Date Planned : __ / __ / __	Daily Tutorial Sheet-3	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	JEE Advanced (Archive)	Exact Duration :_____

31. What is the pH of a 1.0 M solution of acetic acid? To what volume must one litre of this solution be diluted so that the pH of the resulting solution will be twice the original value?
Given, $K_a = 1.8 \times 10^{-5}$ **(1990)**

32. The solubility product of $Ag_2C_2O_4$ at $25°C$ is 1.29×10^{-11} mol^3L^{-3}. A solution of $K_2C_2O_4$ containing 0.1520 mole in 500 mL water is shaken at $25°C$ with excess of Ag_2CO_3 till the following equilibrium is reached $Ag_2CO_3 + K_2C_2O_4 \rightleftharpoons Ag_2C_2O_4 + K_2CO_3$ **(1991)**

33. A 40 mL solution of a weak base, BOH is titrated with 0.1N HCl solution. The pH of the solution is found to be 10.04 and 9.14 after the addition of 5.0 mL and 20.0 mL of the acid respectively. Find out the dissociation constant of the base. **(1991)**

34. The solubility product (K_{sp}) of $Ca(OH)_2$ at $25°C$ is 4.42×10^{-5}. A 500 mL of saturated solution of $Ca(OH)_2$ is mixed with equal volume of 0.4 M NaOH. How much $Ca(OH)_2$ in milligrams is precipitated? **(1992)**
At equilibrium, the solution contains 0.0358 mole of K_2CO_3. Assuming the degree of dissociation of $K_2C_2O_4$ and K_2CO_3 to be equal, calculate the solubility product of Ag_2CO_3.

35. Which of the following solutions will have pH close to 0.1? **(1992)**
(A) 100 mL of (M/10) HCl + 100 mL of (M/10) NaOH
(B) 55 mL of (M/10) HCl + 45 mL of (M/10) NaOH
(C) 10 mL of (M/10) HCl + 90 mL of (M/10) NaOH
(D) 75 mL of (M/5) HCl + 25 mL of (M/5) NaOH

36. An aqueous solution of a metal bromide MBr_2 (0.05 M) is saturated with H_2S. What is the minimum pH at which MS will precipitate? **(1993)**
K_{sp} for MS = 6.0×10^{-21}, concentration of saturated $H_2S = 0.1\ M, K_1 = 10^{-7}$ and $K_2 = 1.3 \times 10^{-13}$, for H_2S.

37. The pH of blood stream is maintained by a proper balance of H_2CO_3 and $NaHCO_3$ concentrations. What volume of 5M $NaHCO_3$ solution should be mixed with a 10 ml sample of blood which is 2M in H_2CO_3, in order to maintain a pH of 7.4? (K_a for H_2CO_3 in blood is 7.8×10^{-7}) **(1993)**

38. Calculate the pH of an aqueous solution of 1.0 M ammonium formate assuming complete dissociation. (pK_a of formic acid = 3.8 and pK_b of ammonia = 4.8) **(1995)**

39. What is the pH of a 0.50 M aqueous NaCN solution? **(1996)**
(pK_b of CN^- = 4.70)

40. The ionisation constant of NH_4^+ in water is 5.3×10^{-10} at $25°C$. The rate constant for the reaction of NH_4^+ and H_2O at $25°C$ is 3.4×10^{10} L/mol. Calculate the rate constant per proton transfer from hydronium ion to NH_3. **(1996)**

41. In the reaction, $I^- + I_2 \longrightarrow I_3^-$, the Lewis acid is..... **(1996)**

42. $(CH_3OH_2^+)$ is..... acidic than $(CH_3NH_3^+)$. **(1997)**

***43.** Which of the following statement(s) is(are) correct? **(1998)**

(A) The pH of 1.0×10^{-8} M solution of HCl is 8

(B) The conjugate base of $H_2PO_4^-$ is HPO_4^{2-}

(C) Autoprotolysis constant of water increase with temperature

(D) When a solution of a weak monoprotic acid is titrated against a strong base, at half-neutralisation point $pH = \left(\frac{1}{2}\right) pK_a$

44. The pH of 0.1 M solution of the following salts increases in the order: **(1999)**

(A) NaCl < NH_4Cl < NaCN < HCl **(B)** HCl < NH_4Cl < NaCl < NaCN

(C) HCN < NH_4Cl < NaCl < HCl **(D)** HCl < NaCl < NaCN < NH_4Cl

***45.** A buffer solution can be prepared from a mixture of: **(1999)**

(A) sodium acetate and acetic acid is water

(B) sodium acetate and HCl in water

(C) ammonia and ammonium chloride in water

(D) ammonia and sodium hydroxide in water