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 **JEE ADVANCED** **DATE : 27-12-15**
TIME : 3:00 **2014_P1 MODEL** **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

31. $[H^+]_{Total} = [H^+]_{CH_3COOH} + [H^+]_{HCl}$

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

$\Rightarrow K_a = \alpha \times 0.1 \Rightarrow 2\times10^{-4} = \alpha$

After NaOH addition (Acidic buffer)

$pH = 4.7 + \log \frac{50/V_{total}}{50/V_{tot}} = 4.7$

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

$[Ag^+]_{eq} = \sqrt{\frac{K_{sp}\,Ag_2C_2O_4}{[C_2O_4^{2-}]}} = \sqrt{\frac{1.2\times10^{-11}}{0.3-0.06}} = 7\times10^{-6}M$

$[CO_3^{2-}]_{final} = 0.06M \quad \therefore K_{sp}\,Ag_2CO_3 = (7\times10^{-6})^2(0.06)$

32. $AgCN(s) \rightleftharpoons Ag^+ + CN^-$

$x \quad x$

$H^+ + CN^- \longrightarrow HCN$, $HCN \rightleftharpoons H^+ + CN^-$

$10^{-3}-x \quad x \quad x-y \quad 10^{-3}+y \quad y \quad (\sim 10^{-3})$

$K_{sp} = x\times y = 2\times10^{-16}$

$K_a = \frac{10^{-3}y}{x-y} = 6\times10^{-10}$

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

$\therefore x = 1.82\times10^{-5}M$

$= 3\times10^{-12}$

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. $\therefore [S^{2-}]_{min} = \frac{1.4\times10^{-14}}{2\times10^{-6}} = 7\times10^{-9}\ M$

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

$K_h = \frac{K_w}{K_a K_b} = \frac{10^{-14}}{1.8\times10^{-5}\times4.5\times10^{-10}}$

$= 1.23$

$\therefore h = 0.52 \Rightarrow pH = 7 + \frac{1}{2}\left[-\log 1.8\times10^{-5} - (-\log 4.5\times10^{-10})\right]$

$= 4.7$

36) $HA + NaOH \longrightarrow NaA + H_2O$

x	y	—	
$x-y$	—	y	

$x = 3.5$ mmoles

$y = 2$ mmoles

$\therefore x - y = 1.5$

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

$\therefore K_a = 4.22\times10^{-6}$

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) $K_{eq} = \frac{2\times10^3}{10^2} = 20$

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

$\alpha = 0.4$, $P = 1$ atm

$\frac{4\times0.16}{0.84} = \frac{4\times0.04}{0.96} P_{new}$

$P_{new} = 4.57$ atm

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

$\therefore x = 0.78$

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