Some Imp. Conc. terms

(1) M (2) N (3) molality

(4) mole fraction (x_A)

(5) mass fraction (m_A)

$$m_A = \left(\frac{\omega_A}{\omega_A+\omega_B}\right) \quad m_B = \frac{\omega_B}{(\omega_A+\omega_B)}$$

Sol

$$m_A + m_B = 1$$

(6) Mole %

$$\text{Mole \%} = x_A \times 100 = \left(\frac{n_A}{n_A+n_B}\right) \times 100$$

(7) mass %

% weight-by weight

% by mass

% w/w

$$\%\ \frac{w}{w} = \frac{(\omega_A)_{gm}}{(\omega_A+\omega_B)_{gm}} \times 100$$

(8) % by volume

(% w/v)

$$\%\ \frac{w}{V} = \frac{(w_A)_{gm}}{(V_A + V_B)_{ml}} \times 100$$

↳ Soln

(9) parts per million (ppm)

⇒ When solute is present in very less quantity.

$$ppm = \frac{\text{Solute (Same)}_{gm,ml} \times 10^6}{\text{Soln (Unit)}_{ml,gm}}$$

$$= \frac{gm, ml, Kg, L}{gm, ml, Kg\ L}$$

(10) parts per billion (ppb)

$$ppb = \frac{\text{Solute}}{\text{Soln}} \times 10^9$$

↳ Same Unit

Table (याद करें)

Compound	mw
H_2SO_4, H_3PO_4	98
CH_3COOH, NH_2CONH_2	60
(Sucrose sugar $(C_{12}H_{22}O_{11})$), $Al_2(SO_4)_3$	342

(Benzene)	C_6H_6	78
	$C_6H_5CH_3$ (Toulene)	92
	C_6H_5OH (Phenol)	94
	NaOH	40
	NaCl	23+35.5 = 58.5
	$C_6H_{12}O_6$ Glucose	180
	$CaCO_3$	100
Methyle Alcohol	CH_3OH	32
Ethyle Alcohol	C_2H_5OH	46
	Na_2CO_3	106
Acetone	CH_3COCH_3	36+6+16 = 58

(1) 4 gm NaOH in 400 ml soln
Molarity = ?

Soln $M = \frac{g_m \text{ solute}}{mw \times V_L \text{ soln}}$

$M = \frac{4 \times 1000}{40 \times 400}$

(2) 4.9 gm H_2SO_4 in 500 ml soln
Normality = ?

Soln $N = \frac{g_m}{Ew \times V_L}$

$N = \frac{4.9 \times 1000}{\left(\frac{98}{2}\right) \times 500}$

$Ew = \frac{mw}{V.f}$

Acid → Basicity

H_2SO_4 → $2H^+$

(3) 20 gm NaOH is present in 200 gm soln molality = ?

Sol: $m = \frac{\text{gm solute}}{mw \times \text{Kg (solvent)}}$

$m = \frac{20 \times 1000}{40 \times 180}$

NaOH 20 — H_2O 180 (200)

(4) 20 gm NaOH is present with 200 gm water molality = ?

$m = \frac{\text{gm solute}}{mw \times \text{Kg solvent}}$

$m = \frac{20 \times 1000}{40 \times 200}$

NaOH 20 — 200

(5) 0.2 M H_2SO_4 200 ml soln Cal. gm of H_2SO_4 in soln

Soln $M = \frac{gm}{mw \times V_L}$

$0.2 = \frac{x \times 1000}{98 \times 200}$

(6) 0.2 N, 500 ml $CaCO_3$ soln Cal. gm of $CaCO_3$ in soln

$N = \frac{gm}{Ew \times V_L}$

$0.2 = \frac{x \times 1000}{\left(\frac{100}{2}\right) \times 500}$

$CaCO_3 \Rightarrow$ is a salt

$Ew = \frac{mw}{\text{total } (+) \text{ or } (-) \text{ charge}}$

$Ew = \frac{mw}{\text{v-f.}} = \frac{100}{2}$

$CaCO_3$ → +2

(7) 4 gm NaOH and 90 gm H_2O in a soln

Mole fraction NaOH

Sol^n $X_{NaOH} = \frac{\text{moles (NaOH)}}{\text{total moles}}$

$\text{moles} = \frac{\text{gm}}{\text{mw}}$ $X_A = \frac{\left(\frac{4}{40}\right)}{\left(\frac{4}{40}\right)+\left(\frac{90}{18}\right)}$

$X_A = \frac{0.1}{0.1+5} = \frac{0.1}{5.1} = \frac{1}{51}$

(8) 3.2 gm CH_3OH + 4.6 gm C_2H_5OH

$X_{CH_3OH} = ?$ $m_{CH_3OH} = ?$

Sol^n $X_{CH_3OH} = \frac{\left(\frac{3.2}{32}\right)}{\left(\frac{3.2}{32}\right)+\left(\frac{4.6}{46}\right)} = \frac{\text{moles}}{\text{total moles}}$ | $m_{CH_3OH} = \frac{3.2}{3.2+4.6} = \frac{\text{gm}}{\text{total gm}}$

(9) 1 mole C_6H_6 + 9.2 gm $C_6H_5CH_3$ (92)

$X_{C_6H_6} = ?$ $m_{C_6H_6} = ?$

Sol^n $X_{C_6H_6} = \frac{1}{1+0.1} = \frac{1}{1.1}$

$\text{mole} = \frac{\text{gm}}{\text{mw}}$ $\text{gm} = \text{mole} \times \text{mw}$

mole $= \frac{\text{gm}}{\text{mw}} = \frac{9.2}{92} = 0.1$

$m_{C_6H_6} = \frac{78}{78+9.2}$ $\text{gm} = 1 \times 78 = 78$

(10) 2 mg F^- ions are present in 4 kg tooth paste, then Calc. Conc. in terms of ppm = ?

Neet

Soln ppm = $\frac{\text{Solute (gm)}}{\text{Soln (gm)}} \times 10^6$

$= \frac{2 \times 10^{-3}}{4 \times 10^3} \times 10^6$

$= \frac{1}{2} = 0.5$ ppm

main (11) 4 ml O_2 gas is dissolved in 50 L sea water Calc. Conc. in ppb = ?

ppb = $\frac{\text{Solute (ml)}}{\text{Soln (ml)}} \times 10^9$

$= \frac{4}{50 \times 10^3} \times 10^9$

(12)

1L = 1000 ml
= 1000 cm^3 (cc)
= 1 dm^3 =

1 cc = 1 ml

1 L = 1000 cm^3
= 1000 × cm × cm × cm

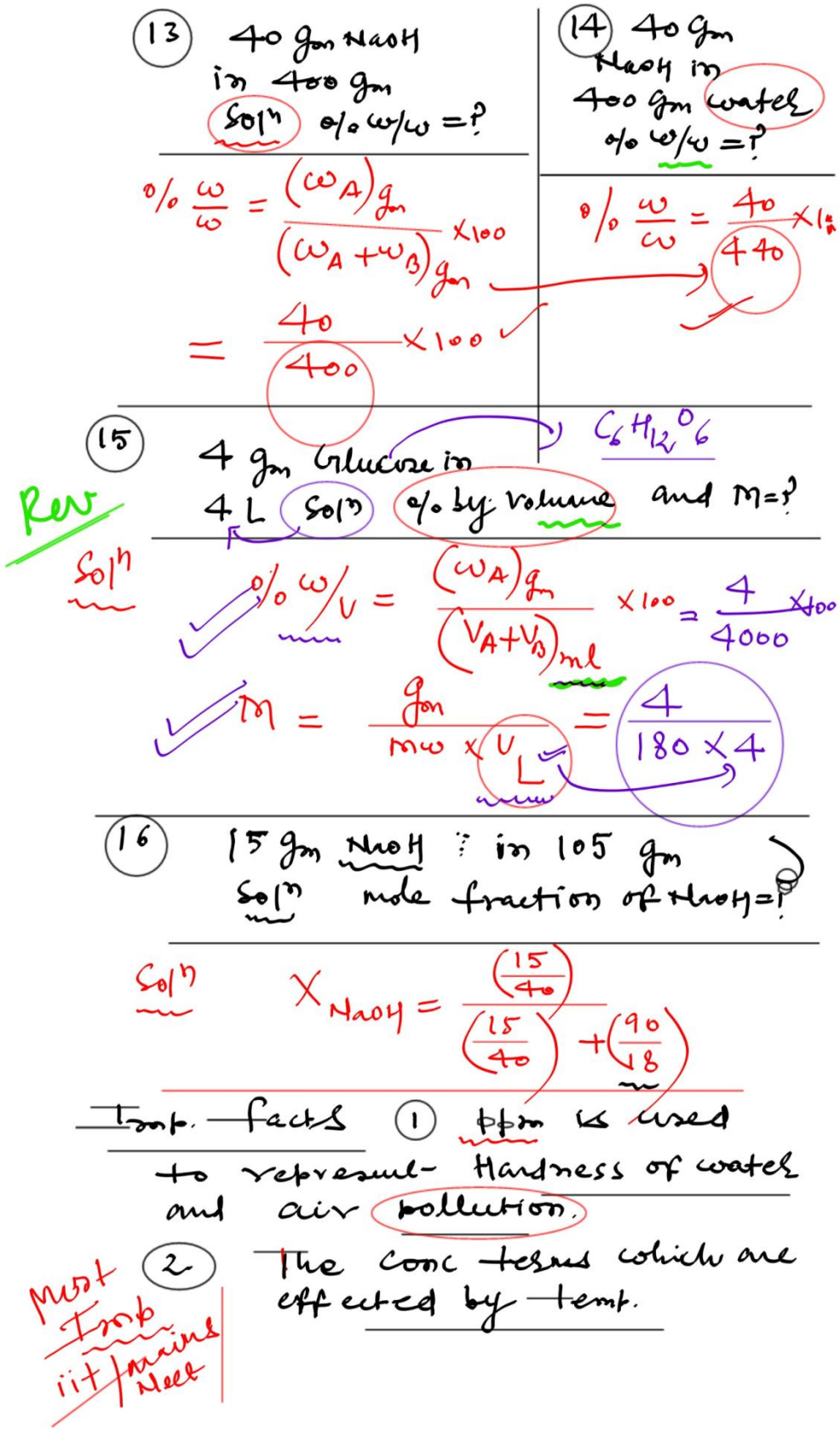
= $1000 \times 10^{-2} \times 10^{-2} \times 10^{-2}$ m^3

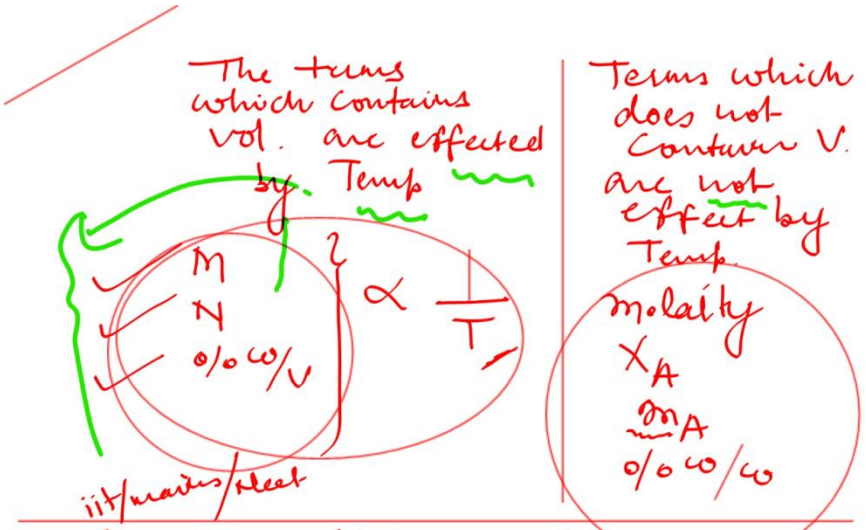
= 10^{-3} m^3

1L = 1000 ml
= 1000 cc
= 1 dm^3 = 10^{-3} m^3

1 Kg = 1000 gm

1 mg = 10^{-3} gm


13 40 gm NaOH in 400 gm Soln % w/w = ?
% w/w = (w_A)gm / (w_A + w_B)gm x100
= 40/400 x100
14 40 gm NaOH in 400 gm water % w/w = ?
% w/w = 40/440 x100
15 4 gm Glucose in 4 L Soln % by volume and M = ?
Rev
Soln
% w/v = (w_A)gm / (V_A+V_B)ml x100 = 4/4000 x100
M = gm / mw x V_L = 4/180x4
C6H12O6
16 15 gm NaOH in 105 gm Soln mole fraction of NaOH = ?
Soln
X_NaOH = (15/40) / (15/40 + 90/18)
Imp. facts (1) ppm is used to represent Hardness of water and air pollution.
(2) The conc terms which are effected by temp.
Must Track iit/mains Neet



Que ① which conc. terms effected by temp.

ⓐ molality ⓑ % by mass

ⓒ Molarity ⓓ all

$N = M \times V.F.$ $\quad M = \frac{N}{V.F.}$

Que. Complete the fill in the blanks

① 0.1 m H_2SO_4 ---- N (0.1 × 2)

Salt ② 0.4 m $Al_2(SO_4)_3$ ---- N (0.4 × 6)

③ 0.2 N $H_2C_2O_4$ ---- M ($\frac{0.2}{2}$) $M = \frac{N}{V.F}$

④ 0.1 M H_3BO_3 ---- N (0.1 × 1)

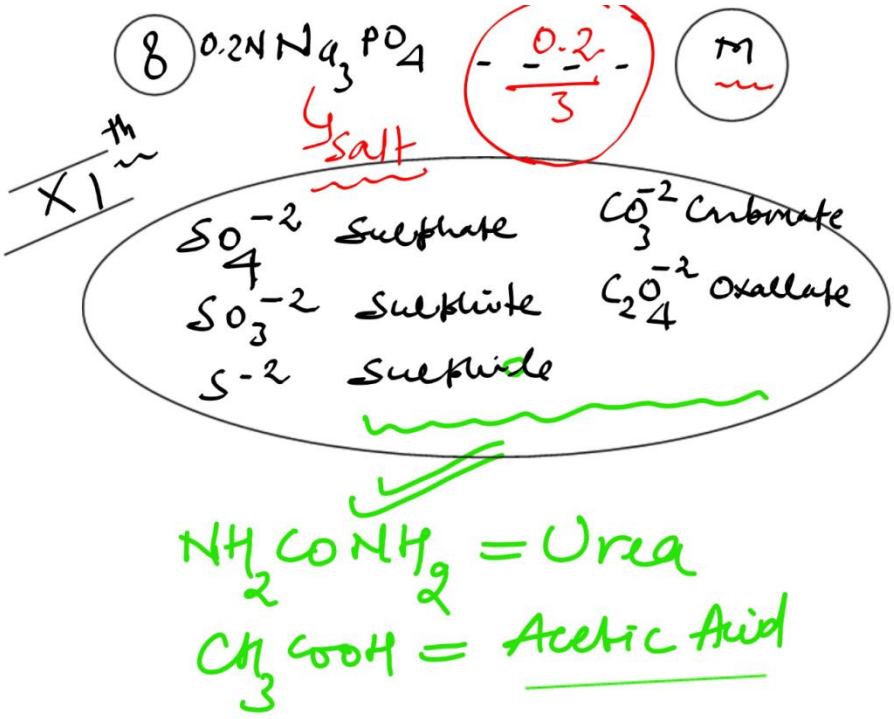
⑤ 0.4 N H_3PO_3 ---- M ($\frac{0.4}{2}$)

⑥ 0.2 M H_3PO_2 ---- N (0.2 × 1)

$N = M \times V.F.$ (N = नॉर्मलिटी, M = मोलैरिटी)

$M = \frac{N}{V.F.}$

⑦ 0.4 M $Al(OH)_3$ ---- N (0.4 × 3)


8
0.2N Na3PO4
0.2/3
M
XI th
Salt
SO4 -2 Sulphate
SO3 -2 Sulphite
S -2 Sulphide
CO3 -2 Carbonate
C2O4 -2 Oxallate
NH2CONH2 = Urea
CH3COOH = Acetic Acid