



Sri Chaitanya IIT Academy, India

A.P, TELANGANA, KARNATAKA, TAMILNADU, MAHARASHTRA, DELHI, RANCHI

A right Choice for the Real Aspirant

ICON CENTRAL OFFICE, MADHAPUR-HYD

Sec: Sr. IPLCO
TIME : 3:00

JEE ADVANCED
2014_P1 MODEL

DATE : 27-12-15
MAX MARKS : 180

KEY & SOLUTIONS

PHYSICS

1	AB	2	ABD	3	CD	4	BD	5	BD	6	D
7	AC	8	ABC	9	ACD	10	BCD	11	6	12	3
13	6	14	1	15	4	16	9	17	5	18	4
19	3	20	1								

CHEMISTRY

21	ACD	22	D	23	BD	24	AC	25	ABD	26	ABD
27	BD	28	BC	29	D	30	AC	31	2	32	5
33	3	34	9	35	5	36	6	37	1	38	2
39	0	40	1								

MATHEMATICS

41	AC	42	BCD	43	AB	44	ABD	45	ABC	46	ACD
47	ACD	48	ACD	49	ABCD	50	ABCD	51	0	52	8
53	2	54	9	55	6	56	4	57	3	58	6
59	7	60	6								

CHEMISTRY

21. Conceptual
22. Conceptual
23. Conceptual
24. Conceptual
25. Conceptual
26. Conceptual
27. Conceptual
28. Conceptual
29. Conceptual
30. Conceptual

$$\underline{31.} \quad [H^+]_{\text{Total}} = [H^+]_{CH_3COOH} + [H^+]_{HCl}$$

$$= C\alpha + 0.1 \sim 0.1 \quad (C\alpha \sim C)$$

$$\Rightarrow K_a = \alpha \times 0.1 \Rightarrow 2 \times 10^{-4} = \alpha$$

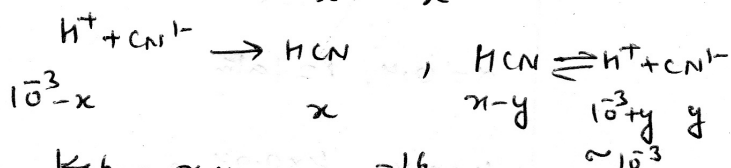
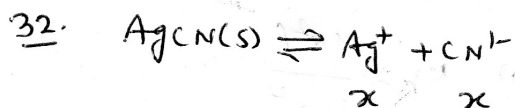
After NaOH addition (Acidic buffer)

$$pH = 4.7 + \log \frac{S_0/V_{\text{total}}}{S_0/V_{\text{total}}} = 4.7$$

$$[K_2C_2O_4] = \frac{0.15}{0.5} = 0.30M, \quad [K_2CO_3] = \frac{0.03}{0.5} = 0.06M = x$$

$$[Ag^+]_{eq} = \sqrt{\frac{K_{sp} Ag_2C_2O_4}{[C_2O_4^{2-}]}} = \sqrt{\frac{1.2 \times 10^{-11}}{0.3 - 0.06}} = 7 \times 10^{-6}M$$

$$[CO_3^{2-}]_{\text{final}} = 0.06M \quad \therefore K_{sp} Ag_2CO_3 = (7 \times 10^{-6})^2 (0.06)$$



$$K_{sp} = x \times y = 2 \times 10^{-16}$$

$$K_a = \frac{10^{-3}y}{x-y} = 6 \times 10^{-10}$$

$$\therefore x = [Ag^+] = \sqrt{\frac{K_{sp}}{K_a} ([H^+] + K_a)}$$

$$\therefore x = 1.82 \times 10^{-5}M$$

$$= 3 \times 10^{-12}$$

33. Conceptual

34. $[S^{2-}] > \frac{K_{sp}}{[Ni^{2+}]}$, NiS will precipitate

Hence $\frac{K_{sp}}{[Ni^{2+}]}$ is minimum conc of S^{2-} above which

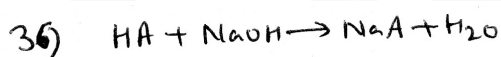
precipitation occurs. $\therefore [S^{2-}] = \frac{1.4 \times 10^{-14}}{2 \times 10^{-6}} = 7 \times 10^{-9} M$

35. $h = \frac{\sqrt{K_h}}{1 + \sqrt{K_h}}$

$K_h = \frac{K_w}{K_a K_b} = \frac{10^{-14}}{1.8 \times 10^{-5} \times 4.5 \times 10^{-10}}$

$= 1.23$

$\therefore h = 0.52 \Rightarrow pH = 7 + \frac{1}{2} [-\log 1.8 \times 10^{-5} - (-\log 4.5 \times 10^{-10})]$
 $= 4.7$



x	y	$-$
$x-y$	$-$	y

$x = 3.5 \text{ mmols}$

$y = 2 \text{ mmols}$

$\therefore x-y = 1.5$

$[H^+] = K_a \frac{[A_{und}]}{[salt]} = 10^{-5.5} = K_a \times \frac{1.5}{2}$

$\therefore K_a = 4.22 \times 10^{-6}$

37) $0.4 = \frac{x}{0.2} \Rightarrow x = 0.08$

$\frac{V_f}{V_i} = \frac{0.8-2x}{0.8} = 1 - \frac{x}{0.4}$

$= 1 - \frac{0.08}{0.40} = \frac{4}{5}$

$$38) K_{eq} = \frac{2 \times 10^3}{10^2} = 20$$

$$39) K_p = \frac{4\alpha^2 p}{1-\alpha^2}$$

$$\alpha = 0.4, p = 1 \text{ atm}$$

$$\frac{4 \times 0.16}{0.84} = \frac{4 \times 0.04}{0.96} p_{\text{new}}$$

$$p_{\text{new}} = 4.57 \text{ atm}$$

$$40) K_c = \frac{4x^2}{(1-x)^2} = 49$$

$$\therefore x = 0.78$$

$$\therefore \eta_{AB} = 2x = 1.56$$