BASIC CONCEPT OF CHEMISTRY

(1) Equal vol. of CO_2 + SO_2 mixed

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

• AV molar vol.
22.4
same हो रहेगा

(2) $CO_2 + SO_2$ in ratio 2:1 of vol.
$CO_2 \rightarrow$ 2mole → 88gm   3mole → 152
$SO_2 \rightarrow$ 1 mole → 64 gm   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 S% of mass / S% in 100gm
→ $x\% = \frac{32}{M} \times 100$
$0.25 - 0.100 \frac{x\%}{}$ → 32
$1 \rightarrow \frac{100}{0.25}$ → 32 / x%
$\frac{32 \times 100}{0.25} = M$

(5) $CaCO_3 \longrightarrow CaO + CO_2$
85gm   vol. of CO_2 decomp.
→ 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
$CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$
1 : 2   1 : 2.   vol. of air needed?
→ 20L O_2
air contains 20% of O_2 by vol
∴ 100L of air

(9) 1ml
$CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$
1ml   2ml
contraction in vol.
1ml
3-1 = 2ml

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

(11) 20L CO_2 passed over red hot coke
35 L mixt. Gas mixt. collect., compositn?
Sol. $CO_2 + C \longrightarrow 2CO$
x   2x.
20   0
20-x   2x.
20+x = 35
x = 15

(12) Limiting reagent
for vol. + moles
जो vol + moles दिए है उनको stoichiometric coeff. से divide करके जो value कम होगी वो L.R होगा।
unreacted moles
L.R के reactant के stoichio. coeff. के साथ multiply करके 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/ml.
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. $Mg + HCl \longrightarrow MgCl_2 + H_2$
$\frac{x}{12}$ 0.6   y.
unreacted $0.6 - \frac{x}{12}$, $0.6 - \frac{x}{12} = 0.2$

(19) n-factor
$\overset{+3}{As_2S_3} \longrightarrow \overset{+5}{AsO_4^-} + SO_4^{2-}$

(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 → 0.225/22.4

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

(23) 10 vol.
1 gm H_2O_2 gives 30gm O_2.

(24) 10Vol → 3%.   64 22.7 → 68
100 Vol → 30%.   x.v.l. 1 → $\frac{64x}{22.7}$

(25) Oleum ($H_2S_2O_7$)
• sample (100+x)%
$SO_3 + H_2O \longrightarrow H_2SO_4$
80gm   18gm   98gm.
$\frac{40}{9}$ gm
$\frac{40}{9}x$.
(100+x)% oleum.
$\frac{40}{9}x\%$. free SO_3

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

(27) Gold
• carat   • 24 carat = 100% pure

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

(29) Equivalent wt
• SCl_2 32gs + 71g Cl
16gs → 35.5Cl
∴ Eq. of S = 16 gm.

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

(31) $H_2O_2 \longrightarrow H_2O + \frac{1}{2}O_2$
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
1 ml of H_2O_2 give 10mL of O_2.

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

(34) Phenol phthalein
$HPh \rightleftharpoons H^+ + Ph^{\ominus}$ 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) 1 Gram 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 the 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) $Na_2S_2O_3 \longrightarrow Na_2SO_4$.
n=?   2x = 4 → 4x = 10
(+2 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) 1 ml of $H_2O(l)$ 1 ml of $H_2O(g)$
$n = \frac{V}{18}$ $V = \frac{}{22400}$

(48) vol. strength = $\frac{wt\%}{}$

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