$$\text{Metal biCarbonate} \xrightarrow{\Delta} \begin{array}{c} (except\ Na/K/Rb/Cs) \\ \text{Metal Carbonate} + CO_2 + H_2O \end{array}$$

$$\downarrow \Delta$$

$$\text{Metal oxide} + CO_2$$

$$NaHCO_3 \xrightarrow{\Delta} Na_2CO_3 + CO_2 + H_2O$$

$$Mg(HCO_3)_2 \xrightarrow{\Delta} MgO + CO_2 + H_2O$$

$LiHCo_3 \Rightarrow$ exist in solution state

$NaHCo_3 \quad KHCo_3 \quad RbHCo_3 \quad CsHCo_3$

exist in solid state

$Be(HCo_3)_2 \quad Mg(HCo_3)_2 \quad Ca(HCo_3)_2 \quad Sr(HCo_3)_2 \quad Ba(HCo_3)_2$

exist in solution state

Thermal stability of monoatomic anion

$$MX \longrightarrow M^+ + X^\ominus \quad \left[T \cdot s \text{ decided by } L \cdot E \right]$$

$Na^+ \ Cl^-$

$$L \cdot E = -\frac{K q_1 q_2}{r}$$

$$r = (r_c + r_a)$$

$r_c = \text{radius of cation}$

$r_a = \text{radius of anion}$

$q_1 \ q_2 = \text{charge}$

$L \cdot E \propto \text{charge}$

$L \cdot E \propto \frac{1}{\text{size}}$
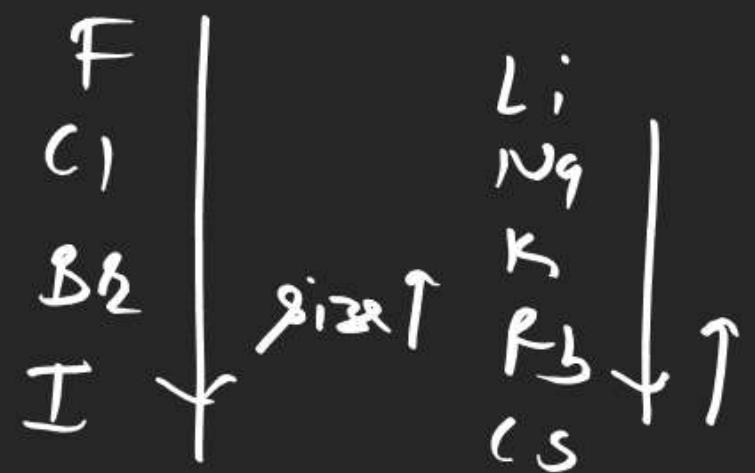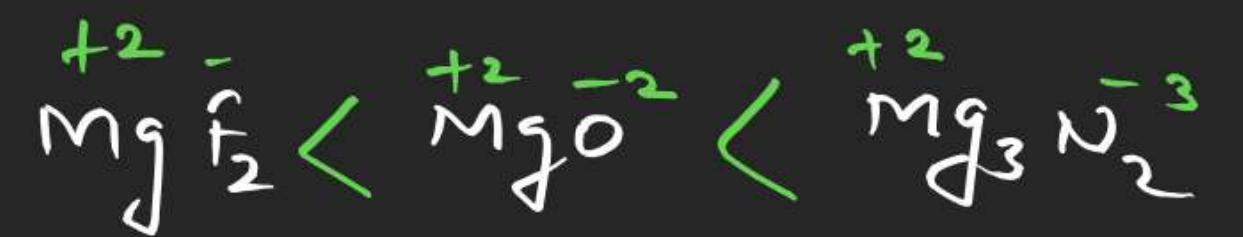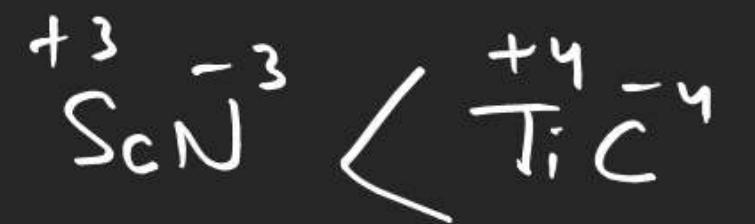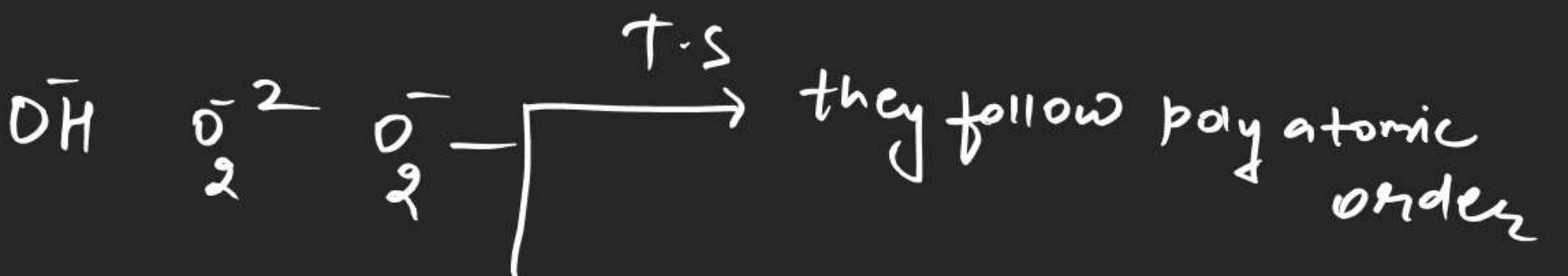
$$\boxed{T \cdot S \propto L \cdot E}$$

L.E [Lattice energy] ⟶ amount of relese energy when one mole of Ionic compound form from cation and anion.

Order of T-S

$\overset{+}{Li}\overset{-}{Cl} > \overset{+}{Na}\overset{-}{Cl} > \overset{+}{K}\overset{-}{Cl} > \overset{+}{Rb}\overset{-}{Cl} > \overset{+}{Cs}\overset{-}{Cl}$

$LiBr > NaBr > KBr > RbBr > CsBr$

$Li_2O > Na_2O > K_2O > Rb_2O > Cs_2O$

$Li_3N > Na_3N > K_3N$

$KF > KCl > KBr > KI$

$$\overset{+3}{Sc}\overset{-3}{N} < \overset{+4}{Ti}\overset{-4}{C}$$

$$\overset{+2}{Mg}\overset{-}{F_2} < \overset{+2}{Mg}\overset{-2}{O} < \overset{+2}{Mg_3}\overset{-3}{N_2}$$

F
Cl
Br   size ↑
I

Li
Mg
K   ↓ ↑
Rb
Cs

$\overline{OH}$ $\overset{2}{\overline{O}_2}$ $\overline{O}_2^-$ $\longrightarrow$ T·S they follow poly atomic order

$\xrightarrow{\text{Solubility}}$ they follow mono atomic order
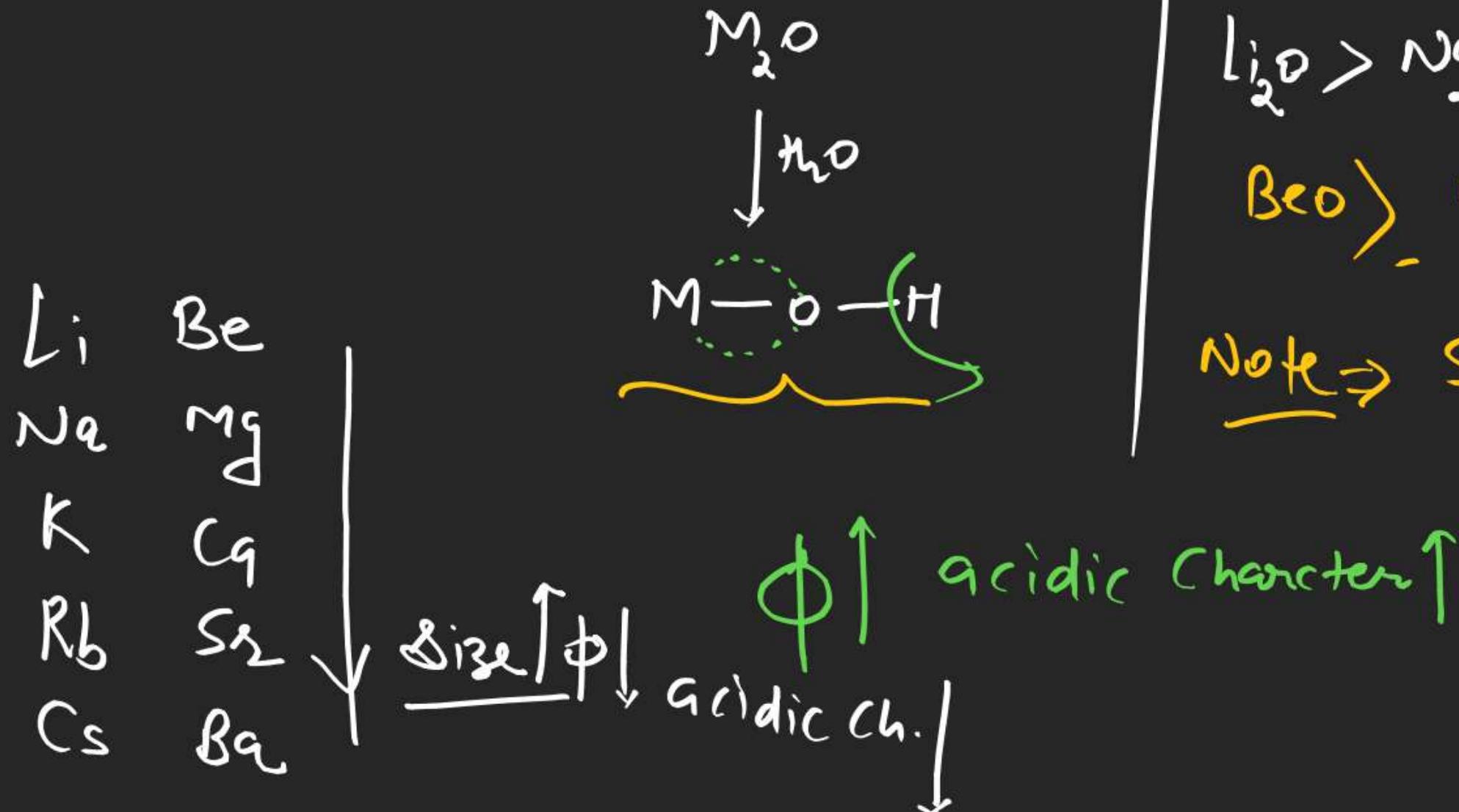
order of Thermal Stability

$LiOH < NaOH < KOH < RbOH < CsOH$

$Na_2O_2 < K_2O_2 < Rb_2O_2 < Cs_2O_2$

$KO_2 < RbO_2 < CsO_2$

② Nature of oxide | Order of acidic ch.

$$M_2O$$

$$\downarrow H_2O$$

$$M - O - H$$

$$Li_2O > Na_2O > K_2O > Rb_2O > Cs_2O$$

$$BeO > MgO > CaO > SrO > BaO$$
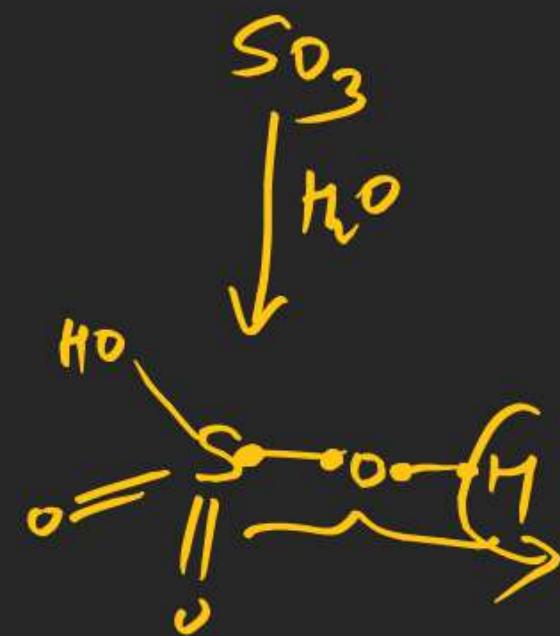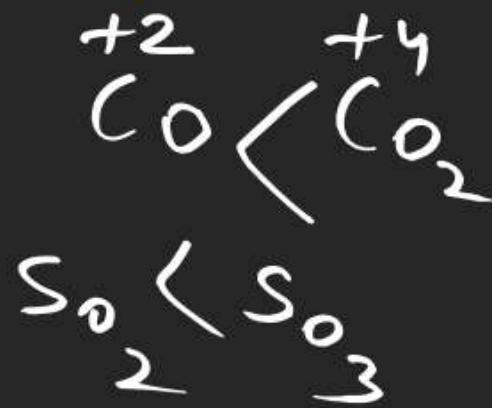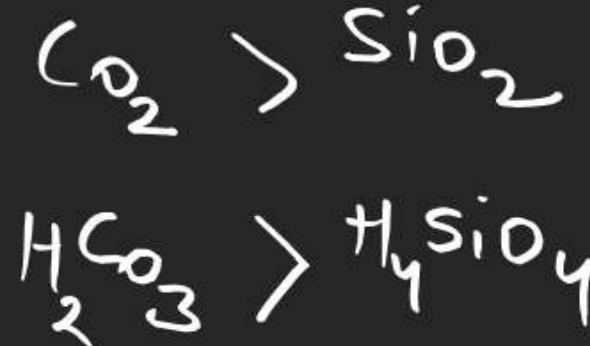
Note ⇒ S-Block oxides are Basic in nature except BeO (Amphoteric)

Li   Be
Na   Mg
K   Ca
Rb   Sr   Size ↑ φ↓ acidic ch. ↓
Cs   Ba

φ↑ acidic Character ↑

$$SO_3$$

$$\downarrow H_2O$$

$$HO-S-O-H$$
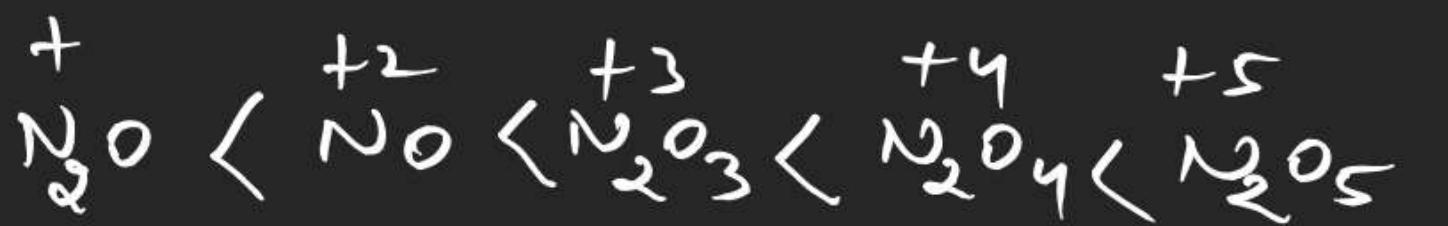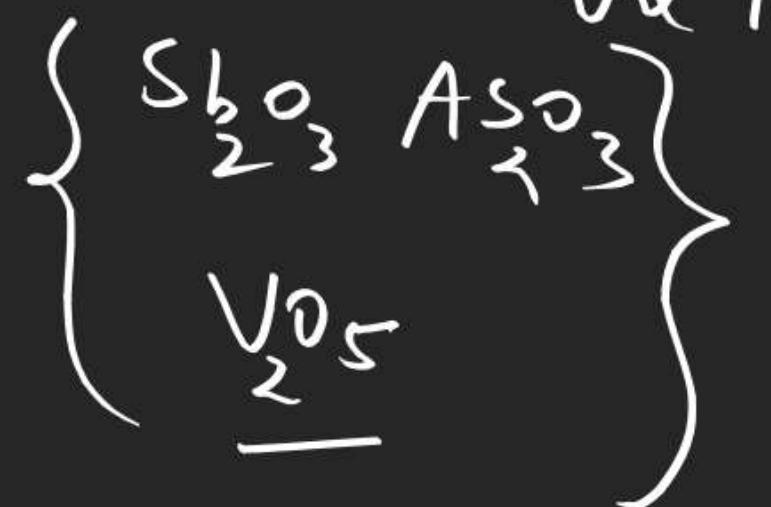
$$+ive\ charge \uparrow\ E\cdot N \uparrow\ acidic\ Ch. \uparrow$$

$$E\cdot N\ of\ non\ metal \uparrow\ acidic\ ch. \uparrow$$

$$\begin{array}{c} C \\ Si \end{array} \Big| E\cdot N \downarrow$$

$$CO_2 > SiO_2$$

$$H_2CO_3 > H_4SiO_4$$

$$\overset{+2}{CO} < \overset{+4}{CO_2}$$

$$SO_2 < SO_3$$

$$\overset{+}{N_2}O < \overset{+2}{NO} < \overset{+3}{N_2O_3} < \overset{+4}{N_2O_4} < \overset{+5}{N_2O_5}$$

$$\overset{+3}{HNO_2} < \overset{+5}{HNO_3}$$

Note $\Rightarrow$ पं   जा   बे   अली   गाना   सुनाओ   कर   में
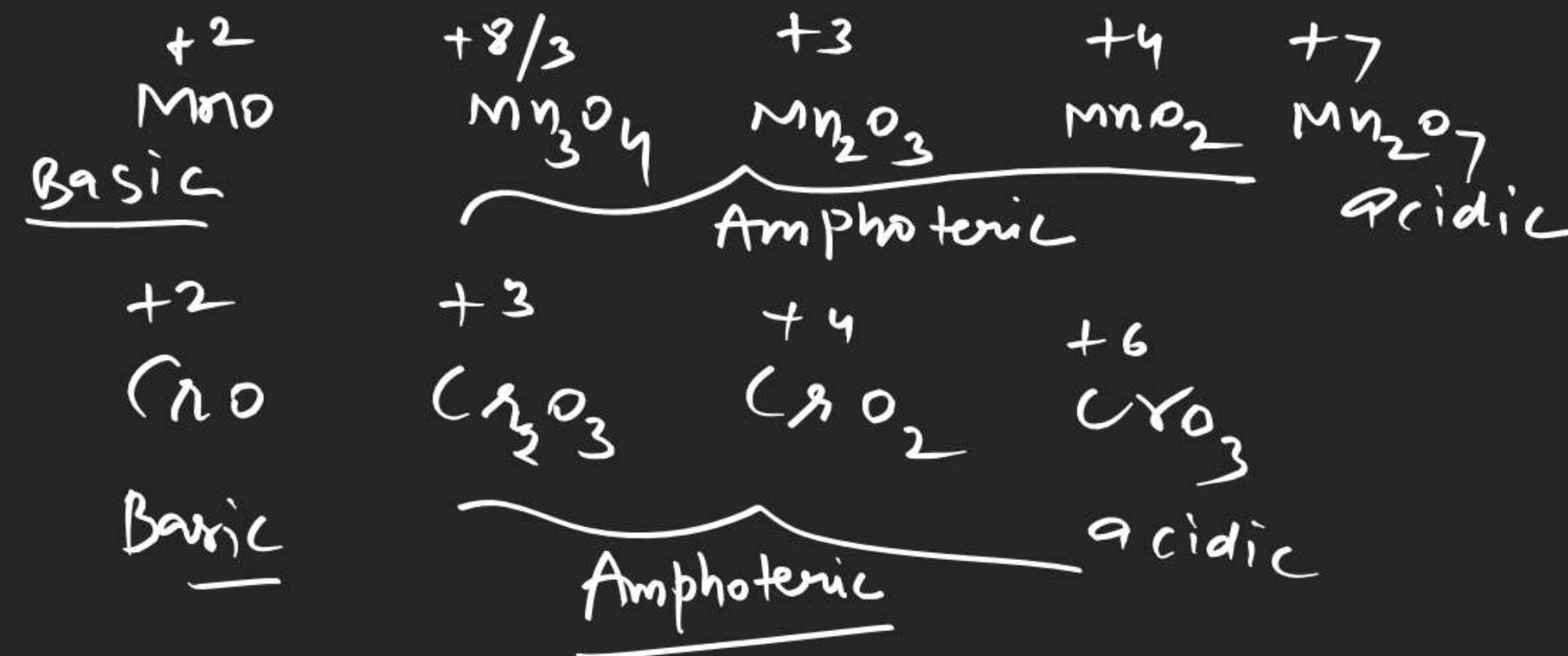
$$Pb \quad Zn \quad Be \quad Al \quad Ga \quad Sn \quad \overset{+3}{Cr} \quad \overset{+4}{Cr}$$

all Oxides and Hydroxide are Amphoteric

$$\left\{ \begin{array}{c} Sb_2O_3 \quad As_2O_3 \\ \\ \underline{V_2O_5} \end{array} \right\}$$

$$NO \quad N_2O \quad CO \quad H_2O$$

$$\underbrace{\hspace{7cm}}_{\text{neutral oxide}}$$

$$\overset{+2}{MnO}$$ $$\overset{+8/3}{Mn_3O_4}$$ $$\overset{+3}{Mn_2O_3}$$ $$\overset{+4}{MnO_2}$$ $$\overset{+7}{Mn_2O_7}$$

Basic

Amphoteric

acidic

$$\overset{+2}{CrO}$$ $$\overset{+3}{Cr_2O_3}$$ $$\overset{+4}{CrO_2}$$ $$\overset{+6}{CrO_3}$$

Basic

Amphoteric

acidic

$$\sqrt{\phi} < 2.1 \quad \text{basic}$$

$$\sqrt{\phi} = 2.1 \text{ to } 3.2 \text{ Amphoteric}$$

$$\sqrt{\phi} > 3.2 \quad \text{acidic}$$

ans Predict the nature of metal oxide if Polarising power of metal Cation is 2.1

$$\phi = 2.1$$

$$\sqrt{\phi} < 2.1$$

Ans = Basic

$$H_2SO_3 < H_2SO_4$$

$$11^{th} \longrightarrow \underline{Notes} + \underline{sheet}$$

$$book$$