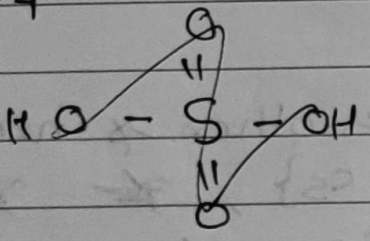
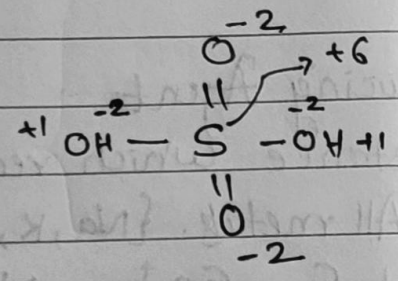
* Rules for Calculating oxidation Number.

Basis of writing oxn. No. is electron negativity of element

Ex. H_2SO_4





ONo. of S = +6
ONo. of H = +1
ONo. of O = -2
} very Common. { most Common Oxn States of O & H }

1] Sum of oxn states of all atoms in a molecule is zero & Sum of oxn states of all atoms in an ion is equals to charge on that ion

finding oxn state with the help of Aufbau's rule (x-method)

Ex. $\overset{+1}{H_2}\overset{x}{S}\overset{-2}{O_4}$ $\Rightarrow (+1)2 + x + (-2)4 = 0$

$\boxed{x = +6}$

2] Common Oxn nos.

for S-block elements

↳ 1st Group. - Li, Na, K, Rb, Cs $\Longrightarrow$ +1

1st Group → Li, Na, K, Rb, Cs → +1
2nd Group → Be, Mg, Ca, Sr, Ba → +2

3] If any element is present in its free state or elemental state, its oxⁿ no. is 0.

Ex. $\overset{0}{Cu_{(s)}}$, $\overset{0}{Na_{(s)}}$, $\overset{x}{F_2}$ $\quad 2x=0 \quad \therefore x=0$

P_4^0, B_2^0, O_3^0

4] Oxⁿ State of two metals in any alloy is zero.

5] For P-block elements

- For Halogens
  Flourine → −1 {Most Electron Negative}
- Other halogens → Cl, Br, I → −1, {But show +Oxⁿ state (with more EN elements)}

Q. Find oxⁿ states of UL elements

1) $\underset{+3}{IF_3}$, 2) $\underset{+5}{I_2O_5}$, 3) $\underset{+3}{I_2Cl_6}$, 4) $\underset{+5}{HIO_3}$, 5) $\underset{+5}{BrF_5}$

6) $\underset{+7}{HClO_4}$, 7) $\overset{-3}{N}\overset{+1}{Br_3}$, 8) $\overset{-3}{N}\overset{+1}{I_3}$, 9) $\overset{-2}{O}\overset{+1}{Cl_2}$

- Oxygen family: (−2, +6) {~~Most Common State = −2 (oxide)~~}

for oxygen :- most Common state = −2 (aka. oxide)
but in few cases. Oxygen can show diff. State

Ex. In peroxide (O_2^{2-}) ; State = -1
Ex. $^{+1}Na_2O_2^{-1}$, $^{+2}BaO_2^{-1}$ etc.

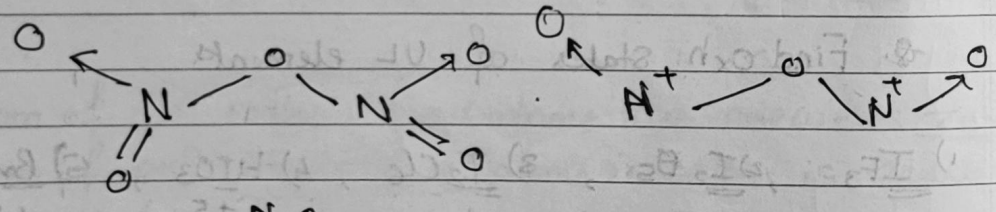
Ex. In Superoxide (O_2^-) ; State = $-1/2$
Ex. $^{+1}CsO_2^{-1/2}$, $^{+1}RbO_2^{-1/2}$, $^{+1}KO_2^{-1/2}$ etc.

Ex. In Ozonide (O_3^-) ; state = $-1/3$
Ex. $^{+1}KO_3^{-1/3}$, with flexible oxn state = +1 or +2

Ex. $^{+2}OF_2^{-1}$ $^{+1}O_2F_2^{-1}$

- Nitrogen family :- (-3, +5) $\left\{ \begin{matrix} ^{-3}NH_3, & ^{0}N_2 & ^{+4}NO_2 \\ ^{+2}N_2H_4, & ^{+1}N_2O, & ^{+5}N_2O_5 \end{matrix} \right\}$

NOTE • For P-block, ~~No. of~~ Max. possible Oxn state = No. of valence electrons



N_2O_5

- Carbon family :- (-4, +4)
- Boron family :- (-3, +3)

NOTE • Aluminium shows +3 oxidation only.

- Oxn State of inert gas in uncombined state = 0.
- Hydrogen Atom :- Most Common Oxn state = +1
  - ② But with s-Block elements, it shows -1 oxn state.

Ex. $\overset{-4}{C}H_4\overset{+1}{}$, $\overset{-3}{N}H_3\overset{+1}{}$, $\overset{-3}{P}H_3\overset{+1}{}$, $\overset{+1}{Na}\overset{-1}{H}$, $\overset{+2}{Ca}H_2\overset{-1}{}$

- For D-Block elements
  - ① D-block element shows multiple oxn states
  - ② These element/metals can show 0 as well as negative oxn state.

* • for 3-d series

Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
+3	+2	+2	+2	+2	+2	+2	+2	+1	+2
	+4	+4	+3	+4	+3	+3		+2	
		+5	+6	+6					
				+7					

(*)

- $FeSO_4 \longrightarrow Fe^{2+} + SO_4^{2-}$ (ferrous sulphate)
- $\overset{+2}{Fe}C_2O_4 \longrightarrow Fe^{2+} + C_2O_4^{2-}$ (ferrooxalate)
- $Fe_2(C_2O_4)_3$ (ferrioxalate)

$K_4[Fe(CN)_6] \rightarrow 4K^{\oplus} + [Fe(CN)_6]^{4-}$

$+4 + x - 6 = 0$

$x = +2$