

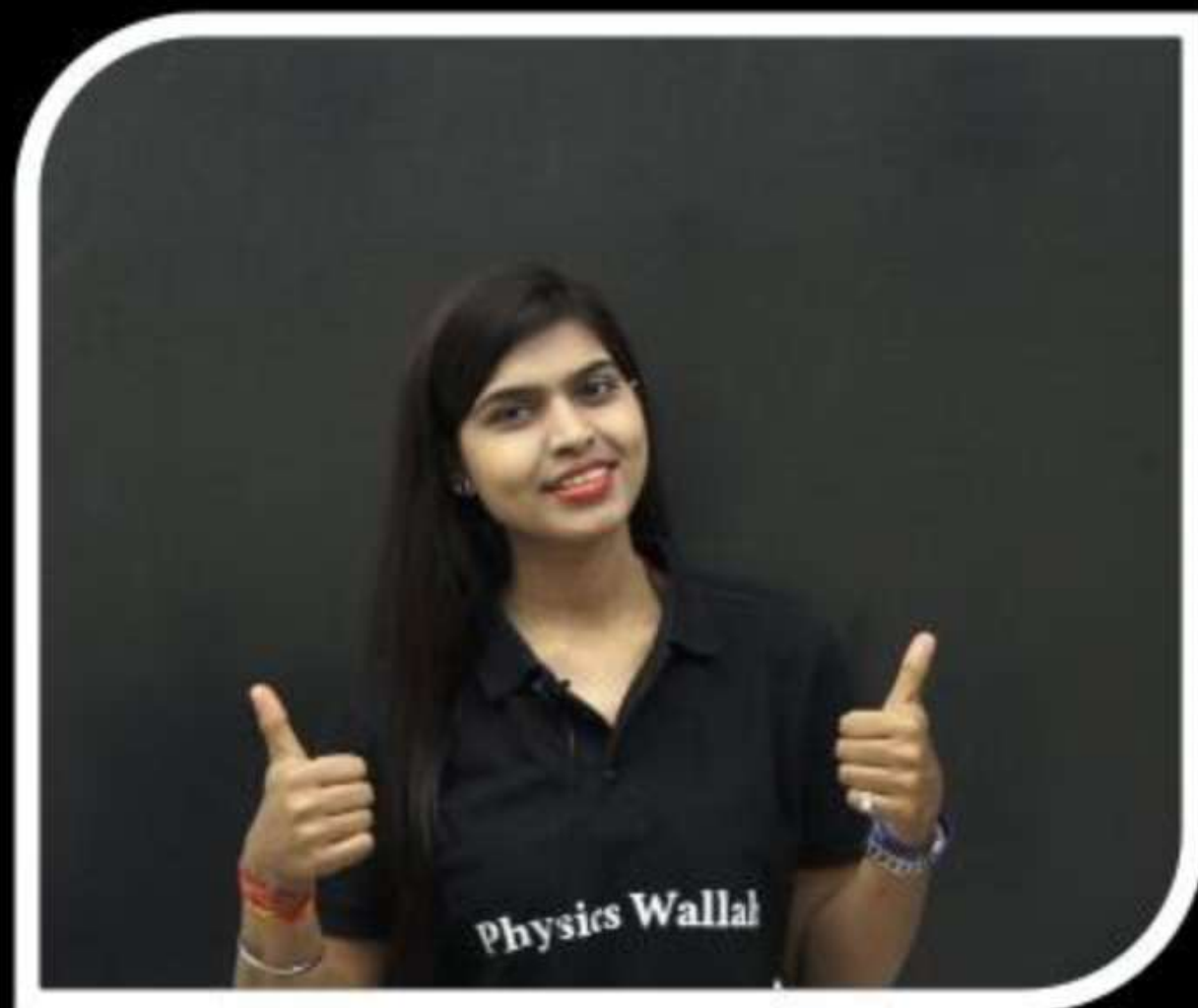


ARJUNA NEET BATCH



SOME BASIC CONCEPTS OF CHEMISTRY

LECTURE - 10

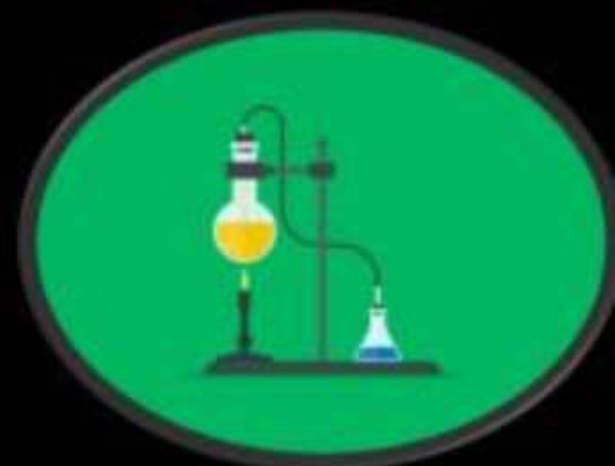


BY : DOLLY SHARMA

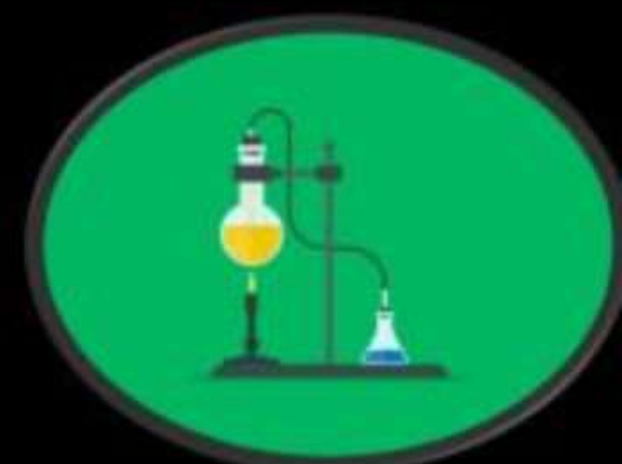
Objective of today's class



EQUIVALENT MASS



Are u ready
for the
Homework



Q. Percentage of Se in Peroxidase anhydrous enzyme is 0.5% by weight (at. Wt. = 78.4) then minimum molecular weight of peroxidase anhydrous enzyme is

(a) 1.568×10^4

(b) 1.568×10^3

(c) 15.68

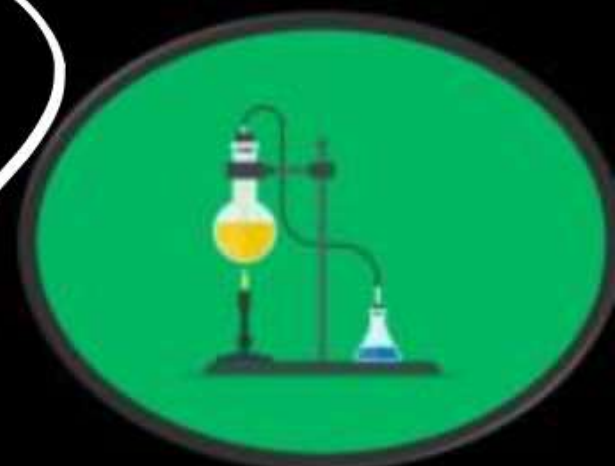
(d) 2.136×10^4

$$\% = \frac{\text{Atomic mass}}{\text{Mol. wt}} \times 100$$

$$0.5 = \frac{78.4}{\text{MMW}} \times 100$$

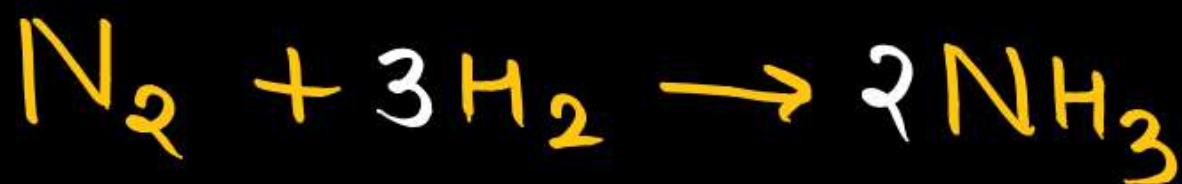
$$0.5 = \frac{78.4 \times 1}{\text{MMW}} \times 100$$

$$\text{MMW} = \frac{78.4 \times 100}{0.5} = 156.8 \times 100$$



Q. In Haber process 30 litres of dihydrogen and 30 litres of dinitrogen were taken for reaction which yielded only 50% of the expected product. What will be the composition of gaseous mixture under the aforesaid condition in the end?

- (a) 20 litres ammonia, 20 litres nitrogen, 20 litres hydrogen
- ☒ (b) 10 litres ammonia, 25 litres nitrogen, 15 litres hydrogen
- (c) 20 litres ammonia, 10 litres nitrogen, 30 litres hydrogen
- (d) 20 litres ammonia, 25 litres nitrogen, 15 litres hydrogen



30L

30L

10L

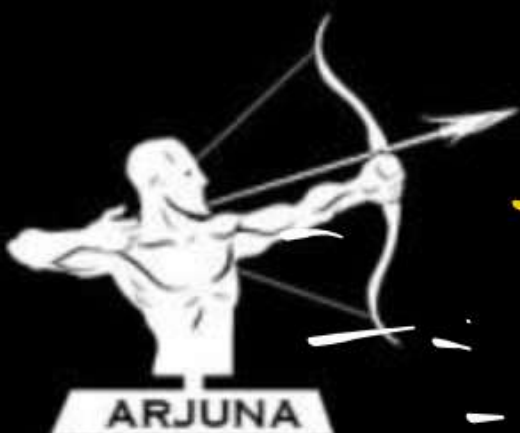
$\frac{1}{3} \times 30 =$

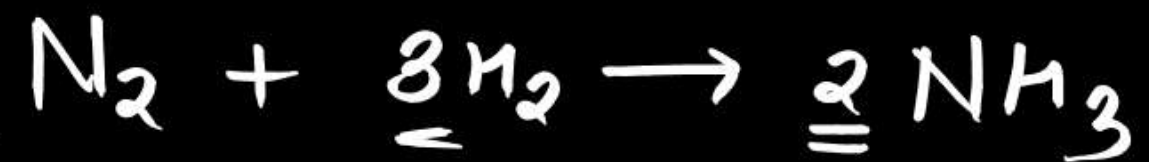
$\frac{1}{3} \times 30 = 10\text{L}$

$$\frac{1}{3} \times 30 = \frac{1}{2} \times n_{\text{NH}_3}$$

$$n_{\text{NH}_3} = 20 = 20\text{L}$$

$$20 \times 50 = 10\text{L}$$



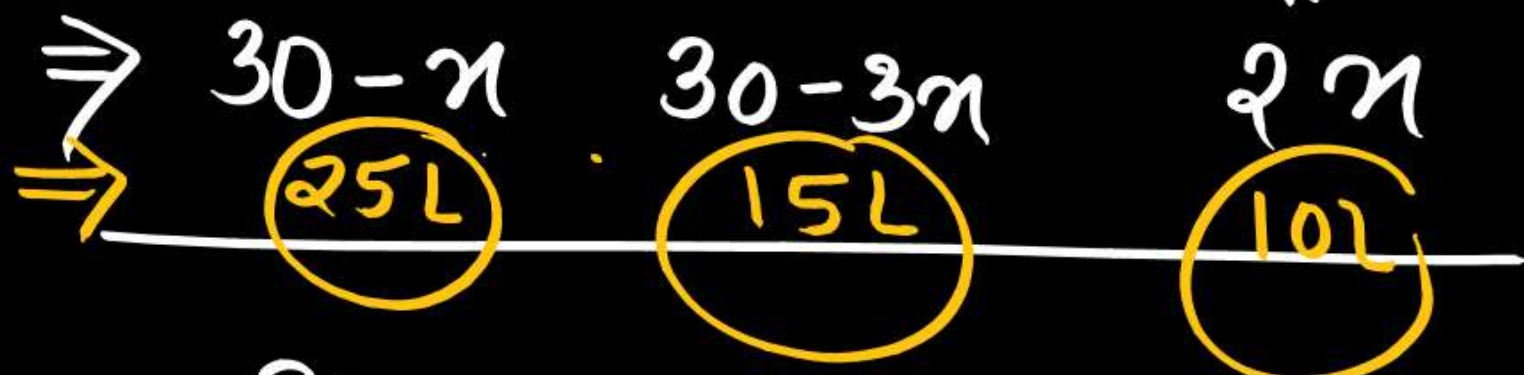


30L

30L

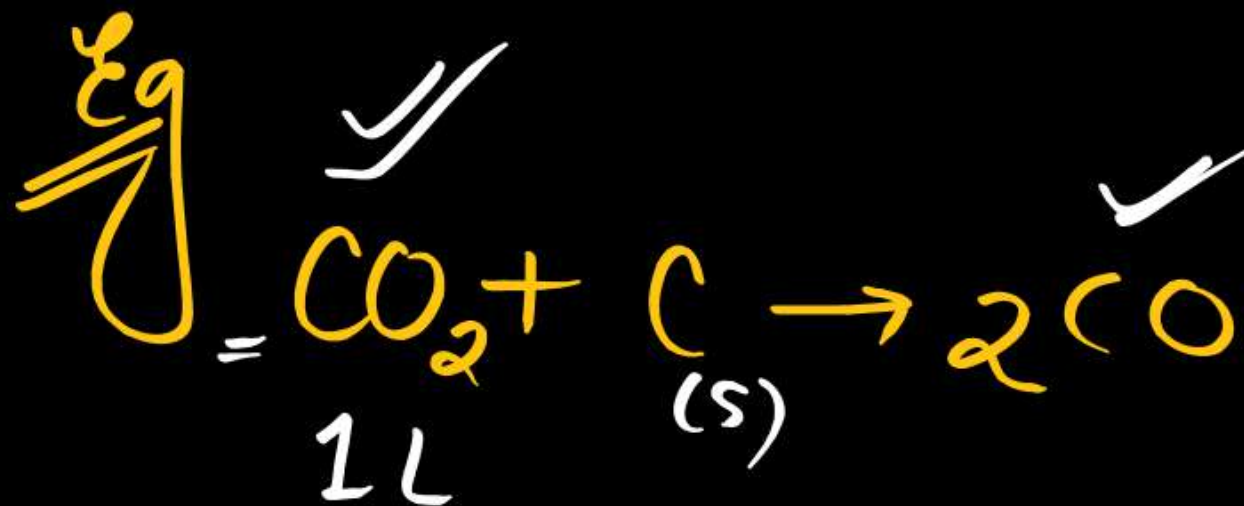
10L

||



$$2x = 10$$

$$\boxed{x = 5\text{L}}$$



$$\Rightarrow 1-x$$

$$2x$$

$$1-x+2x=10\text{L}$$

$$x=?$$

- (a) 10^{20} molecules (b) 10^{10} molecules
(c) 21 molecules ~~(d) 10^{21} molecules~~

200 mg of CO₂ - n Molecules $\rightarrow 2.89 \times 10^{-3}$ moles

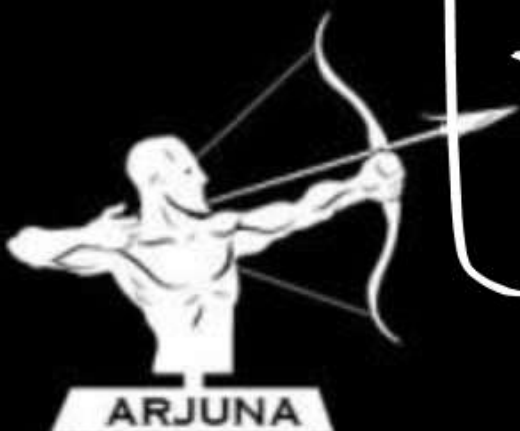
$$\Rightarrow \frac{200 \times 10^{-3}}{44} - \frac{x}{N_A} = 2.89 \times 10^{-3} \quad \left| \frac{x}{N_A} = 10^{-3} \left[\frac{200 - 127.6}{44} \right] \times \right.$$

$$\left[\frac{200 \times 10^{-3} - 2.89 \times 10^{-3}}{44} \right] = \frac{2}{N_A}$$

$$n = 16 \times (200 - 127.6) \times 6.02 \times 10^{23}$$

21 44

10



1 H
2 He
3 Li
4 Be
5 B
6 C
7 N
8 O
9 F
10 Ne
11 Na
12 Mg
13 Al
14 Si

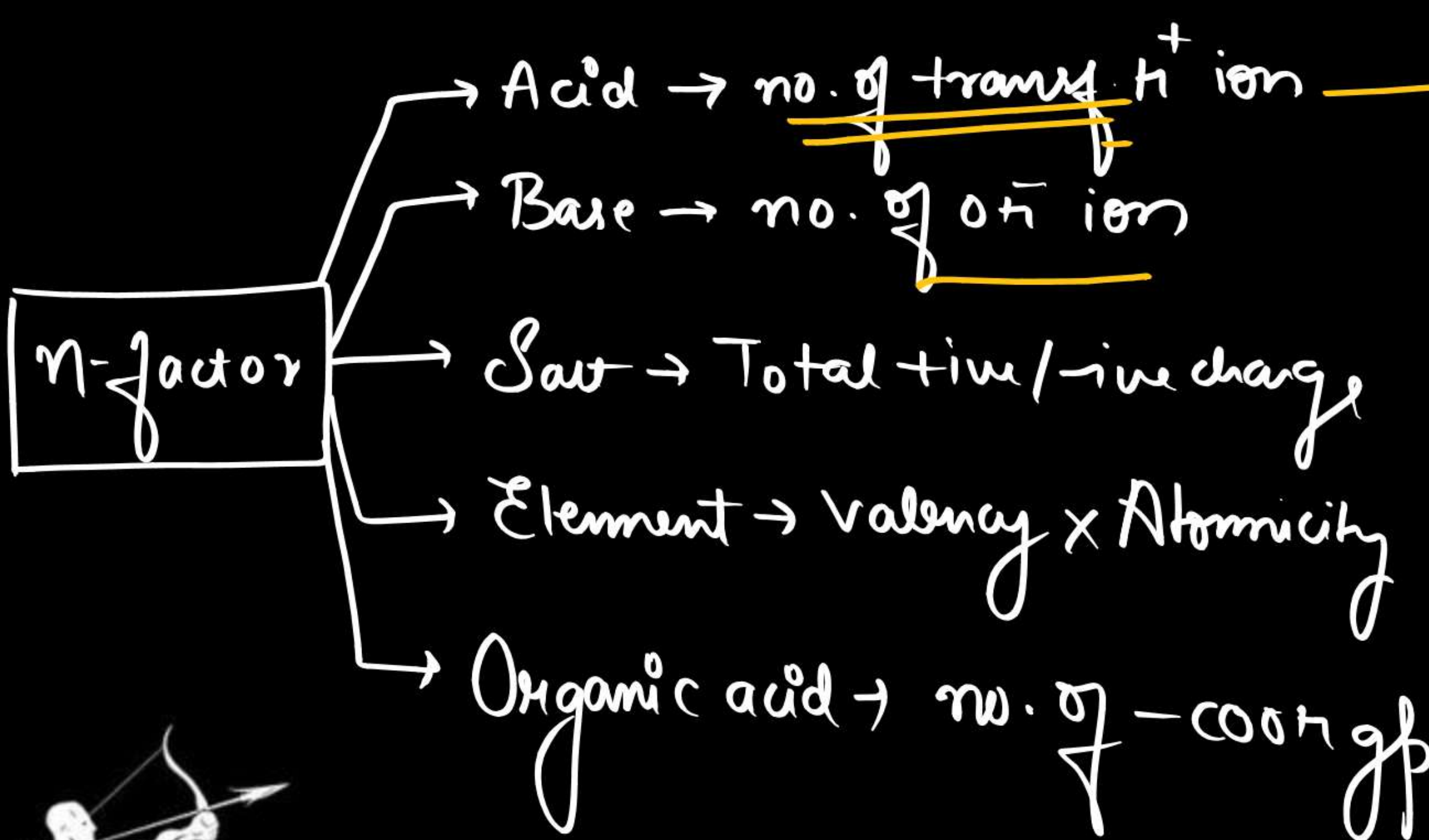


Element	Atomic number	Atomic mass
Hydrogen	1	1
Helium	2	4
Lithium	3	6.94
Beryllium	4	9.01
Boron	5	10.81
Carbon	6	12.01
Nitrogen	7	14.01
Oxygen	8	15.99 = 16
Fluorine	9	19
Neon	10	20.18
Sodium	11	22.99 = 23
Magnesium	12	25.31 = 24
Aluminium	13	26.98 = 27
Silicon	14	28.09
Phosphorus	15	30.97 = 31
Sulphur	16	32.07
Chlorine	17	35.45
Argon	18	39.95
Potassium	19	39.1
Calcium	20	40.08
Scandium	21	44.96
Titanium	22	47.87
Vanadium	23	50.94
Chromium	24	52
Manganese	25	54.94
Iron	26	55.85
Cobalt	27	58.93
Nickel	28	58.69
Copper	29	63.55
Zinc	30	65.41

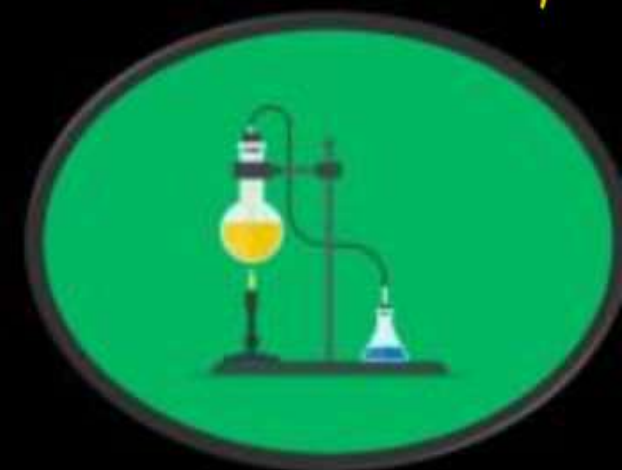
15 P
16 S
17 Cl
18 Ar
19 K
20 Ca
21 Sc
22 Ti
23 V
24 Cr
25 Mn
26 Fe
27 Cu
28 Ni
29 Co
30 Zn

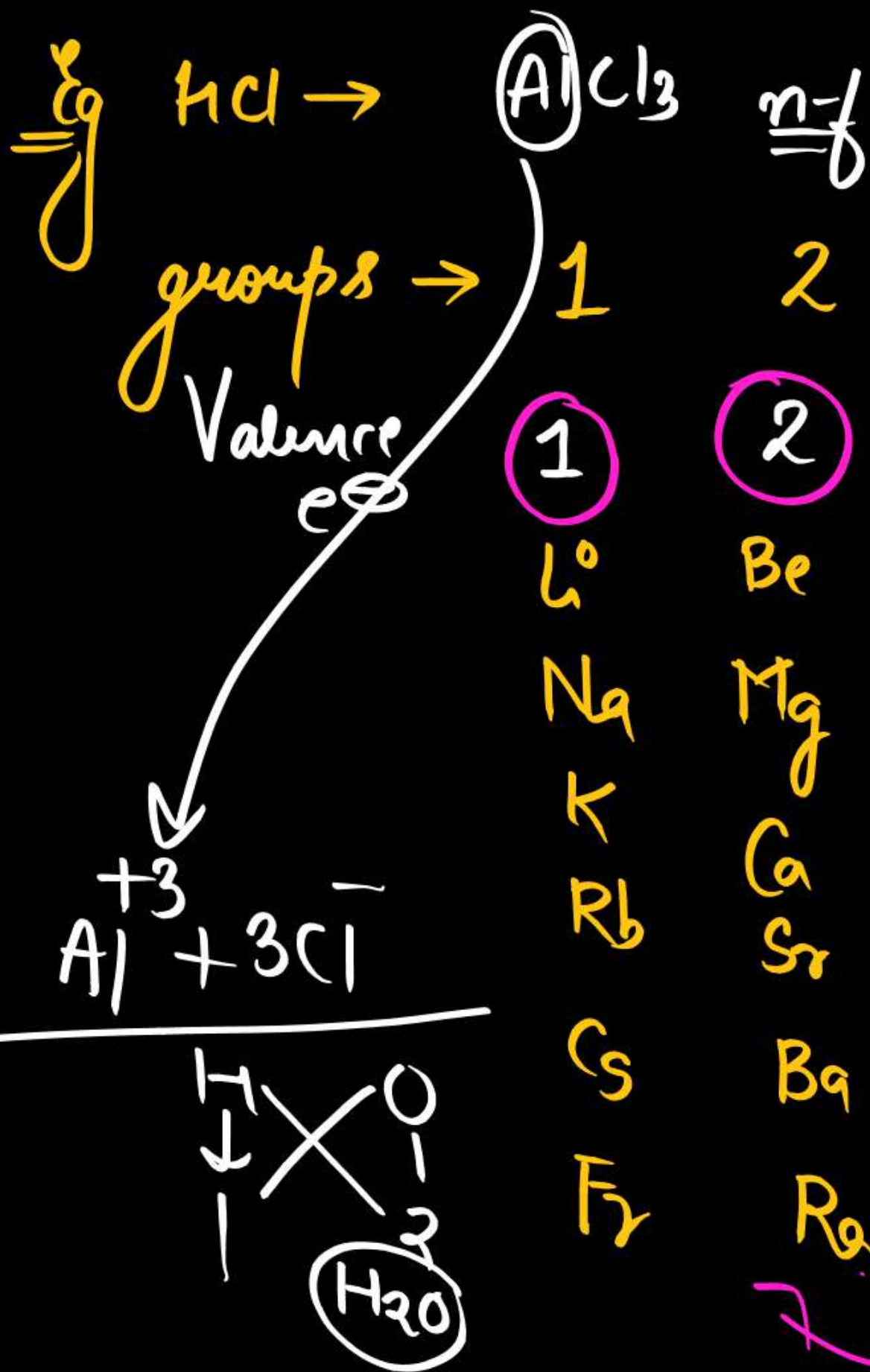


EQUIVALENT MASS

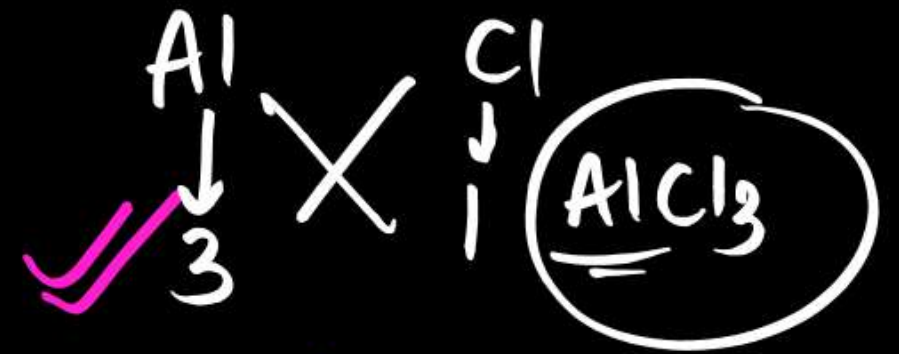


H^+
↓
transfer
↓
directly attach
to EN^{\ominus} atom

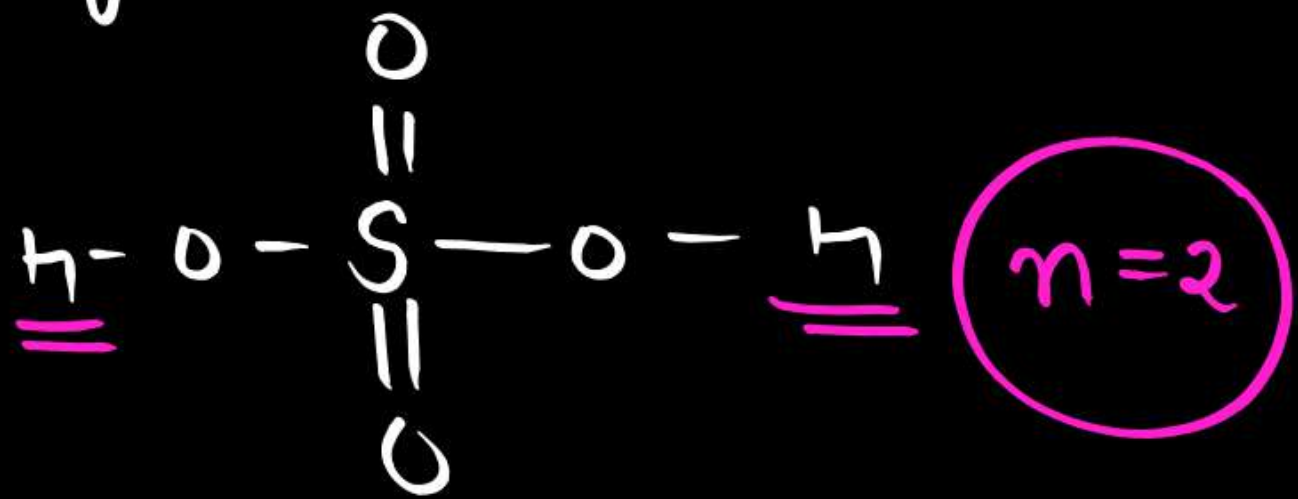
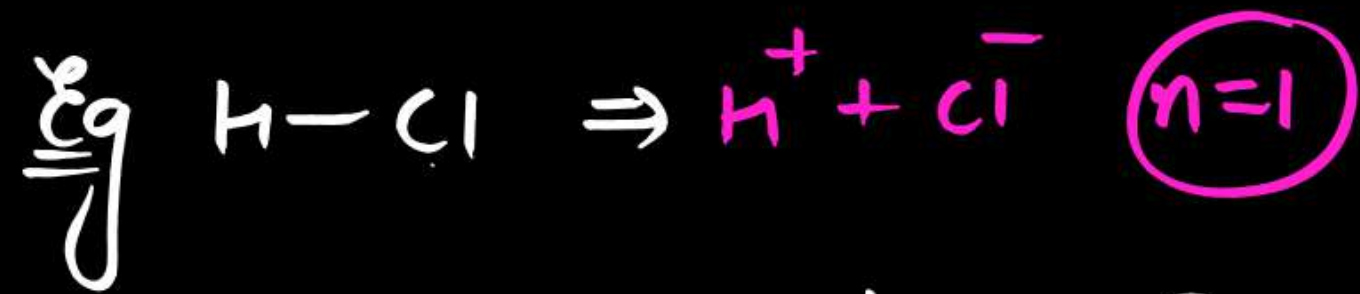




$$N \Rightarrow 8 - 5 = 3$$



13	14	15	16	17	18
3	4	5	6	7	8
B	C	N	O	F	He
Al	Si	P	S	Cl	Ar
Ga	Ge	As	Se	Br	Kr
In	Sn	Sb	Te	I	Xe
Tl	Pb	Bi	Po	At	Rn
					Po



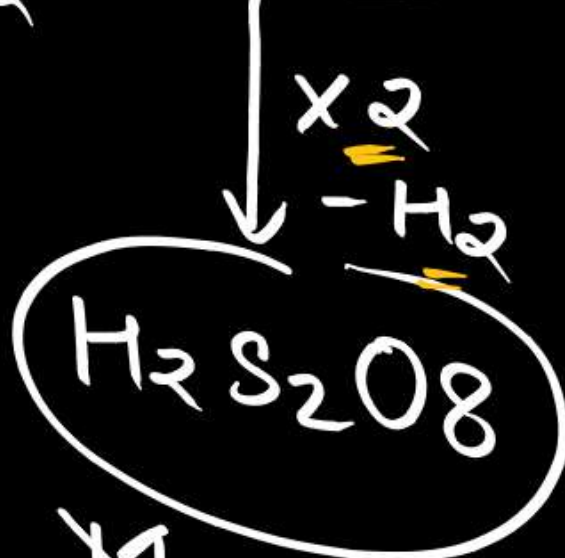
Oxo-Acids of Sulfuric Acid



oil of vitriol.

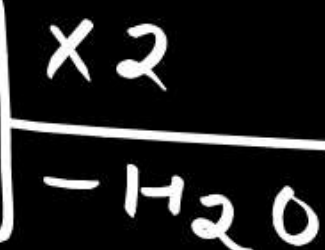
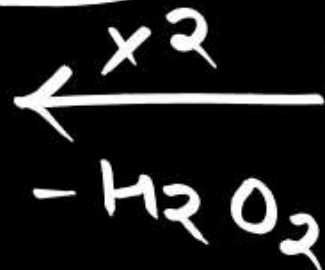
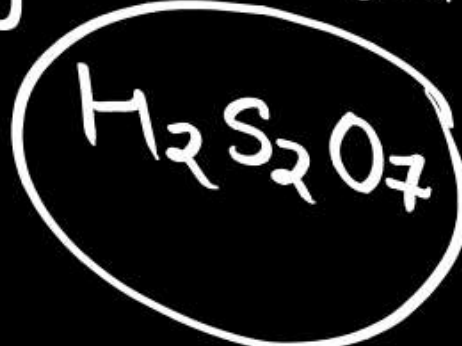


Dithionic acid



Marshalls acid

Pyrosulfuric acid

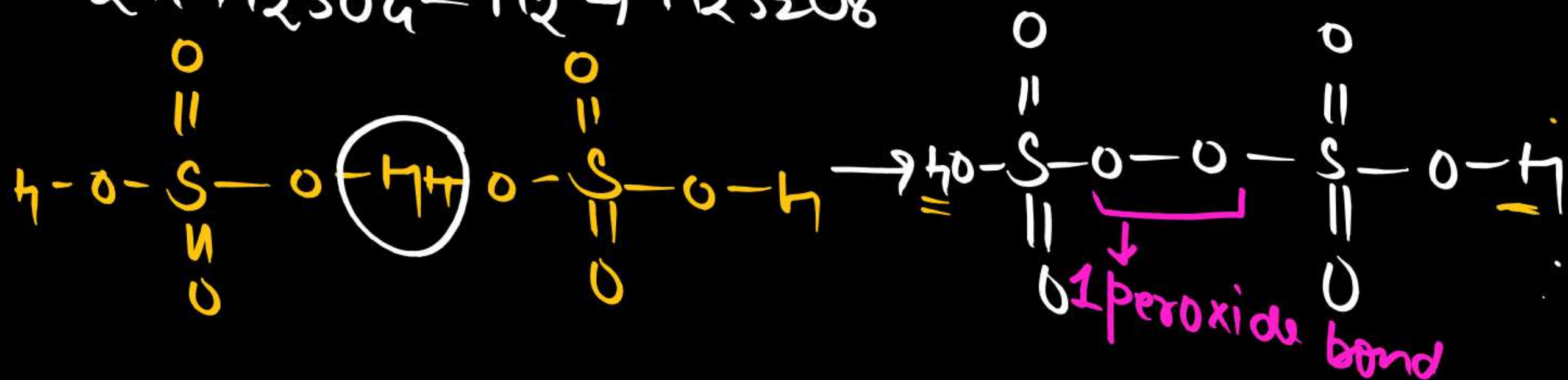


① Pyrosulphuric acid ($H_2S_2O_7$) → Oleum



$\eta = 2$ or 1

② $H_2S_2O_8$ (Marshall's acid)



$\eta = 2$ or 1

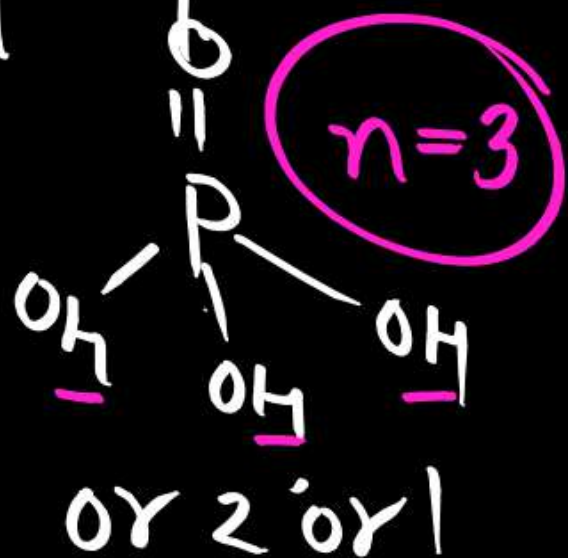
③ Dithionic acid ($H_2S_2O_6$)



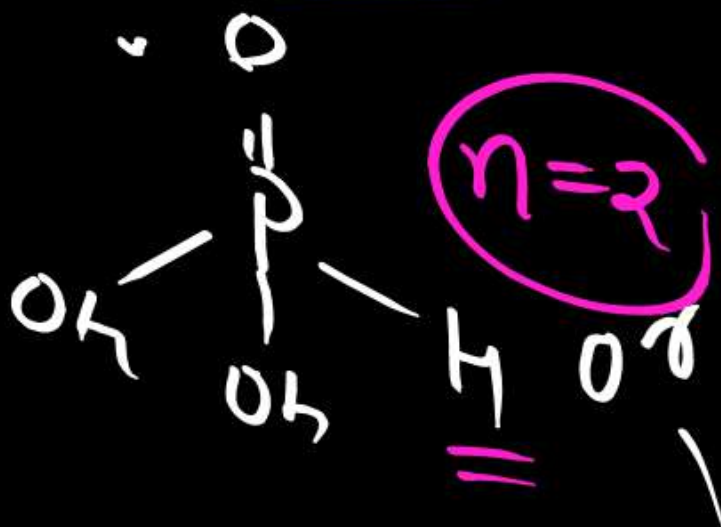
Oxo #
Acid of
PHOSPHOROUS



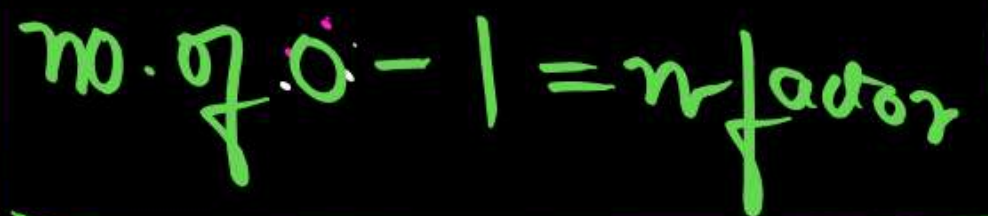
Orthophosphoric acid

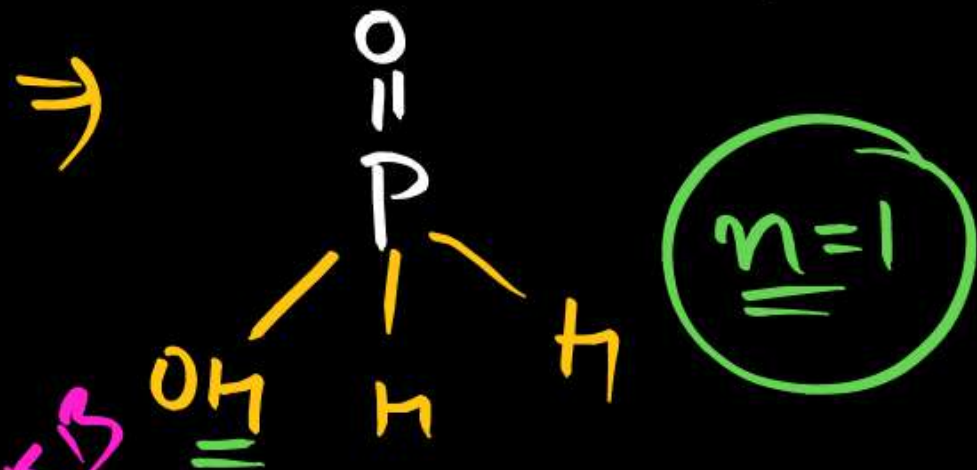


Orthophosphorous acid



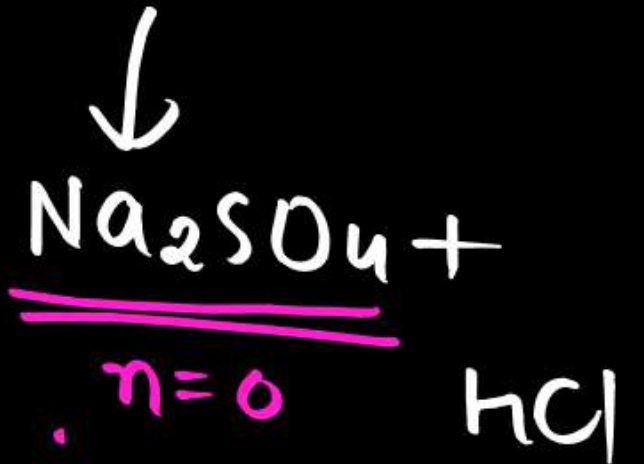
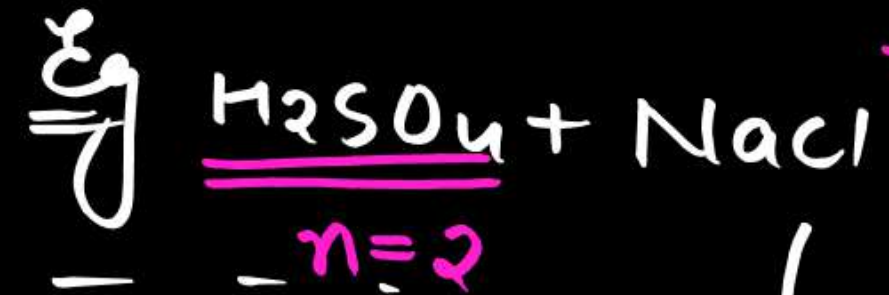
Trick





n-factor in a chemical

$R \times n$



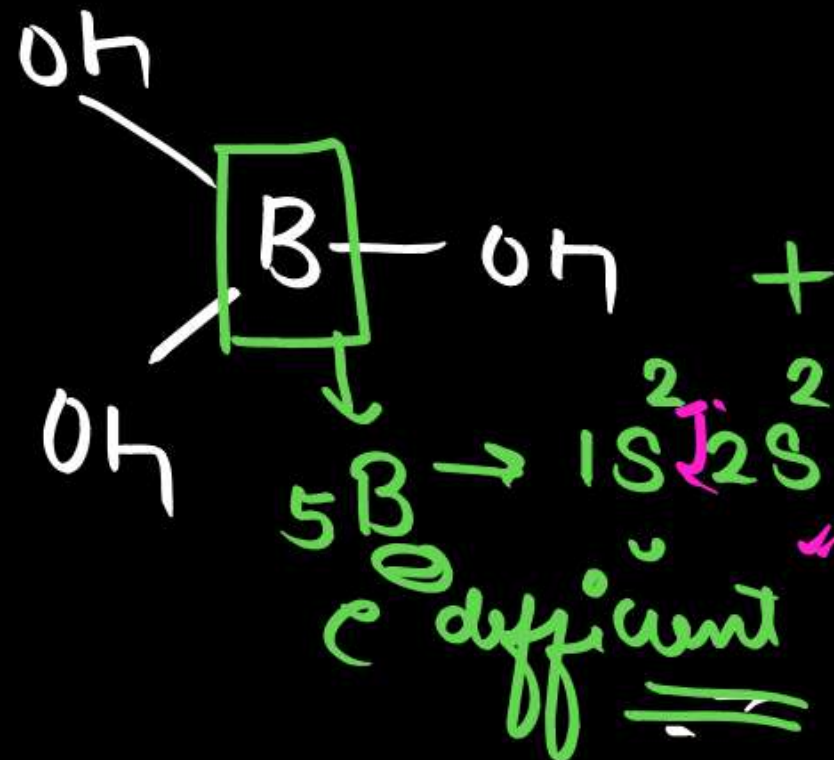
$\Rightarrow 2-0 = \underline{\underline{2}}$

EXCEPTION:-

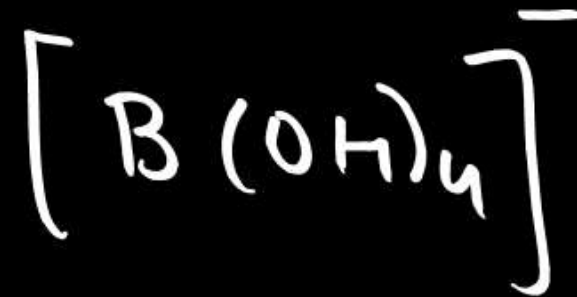
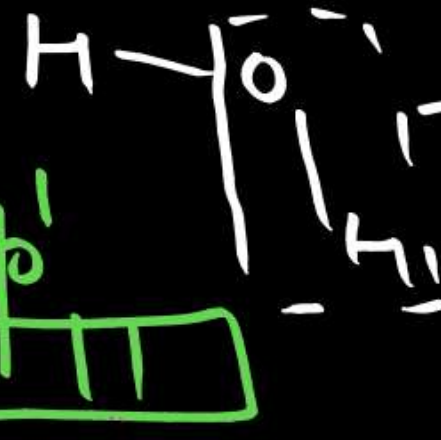
Boric acid



$n\text{-factor} = 1$



or





n-factor of 2-1 = 1

$$\text{Equivalent Mass} = \frac{\text{Mol. Mass}}{\text{n-factor}}$$

$$\text{Equivalent Volume} = \frac{\text{Molar Volume}}{\text{n-factor}}$$

n.w:

Q Calculate Equivalent Mass & Equivalent Volume?

① O_2

⑤ NaOH

② N_2

⑥ H_2SO_4

③ H_2

⑦ MgCl_2

④ Cl_2

Displacement Method's

① Oxide Displacement Method

$$E_M \propto W_M - ①$$

$$E_{O_2} \propto W_{O_2} - ②$$

$$\frac{①}{②}$$

$$\frac{E_M}{E_{O_2}} = \frac{W_M}{W_{O_2}}$$

$$\Rightarrow E_M = \frac{W_M}{W_{O_2}} \times 8$$

② Hydrogen Displacement Method.

$$E_M \propto W_M - ①$$

$$E_{H_2} \propto W_{H_2} - ②$$

$$\frac{①}{②}$$

$$\frac{E_M}{E_{H_2}} = \frac{W_M}{W_{H_2}}$$

$$E_M = \frac{W_M}{W_{H_2}} \times 1$$

③ Chlorine Displacement Method

$$E_M \propto W_M - ①$$

$$E_{Cl_2} \propto W_{Cl_2} - ②$$

$$\frac{E_M}{E_{Cl_2}} = \frac{W_M}{W_{Cl_2}}$$

$$E_M = \frac{W_M}{W_{Cl_2}} \times 35.5$$

$$E_{Cl_2} = \frac{71}{2} \Rightarrow 35.5$$

Equivalent Mass = $E_M + E_{O_2}$
 of Metal
 of Oxide

$$E_{MO} = E_M + 8$$

Equivalent Mass = $E_M + E_{H_2}$
 of Metal Hydride

$$E_{MH} = E_M + 1$$

$$E_{MSO_4} \Rightarrow E_M + E_{SO_4^{2-}}$$

$$E_{MSO_4} = E_M + 48$$

$$\begin{array}{r} 32 \\ 64 \\ \hline 96 \end{array}$$

$$\begin{array}{r} SO_4^{2-} \\ \Rightarrow 96 \\ \hline \Rightarrow 48 \end{array}$$

Are u
ready
for the
Questions



Q. In metal oxide, metal is 30%. Then calculate equivalent weight of metal.

$$E_M = \frac{W_M \times 8}{W_{O_2}}$$

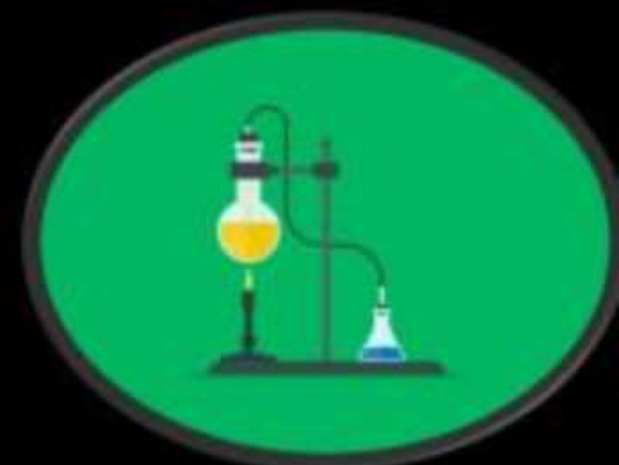
$$W_M = 30g$$

$$W_{O_2} = 70g$$

?

$$E_M = \frac{30}{70} \times 8$$

$$\frac{24}{7}$$





^{Oxygen}
Q. In a metal oxide is 80% & metal is 20%. Then calculate
Equivalent weight of metal and equivalent weight of metal oxide.

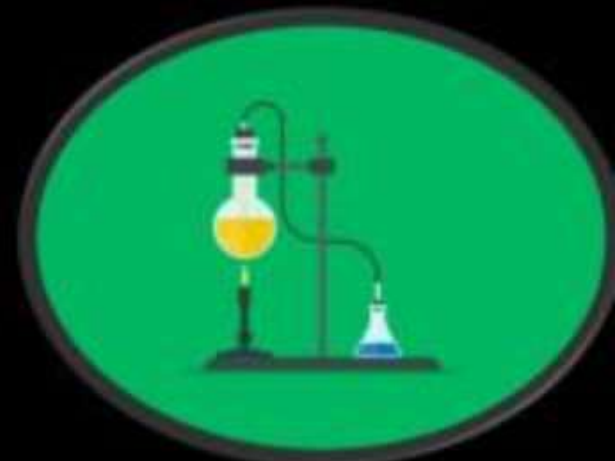
$$W_1 = 20 \text{ g}$$
$$W_{O_2} = 80 \text{ g}$$

$$E_1 = \frac{W_1}{W_{O_2}} \times 8$$

$$= \frac{20}{80} \times 8$$

$$E_1 = 2$$

$$E_{MO} = E_M + E_{O_2}$$
$$= 2 + 8$$
$$= 10$$



Q. 111 gm of metal chloride contain 71 gm of chlorine. Find Equivalent mass of metal & metal chloride.

$$W_{MCl} \Rightarrow 111g$$

$$W_{Cl_2} \Rightarrow 71g$$

$$W_M + W_{Cl_2} = W_{MCl}$$

$$W_M + 71 = 111g$$

$$W_M = 111 - 71$$

$$= 40$$

$$E_M = \frac{W_M}{W_{Cl_2}} \times 35.5$$

$$\Rightarrow E_M = \frac{40}{2} \times 35.5$$

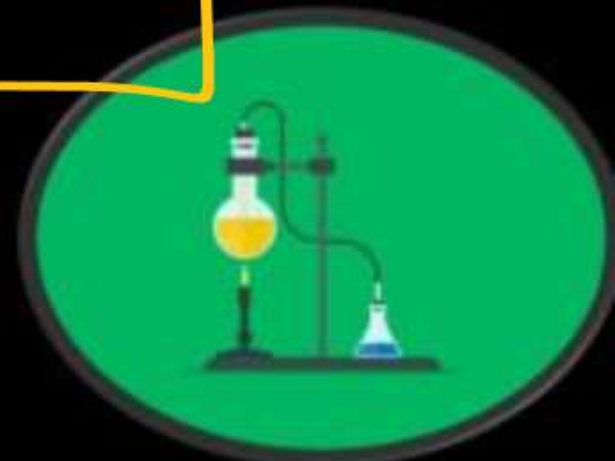
$$\Rightarrow 20$$

$$E_M = 20$$

$$E_{MCl} = E_M + E_{Cl_2}$$

$$= 20 + 35.5$$

$$E_{MCl} = 55.5$$



Q. 2.4 gm metal displace 0.56 L hydrogen at NTP. Then find equivalent mass?

$$W_M = 2.4 \text{ gm}$$

$$V_{H_2} = 0.56 \text{ L at NTP}$$

$$\Rightarrow E_M = \frac{W_M}{W_{H_2}} \times 1$$

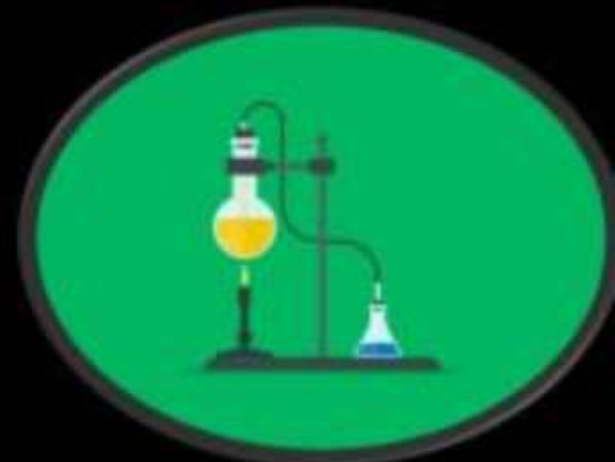
$$\eta = \frac{W}{MM} = \frac{V_L}{22.4}$$

$$\frac{W_{H_2}}{2} = \frac{0.56}{22.4} \times 100$$

$$W_{H_2} = \frac{1}{20}$$

$$E_M = \frac{2.4 \times 20}{1}$$

$$E_M = 48$$



Q. 1 gm metal carbonate on strong heating gives 0.56 gm of metal oxide then find equivalent mass of metal ?



$$W_{MCO_3} = 1g \propto E_{MCO_3} - (1)$$

$$W_{MO} = 0.56g \propto E_{MO} - (2)$$

$$\Rightarrow E_{MCO_3} = E_M + E_{CO_3^{2-}}$$

$$E_{MO} = E_M + E_{O_2}$$

(1)/(2)

$$\frac{1}{0.56} = \frac{E_M + 30}{E_M + 8}$$

$$E_{CO_3^{2-}} \Rightarrow \frac{60}{2}$$

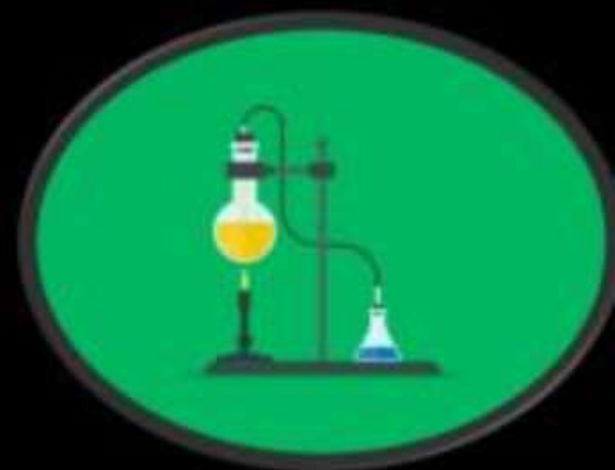
$$\Rightarrow \frac{30}{1}$$

$$E_M + 8 = 0.56 E_M + 0.56 \times 30$$

$$0.44 E_M = 16.8 - 8$$

$$E_M = \frac{8.8}{0.44} = 20$$

20

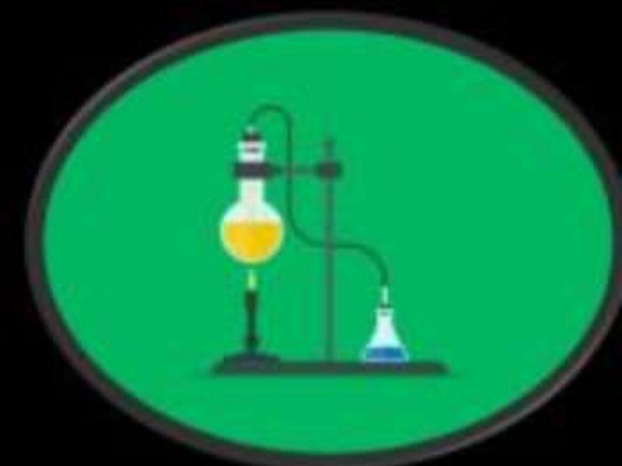


Q. 2 gm metal hydroxide on strong heating is 1 gm of metal oxide. Find equivalent mass of metal and metal hydroxide.



How

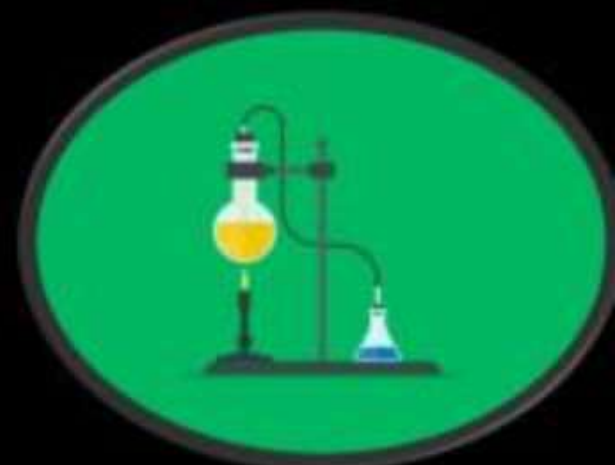
to



Q. In metal oxide, metal is 53% & V.D. of MCl is 79. Find atomic mass of metal.

Ye Mai Kal Class me KARVAUNG!

V.D





*thanks
for watching*

