Problems related with Mixing of Solution

Course on Mole Concept for Class XI

akhilesh • Lesson 11 • June 26, 2021

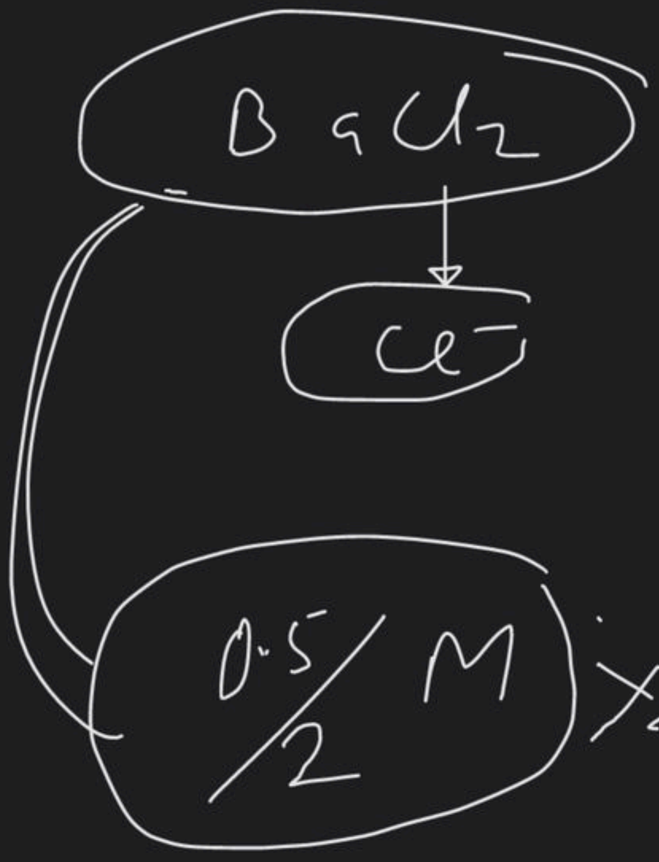
(6) H_2O NaCl

1 mol 1 mol

18 gm

$$m = \frac{1}{18} \times 1000$$

(5)



HCl

$$\frac{1.825 / 36.5}{100} \times 1000$$

$$\times \frac{250}{1000} = 0.5$$

2 M $MgCl_2$

$[Mg^{2+}] = 2$

$[Cl^-] = 4$

NaCl

1 ∞ gm

KCl

1 ∞ gm

5 M Urea $d = 1.5$ gm/ml

1) % W/W = 2 | 20

2) % W/V = 3 | 30

3 = 30 | 2×10^{-5} | 30

4 = 3×10^{4} | 30 | 2×10^{5}

5 M = 50 / 147 = 4.16

6 = 3/493 = | 9/128

1000 ml Soln contains 5 mol urea

1500 gm Soln —— 300 gm urea

$W_{solvent} = 1200$ gm

ppm

20×10^4

$\% W/W = \frac{300}{1500} \times 100 = 20$

$\% W/V = \frac{300}{1000} \times 100 = 30$

gm/lit = 300

$$\eta = \frac{5}{1200} \times 1200 = \frac{5}{12}$$

$$\frac{5}{5 + \frac{1200}{18}\frac{60}{9}} = \frac{5}{645} = \boxed{\frac{3}{43}}$$

x m Urea $d = 1.5$ gm/ml

1000 gm solvent contains x gm/mol urea

1000 gm Solvent 300 gm urea

$W_{soln} = 1300$ gm

$V_{soln} = \frac{1300}{1.5}$

find molality (m) of x M solute (having M. mass = M_1) and M. mass of solvent = M_2. Given density of soln = d gm/ml

1000 ml solution contains x mol solute

1000 × d gm soln ⟶ xM_1

$w_{solvent} = 1000d - xM_1$

$m =$

$$\Lambda_m = \frac{\kappa}{1000\,d - \kappa M_1} \times 1000$$

for a dilute aqueous soln

m = Molarity

Molarity & Molality of pure water :→

Let we have 1000 gm $H_2O(\ell)$

1000 ml $H_2O(\ell)$

$\frac{1000}{18}$ mol

$M = \frac{1000}{18}$

$= 55.55$

$m = \frac{1000}{18}$

$= 55.5$

find Molarity & Molality of pure CH_3COOH (l). Given density = 0.8 gm/ml

Let we have 1000 ml CH_3COOH (l)

$$\underline{800 \text{ gm}} \equiv \underline{40/3 \text{ mol}}$$

$$M = \frac{40/3}{1} \qquad m = \frac{40/3}{800} \times 1000$$

$$= \underline{50/3}.$$

Problems Related with mixing of soln

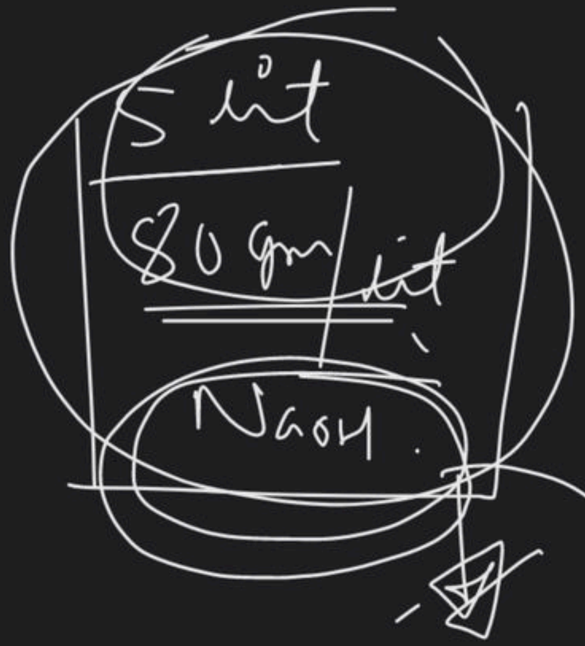
Case-1 If there is no Rxn after mixing

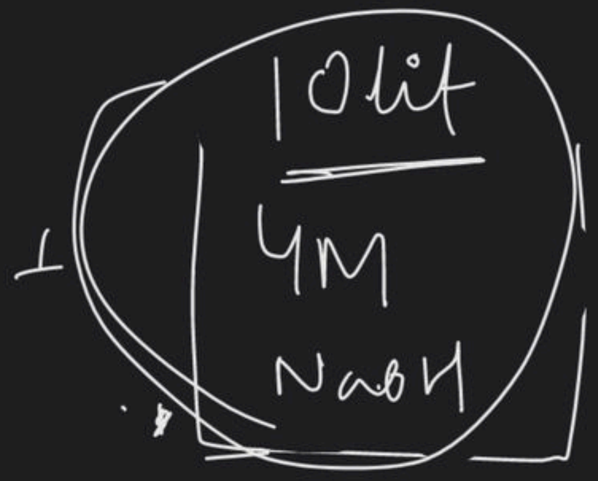
2M NaOH Soln	+	3M NaOH 10 Lit	=	M = ?

$$n_1 + n_2 = n_3$$

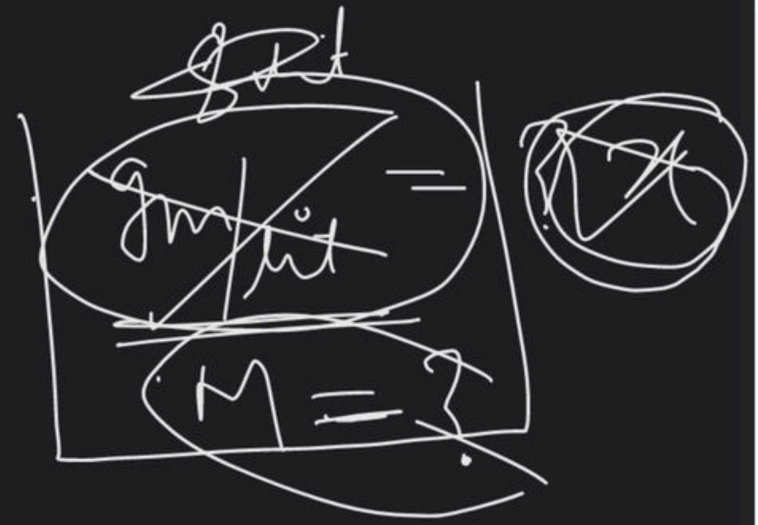
$$M_1V_1 + M_2V_2 = M_f(V_1 + V_2)$$

$$10 + 30 = M \times 15$$





=



400gm + 600gm = 8x.

A) 12.5

B) 125

C) None

(A) $10/3$

(B) $88/3$

(C) None

10 moles + 40 mol = M × 15

$10/3 = M$

40 gm + 16 mole gm = $\frac{x}{(\text{gm/lit})} \times 15$

① 10 kg 2000 ppm $CaCO_3$ + 15 kg 4000 ppm $CaCO_3$ = PPM = ? 3200

② 500 ml 20% W/V NaOH + 1 lit 2M NaOH = M = ? = 3

1

③ 200 gm 20% W/W HF + 400 ml = 500 gm 30% W/W HF = % W/W

($d = 1.25$ gm/ml)

$10\,kg = 10^4\,gm$

$200\,ppm$

1.5×10^4

$$\frac{q_1 w}{10^6} \times 10^4 + \frac{400}{10^6} \times 1.5 \times 10^4 = \frac{x}{10^6} \times 2.5 \times 10^4$$

(4) 540 gm solution of 2m NaOH + 2320 gm soln of 4m NaOH = ? m

1000 gm solvent — 2 mol

80 gm NaOH

$W_{soln} = 1080$

540 gm — 40 gm

$W_{H_2O} = 500$ gm

1000 gm solvent — 4 mol

160 gm

$W_{soln} = 1160$ gm

2000 gm + 320 gm

3.6 m

5-1

8-25

0-1

18-28

$$\frac{90}{2.5} = 18/5 = 3.6$$