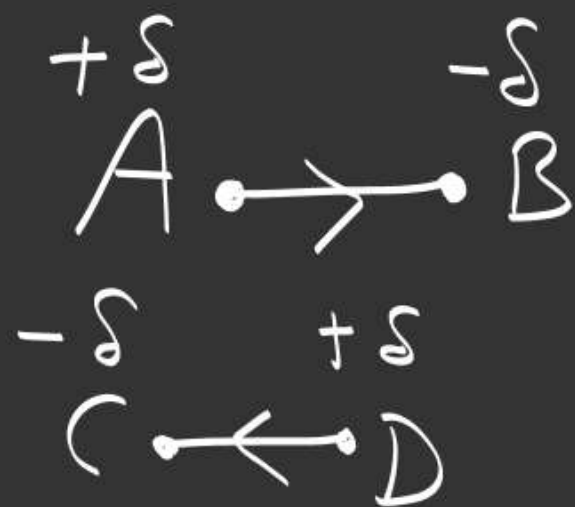


E.N  $\rightarrow$  the tendency of an atom  
to attract shared pair  
electron.



Scale  $\rightarrow$  Pauling scale

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

$\Delta =$  Ionic resonance energy

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

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

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

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

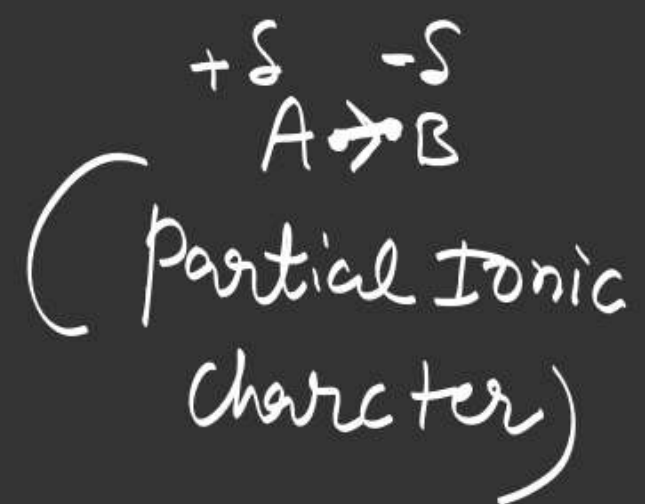
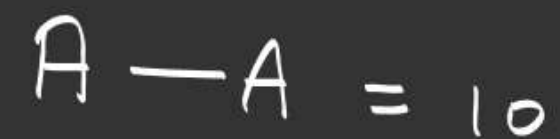
$E_{A-A}$  = Bond energy of A-A bond

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

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

theoretical bond energy = geometrical mean of bond energy  
of  $A-B$  of  $A-A$  bond and  $B-B$  bond.

F.N



one Pauling Scale is based on

① Bond energy

② Bond length

③ Ionisation energy

④ none

Value of  $\varepsilon \cdot N$

A hand-drawn periodic table on a dark background, showing electronegativity values for elements from Hydrogen (H) to Fluorine (F). The values are written in white chalk. The elements are arranged in a single row, with their symbols and corresponding electronegativity values written below them. The values increase from left to right, starting at 2.1 for H and reaching 4 for F. The elements are enclosed in a white outline that follows their general shape. The values are: H (2.1), Li (1), Be (1.5), B (2), C (2.5), N (3), O (3.5), F (4). The values are written in a simple, handwritten style.

H	Li	Be	B	C	N	O	F
2.1	1	1.5	2	2.5	3	3.5	4

Bond energy  $\Rightarrow$   $\text{A} \cdot \text{B}$  not c/p  
when covalent bond is  
formed then energy is  
released which is called  
Bond energy.

Bond dissociation energy = Required energy to  
break covalent bond.

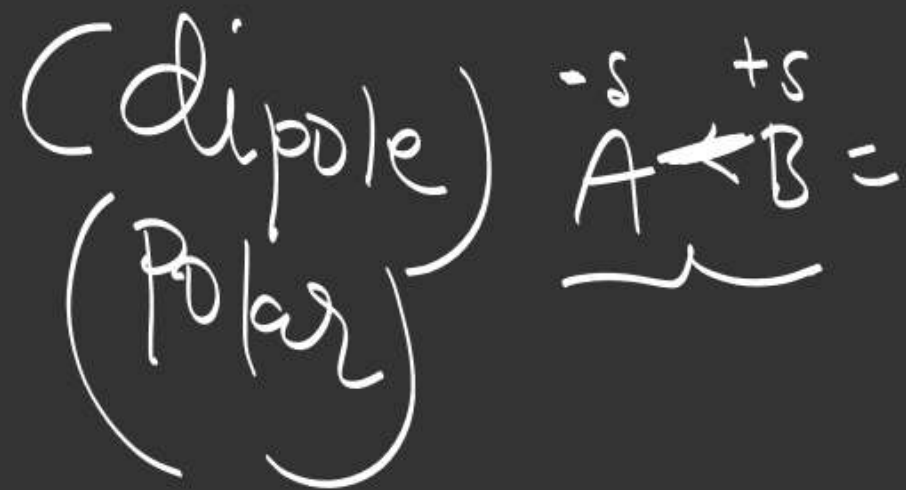
$$|e_v|_{\text{atom}} = 96.4 \text{ KJ/mole}$$

$$|e_v|_{\text{atom}} = 23.1 \text{ KCal/mole}$$

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

$$\begin{aligned} X_A - X_B &= 0.208 \sqrt{\Delta} \text{ KCal/mole} \\ X_A - X_B &= 0.102 \sqrt{\Delta} \text{ KJ/mole} \end{aligned}$$

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



## Mulliken scale

acc. to Mulliken scale  $E.N$  depends on two tendency of an element

- ① donating tendency
  - ② accepting tendency
- $\left\{ \begin{array}{l} E.A = \text{electron} \\ \text{affinity} \end{array} \right.$

$$\star \quad E.N = \frac{I.E + E.A}{2} \text{ eV/atom}$$

if I.E and E.A given in  
KJ/mole then

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

if I.E and E.A given in  
KCal/mole then

$$\star E.N = \frac{I.E + E.A}{2 \times 23.1} \text{ eV/atom}$$

~~\*~~

$$X_p = \frac{X_m}{2.8}$$

## All Red - RoChow

$$\chi_{A-R} = \frac{0.359 Z_{eff}}{\gamma_{cov.}^2}$$

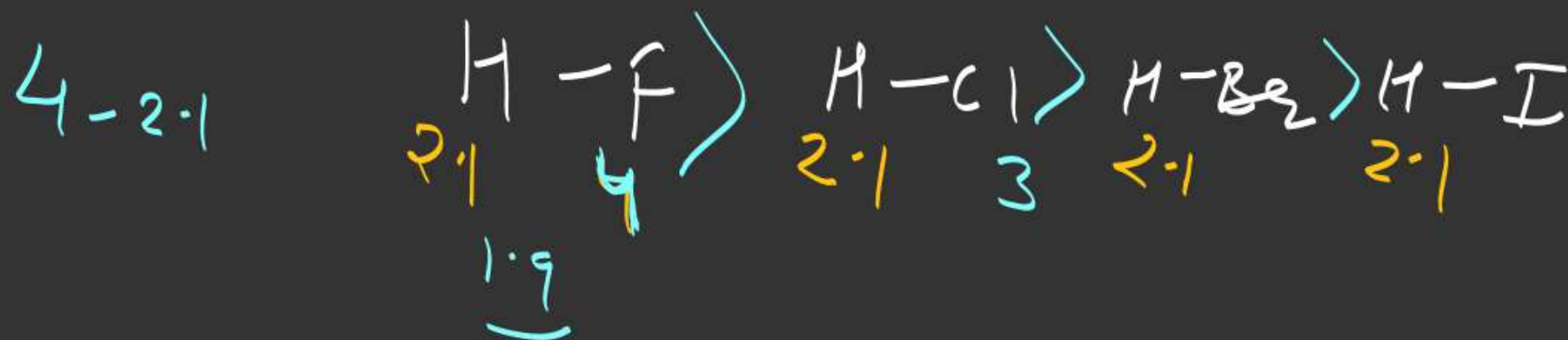
$\gamma_{cov.}^2 = \text{radius in } A^0$

$$p = \chi_{A-R} + 0.744$$

① polarity

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

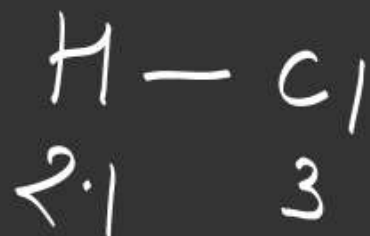
## Order of polarity



## ② Calculation of partial Ionic ch.

Henny Smith

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

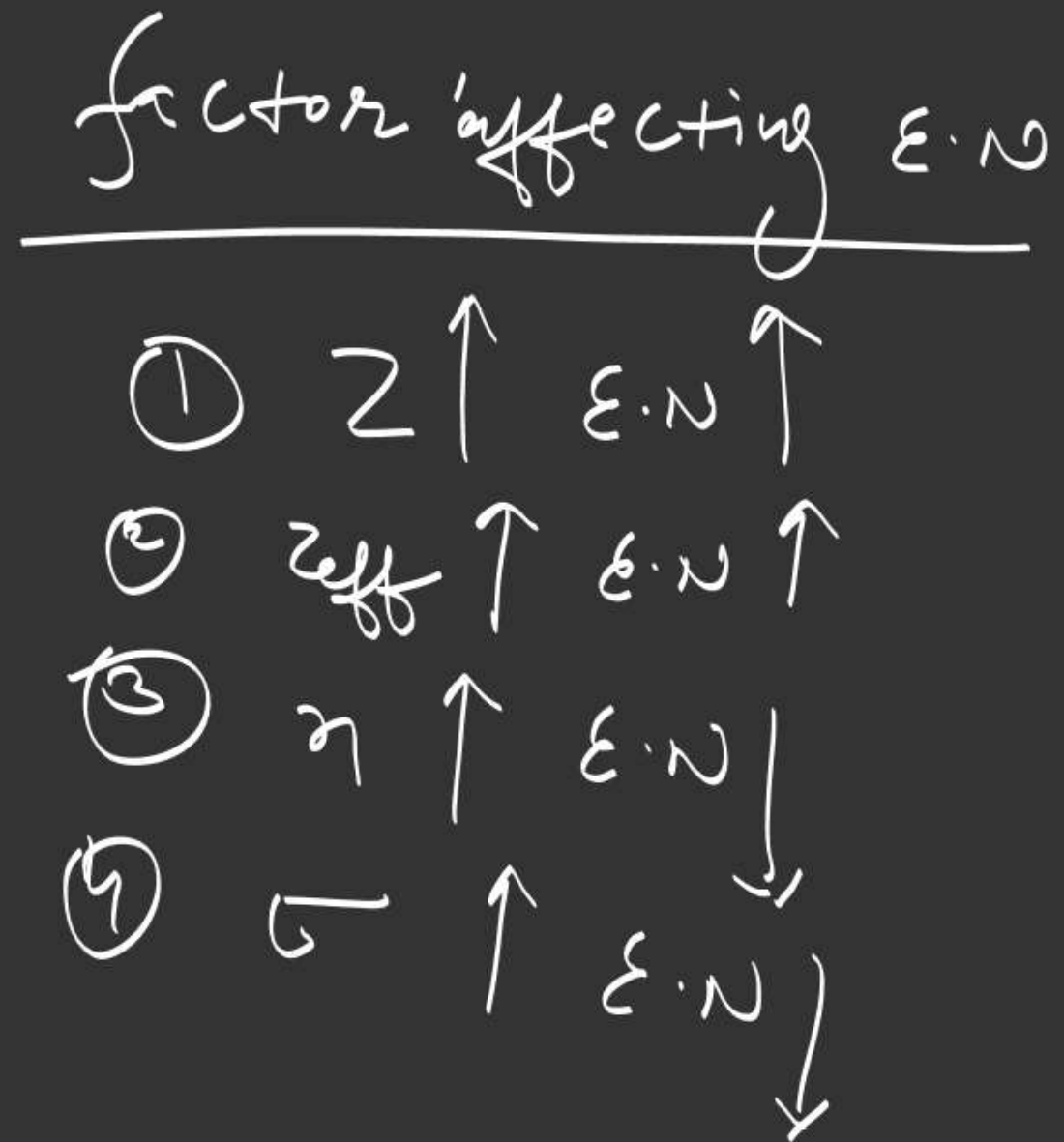


0.9

$\Delta = \text{E.N. diff}$

qst Calculate % of Ionic character in HCl

$$\begin{aligned} &= 16 \times 0.9 + 3.5(0.9)^2 \\ &= \underline{17.235\%} \end{aligned}$$



# ⑤ %s character

order of  
E.N



$sp$  >  $sp^2$  >  $sp^3$   
(hybrid orbital) (hybrid orbital) (hyb. orbital)

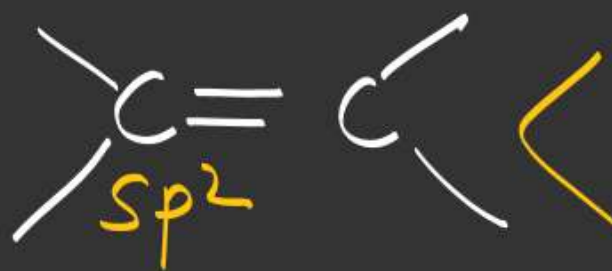
$$\begin{aligned} \%s &= \frac{1}{2} \times 100 \\ &= 50\% \end{aligned}$$

$$\begin{aligned} &\frac{1}{3} \times 100 \\ &33.33 \end{aligned}$$

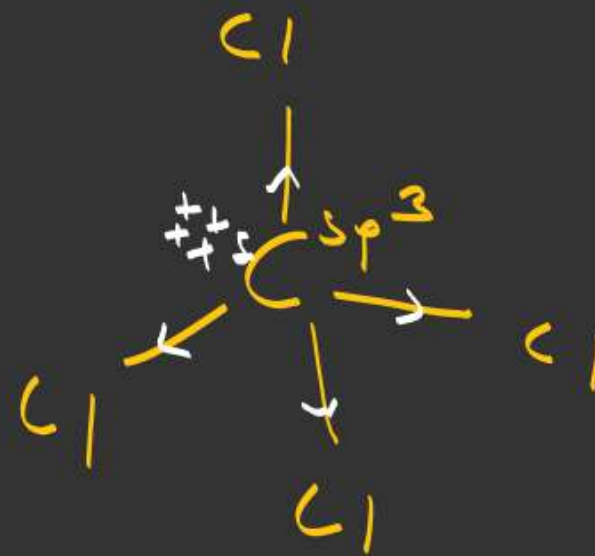
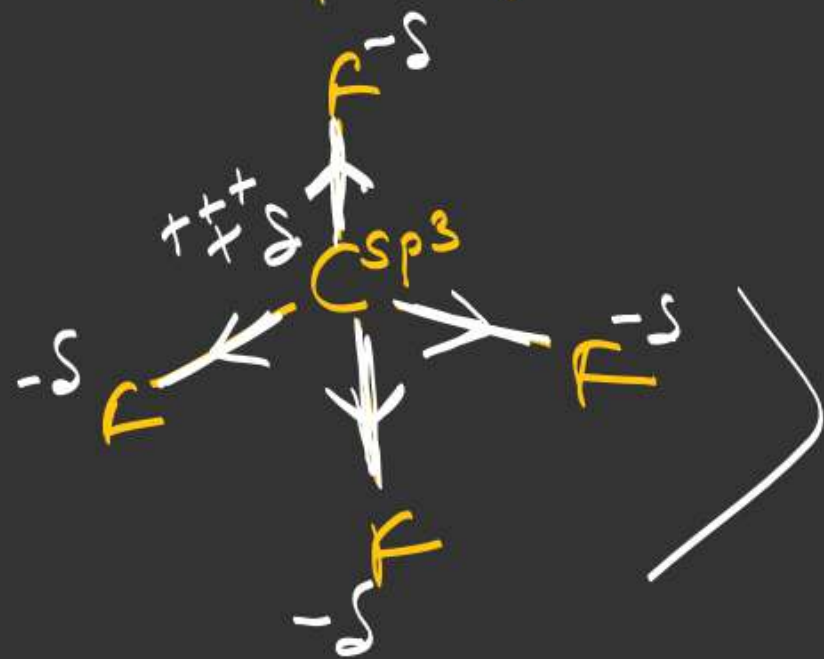
$$\begin{aligned} &\frac{1}{4} \times 100 \\ &25 \end{aligned}$$

Order of E.N

H  
Li Be B C N O F  
2.5

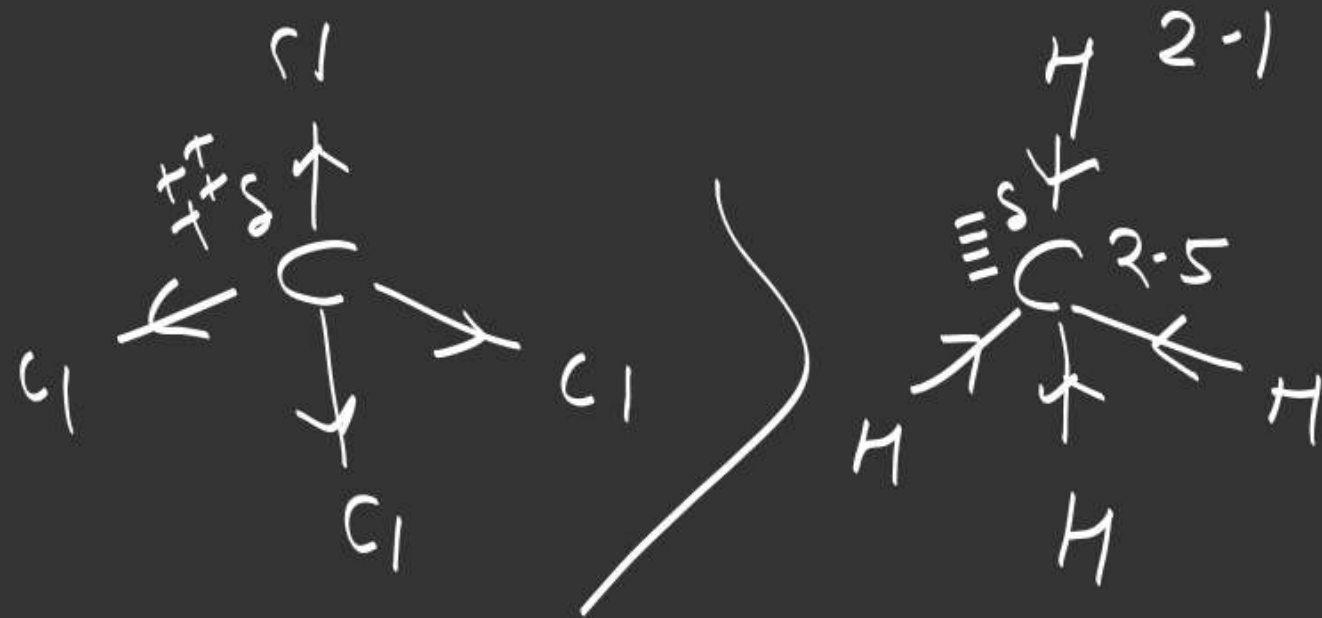


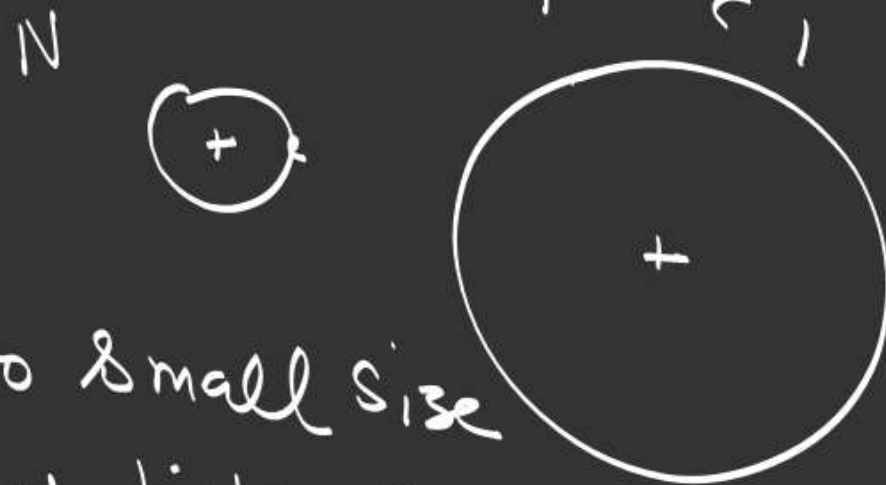
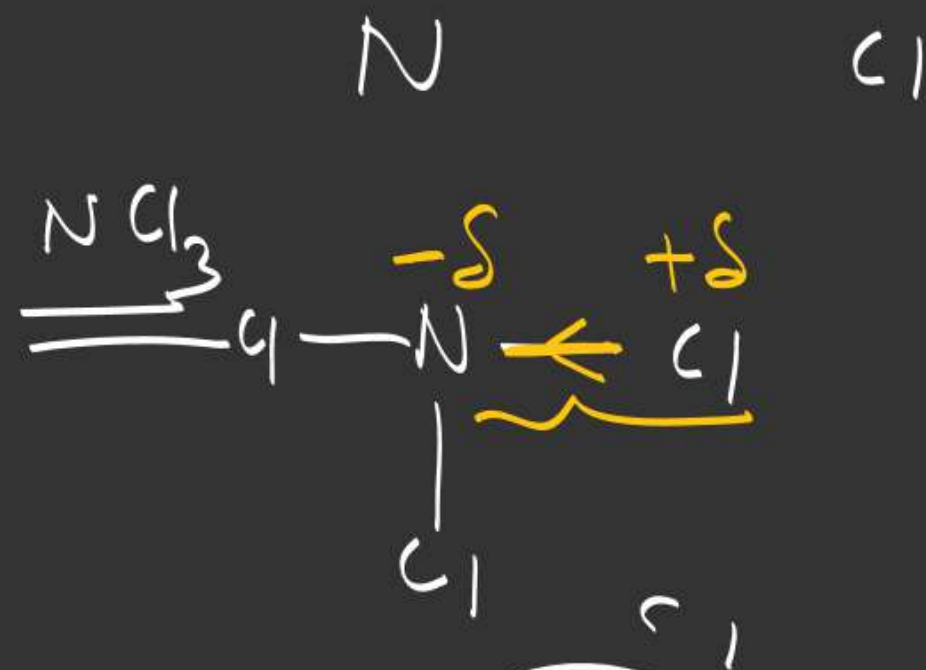
→ E.N dep. upon surrounding atom.



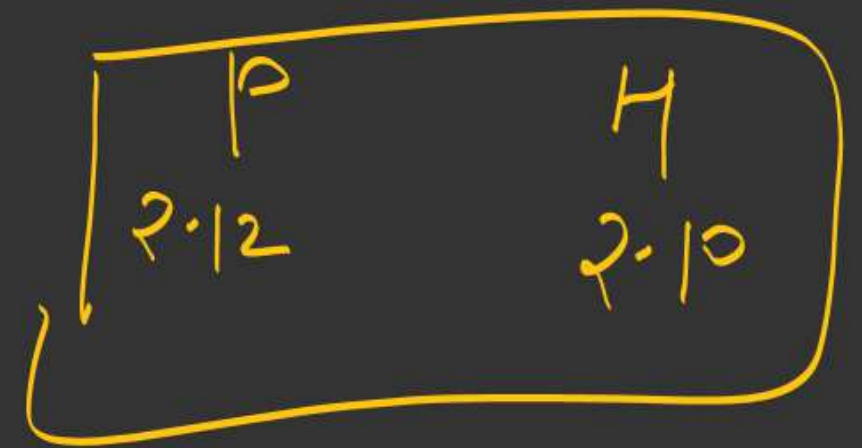
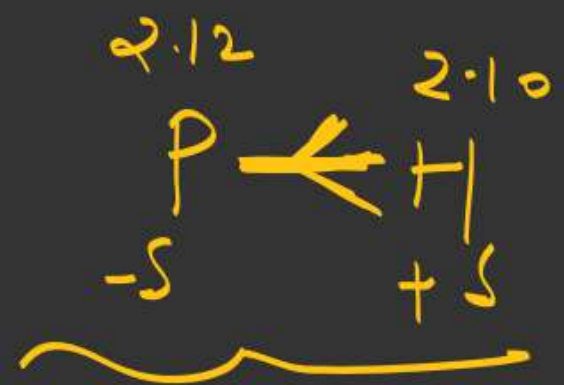
→ tive charge  $\uparrow$  e.n  $\uparrow$



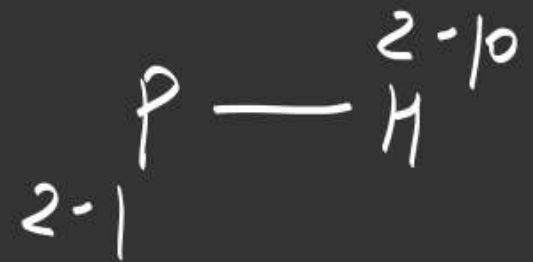
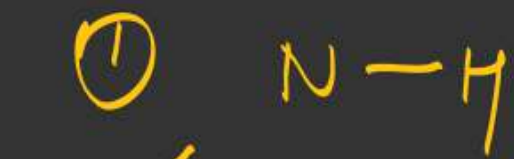




due to small size  
N has higher  $z_{\text{eff}}$  than Cl  
that's way  $E \cdot N \propto N > E \cdot N \propto Cl$



Ques Which of the following bond is least Polar



E.N      In period  
 L — R in periodic table  
 E.N ↑

down the group

E.N ↓ decrease down the group

