BASIC CONCEPT OF CHEMISTRY

① Equal vol. of CO_2 & SO_2 mixed

• AV Mol. mass Mix.
1 CO_2 → 44
1 SO_2 → 64g
2mole → 108gm
AV → 54gm

• AV molar vol.
22.4
same ही रहेगा

② $CO_2 + SO_2$ in ratio 2:1 of vol.
CO_2 → 2mole → 88gm
SO_2 → 1 mole → 64gm
3mole → 152
1 → 152/3.

③ $CO_2 + SO_2$ in ratio 2:1 of mass.
$CO_2 : SO_2$
2 : 1
88 : 44
→ 44/64 = 0.68 mole
$M_{av} = \frac{88+44}{2+0.68} = \frac{132}{2.68}$

④ Mini. M.M of enzyme that contain x% of S by mass
Hint 5% of mass
5% in 100gm
→ $x\% = \frac{32}{M} \times 100$
0.25 → 100
x% → 32
1 → $\frac{100}{0.25}$ → 32 / x%

⑤ $CaCO_3 \rightarrow CaO + CO_2$
85gm
vol. of CO_2
decomp.
$\frac{12 \times 100}{...}$ = M
→ 5.6L

⑥ $CaCO_3 \xrightarrow{\Delta} CaO + CO_2$
200gm, 40% pure
residue left
→ 165g.

⑦ $MgCO_3 \xrightarrow{\Delta} MgO + CO_2$.
100gm
5.6L. % purity.

⑧ 10L
$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
1 : 2 1 : 2.
vol. of air needed?
→ 20L O_2
air contains 20% of O_2 by vol
∴ 100L of air

⑨ 1ml
$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
1ml 2ml 1ml
contraction in vol.
3−1 = 2ml

⑩ $C_2H_6 + C_4H_{10}$ 3L burnt in O_2, 8L CO_2 produced.
composition of mixt.
Sol. $C_2H_6 + O_2 \rightarrow 2CO_2 + 3H_2O$
2x
$C_4H_{10} + O_2 \rightarrow 4CO_2 + 5H_2O$
4(3−x).
4(3−x) + 2x = 8.

⑪ 20L CO_2 passed over red Hot coke 35 L mixt. Gas mixt. collect., composition?
Sol. $CO_2 + C \rightarrow 2CO$
x 2x. 20+x = 35
20 0 x = 15
20−x 2x.

⑫ Limiting reagent
for vol. & moles
जो vol & moles दिए हैं उनको stoichiometric coeff. से divide करेंगे तो value कम होगी वो L.R होगा।
Unreacted moles
L.R की reactant के stoichio. coeff. के द्वारा multiply करेंगे Given moles में से ⊖ कर देंगे

⑬ Sol. i.e 20% by wt. cooled, then ppt of Half of solute of 25 out of 250gm is taken out. % wt. of remaining sol. will be?
Sol. $\frac{250 \times 20}{100} = 50$
50 200gm
25gm 225gm
$\% \frac{w}{w} = \frac{25}{225} \times 100 = 11.1$

⑭ $m = \frac{M \times 1000}{(d \times 1000) - M M_0}$

⑮ M=? of 0.1m H_2SO_4, ρ = 1.12g/mol.
Sol. 0.1 mole of H_2SO_4 in 1000gm.
9.8 + 1000 → 1009.8 gm.
$1.12 = \frac{1009.8}{V}$ $V = \frac{1009.8}{1.12}$ $M = \frac{n}{V} \times 1000$

⑯ Vol. of stock sol. needed to prepare 200ml (of H_2SO_4 with 98% by mass) decimolar sol. ρ=1.84
Sol. 200ml 0.1M → $\frac{9.8}{5}$ gm.
98g → 100g
1 → $\frac{100}{98} \times \frac{9.8}{5}$ = 2gm. $d = \frac{M}{V}$

⑰ Vol. of NaOH sol. (20% w/v) needed to make 250 ml of its semimolar sol.
Sol. $\frac{0.5}{4} \times 40 = 5g$
20g → 100ml
5g → 25ml

⑱ Mg dissolves in HCl (2M, 300ml). Acid left unused was Neut. by 200ml, 1M in NaOH sol. Mass of Mg?
Sol. $Mg + HCl \rightarrow MgCl_2 + H_2$
$\frac{x}{12}$ 0.6 y.
unreacted 0.6 − $\frac{x}{12}$. , $0.6 - \frac{x}{12} = 0.2$

⑲ n- factor
$\overset{+3}{As_2S_3} \rightarrow \overset{+5}{AsO_3^-} + SO_4^{2-}$

⑳ At. wt × sp. Heat = 6.4
M×S=6.4

㉑ 0.225 gm of liq. of Victor meyer Exp. displaces 5L air, V.D of liq.
Sol. xg → 5L → 0.225
1 → $\frac{0.225}{5} \times 22.4$

㉒ Vol strength
$2H_2O_2 \rightarrow 2H_2O + O_2$
V = M×11.2 L V = N×5.6L

㉓ 30% H_2O_2
1gm H_2O_2 gives 30gm O_2.

㉔ 10vol → 3%.
100vol → 30%.
64 22.7 → 68
x·V.1 1 → $\frac{64 \times x}{22.7}$

㉕ Oleum ($H_2S_2O_7$)
• sample (100+x)%.
$SO_3 + H_2O \rightarrow H_2SO_4$
80gm 18gm
$\frac{40}{9}$gm 9gm.
$\frac{40}{9}x$.
(100+x)% oleum.
$\frac{40}{9}x$% free SO_3

㉖ 40gm 109% oleum, vol. ___ of 0.1N for Neutralisation
Sol. 40% free SO_3.
40
H_2SO_4 SO_3
$\frac{24}{98} \times 2$ $\frac{16}{80} \times 2$
$\frac{24}{98} \times 2 + \frac{16}{80} \times 2 = 0.1V$

㉗ Gold
• carat • 24 carat = 100% pure

㉘ • Alkaline pyragallol
• Heated Cu } Absorb O_2
• KOH } → CO_2
• Turpentine oil → O_3.
• Heated Mg
Heated Al } N_2 absorb.

㉙ Equivalent wt
• SCl_2
32g S + 71g Cl
16gS + 35.5Cl
∴ Eq. of S = 16 gm.

㉚ x gm of metal form y gm oxide.
Eq. mass → $\frac{8x}{y-x}$.

㉛ $H_2O_2 \rightarrow H_2O + \frac{1}{2}O_2$
1M ½ mole → 11.2L
2M 1 mole → 22.4L
∴ vol. of O_2 evolved from unit vol. of H_2O_2

㉜ 10V H_2O_2
1ml of H_2O_2 give 10ml of O_2.

㉝ "Double Titration".
$Na_2CO_3 + HCl \rightarrow NaCl + NaHCO_3$] Phe] Alk.
$NaHCO_3 + HCl \rightarrow NaCl + H_2O + CO_2$] MeOH] Acid.
$Na_2CO_3 + 2HCl \rightarrow 2NaCl + H_2O + CO_2$

㉞ Phenolpthalein
$HPh \rightleftharpoons H^+ + Ph^\ominus$ pH = 8.2 − 9.8

㉟ Methyl orange
$MeOH \rightleftharpoons Me^+ + OH^\ominus$ pH = 3 − 4.4

㊱ S.A + S.B
PhH + MeOH used

㊲ W.A + S.B
PhH used

㊳ 1Gram atom of element = its mass in gm

㊴ Specific Gravity of CS_2 2.63 means 1ml of CS_2 contain 2.63 gm of CS_2.

㊵ Standard NaOH sol. left in air. → due to deliquescent it absorb. water & its strength ↓es.

㊶ disproportion Rxn.
Start from intermediate always.

㊷ 98% w/w H_2SO_4 (ρ=1.8g/ml), must be diluted to prepare 12.5L 2.5M sol.
→ $M_1V_1 = M_2V_2$
1.73.

㊸ $e^\ominus$ in 18ml water
$N_A \times 10e^-$

㊹ $Na_2S_2O_3 \rightarrow Na_2S_4O_6$.
n=?.
2x = 4 → 4x = 10
n=1 n=1. PC

㊺ ppm = $\frac{\text{mass of solute}}{\text{Vol. of soln}}$

㊻ n-factor = $\frac{\text{no. of } e^-}{\text{no. of species}}$

㊼ Vml of $H_2O(l)$ Vml of $H_2O(g)$
$n = \frac{V}{18}$ $\frac{V}{22400}$

㊽ vol. strength = $\frac{wt\%}{...}$

㊾ $\frac{M}{M_w} \times \frac{x\%}{100} = 1$