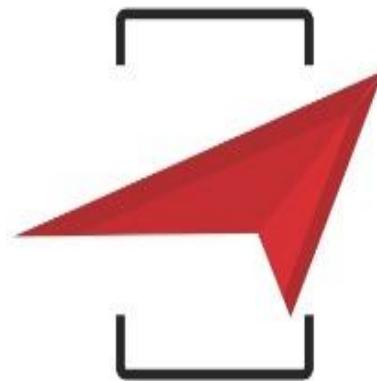


~~Chemical Reaction~~ { Oxidation ✕
Reduction ✓ }



SAFALTA CLASS™

An Initiative by **अमरउजाला**

Different Types of Chemical Reactions

2

(विभिन्न प्रकार के
रसायनिक अभिक्रियाएं)

Please
stop
calling
me
a
careless
zebra
instead
try
learning
now
copper
saves
gold

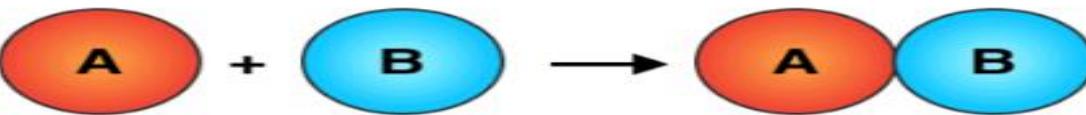
Reactivity series of metals

K	Potassium ✓	Most reactive
Na	Sodium ✓	
Ca	Calcium	
Mg	Magnesium	
Al	Aluminium	
C	Carbon	
Zn	Zinc	
H	Hydrogen	Increasingly reactive
Fe	Ferum	
Sn	Tin	
Pb	Lead	
Cu	Copper	
Hg	Mercury	
Ag	Silver ✓	
Au	Gold ✓	Least reactive

5



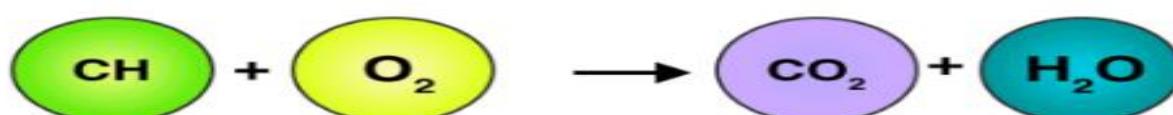
Combination reaction



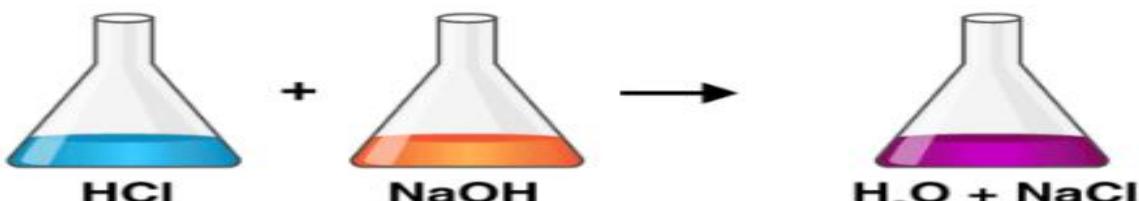
Decomposition reaction



Combustion reaction

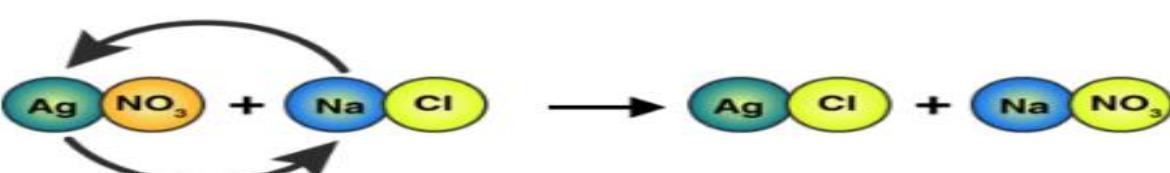


Neutralization reaction



Acid + Base → H⁺OH⁺ + Salt

Displacement reaction



1. Combination Reaction (संयोजन अभिक्रियाएं)



A reaction in which two or more reactants combine to form a single product is known as a combination reaction.

एक अभिक्रिया जिसमें एक उत्पाद बनाने के लिए दो या दो से अधिक अभिकारकों का संयोजन होता है,

एक संयोजन अभिक्रिया के रूप में जाना जाता है।

It takes the form of - $\underline{X} + \underline{Y} \rightarrow \underline{\underline{XY}}$

Combination reaction is also known as a synthesis reaction.

एक संयोजन अभिक्रिया को संश्लेषण अभिक्रिया के रूप में भी जाना जाता है।



Example : $2 \text{Na} + \text{Cl}_2 \rightarrow 2 \text{NaCl}$

- More Examples:



2. Decomposition Reaction (अपघटन प्रतिक्रिया)

A reaction in which a *single compound* breaks into two or more simpler compounds is known as a decomposition reaction.

एक अभिक्रिया जिसमें एक एकल यौगिक दो या दो से अधिक सरल यौगिकों में विघटित होता है, एक

अपघटन अभिक्रिया के रूप में जाना जाता है। $\text{X} + \text{Y} \rightarrow \text{XY}$

It takes the form of -



A decomposition reaction is just the opposite of ~~combination reaction~~.

एक अपघटन अभिक्रिया संयोजन अभिक्रिया के ठीक विपरीत है।



- The reaction in which a compound decomposes due to heating is known as a thermal decomposition reaction. जिस अभिक्रिया में एक यौगिक हीटिंग के कारण विघटित हो

जाता है उसे थर्मल अपघटन अभिक्रिया के रूप में जाना जाता है।

More Examples:

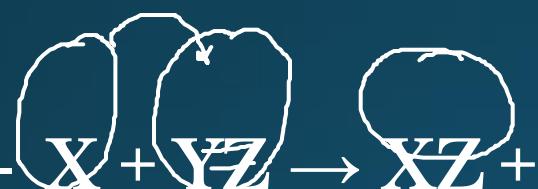


3. Displacement Reaction (विस्थापन अभिक्रिया)

A chemical reaction in which a *more reactive element displaces a less reactive element from its aqueous salt solution.*

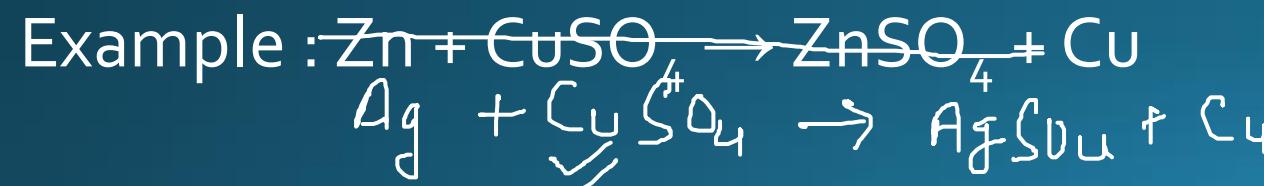
एक रासायनिक अभिक्रिया जिसमें एक अधिक अभिक्रियाशील तत्व अपने जलीय नमक समाधान से कम

अभिक्रियाशील तत्व को विस्थापित करता है।

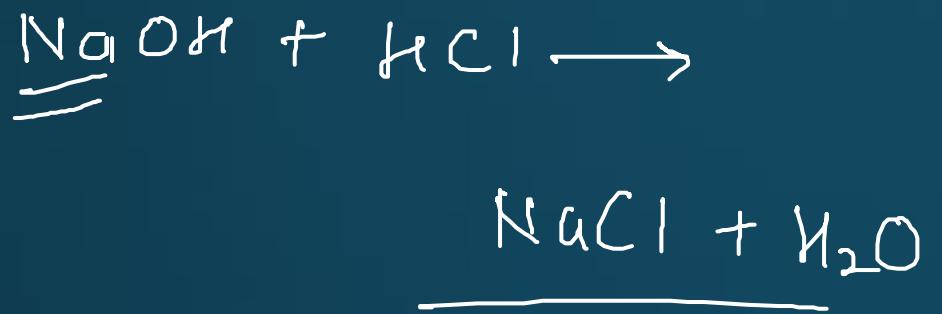


It takes the form - $\underline{X} + \underline{YZ} \rightarrow \underline{XZ} + \underline{Y}$

It is also called a substitution reaction
इसे प्रतिस्थापन अभिक्रिया भी कहा जाता है



- More Examples:



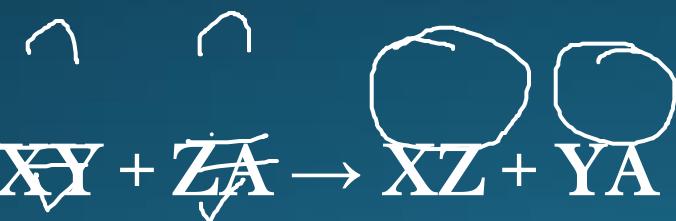
4. Double Displacement Reaction (डबल विस्थापन अभिक्रिया)



A chemical reaction in which *ions gets exchanged between two reactants which form a new compound* is called a double displacement reaction.

एक रासायनिक अभिक्रिया जिसमें दो अभिकारकों के बीच आयनों का आदान-प्रदान होता है, जो एक नए

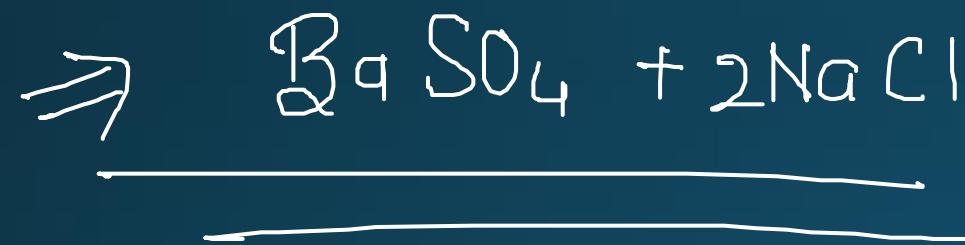
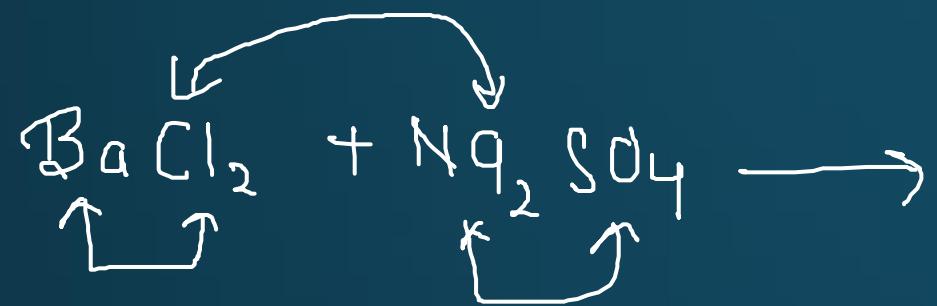
यौगिक का निर्माण करता है, दोहरी विस्थापन अभिक्रिया कहलाती है।



It takes the form of - $\overset{\wedge}{XY} + \overset{\wedge}{ZA} \rightarrow \overset{\wedge}{XZ} + \overset{\wedge}{YA}$

It is also called a metathesis reaction
इसे मेटाथिसिस अभिक्रिया भी कहा जाता है

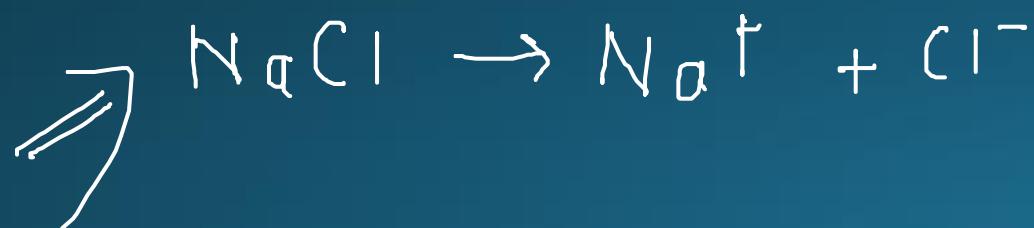
Example : $\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$



5. Precipitation Reaction (अवक्षेपण अभिक्रिया)

A chemical reaction that involves the *formation of an insoluble product* (precipitate; solid) is called Precipitation reaction.

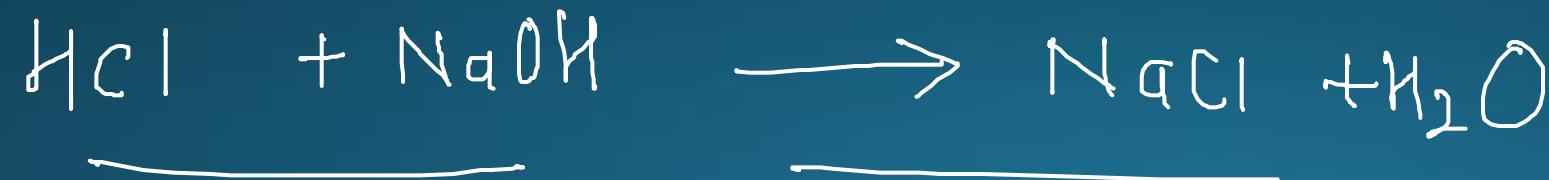
एक रासायनिक अभिक्रिया जिसमें एक अघुलनशील उत्पाद (अवक्षेपण; ठोस) का निर्माण होता है, को एक अवक्षेपण अभिक्रिया कहा जाता है।



6. Neutralization Reaction (उदासीनीकरण अभिक्रिया)

- Neutralization is a chemical reaction in which acid and a base react quantitatively with each other. In a reaction in water.
- जिन अभिक्रियाओं में अम्ल तथा क्षार क्रिया करके जल एवं लवण बनाते हैं उन क्रियाओं

को रसायन विज्ञान में उदासीनीकरण अभिक्रिया(neutralization) कहते हैं।



OXIDATION

ବ୍ୟାପାରିକ ଅଧ୍ୟୋତ୍ତମା

AND

ବ୍ୟାପାରିକ

REDUCTION

① Oxygen (आक्षयिक)

② Hydrogen ✓

③ electrons ✓

Oxidation

उत्तमीकरण

Gain (जुट) ✓

Loss (कमी)

✓ Loss (कमी)

Reduction

अवृद्धि

✓ Less (कमी)

✓ Gain (जुट)

Gain

OXIDATION (ऑक्सीकरण)

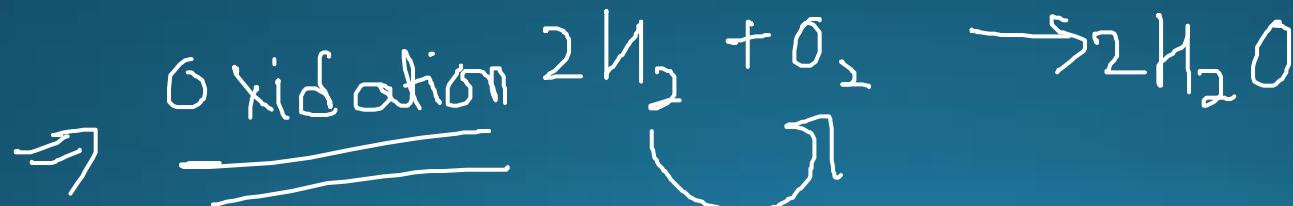
- Addition of O₂ or any electronegative element.

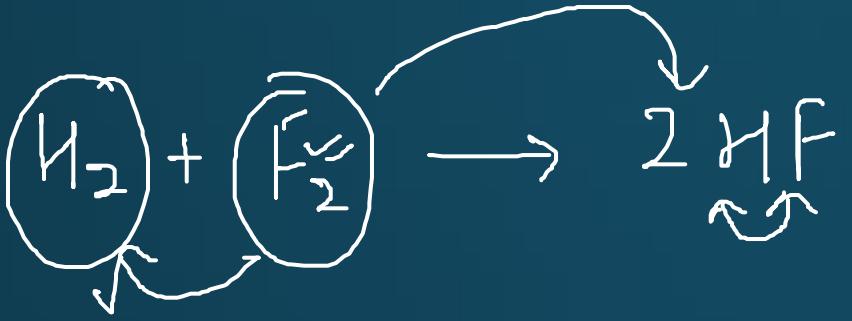
O₂ या किसी इलेक्ट्रोनगेटिव तत्व को जोड़ना।



- Removal of an electro positive element or H₂.

इलेक्ट्रो पॉजिटिव तत्व या H₂ को हटाना।





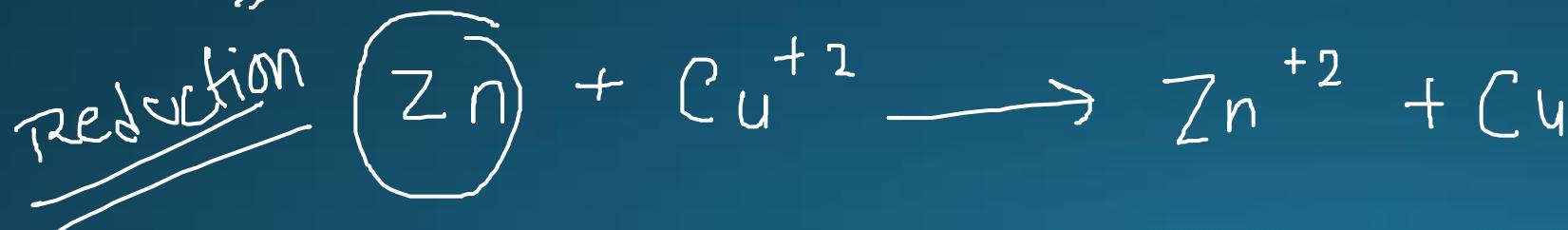
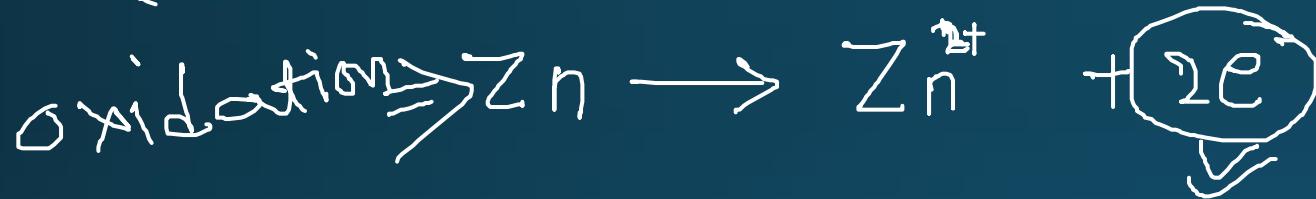
\Rightarrow Redox \Rightarrow Oxidation + Reduction
ରେଡ଼ୋକ୍ସିଡ଼େସନ୍ ହେଉଥିଲା ଅଧିକରଣ + ଅପରାପନ

\Rightarrow F \rightarrow Reduction (addition \rightarrow H)

H \rightarrow oxidation (electronegative)

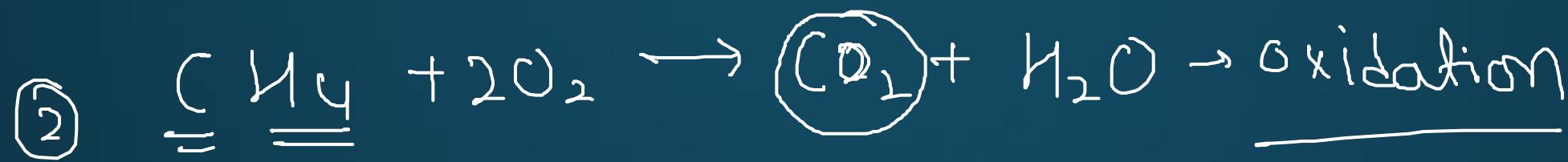


Redox Reaction



REDUCTION (अपचयन)

- Removal of an electro negative element or o₂.
इलेक्ट्रो निगेटिव तत्व या O_2 को हटाना |
- Addition of an electro positive element or h₂.
एक इलेक्ट्रो पॉजिटिव तत्व या H_2 का जोड़ |



ELECTRONEGATIVITY (वैद्युतीयऋणात्मकता)

0.7

4

- 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

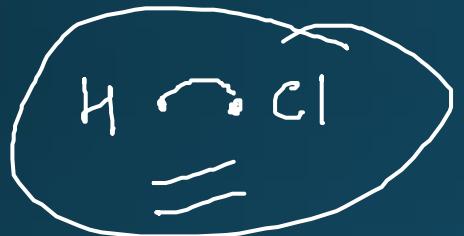
TABLE 1.1 ELECTRONEGATIVITY VALUES OF SOME COMMON ELEMENTS

Increasing electronegativity

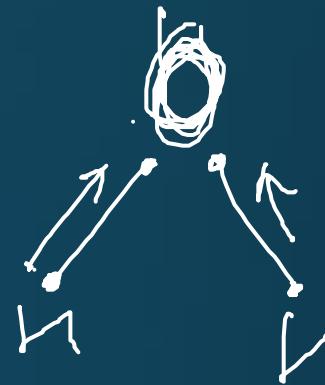
		H					
		2.1					
Li	Be	B	C	N	O	F	
1.0	1.5	2.0	2.5	3.0	3.5	4.0	
Na	Mg	Al	Si	P	S	Cl	
0.9	1.2	1.5	1.8	2.1	2.5	3.0	
K						Br	
0.8						2.8	

H Cl

H - Cl



F



OXIDATION NUMBER (ऑक्सीकरण संख्या)

Species \rightarrow (element, molecule or Compound)

- * Total number of e^- that an atom can either gain or loss in order to form covalent bond with other atom.

≡

e.g.

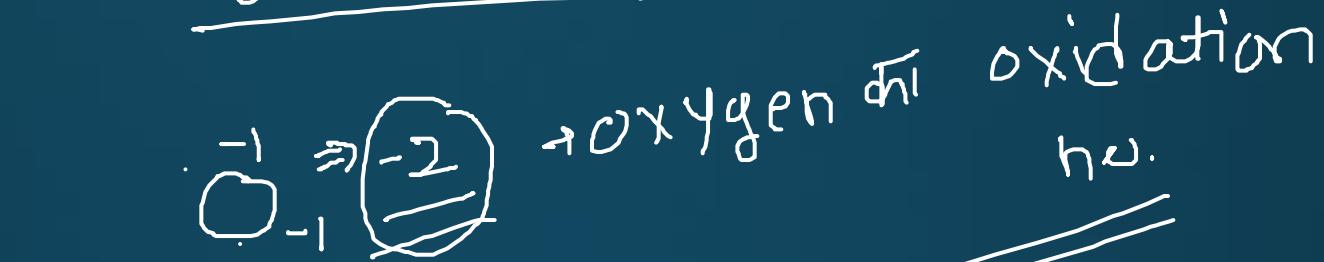


- ① By Structure \rightarrow 100%.
- ② By Formula \rightarrow

Oxygen = ?



Hydrogen = ?



h.v.



Hydrogen in
oxidation no.

ELECTRONEGATIVITY (वैद्युतीयऋणात्मकता)

- 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

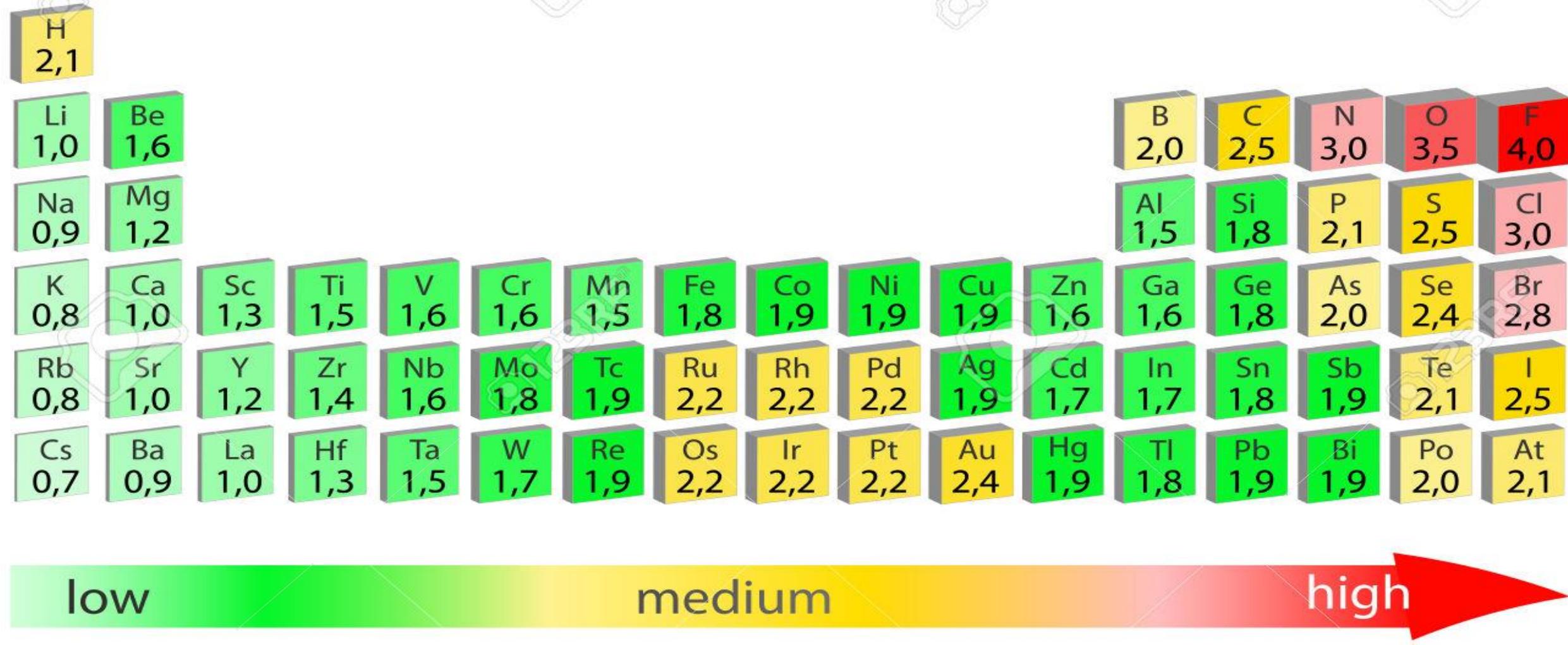
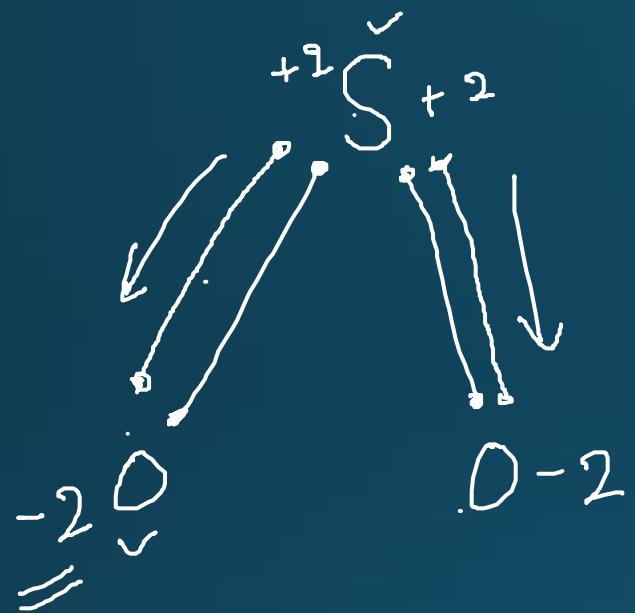


TABLE 1.1 ELECTRONEGATIVITY VALUES OF SOME COMMON ELEMENTS

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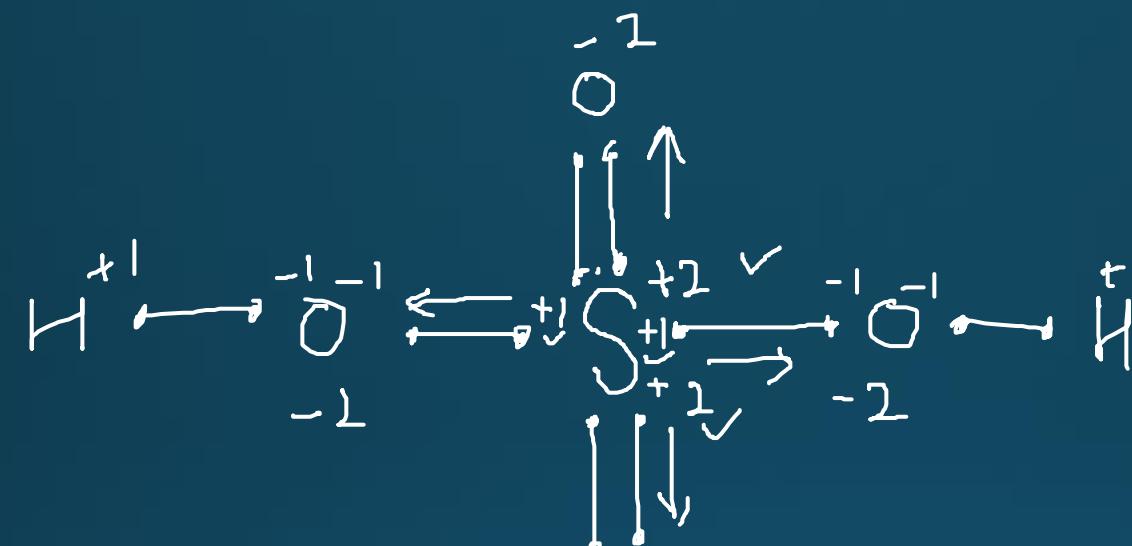
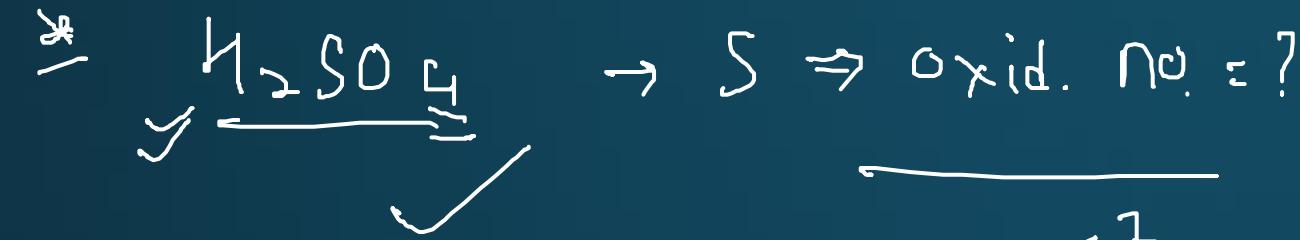
		H					
		2.1					
Li	Be	B	C	N	O	F	
1.0	1.5	2.0	2.5	3.0	3.5	4.0	
Na	Mg	Al	Si	P	S	Cl	
0.9	1.2	1.5	1.8	2.1	2.5	3.0	
K						Br	
0.8						2.8	

$\text{S} \text{O}_2$ \Rightarrow Oxygen and oxidation no. = ?



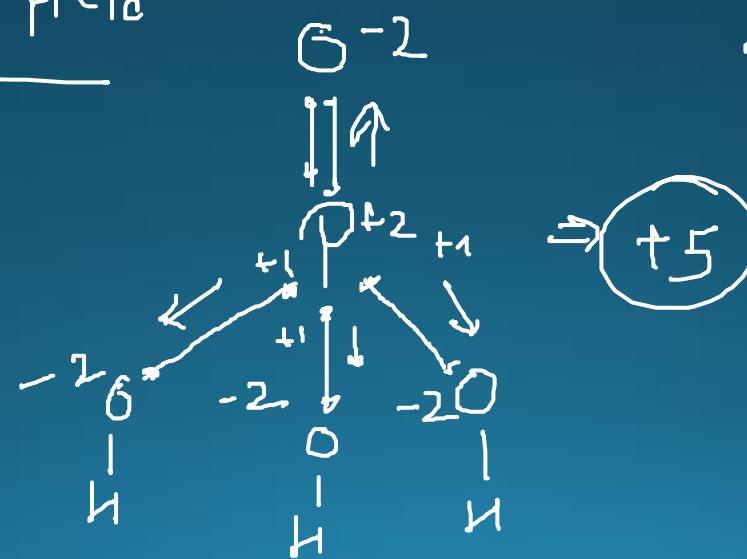
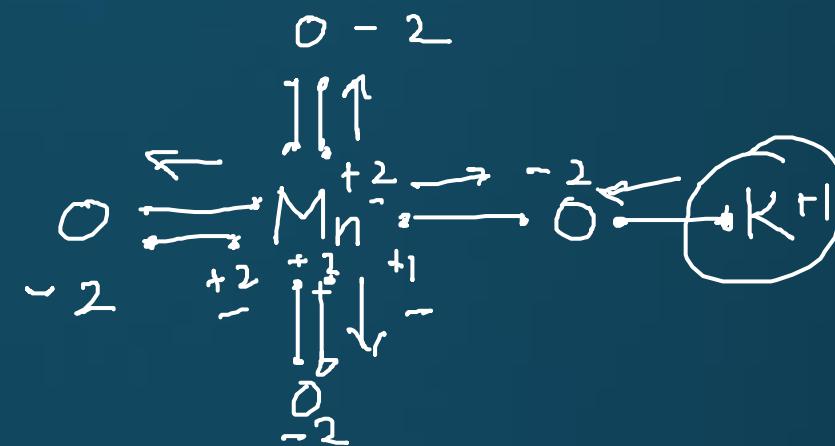
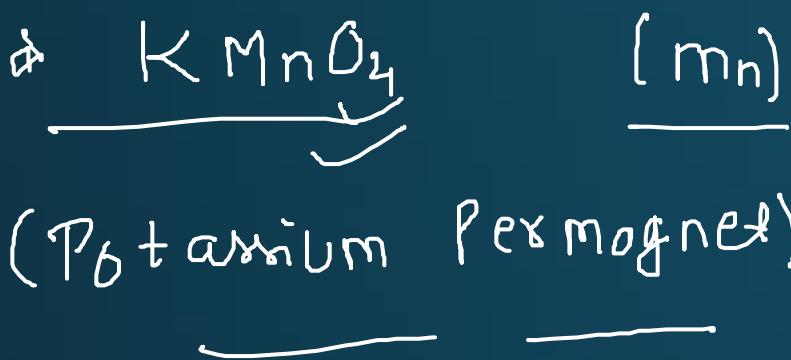
Total ox. No. for S $\Rightarrow +4$

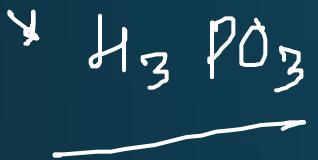
for oxygen $\Rightarrow -2$



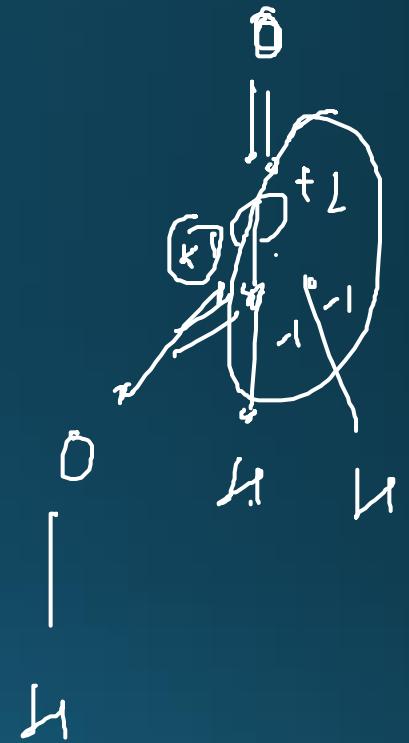
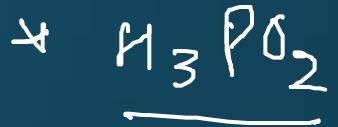
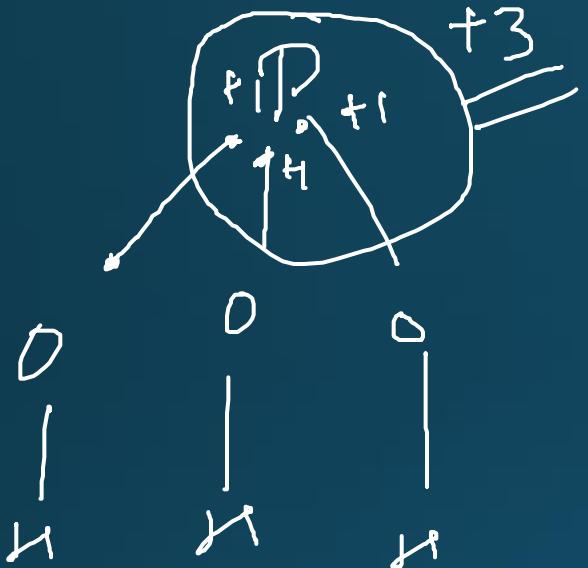
$$\text{Total} = +6$$



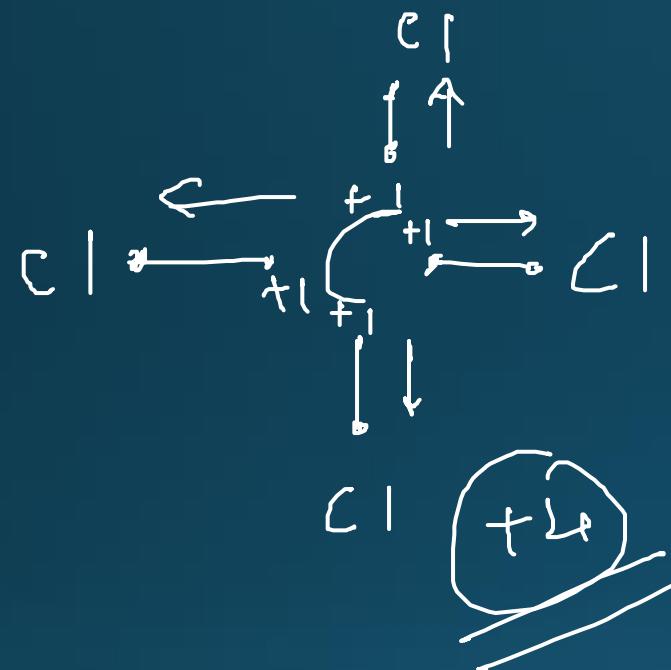




$P = ?$

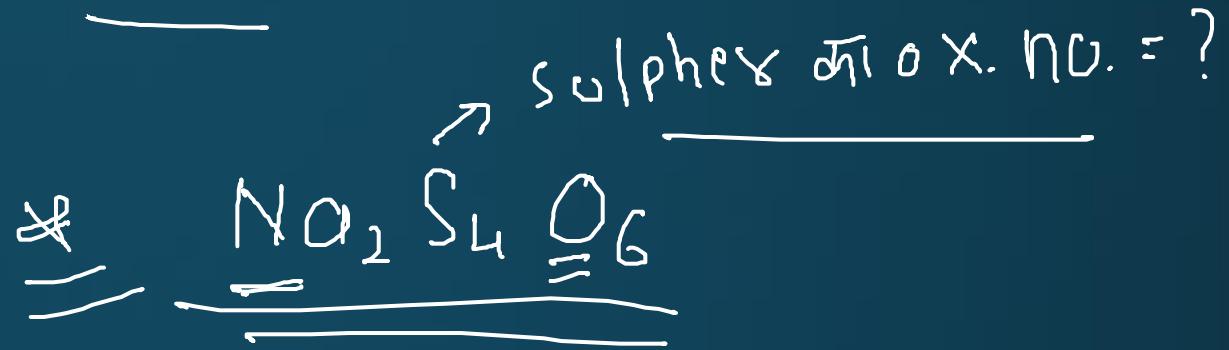


~~C~~ CCl_4 \Rightarrow C की ऑक्सिजन नंबर = ?

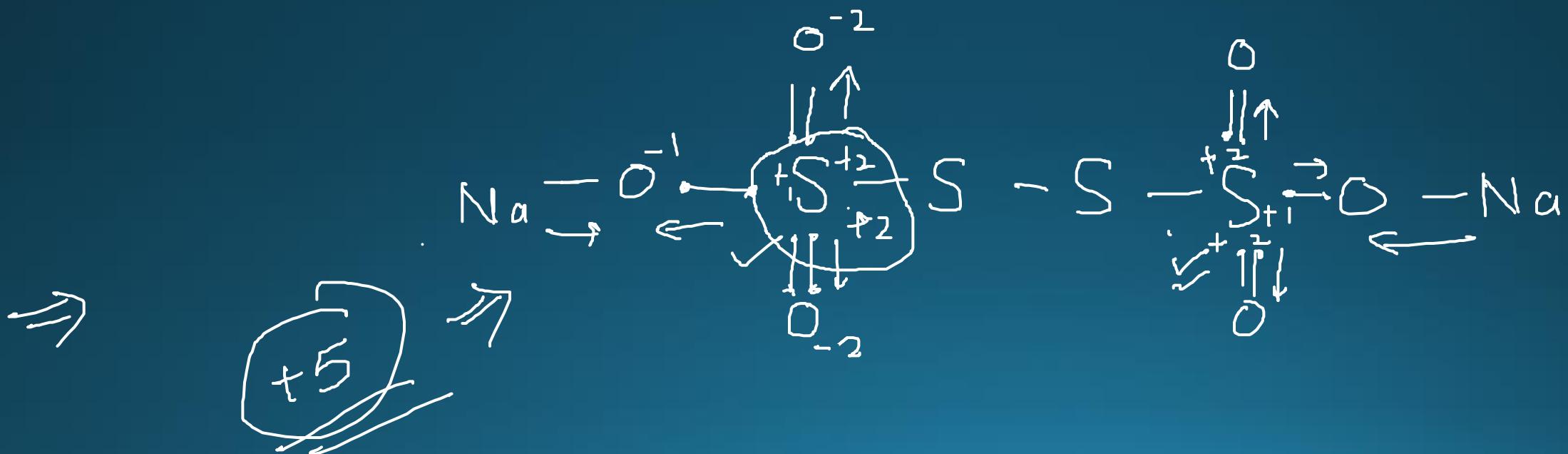


- \Rightarrow Oxidation number
- (i) Positive ✓ Negative
- Zero
- (ii) only Pos.
- (iii) only neg
- (iv) can't say.

\checkmark $O \rightarrow O$ \rightarrow zero oxidation number.



\Rightarrow Sodium Tetra Thionate)



Maximum Oxidation Numbers

⇒ maximum Number ⇒ +9 ✓



⇒ minimum number ⇒

~~-5~~

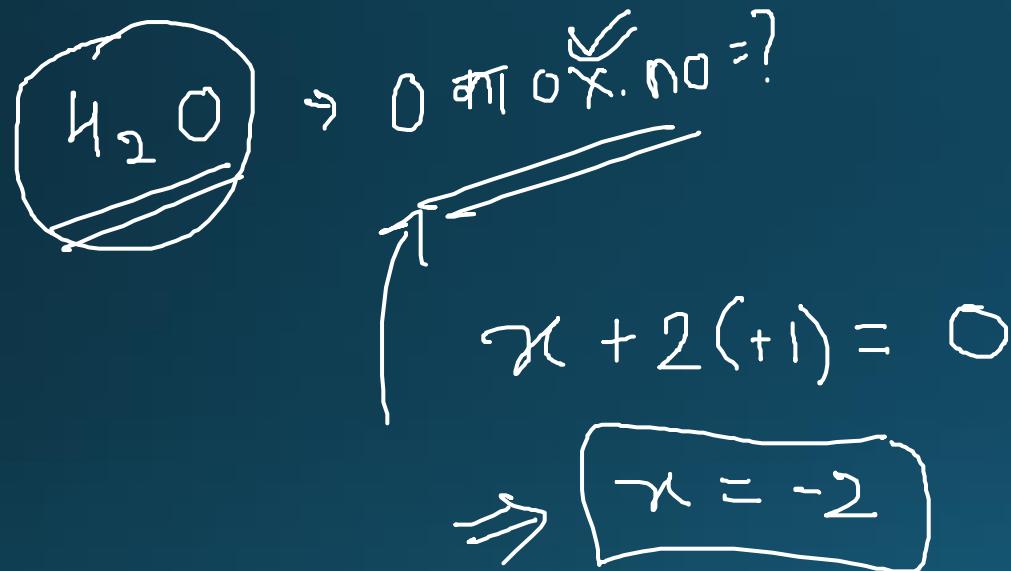


* Peroxides:-



⇒ By formula:-

[Total no. of oxidation of
species we know.]



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

$$\underline{x = -2}$$

* $\text{CIO}_4 \Rightarrow \text{Cl}_2?$

$$\text{CD}_4 \Rightarrow \text{O}$$

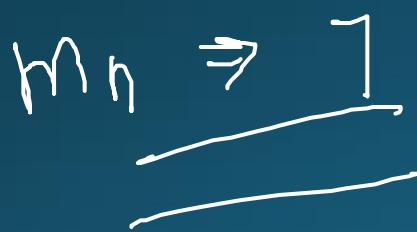
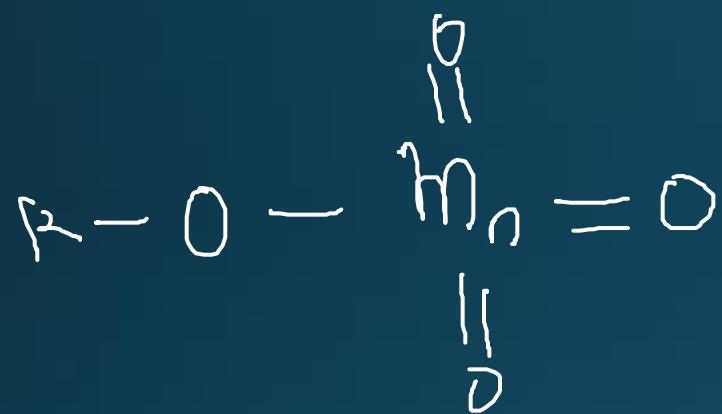
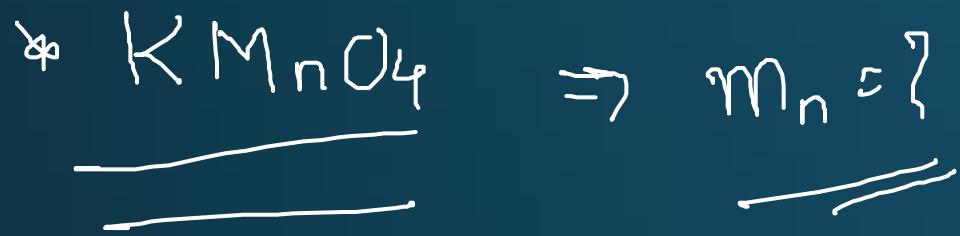
$$x + 4(-2) = 0$$

$$x = 8$$

* $\text{CIO}_4 \Rightarrow x + 4(-2) = -1$

$$x = -1 + 8$$

$$\underline{\underline{x = 7}}$$



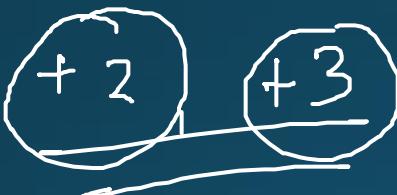
$$x + 4(-2) + (1) = 0$$

$$x = 1$$

~~Chromium~~

Chromium

\Rightarrow +2, +3, +6

Iron \Rightarrow 



① Reactivity

② Electro negative

③ Oxidation no. of
imp elements



↓
⇒ Transition metal ⇒ multiple oxidation no.



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