

Oxidation & Reduction



SAFALTA CLASSTM

An Initiative by अमरउजाला

OXIDATION (आक्सीकरण)

AND

(अपचयन)

REDUCTION

OXIDATION (ऑक्सीकरण)



Compound ✓

वैद्युत ऋणात्मक ✓

➤ Addition of O_2 or any electronegative element.

O_2 या किसी इलेक्ट्रोनगेटिव तत्व को जोड़ना।

➤ Removal of an electro positive element or H_2 .

इलेक्ट्रो पॉजिटिव तत्व या H_2 को हटाना।



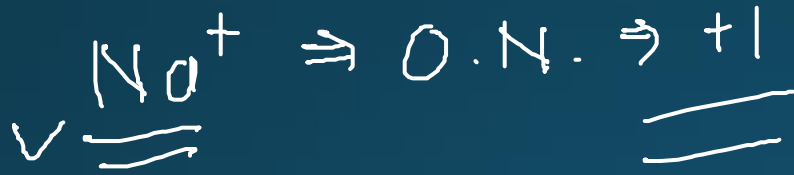
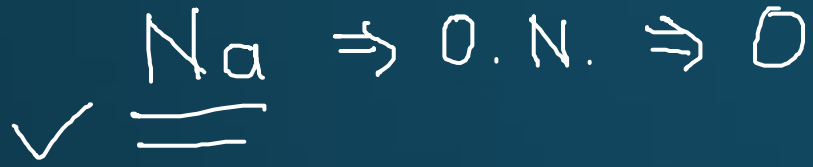
3

Oxidation Number → increase ✓
आक्सीकरण संख्या



* Oxidation No. \Rightarrow charge on Species.
अवस्था

\Rightarrow e.g.:



Atom \Rightarrow N \checkmark
ion \Rightarrow N⁺ or N⁻

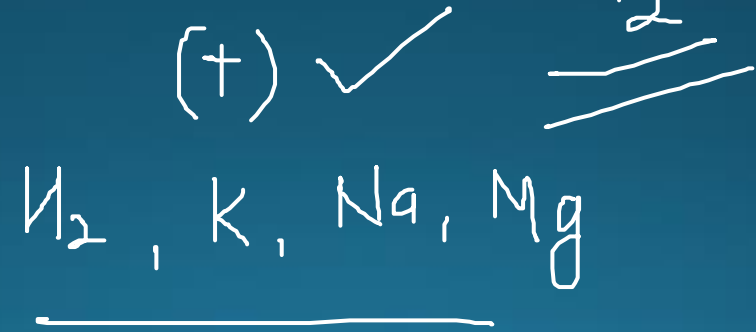
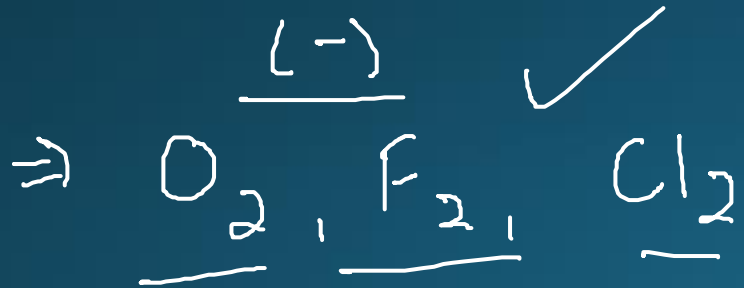
REDUCTION (अपचयन)



➤ Removal of an electro negative element or O₂.
इलेक्ट्रो निगेटिव तत्व या को हटाना।



➤ Addition of an electro positive element or H₂.
एक इलेक्ट्रो पॉजिटिव तत्व या H₂ का जोड़।

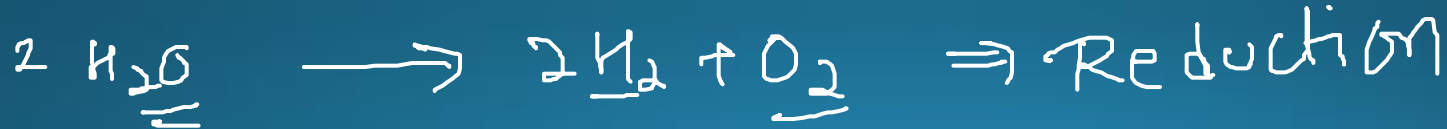
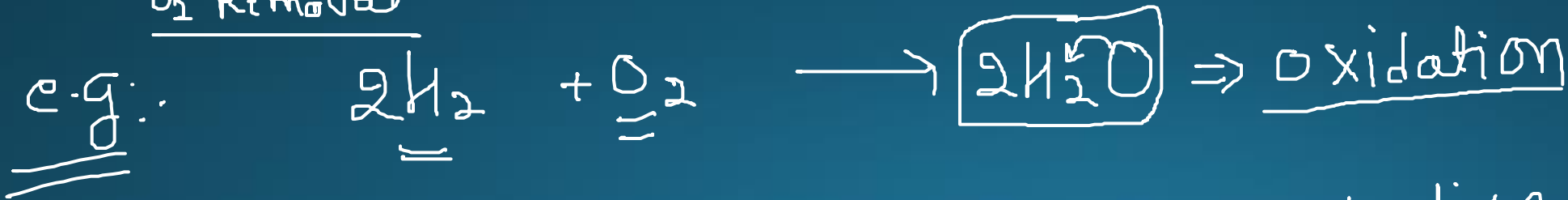
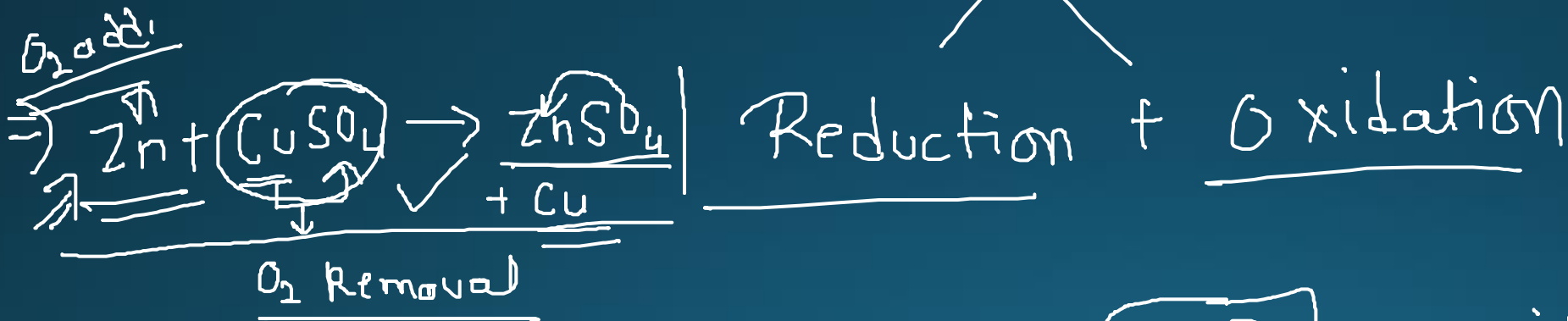


③ Oxidation Number decreases.

$\begin{array}{c} \text{e}^- \text{ gain} \\ \text{H}_2 + \text{F}_2 \\ \text{1} \quad \text{0} \\ \text{1} \quad \text{1} \end{array} \longrightarrow \text{2HF} \xrightarrow{\text{Redox}}$

⇒

REDOX



OXIDATION NUMBER (ऑक्सीकरण संख्या)

① Element in general \rightarrow Neutral state

N \rightarrow oxidation
Number ≥ 0
(No charge)



e.g. Na, K, Cl₂, F₂, Ca, Ti,

✓
N₂, O₂

② Compounds (यौगिक): - Oxidation number = 0
(Always)

e.g.:

{
H₂O
H₂SO₄
HCl
H₂O₂
NH₃
HNO₃

→ O.N. = 0

ELECTRONEGATIVITY (वैद्युतीय ऋणात्मकता)

✓
✓
➤ Electronegativity is a measure of the tendency of an atom to attract a bonding pair of electrons. The Pauling scale is the most commonly used.



✓
➤ Fluorine (the most electronegative element) is assigned a value of 4.0.

✓
➤ values range down to cesium and francium which are the least electronegative at 0.7

ELECTRONEGATIVITY

H 2,1											B 2,0	C 2,5	N 3,0	O 3,5	F 4,0	
Li 1,0	Be 1,6											Al 1,5	Si 1,8	P 2,1	S 2,5	Cl 3,0
Na 0,9	Mg 1,2											Ga 1,6	Ge 1,8	As 2,0	Se 2,4	Br 2,8
K 0,8	Ca 1,0	Sc 1,3	Ti 1,5	V 1,6	Cr 1,6	Mn 1,5	Fe 1,8	Co 1,9	Ni 1,9	Cu 1,9	Zn 1,6	In 1,7	Sn 1,8	Sb 1,9	Te 2,1	I 2,5
Rb 0,8	Sr 1,0	Y 1,2	Zr 1,4	Nb 1,6	Mo 1,8	Tc 1,9	Ru 2,2	Rh 2,2	Pd 2,2	Ag 1,9	Cd 1,7	Hg 1,9	Pb 1,9	Bi 1,9	Po 2,0	At 2,1
Cs 0,7	Ba 0,9	La 1,0	Hf 1,3	Ta 1,5	W 1,7	Re 1,9	Os 2,2	Ir 2,2	Pt 2,2	Au 2,4						

low

medium

high



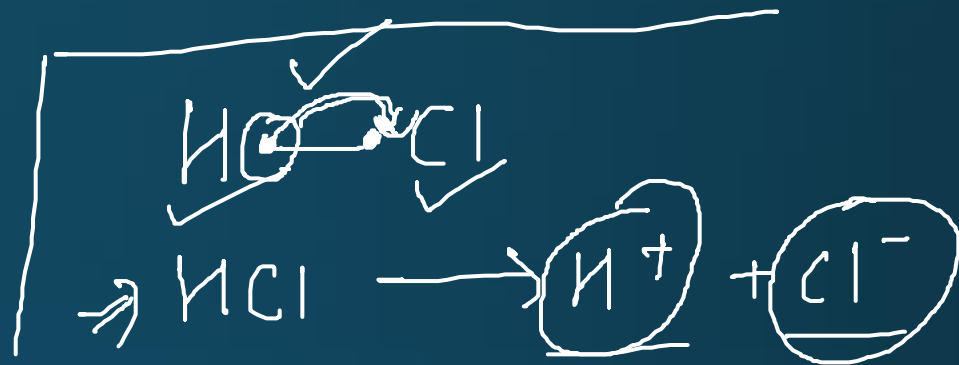
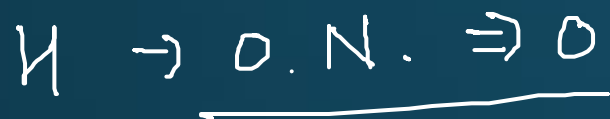
TABLE 1.1 ELECTRONEGATIVITY VALUES OF SOME COMMON ELEMENTS

Increasing electronegativity

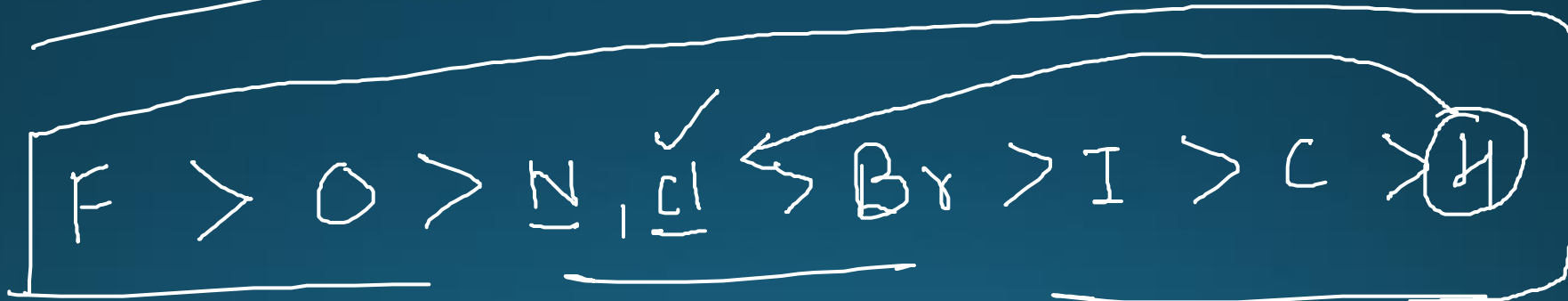


		H 2.1					
Li 1.0	Be 1.5	B 2.0	C 2.5	N 3.0	O 3.5	F 4.0	
Na 0.9	Mg 1.2	Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0	Increasing electronegativity
K 0.8						Br 2.8	

* Total formal charge on an atom in species.



\Rightarrow





Structure:-



O.N

By ✓
Structure

↓
Accurate
100%

②

By formula
↓
95%
Accurate

2

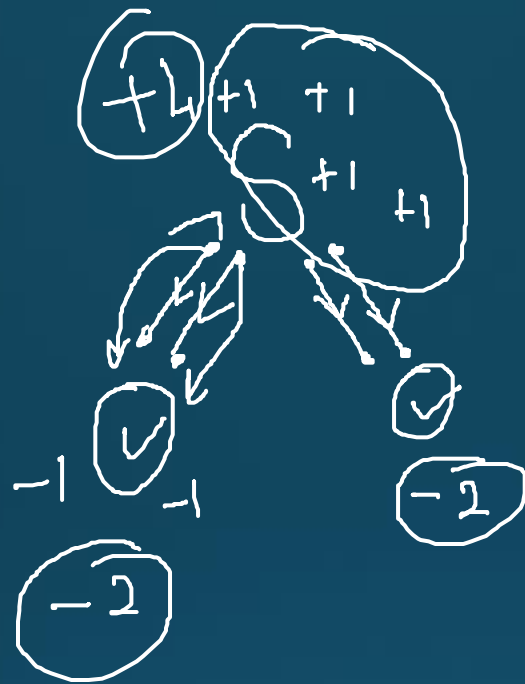
SO₂

S → O.N. ⇒ +4

O → O.N. ⇒ -2

O → O.N. ⇒ -2

=====

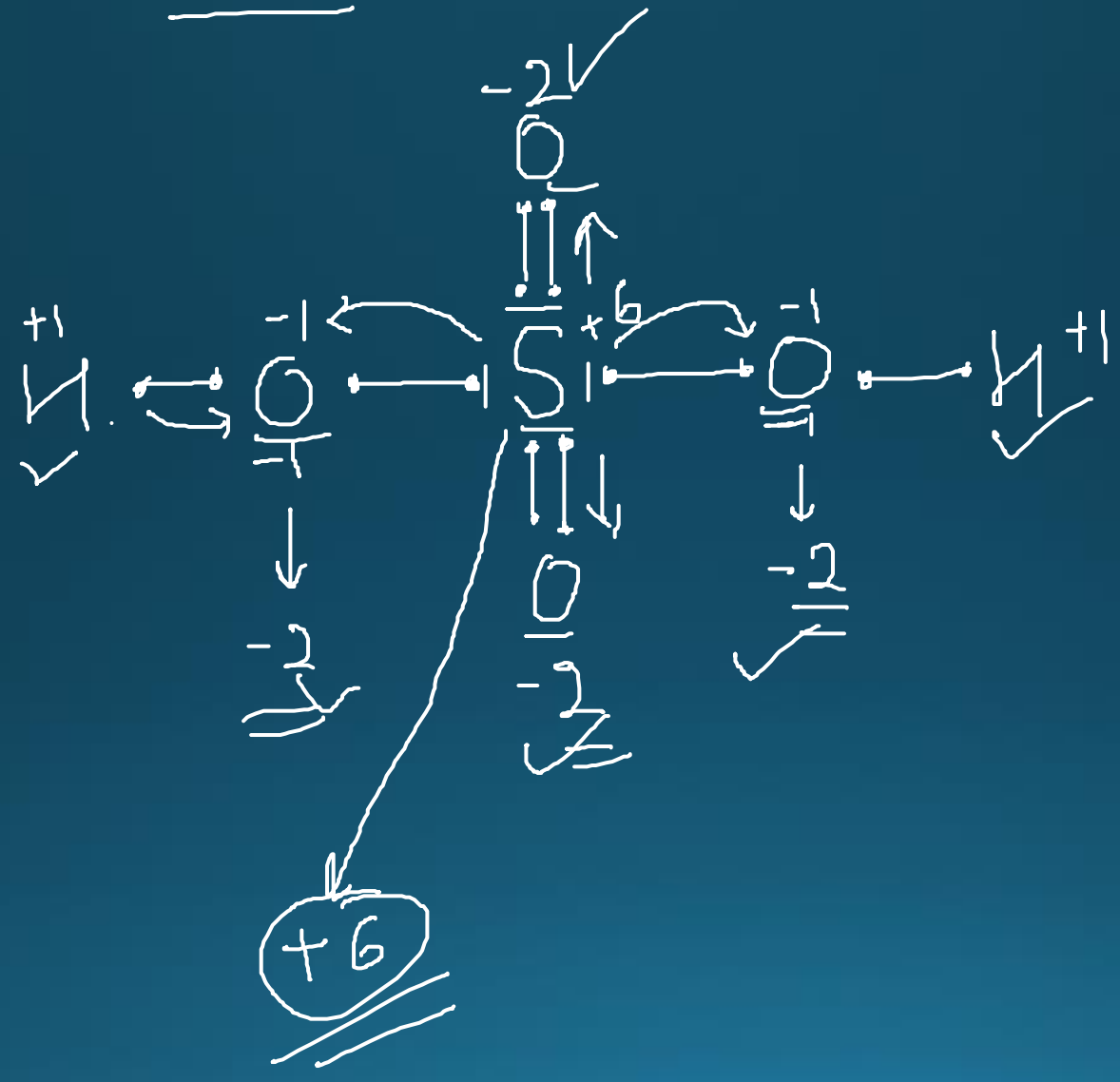


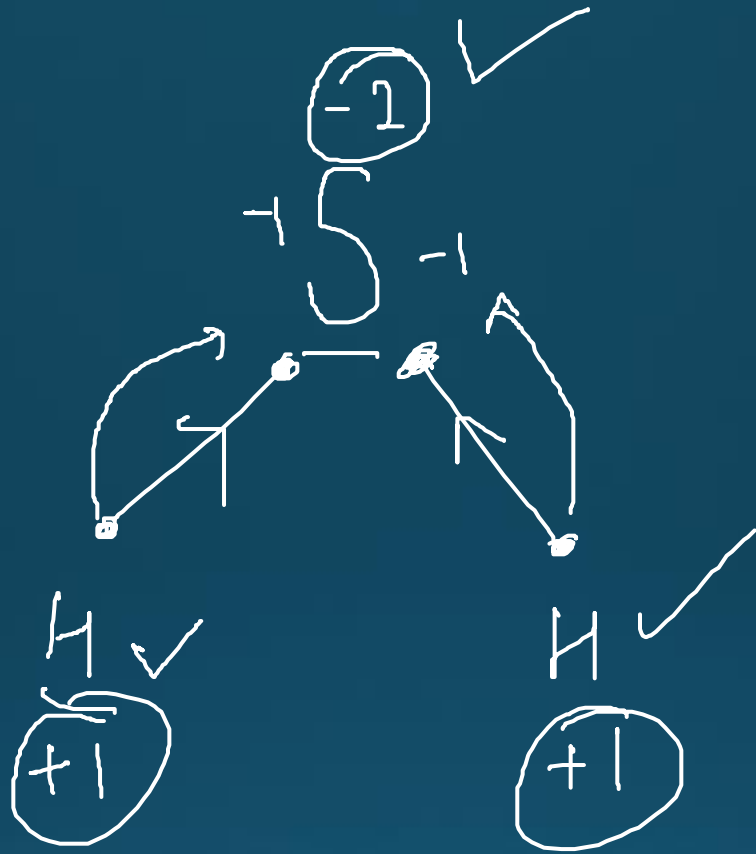
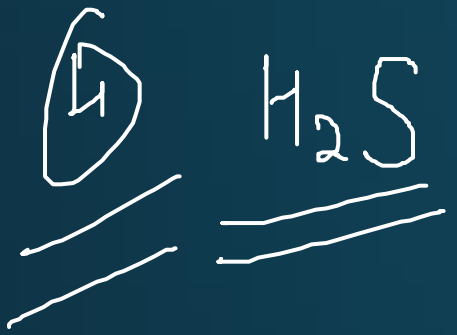


G.N.

S → +6

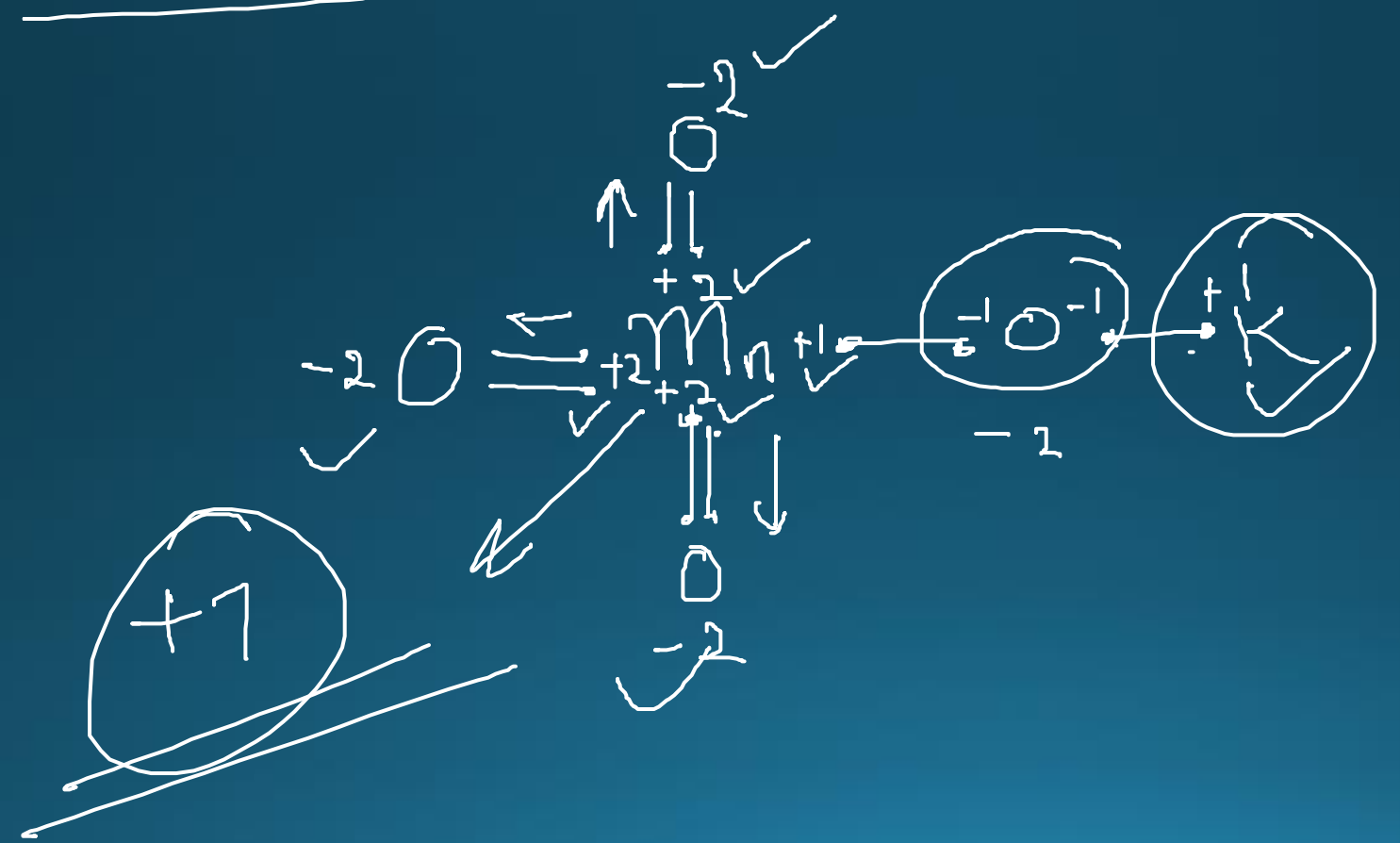
O →





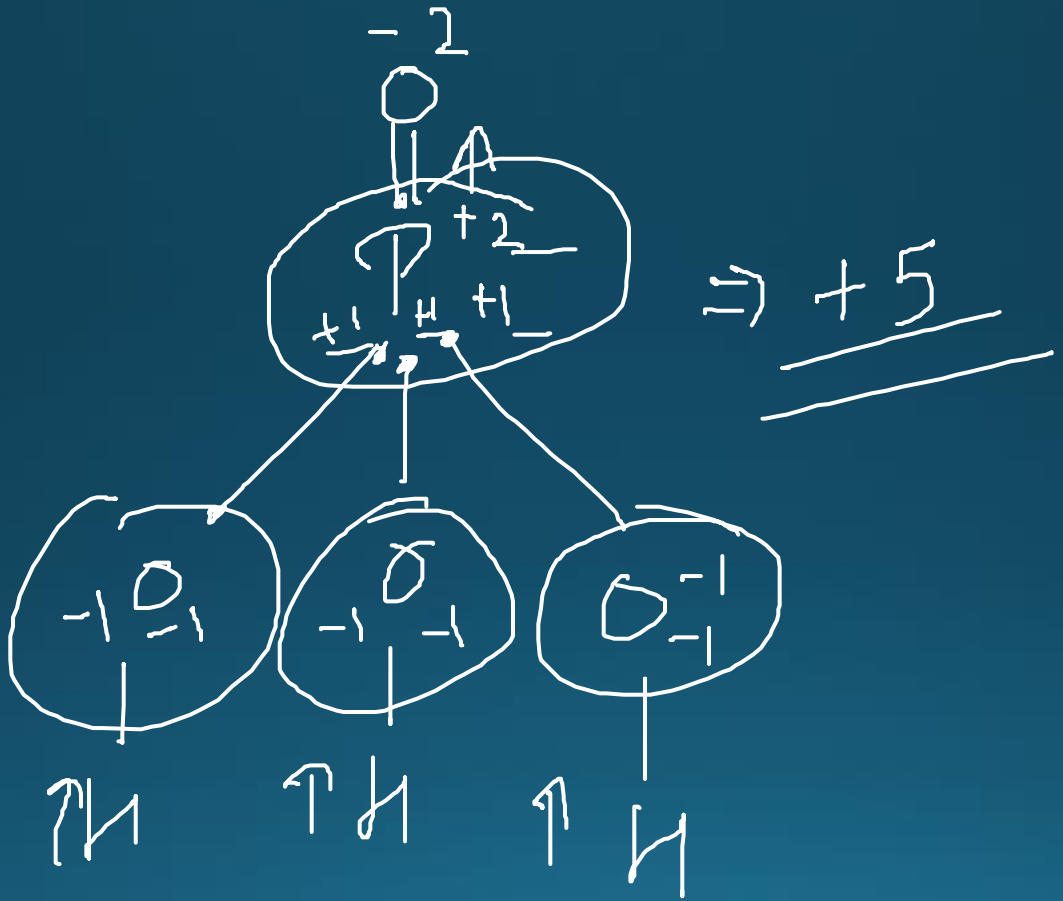
⑤ $KMnO_4$ (Potassium Permanganate)

Mn का O.N. = ?

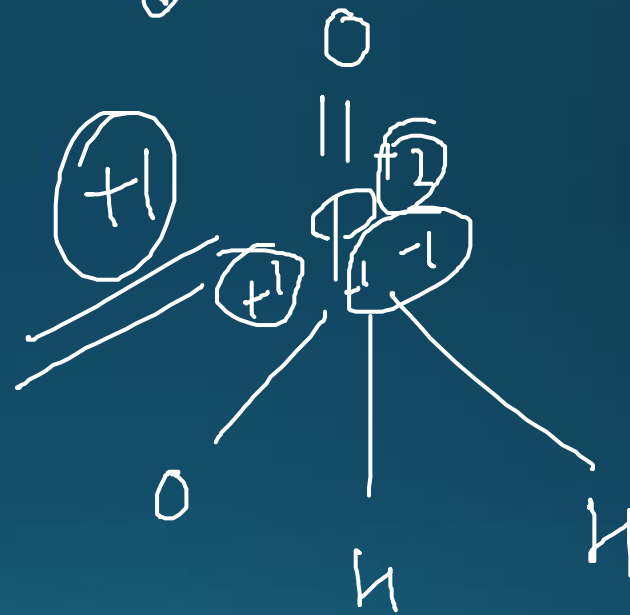
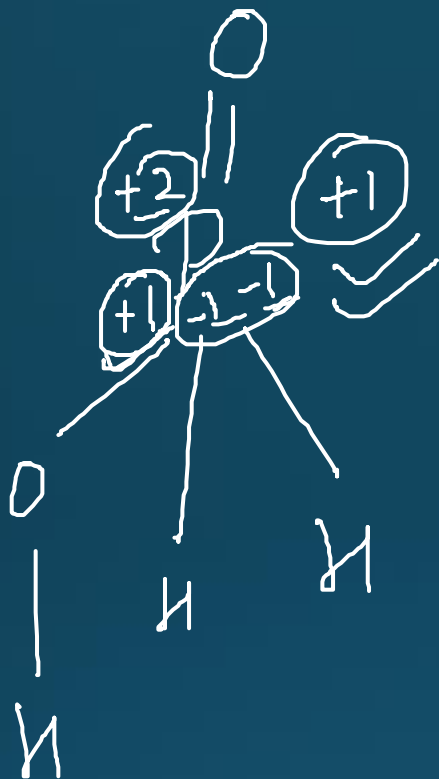
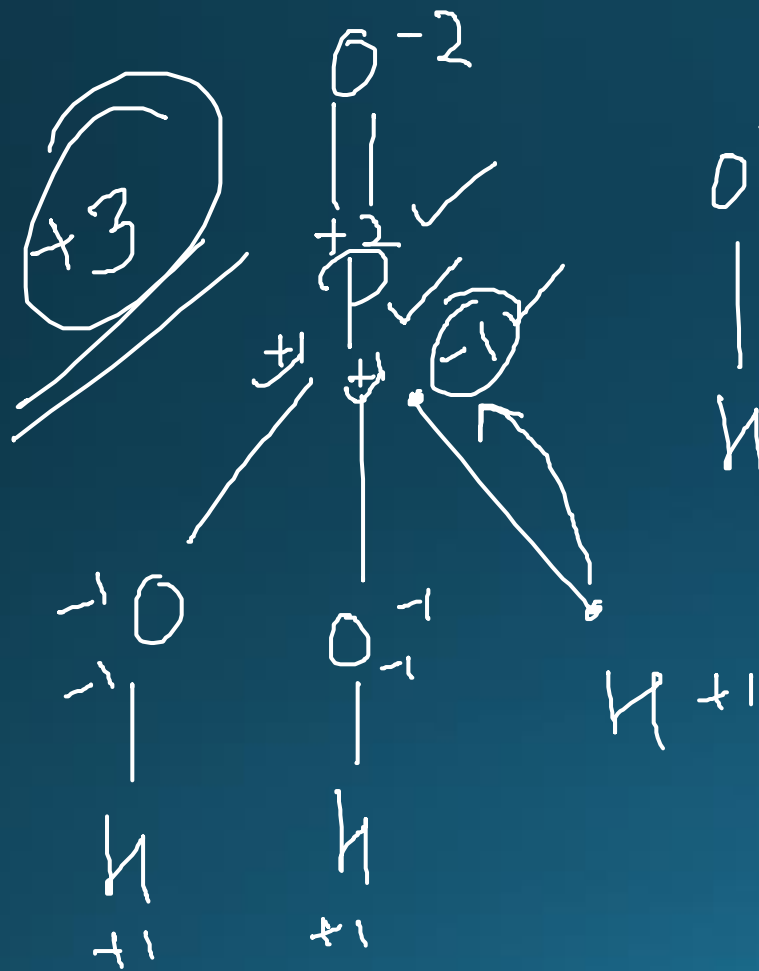




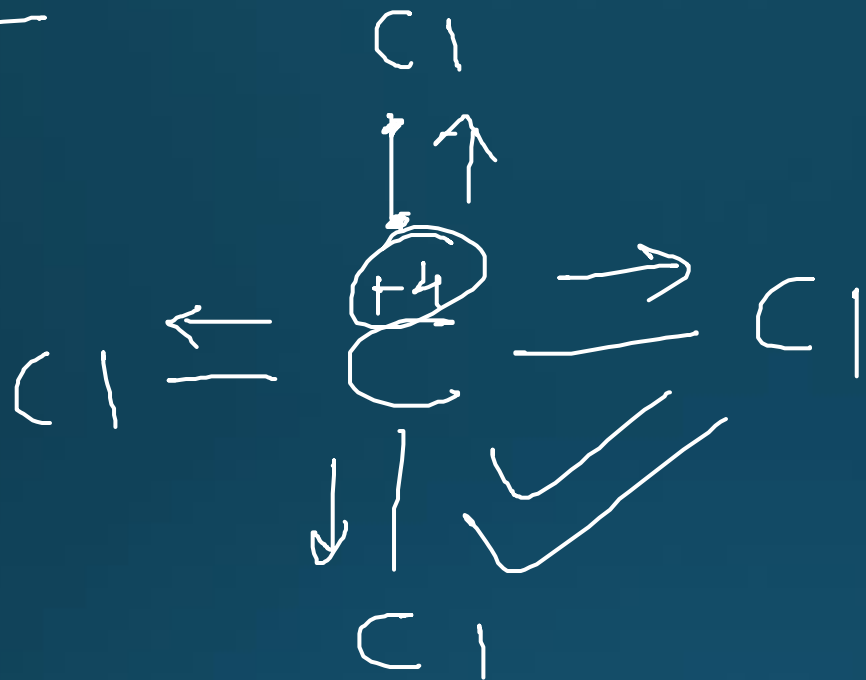
P ၏ O.N. = ?



*



* CCl₄



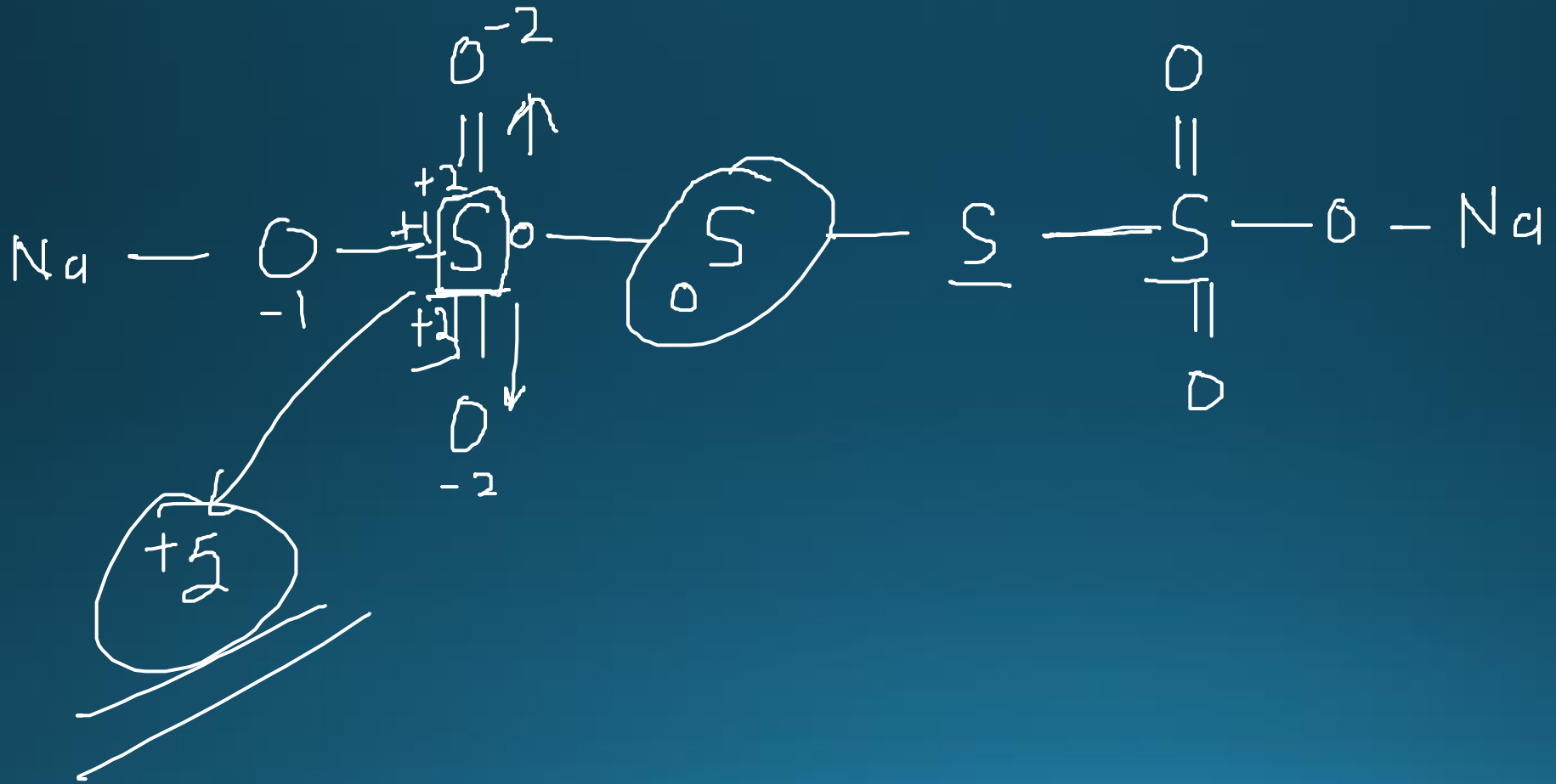
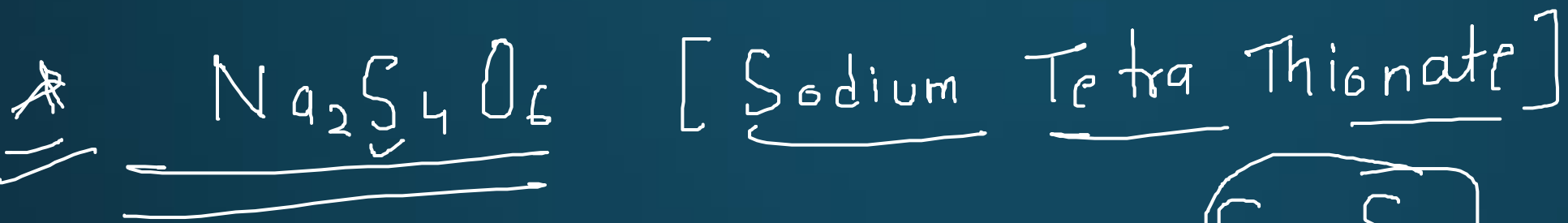
Oxidation Number

can be → ① Positive ✓

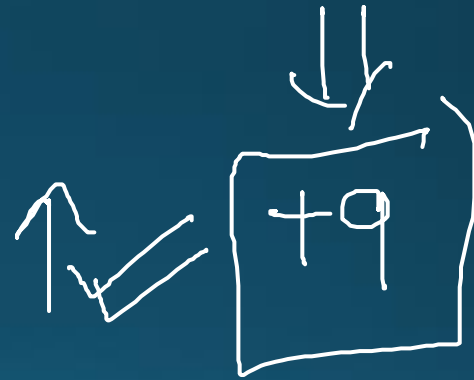
② Negative ✓

③ Zero ✓

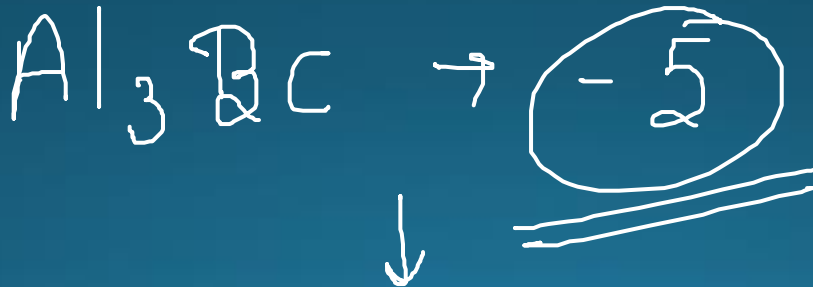
~~④~~ All of them



* Maximum Oxidation Number:-



* Lowest O.N:-



* Peroxide:-



* Alkali Metals: - Li, Na, K, Rb, Cs, Fr)
आम धातुएँ Ox. No. \Rightarrow +1

* Alkaline earth Metal: - [Be, Mg, Ca, Sr, Ba, Ra)
आसीय मृदा धातुएँ Ox. No. \Rightarrow +2

* Fluorine \Rightarrow -1 * Oxygen \Rightarrow -2

* Halogens \rightarrow Cl, Br, I \rightarrow -1

① Formula \Rightarrow

Sum of O.S. of all atoms
= Total charge on Species

H₂O \rightarrow O की O.N = ?

$$x + 2(+1) = \underline{\underline{0}}$$

$$\boxed{x = -2} \quad \checkmark$$



$$\underline{\underline{S \text{ की O.N. = ?}}}$$

↓

$$x + 2(+1) = 0$$

$$x = -2$$



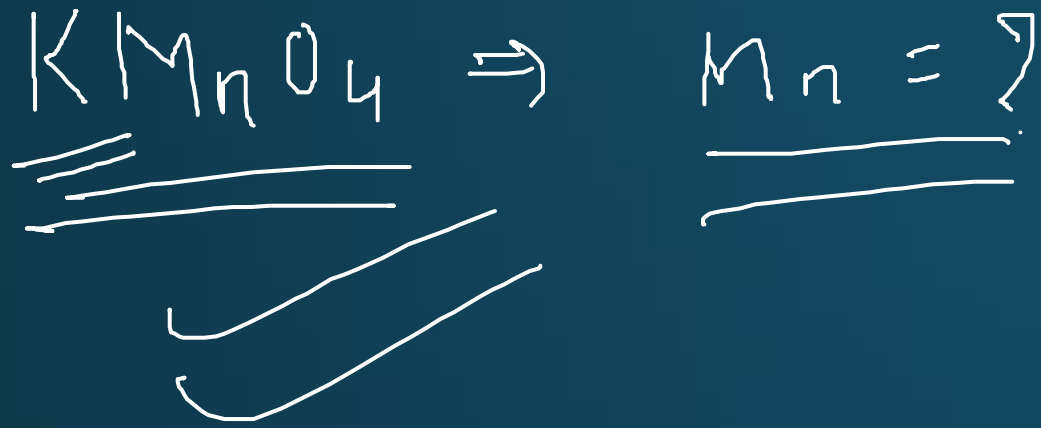
$$x + 4(-2) = \underline{\underline{0}}$$

$$x = +8$$



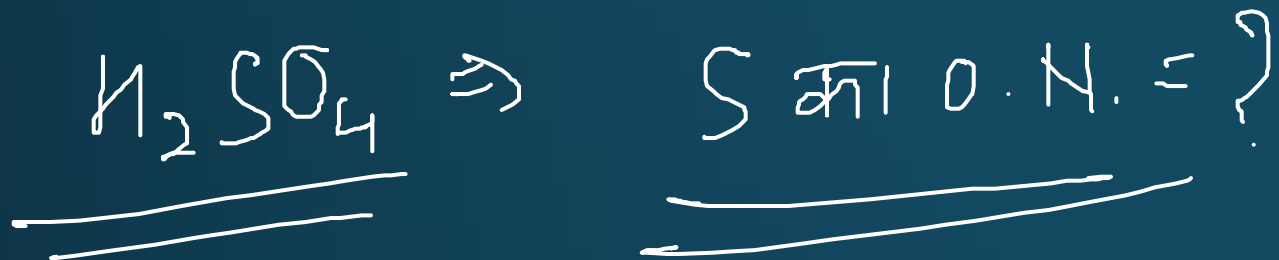
$$\Rightarrow x + 4(-2) = \underline{\underline{-1}}$$

$$x = -7 \quad \checkmark$$



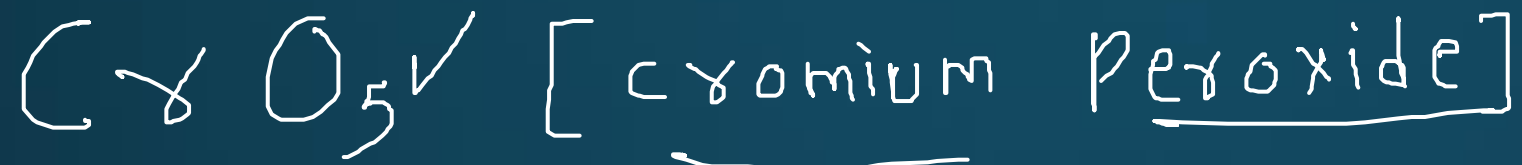
$$x + \underline{4(-2)} + \underline{(+1)} = 0$$

$$\boxed{x = +7}$$



$$x + 4(-2) + 2(+1) = 0$$

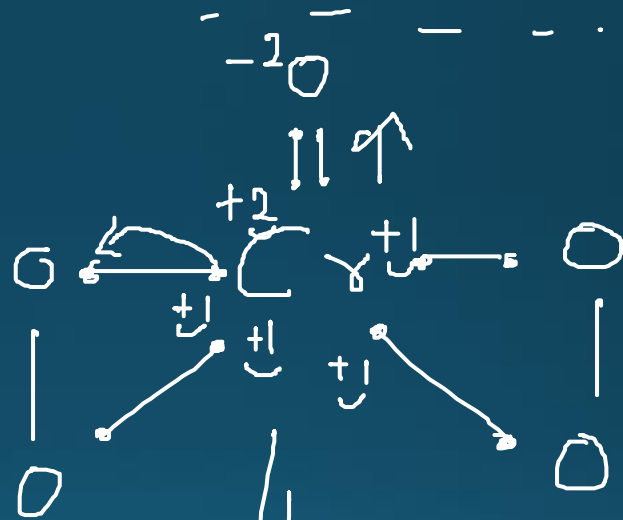
$$x = 6$$



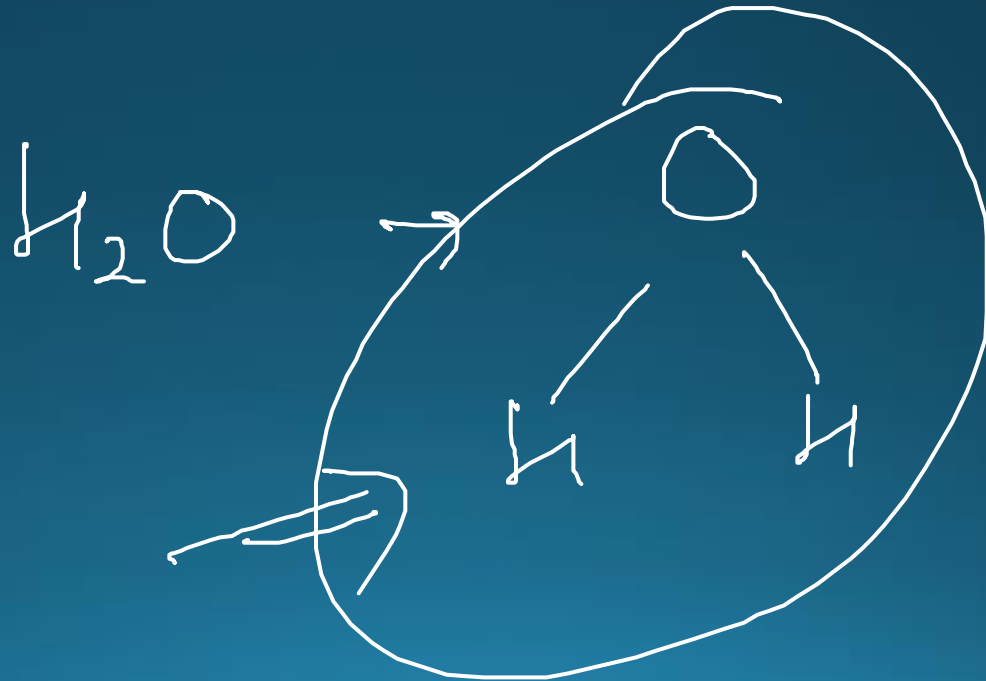
Cr oxidation Number = ?

$$\text{Cr} + 5[-2] = 0$$

$\text{Cr} = +10$ X



Right → +6



**Don't Forget to Like /
Comment & Share this
video**



www.Youtube.com/safaltaclass



www.Facebook.com/safaltaclass



www.Instagram.com/safaltaclass



Google Play
Store



SAFALTACLASS