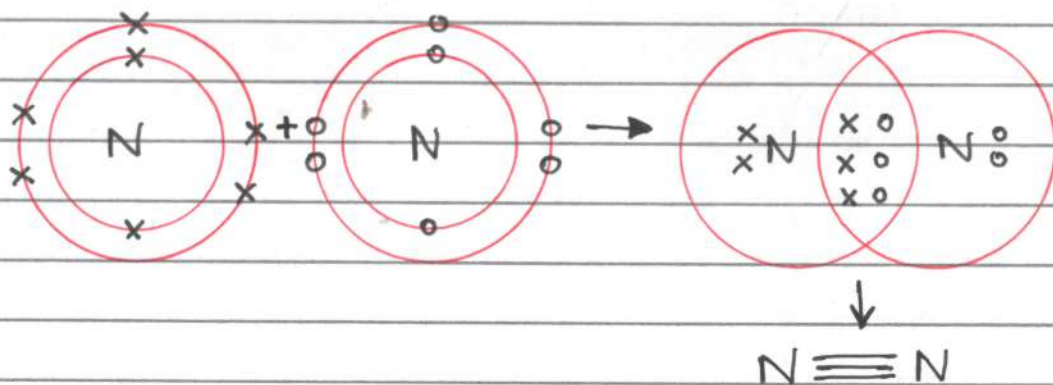
$$\text{E.C} = 2, 6$$



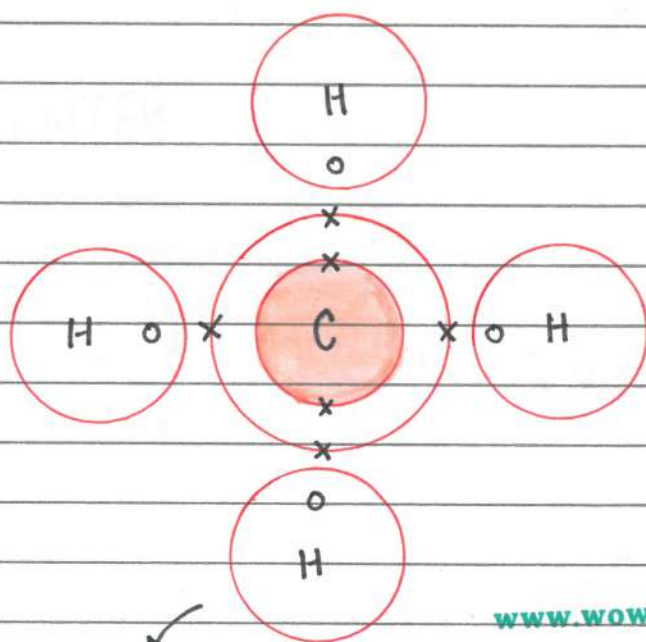
N_2 NITROGEN MOLECULE Triple

A.N = 7

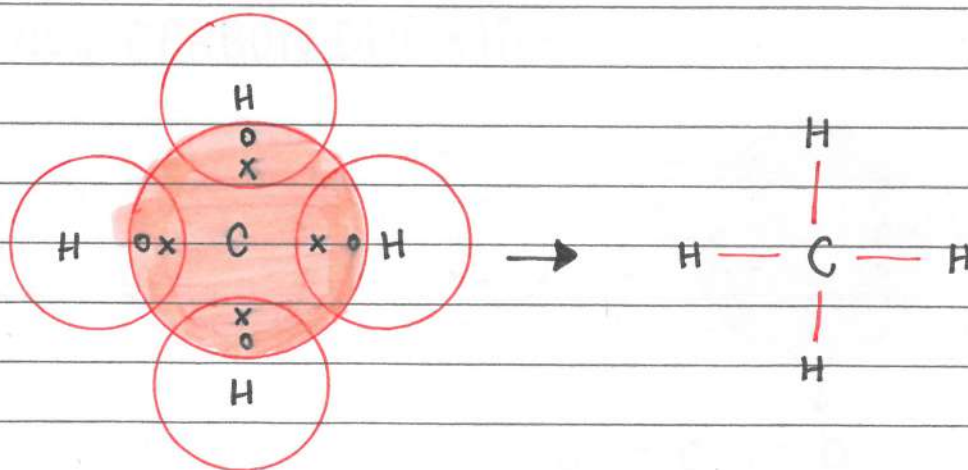
E.C = 2, 5



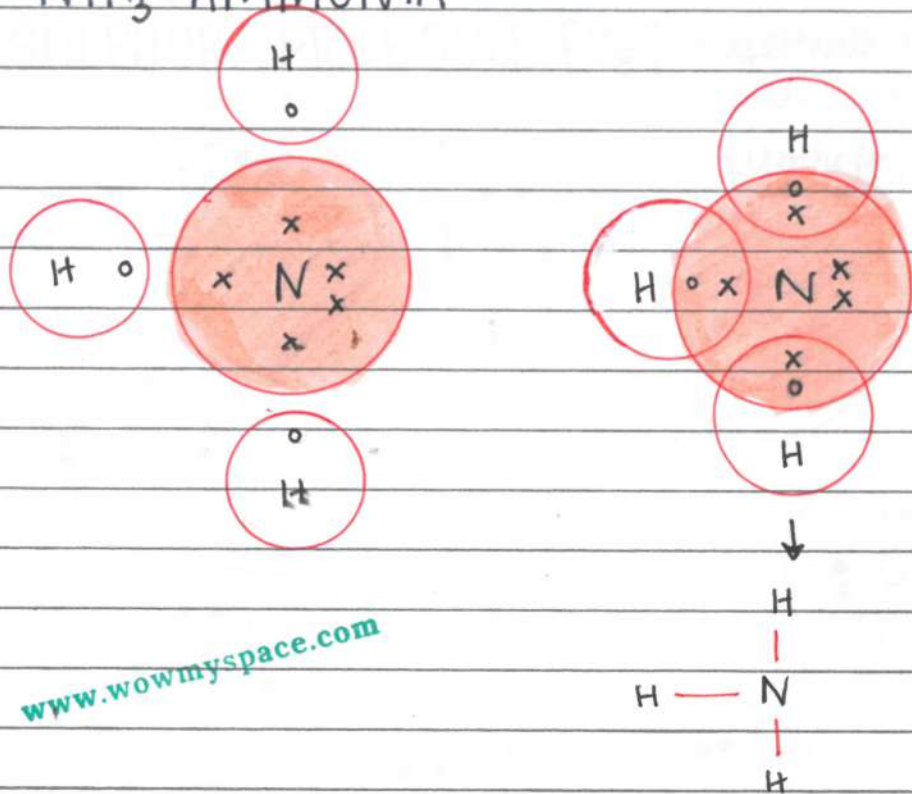
METHANE / Marsh Gas



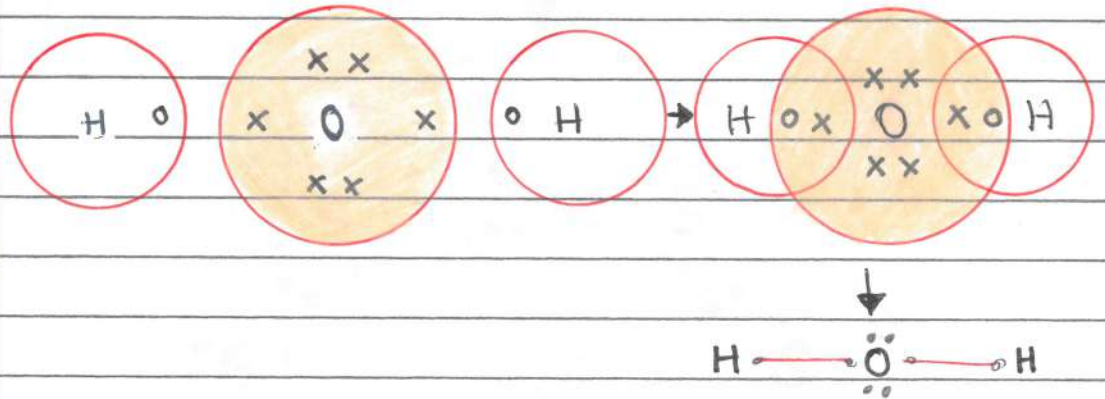
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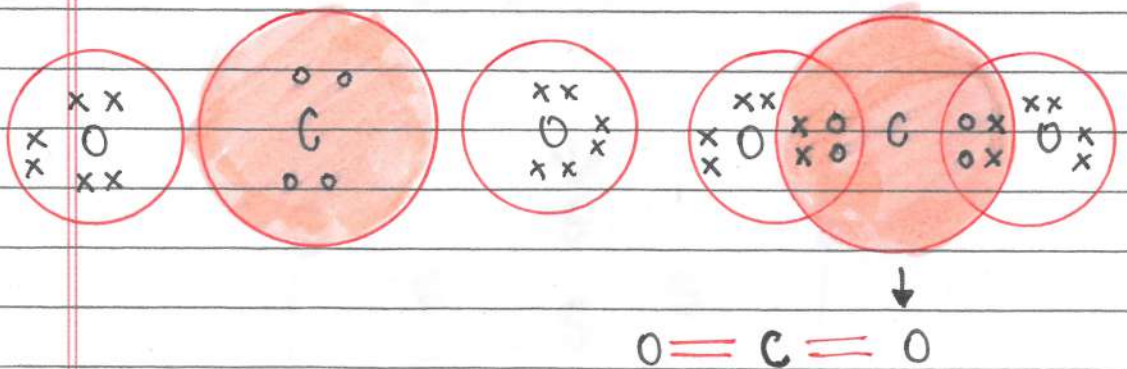
NH₃ - AMMONIA



H₂O - WATER



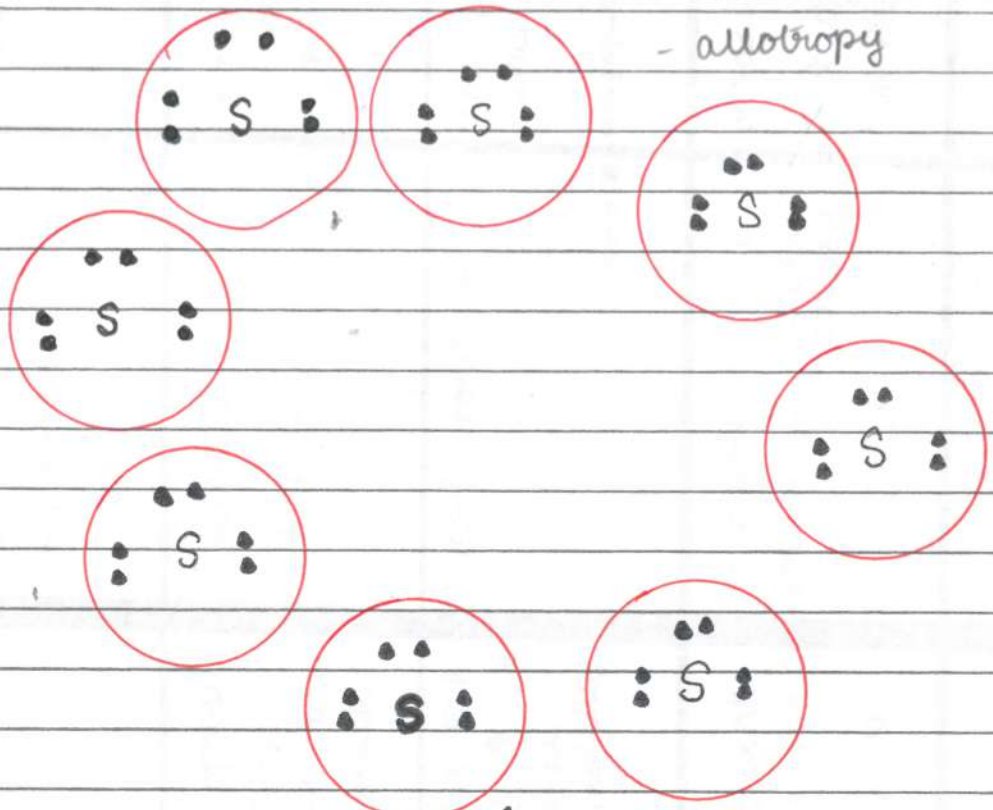
CO₂ - CARBON-DI-OXIDE



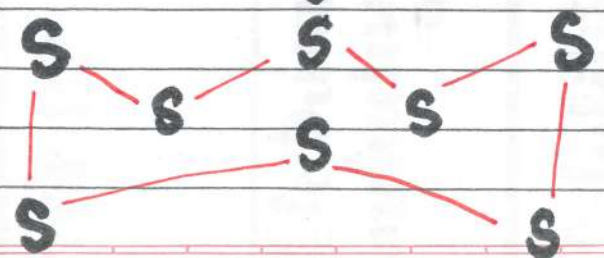
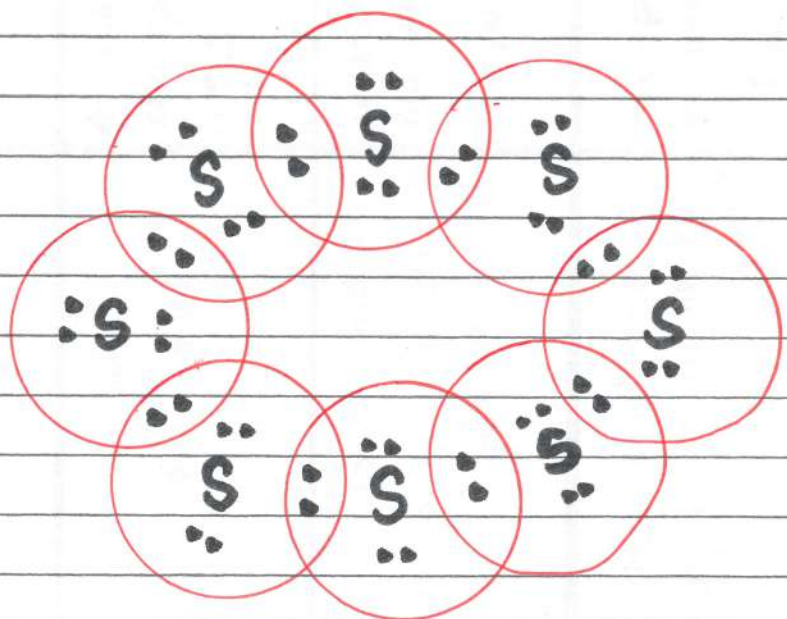
NM **SULPHUR MOLECULE [S₈]** - yellow solid

- catenation

- allotropy



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PROPERTY

IONIC

COVALENT

1. Constituent Nature

ions
HARD-S

↑ intermolecular FOA

molecules
S-S, L, G
↓ soft solids

↓ intermolecular FOA
↑ intramolecular FOA

2. MP, BP

non volatile
↓
↑ MP, ↑ BP

↑ FOA b/w opposite charged ions,
∴ ↑ Δ required to break

volatile
↓
↓ MP, ↓ BP

↓ FOA b/w binding molecules
∴ ↓ Δ is required

3. Electrical Conductivity

S - don't conduct
FUSED / MOLTEN STATE
↓
conducts

intermolecular FOA.
B/w ions in S - ↑
↓ weakens
FUSED / MOLTEN - mobility

don't conduct

∴ no free ions / charged particles

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4. Solubility

soluble in H₂O
insoluble in ORGANIC SOLVENT

H₂O - polar solvent
↓ intermolecular FOA
∴ free ions in aq.

insoluble in H₂O
soluble in ORGANIC SOLVENT

organic solvents - non polar
∴ it dissolves in NON-POLAR COVALENT bond

complete transfer

mutual sharing

ALLOTROPES

an element exists in more than one form and each form has different physical properties but identical chemical properties.

Diamond transparent

- hardest - \uparrow MP, \uparrow BP

- insulator

- synthetic \blacklozenge - \uparrow Pa \uparrow T

- uses

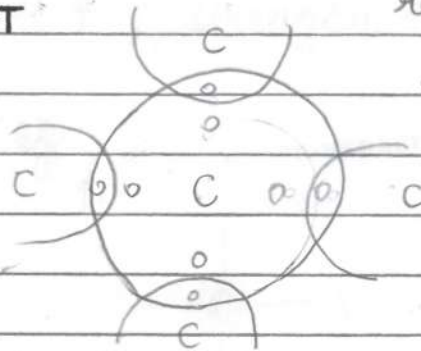
- cutting

- jewellery

- drilling rocks

- rigid 3D

- each C bonded to 4 other C



shiny

$\therefore \uparrow$ internal refraction

\downarrow
 \uparrow refractive index

Graphite greyish-black

- smooth & slippery \downarrow FOA

- conductor - 1 double bond - π - free e^-

- uses

- lubricant

- same plane - 2D - flat layer

- each C bonded to 3 other C

Fullerene

- Buckminster fullerene [architect]

- C_{60} - football

- dark S at room temp

VERSATILE

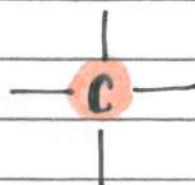
 large no. of C compounds...

▷ Catenation

- > self linking property of elements mainly C-atoms through **covalent bonds** to form **long, branched, ring or straight** of different sizes
- > due to:
 - = small size
 - = C-C bond - stable ↑, strength ↑

▷ Tetravalency

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- > tetravalent - 4 = valency
- > bonding capacity
- > forms single, double & triple bonds.

BOND STRENGTH

amount of energy required to break bonds.

Single < Double < Triple

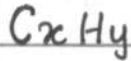
BOND LENGTH

distance b/w nuclei of 2 atoms in a bond

Triple < Double < Single

HYDROCARBON

compounds of carbon and hydrogen
Parent organic compounds.



HYDROCARBON

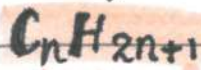
min 2 C



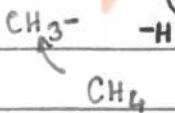
SATURATED

UNSATURATED

ring



Alkyl



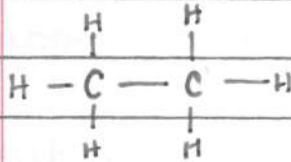
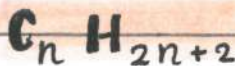
single

addition x

substitution ✓

Alkane

1



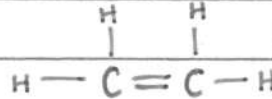
double & triple

addition ✓

substitution ✓

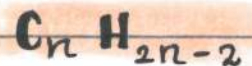
Alkene

2



Alkyne

3



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IUPAC

International Union of Pure
& Applied Chemistry

FUNCTIONAL GROUPS

> atom / group of atoms which makes a C compound reactive & decides its properties regardless of length and nature of carbon chain.

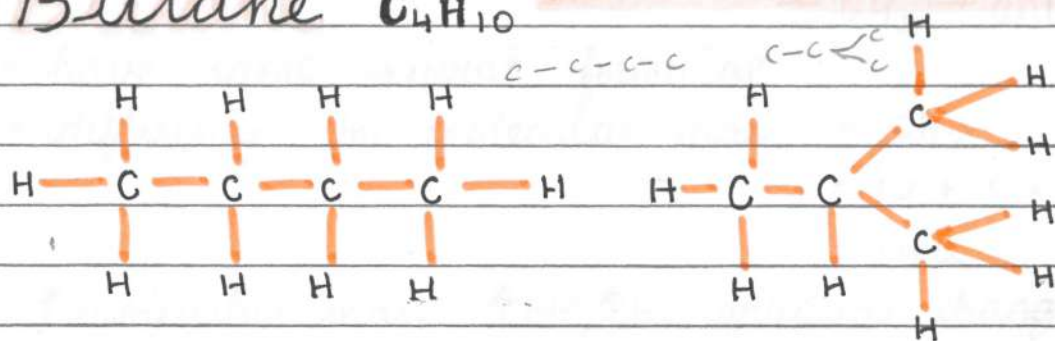
> Heteroatoms :

any atom that is not C / Hydrogen
Eg: Oxygen,
Nitrogen,
Halogen

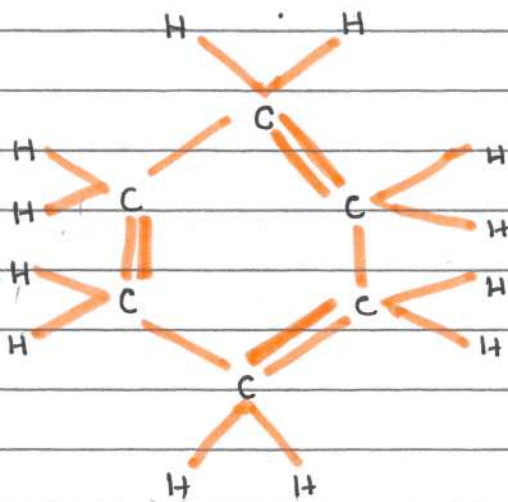
Isomerism

- Organic compounds - same molecular formulae but different chemical and physical properties
- STRUCTURAL ISOMERS

Butane C_4H_{10}



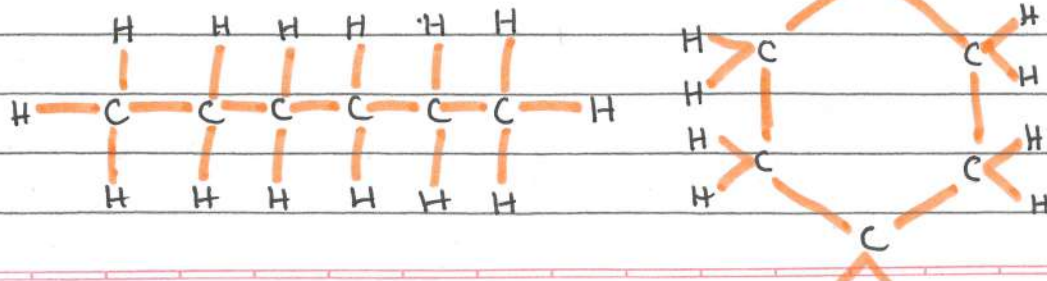
Benzene RING C_6H_6



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Cyclohexane

HEXANE



Homologous Series

Series of similarly constituted compounds in which the members present have

- same functional group
- similar chemical properties
- any 2 successive members in a particular series differ in the MOLECULAR FORMULA by $-\text{CH}_2-$ unit
- have same general formulae
- difference in molecular mass = CH_2
 $= 12 + 2 \times 1$
 $= 14 \text{ u}$
- \uparrow molecular mass - \uparrow MP, \uparrow BP - gradual change in physical properties.