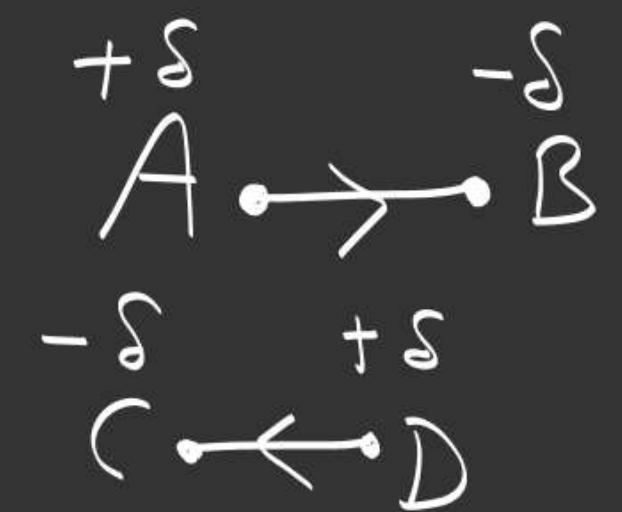


E_N → the tendency of an atom
to attract shared pair
electron.



Scale → Pauling scale

$$X_A - X_B \propto \sqrt{\Delta}$$

Δ = Ionic resonance energy

$$X_A = \text{E.N of } A$$

$$X_B = \text{E.N of } B$$

$$\Delta = E_{A-B} - \sqrt{E_{A-A} \times E_{B-B}}$$

E_{A-B} = Bond energy of A-B bond

E_{A-A} = Bond energy of A-A bond

E_{B-B} = Bond energy of B-B bond

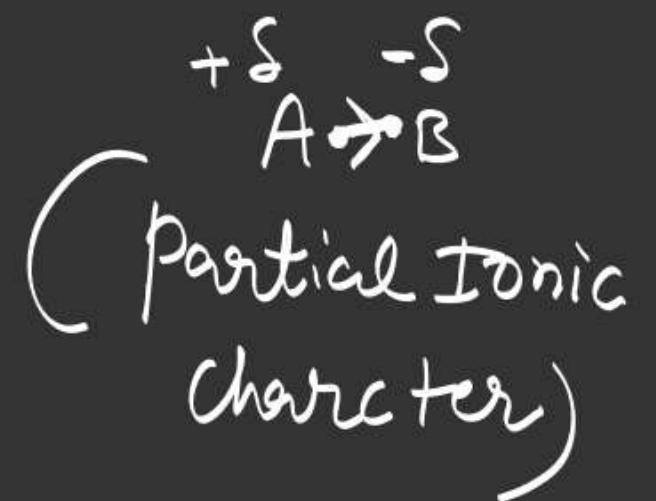
$$\Delta = \frac{\text{Actual bond energy}}{\text{theoretical bond energy}} - \text{theoretical bond energy}$$

Theoretical bond energy = geometrical mean of bond energy
of A-A bond and B-B bond.

F.N

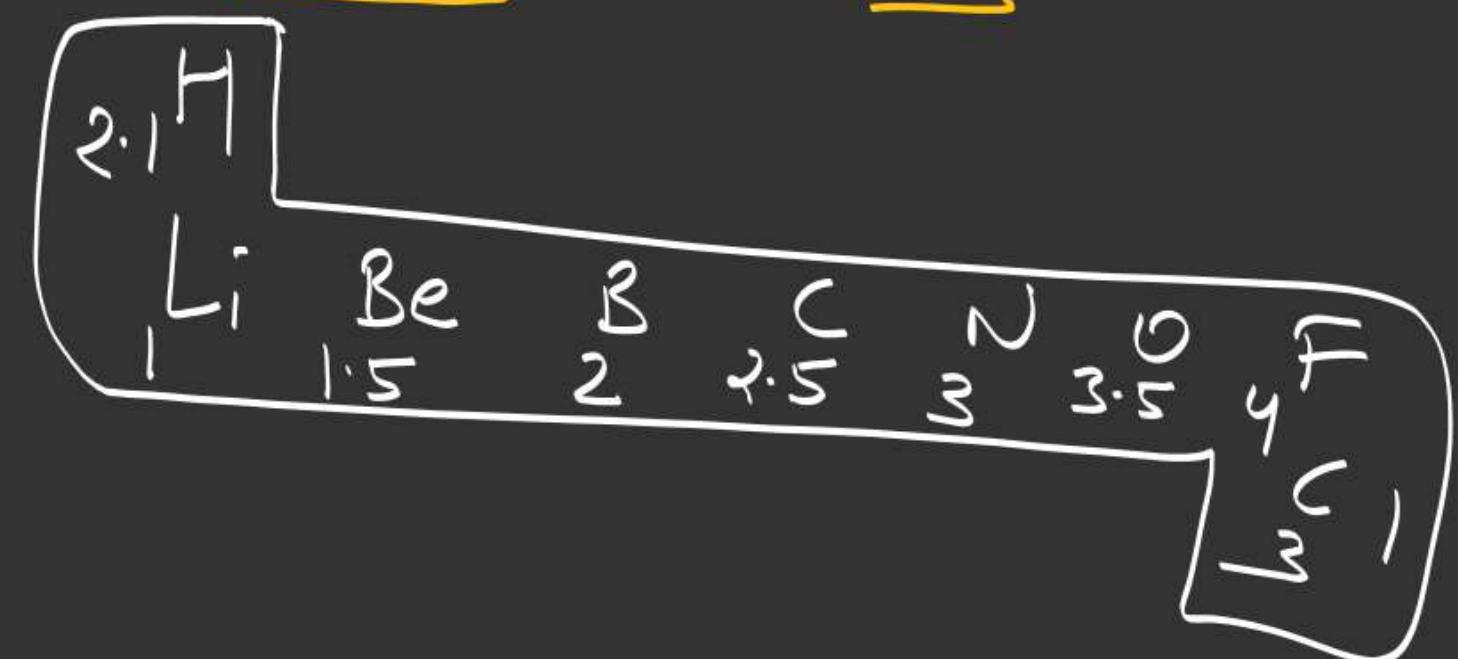
$$A-A = 10$$

$$B-B = 12$$



the Pauling Scale is based on

- ① Bond energy
- ② Bond length
- ③ Ionisation energy
- ④ none

Value of ΣN 



Bond energy \Rightarrow When Covalent bond is formed then energy is released which is called Bond energy.

Bond dissociation energy = Required energy to break Covalent bond.

$$1 \text{ ev/atom} = 96.4 \text{ kJ/mole}$$

$$1 \text{ ev/atom} = 23.1 \text{ kcal/mole}$$

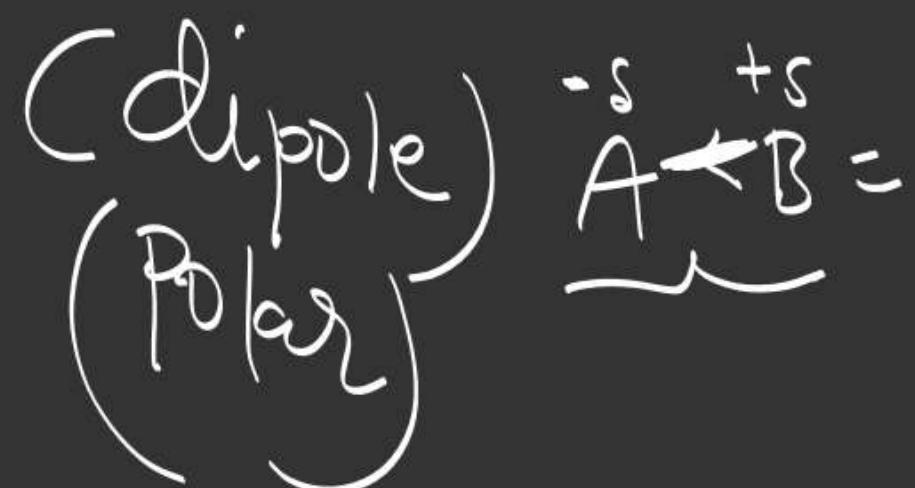
$$\chi_A - \chi_B \propto \sqrt{\Delta}$$

$$\boxed{\begin{aligned}\chi_A - \chi_B &= 0.208 \sqrt{\Delta} \text{ kcal/mole} \\ \chi_A - \chi_B &= 0.102 \sqrt{\Delta} \text{ kJ/mole}\end{aligned}}$$

Actual bond energy is always higher than theoretical because of partial ionic character there will be higher attraction.

$$A - A = 10$$

$$B - B = 12$$



Mulliken Scale

According to Mulliken scale $E \cdot N$ depends on two tendency of an element

- ① donating tendency
 - ② accepting tendency
- $E \cdot A = \text{electron affinity}$

~~A~~

$$E \cdot N = \frac{I \cdot E + E \cdot A}{2} \text{ evaluation}$$

if $I\cdot E$ and $E\cdot A$ given in
KJ/mole then

$$E\cdot N = \frac{I\cdot E + E\cdot A}{2 \times 96.4} \text{ ev/atom}$$

if $I\cdot E$ and $E\cdot A$ given in
Kcal/mole then

$$E\cdot N = \frac{I\cdot E + E\cdot A}{2 \times 23.1} \text{ ev/atom}$$

$$X_p = \frac{X_m}{2 \cdot 8}$$

All Red - RoChow

$$\overline{X}_{A-R} = \frac{0.359 Z_{eff}}{\gamma_{cor.}^2}$$

$\gamma_{G.V.}^2$ = reading in A°

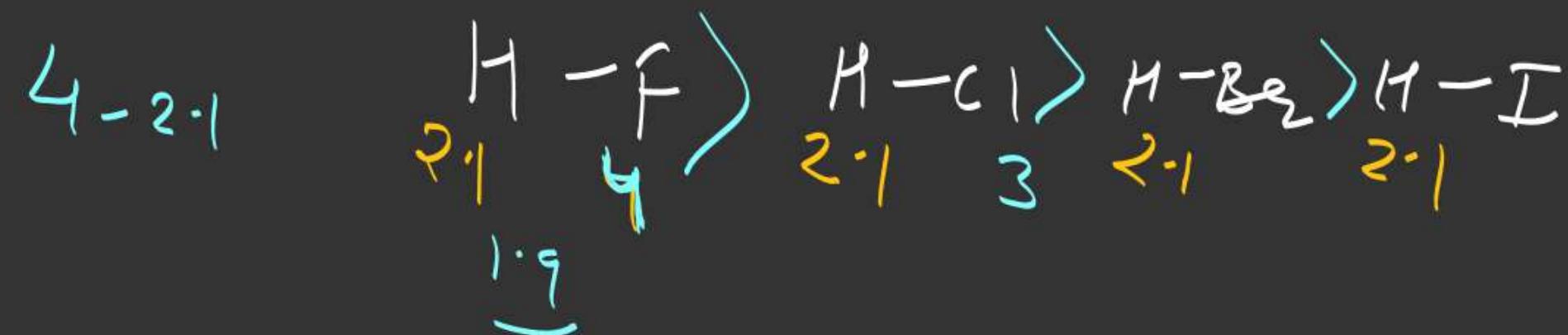
$$P = X_{A-R} + 0.74\gamma$$

Application of $\epsilon \cdot N$

① polarity

[if $\epsilon \cdot N$ diff \uparrow] partial Ionic ch. \uparrow polarity \uparrow

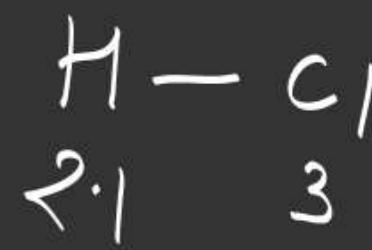
order of polarity



② Calculation of partial Ionic ch.

Henny Smith

$$\% \text{ Ionic ch} = 16\Delta + 3.5\Delta^2$$



$$\Delta = \epsilon_{\text{N}} \text{ diff}$$

0.9 get Calculate $\% \text{ of Ionic character in HCl}$

$$= 16 \times 0.9 + 3.5(0.9)^2$$

$$= \underbrace{17.235}_{\%}$$

factor affecting $\epsilon \cdot N$

- ① $Z \uparrow \epsilon \cdot N \uparrow$
- ② $z_{eff} \uparrow \epsilon \cdot N \uparrow$
- ③ $\gamma \uparrow \epsilon \cdot N \downarrow$
- ④ $G \uparrow \epsilon \cdot N \downarrow$

⑤ %s Character

order of
E.N

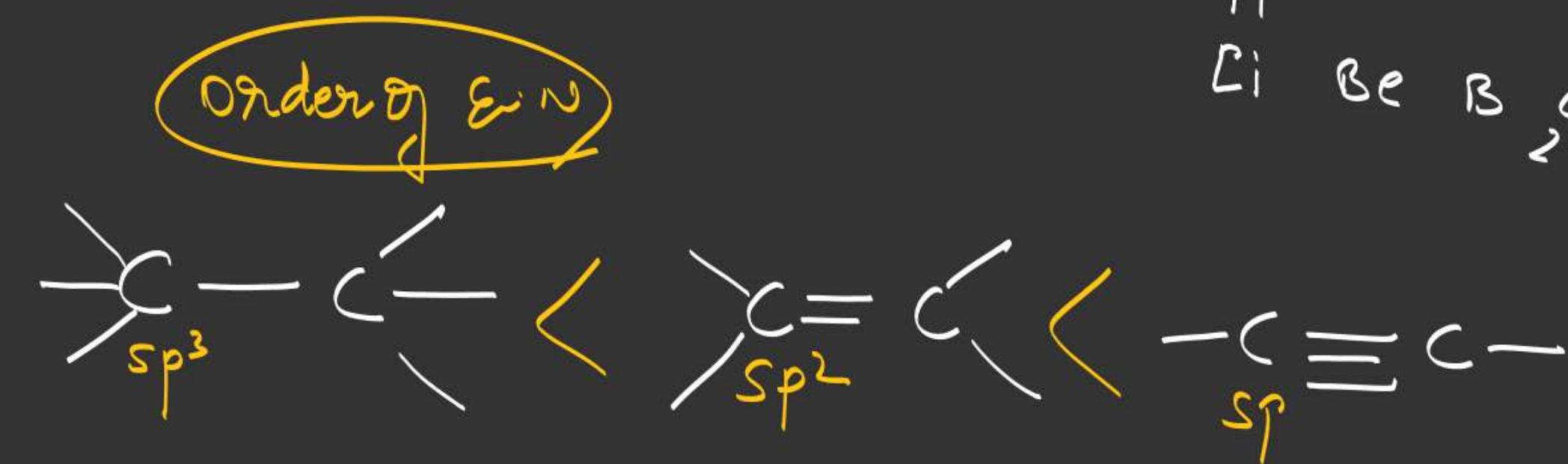


$s_x \uparrow$ att. \uparrow E.N \uparrow

$(\text{Hybrid orbital})^{sp} > (\text{Hybrid orbital})^{sp^2} > (\text{Hyb. orbital})^{sp^3}$

$$\begin{aligned}\%s &= \frac{1}{2} \times 100 & \frac{1}{3} \times 100 & \frac{1}{4} \times 100 \\ &= 50\% & 33.33 & 25\%\end{aligned}$$

H
Li Be B C N O F
 $\frac{2}{2.5}$

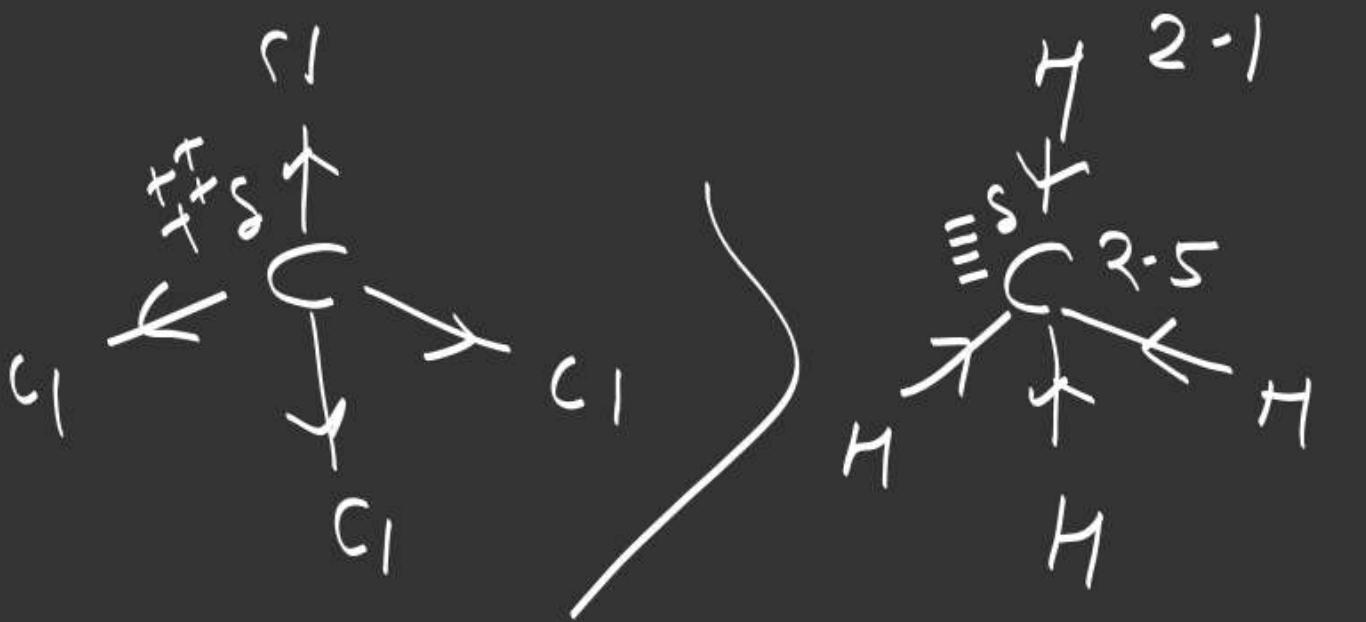


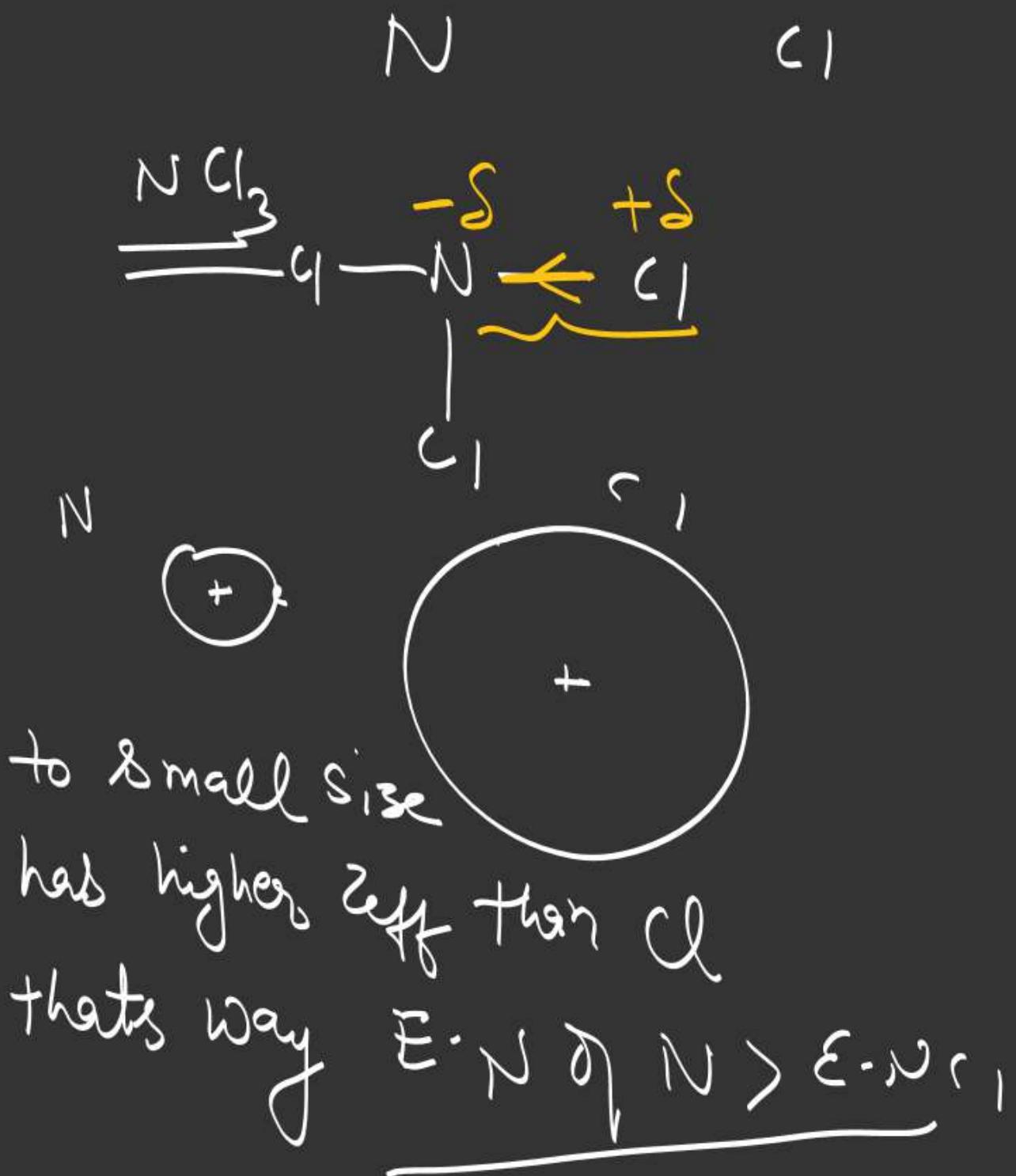
→ $\epsilon \cdot N$ dep. upon surrounding atom.

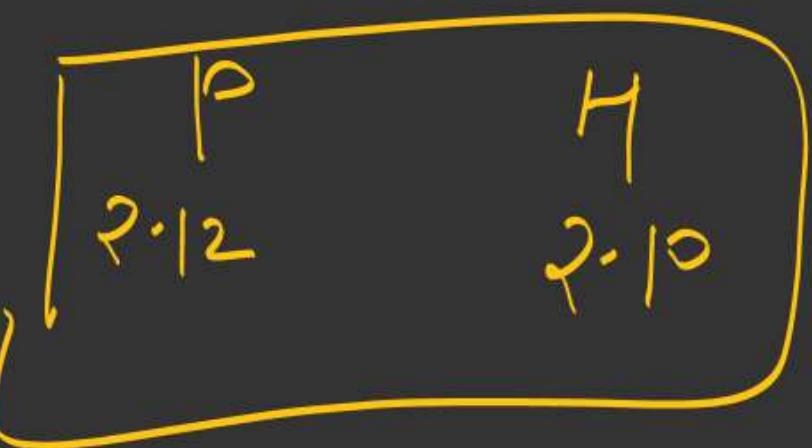
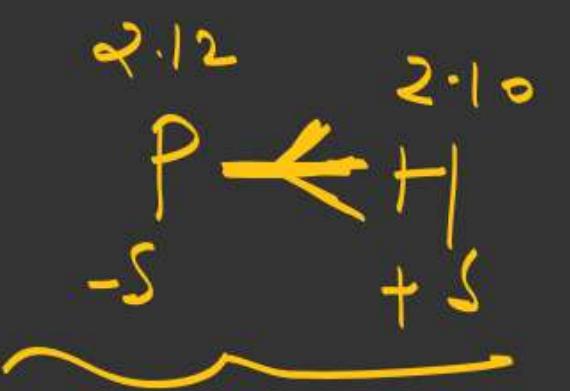


→ positive charge ↑ & n↑

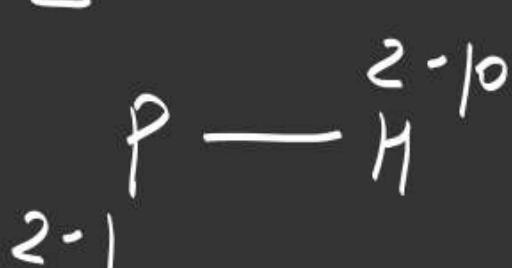
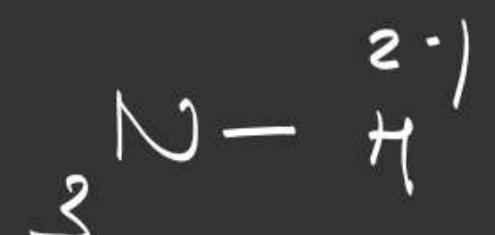








Ques Which of the bond is least
Polar



$\frac{\epsilon \cdot N}{\epsilon \cdot N}$ In period
 L — R in periodic table
 $\epsilon \cdot N \uparrow$

