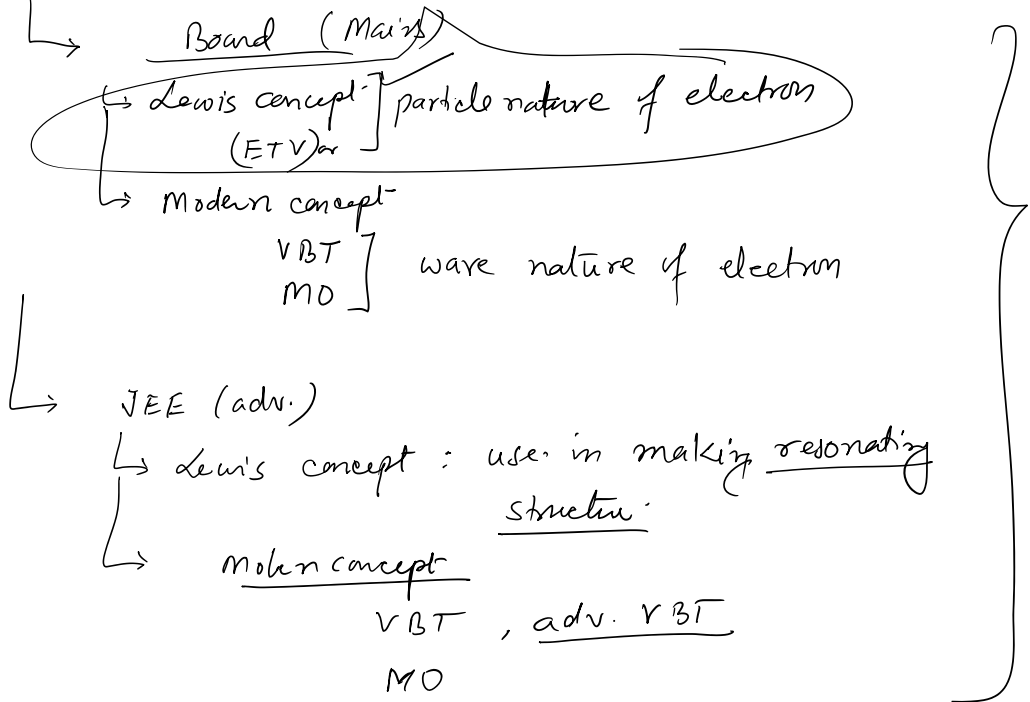


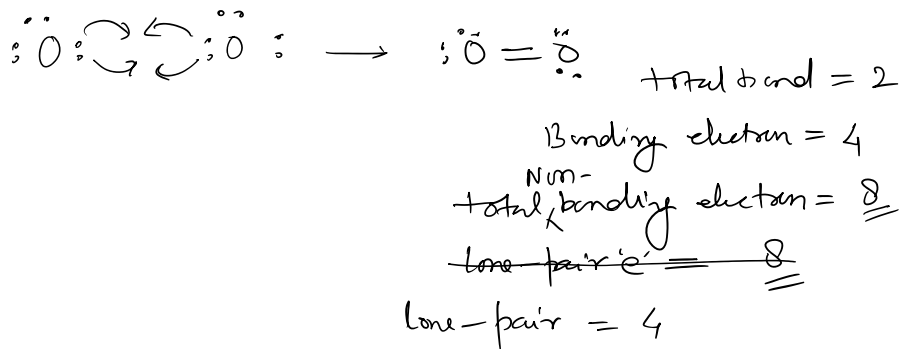
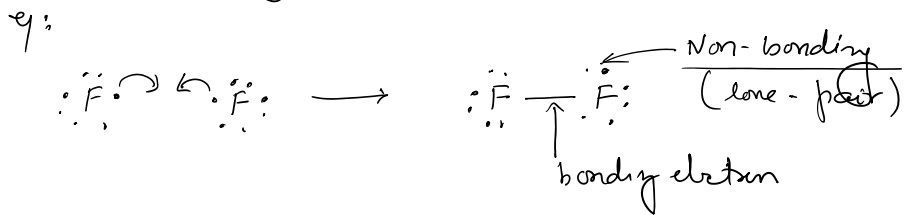
Covalent Compound

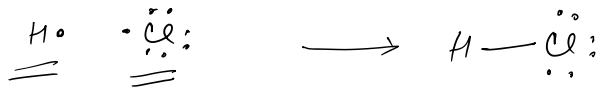
" " bond



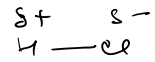
" Covalent Bond : Lewis Concept :

↳ by mutual sharing of electron of one or more electron pairs between two atoms so that each atom involved in bonding attains nearest noble gas configuration in order to gain stability.





\hookrightarrow polar covalent : bond betⁿ Homostoms $\text{N} \equiv \text{N}, \text{O}_2, \text{F}_2$ etc.
 Non-polar " : " " Heteroatoms $\text{HCl}, \text{H}_2\text{O},$ etc.

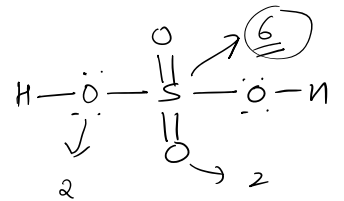
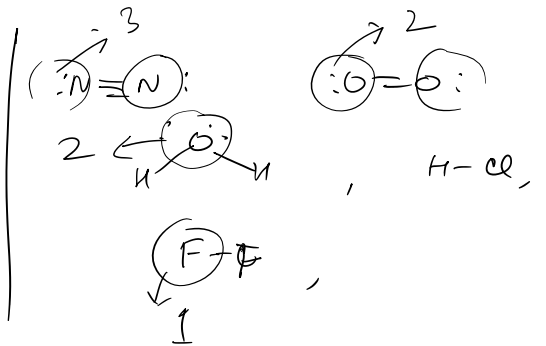


Condition for formation of covalent bond:

- \hookrightarrow both atoms should have same or almost same E.N.
- \hookrightarrow between non-metals.

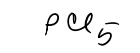
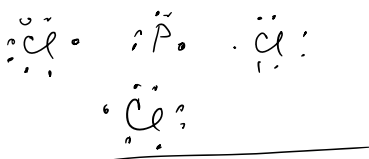
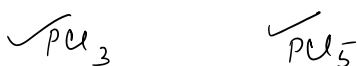
Covalecy:

Covalecy of an atom represents no. of valence electron electrons shared by atom to complete its octet or it is equal to no. of covalent bonds formed by an atom in molecule.

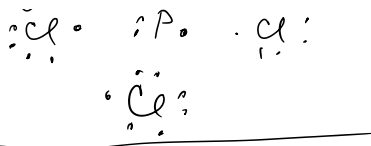


Variable covalecy:

\hookrightarrow based on internal excitation of electron.
 \hookrightarrow possible due to presence of d-orbital (3rd period onward elct's)

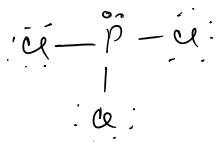


P goes for internal excitation



PCl_5

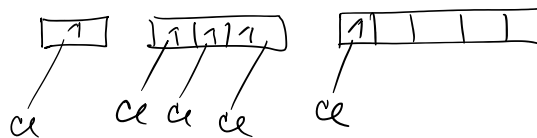
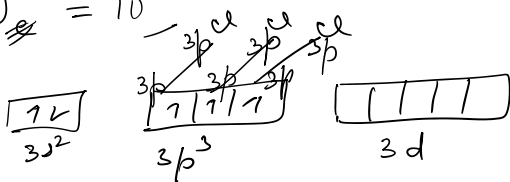
P goes for internal excitation



$(\text{NB})_e = 20$

$(\text{lp})_e = 10$

$P \Rightarrow$

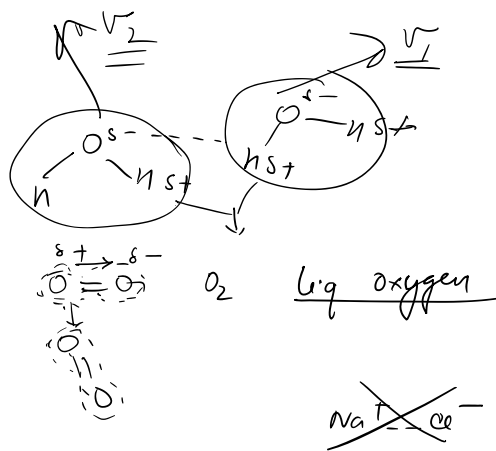


P	S	Cl
3, 5	2, 4, 6	1, 3, 5, 7
PCl_3	H_2S SO_2	Cl-F
PCl_5	SO_3	ClF_3 ClF_5 ClF_7

Characteristics of covalent compound:

D) Physical state:

in covalent compounds
 molecules are held
 together by weaker forces
 of attraction (intermolecular
 forces : vanderwall forces
 Dispersion forces
 H bonding)



Covalent Solids:

Soft volatile solids

molecules are held
 together by
 van der waals' forces

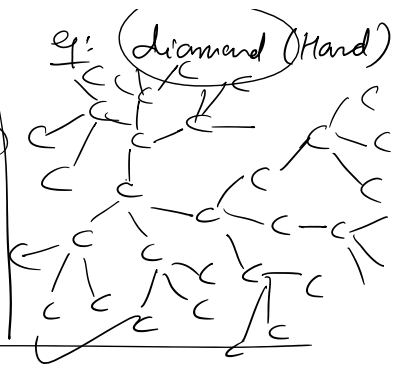
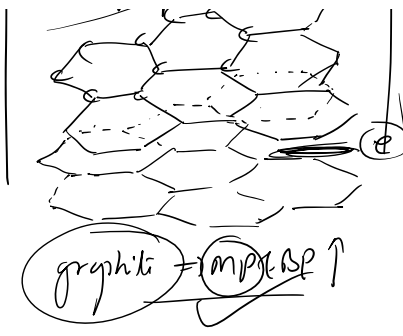
Solids made up
 of flat layers



Solids having
 giant molecules
 & have high M.P & B.P

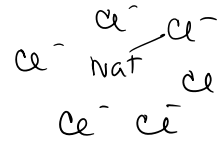
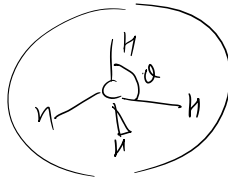


van der waals forces
 ex: S_8 , P_4 , I_2 etc.



2). Mp & B.p. (in comparison to ionic solid covalent solids, in general, has lower m.pt) (b.pt)

3).



Covalent bond is directional

that why they can show isomerism (space).

4) Solubility:

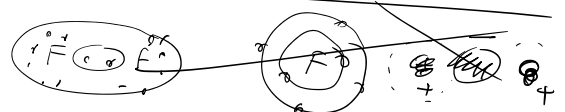
polar covalent $\xrightarrow{\text{dissolves}}$ in polar solvent
 ex: HCl, R-O-N, CO₂ etc. ex: H_2O , $NH_3(l)$ etc.

Non-polar covalent $\xrightarrow{\text{dissolves}}$ in non-polar solvent
benzene CCl₄
 $CH_4(l)$

5). Electrical conductivity: insulator (in general)
 *(graphite ; conductor)

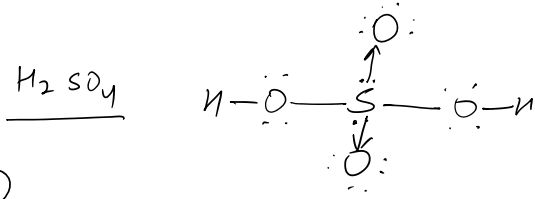
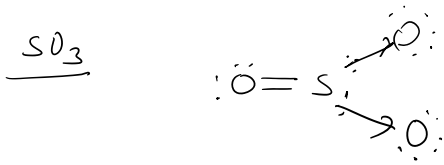
6). Hardness & brittleness: less hard & ~~more~~ brittle than ionic compounds.

Limitation of Lewis concept:

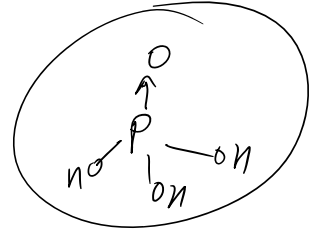
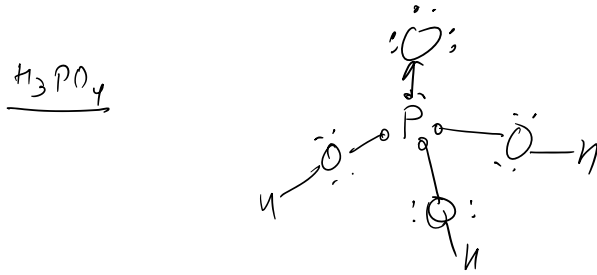


(i). it does not explain cause of covalent bond formation.

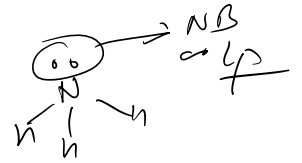
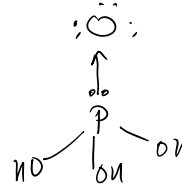
(ii). it does not explain the directionality of covalent bond.



H₂O



H₃



Coordinate covalent bond betⁿ two molecules:

