Exercise # 1

Q.1 The pH of a solution is 5.0. An acid is added to it so that its pH becomes 2.0. The $[H^+]$ concentration of the solution increases :

[1] 100 times [2] 1000 times [3] 2.5 times [4] 10 times

Q.2 The degree of ionisation of 0.1 M HCN solution is 0.01%. The ionisation constant of HCN is :

[1] 10^{-9} [2] 10^{-7} [3] 10^{-3} [4] 10^{-5}

Q.3 The solubility product of a sulphide MS is 3×10^{-25} and that of NS 4×10^{-40}. In the ammoniacal solution :

[1] Only NS will precipitate [2] Only MS will precipitate

[3] Neither NS nor MS will precipitate [4] Both NS and MS will precipitate

Q.4 The solution of $NaHCO_3$ does not give pink colour with phenolphthalein. The reason is :

[1] The solution is neutral [2] Solution is acidic

[3] The pH of the solution is more than 8.0 [4] The pH of the solution is less than 8

Q.5 At 298 K, the solubility product of $Zn(OH)_2$ in 10^{-14}. What will be the concentration in moles L^{-1} of Zn^{2+} ions in 0.1 M Na_4OH solution. (The degree of dissociation of NH_4OH is 50%) :

[1] 4×10^{-12} [2] 4×10^{-13} [3] 4×10^{-14} [4] 4×10^{-12}

Q.6 Which one of the following factors does not affect the ionisation of an electrolyte ?

[1] Dilution [2] Temperature [3] Nature of electrolyte [4] Amount of electric current

Q.7 The ratio of hydrogen ions to hydroxide ions in a 500 ml solution of 0.002 M HNO_3 is :

[1] $4 \times 10^8 : 1$ [2] $1 : 4 \times 10^8$ [3] $4 \times 10^{-8} : 1$ [4] $1 : 4 \times 10^{-8}$

Q.8 At 298 K, if the ionic product of water is K_w and ionisation constant is K then :

[1] $K = K_w$ [2] $55.55\ K = K_w$ [3] $K = 55.5\ K_w$ [4] $K = 1.8\ K_w$

Q.9 AB is a strong electrolyte and AC a weak electrolyte. Both are dissolved in water separately and their solutions are mixed together :

[1] The degree of ionisation of AC will decreases [2] The degree of ionisation of AB will decrease

[3] AB will be precipitated [4] AC will be precipitated

Q.10 The dissociation constant of acetic acid and hydrogen cyanide are 1.8×10^{-5} and 3.2×10^{-10} respectively. If the degree of hydrolysis of potassium cyanide and potassium acetate are h_1 and h_2 respectively then :

[1] $h_1 > h_2$ [2] $h_1 < h_2$ [3] $h_1 = h_2$ [4] None of these

Q.11 How many times a solution of pH = 2 has higher acidity then the solution of pH = 6 ?

[1] 10000 [2] 12 [3] 400 [4] 4

Q.12 The pH of a soft drink is 3.82. The concentration of hydrogen ions in it is :

[1] 1.96×10^{-2} moles L^{-1} [2] 1.96×10^{-3} moles L^{-1}

[3] 1.5×10^{-4} moles L^{-1} [4] 1.96×10^{-1} moles L^{-1}

Q.13 1.0 M solution of a monoprotic acid is 0.001 percent ionised. The dissociation constant of the acid is :

[1] 1.0×10^{-3} [2] 1.0×10^{-6} [3] 1.0×10^{-8} [4] 1.0×10^{-10}

Q.14 pH can be defined as :

[1] $pH = \log \frac{1}{[H^+]}$ [2] $pH = \log [H^+]$ [3] $pH = \frac{K_w}{[H^+]}$ [4] $pH = -\log^{[H^+]}$

Q.15 Ag_2CrO_4 is :

[1] Mono-bivalent salt [2] Mono-trivalent salt [3] Mono-monovalent salt [4] Di-trivalent salt

Q.16 The aqueous solution of H_2S has the equilibrium : $H_2S \rightleftharpoons H^+ + HS^-$

If HCl is added to this solution without changing temperature then :

[1] Concentration of HS^- increases [2] Concentration of HS^- decreases

[3] Concentration of H_2S decreases [4] Equilibrium constant changes

Q.17 0.5 mole of $BaCl_2$ is mixed with 0.2 mole of Na_3PO_4. The maximum number of moles of $Ba_3(PO_4)_2$ obtained are

[1] 0.10 [2] 0.20 [3] 0.50 [4] 0.70

Q.18 Which of the following is a false statement ?

[1] At normal temperature pH + pOH = 14

[2] For the standardisation of acids, the general primary standard is Na_2CO_3 of borax

[3] At 22° C, $[H^+]\,[OH^-] = 10^{-14}$

[4] Generally the bases are standardised by acetic acid or borax

Q.19 At 298 K, the solubility product of $PbCl_2$ is 1.0×10^{-6}. Solubility of $PbCl_2$ in moles L^{-1} is :

[1] 6.3×10^{-3} [2] 1.0×10^{-3} [3] 3×10^{-3} [4] 4.6×10^{-4}

Q.20 The salt which shows cationic hydrolysis is :

[1] NH_4CN [2] $(NH_4)_2SO_4$ [3] KCl [4] CH_3COOK

Q.21 The pH of $\frac{N}{1000}$ KOH solution is :

[1] 10^{-11} [2] 3.0 [3] 11 [4] 2.0

Q.22 Which of the following is a false statement for a weak acid ?

[1] It dissociates partially [2] The value of its dissociation constant is very low

[3] The value of its pK_a is very low [4] The aqueous solution of its sodium salt is basic

Q.23 At 373 K, the ionisation constants of formic acid and lactic acid are 4×10^{-4} and 2×10^{-4} respectively. What is the isohydric concentration of formic acid with 0.02 N lactic acid ?

[1] 0.02 N [2] 0.04 N [3] 0.01 N [4] None of these

Q.24 The dissociation constants of acetic acid and propionic acid are 1.0×10^{-5} and 1.0×10^{-6} respectively. The value of $pK_{a\ (propionic\ acid)} - pK_{a\ (Acetic\ acid)}$ is –

[1] 10.0 [2] 10^{-1} [3] 1.0 [4] – 1.0

Q.25 The hydrolysis constants of two salts M_1X and M_2X formed from strong acid and weak base are 10^{-6} and 10^{-3} respectively. If $K_b = 10^{-3}$ for M_3OH then base strength :

[1] $M_1OH < M_2OH < M_3OH$ [2] $M_1OH > M_2OH > M_3OH$

[3] $M_3OH > M_1OH > M_2OH$ [4] None of these

Q.26 The ionic product of distilled water may be given as :

[1] $[H_3O^+]^2$ [2] $[H^+]^2\,[OH^-]$ [3] $[H^+]\,[OH^-]^2$ [4] $[H_3O^+] + [OH^-]$

Q.27 How many grams of CaC_2O_4 are dissolved in distilled water to prepare one litre saturated solution ? Solubility product of CaC_2O_4 is 2.5×10^{-9} mole^2 L^{-2} and molecular mass is 128 :

[1] 0.0064 g [2] 0.0128 g [3] 0.0032 g [4] 0.0640 g

Q.28 The pH of a solution is 6.0. In this solution :

[1] $[H^+] = 100\,[OH^-]$ [2] $[H^+] = 10\,[OH^-]$ [3] $[H^+] = [OH^-]$ [4] $[H^+] = \frac{1}{10}[OH^-]$

Q.29 20 ml of 0.1 N hydrochloric acid is mixed with 20 ml of 0.1 N potassium hydroxide solution. The pH of the resulting solution is :

[1] 0.00 [2] 7.00 [3] 2.00 [4] 9.00

Q.30 At 298 K, how many milligrams of silver bromide can be dissolved in 20 litres of water ? [$K_{sp\ (AgBr)} = 5.0 \times 10^{-13}$] (Atomic wt. Ag = 108, Br = 80)

[1] 2.66 [2] 3.66 [3] 4.66 [4] None of these

Q.31 The dissociation constants of both NH_4OH and CH_3COOH are 2.0×10^{-5}. What is the degree of hydrolysis of ammonium acetate ?

[1] 5×10^{-6} [2] 2.0×10^{-5} [3] 5×10^{-3} [4] None of these

Q.32 The pH of an aqueous solution is zero. This solution will be :

[1] Basic [2] Acidic [3] Neutral [4] Amphoteric

Q.33 At 25ºC what will be the solubility of silver carbonate in 0.1 M Na_2CO_3 solution. At this temperature K_{sp} of silver carbonate is 4×10^{-13} :

[1] 2×10^{-7} [2] 2×10^{-6} [3] 10^{-6} [4] 10^{-7}

Q.34 0.5 moles of HCl and 0.5 moles of CH_3COONa are dissolved in water and the solution is made upto 500 ml. The pH of the resulting solution will be : (K_a (CH_3COOH) = 1.6×10^{-5})

[1] 1.6×10^{-5} [2] 1.6×10^{-4} [3] 4×10^{-3} [4] 4×10^{-2}

Q.35 4.0 g of NaOH and 4.9 g of H_2SO_4 are dissolved in water and the volume is made upto 250 ml. The pH of this solution is :

[1] 7.0 [2] 1.0 [3] 2.0 [4] 12.0

Q.36 $[H^+]/[OH^-]$ in 0.25 N H_2SO_4 is :

[1] 6.25×10^{12} [2] 5×10^{13} [3] 6.25×10^{-12} [4] 5×10^{-13}

Q.37 Select the incorrect statement :

[1] pH of 500 ml 0.001 N HNO_3 is 3.0 [2] pH of 500 ml of 0.001 N HNO_3 is 4 – log 5

[3] pH of 20 ml decinormal HCl solution is 1.0 [4] pH of 100 ml 0.01 N NaCl solution is = 7.0

Q.38 1.0 M HCN solution is 1.0 percent ionised. The number of CN^- ions in 250 ml of the solution is :

[1] 1.5×10^{21} [2] 6×10^{23} [3] 5×10^{-3} [4] 3.01×10^{21}

Q.39 AT 25º C, the pK_a values of four acids are given below. Which one is for the strongest acid ?

[1] 2.0 [2] 2.5 [3] 3.0 [4] 4.0

Q.40 Which of the following compounds is almost ionised in water ?

[1] Alcohol [2] Acetic acid [3] Sodium chloride [4] Ammonium acetate

Q.41 The first and second ionisation constants of H_2S are K_1 and K_2 respectively. If ionisation constant of H_2S is K then :

[1] $pK = pK_1 + pK_2$ [2] $pK = pK_1 - pK_2$ [3] $pK + pK_2 = pK_1$ [4] $pK + pK_1 - pK_2 = 0$

Q.42 X^- and HX concentration in a buffer solution are equal. If K_b of X^- is 10^{-10} then pH of the buffer solution is :

[1] 4.0 [2] 7.0 [3] 10.0 [4] 14.0

Q.43 The weakest Bronsted base is :

[1] Br^- [2] NO_3^- [3] SO_4^{2-} [4] ClO_4^-

Q.44 50 ml of 0.05 M sodium hydroxide is mixed with 50 ml of 0.1 M acetic acid solution. What will be the pH of resulting solution if K_a (CH_3COOH) = 2×10^{-5} :

[1] 4.5 [2] 2.5 [3] 4.7 [4] 4.0

Q.45 For which of the following pairs, the expression $pK_a + pK_b - 14 = 0$ is true ?

(a) KOH, HNO_3 (b) CH_3COOH, CH_3COO^- (c) RNH_2, RNH_3^+ (d) RNH_4OH, HCl

Correct answer is :

[1] a, b [2] c, d [3] b, c [4] a, d

Q.46 The conjugate acid of HPO_4^{2-} is :

[1] PO_4^{3-} [2] $H_2PO_4^-$ [3] H_3PO_4 [4] $H_4PO_4^+$

Q.47 The Hunderson equation for the pOH of a basic buffer is :

[1] $pOH = 14 - \log \frac{[Salt]}{[Acid]}$ [2] $pOH = 14 - \log \frac{[Acid]}{[Salt]}$

[3] $pOH = pK_b + \log \frac{[Base]}{[Salt]}$ [4] $pOH = pK_b + \log \frac{[Salt]}{[Base]}$

Q.48 In the reaction : $HNO_3 + H_2O \rightleftharpoons H_3O^+ + NO_3^-$

the conjugate base of HNO_3 is :

[1] H_2O [2] H_3O^+ [3] NO_3^- [4] H_3O^+ and NO_3^-

Q.49 BF_3 is a :

[1] Lewis acid [2] Lewis base [3] Arrhenious acid [4] None of these

Q.50 The concentration of CH_3COOH and HCN is equal. Their pH is 3.0 and 2.0 respectively. If K_a of CH_3COOH is 1.8×10^{-5} then K_a value of HCN is :

[1] 1.8×10^{-7} [2] 1.8×10^{-3} [3] 1.8×10^{-5} [4] None of these

Q.51 In HCl and NH_4OH titration if phenolphthalein is used as indicator, the colour change will be :

[1] on complete neutralisation of HCl [2] on half neutralisation of HCl

[3] on one third neutralisation of HCl [4] None of these

Q.52 In a buffer solution X^- and HX concentration are same. If K_b value for X^- is 10^{-8} then pH of the buffer solution is :

[1] 8.0 [2] 6.0 [3] 4.0 [4] 10.0

Q.53 The pH of sodium acetate buffer may be given by the following expression :

$pH = pK_a + \log \frac{[Salt]}{[Acid]}$. K_a for acetic acid = 1.8×10^{-5}. If [Salt] = [Acid] = 0.1 M then pH of the solution will be approximately :

[1] 7.0 [2] 4.7 [3] 5.3 [4] 1.4

Q.54 The pH of two equimolar weak acids are 3.0 and 5.0 respectively. Their relative strength is :

[1] 3 : 5 [2] 5 : 3 [3] 100 : 1 [4] 1 : 100

Q.55 The correct sequence of the colours obtained by the dissociation of methyl orange is :

[1] MeOH (Red) $\rightleftharpoons$ Me^+ (Colourless) + OH^- (Yellow)

[2] MeOH (Red) $\rightleftharpoons$ Me^+ (Yellow) + OH^- (Colourless)

[3] MeOH (Yellow) $\rightleftharpoons$ Me^+(Colourless) + OH^- (Red)

[4] MeOH (Yellow) $\rightleftharpoons$ Me^+ (Red) + OH^-(Colourless)

Q.56 The change in pH of a buffer solution is 0.05 on addition of 0.02 mole of NaOH. The buffer capacity of the solution is

[1] 0.05 [2] 0.25 [3] 2.5 [4] 0.4

Q.57 The dissociation constants of two weak acids with same concentration are 2×10^{-7} and 2×10^{-5} respectively. Second acid is how much times stronger than first ?

[1] 100 times [2] 10 times [3] 1.0×10^{-2} times [4] 1.0 times

Q.58 An indicator is neutral when :

[1] Concentration of unionised indicator > Conc. of ionised indicator

[2] Concentration of ionised indicator > Conc. of unionised indicator

[3] Concentration of ionised indicator = Conc. of unionised indicator

[4] None of these

Q.59 For the maximum buffer action of alkaline buffer :

[1] [Base] > [Conjugate acid] [2] [Base] < [Conjugate acid]

[3] [Base] = [Conjugate acid] [4] None of the above

Q.60 0.05 M ammonium hydroxide solution is dissolved in 0.001 M ammonium chloride solution. What will be the OH^- ion concentration of this solution ?

$K_b(NH_4OH) = 1.8 \times 10^{-5}$

[1] 3.0×10^{-3} [2] 9.0×10^{-4} [3] 9.0×10^{-3} [4] 3.0×10^{-4}

Answer Key

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	1	4	4	1	4	1	2	1	1	1	3	4	1	1	2	1	4	1	2
Qus.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	3	3	3	3	3	1	1	1	2	1	3	2	3	3	1	1	2	1	1	3
Qus.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	1	1	4	3	3	2	4	3	1	2	4	2	2	3	4	4	2	3	3	2

Exercise # 2

Q.1 Pure water is kept in a vessel and it remains exposed to atmospheric CO_2 which is absorbed then its pH will be

[1] Greater than 7 [2] Less than 7 [3] 7 [4] Depends on ionic product of water

Q.2 Lewis acid are those substances :

[1] Which accept electron pair [2] which provide H^+ ion in the solution

[3] Which give electron pair [4] Which accept OH^- ion

Q.3 The pH of a soft drink is 3.82. It hydrogen ion concentration will be :

[1] 1.96×10^{-2} mol/l [2] 1.96×10^{-3} mol/l [3] 1.5×10^{-4} mol/l [4] 1.96×10^{-1} mol/l

Q.4 The solubility product of a salt AB is 1×10^{-8}. In a solution concentration of A is 10^{-3} M. The AB will precipitate when the concentration of B will be :

[1] 10^{-7} M [2] 10^{-4} M [3] 10^{-5} M [4] 10^{-6} M

Q.5 A monoprotic acid in a 0.1 M solution ionizes to 0.0001%. Its ionization constant is :

[1] l1.0×10^{-3} [2] 1.0×10^{-6} [3] 1.0×10^{-8} [4] 1.0×10^{-10}

Q.6 In a solution of pH =5, more acid is added in order to reduce the pH = 2. The increase in hydrogen ion concentration is :

[1] 100 times [2] 1000 times [3] 3 times [4] 5 times

Q.7 At 298 K, the solubility product of $PbCl_2$ is 1.0×10^{-6}. What will be the solubility of $PbCl_2$ in moles/litre :

[1] 6.3×10^{-3} [2] 1.0×10^{-3} [3] 3.0×10^{-3} [4] 4.6×10^{-14}

Q.8 At 90ºC pure water has $[H_3O^+] = 10^{-6}$M, the value of K_w at this temperature will be :

[1] 10^{-6} [2] 10^{-12} [3] 10^{-14} [4] 10^{-8}

Q.9 When equal volumes of the following solutions are mixed, precipitation of AgCl ($K_{sp} = 1.8 \times 10^{-10}$) will occur only with :

[1] 10^{-4} M Ag^+ and 10^{-4} M Cl^- [2] 10^{-5} M Ag^+ and 10^{-5} M Cl^-

[3] 10^{-6} M Ag^+ and 10^{-6} M Cl^- [4] 10^{-10} M Ag^+ and 10^{-10} M Cl^-

Q.10 Why pure NaCl is precipitated when HCl gas is passed in a saturated solution of NaCl :

[1] Impurities dissolves in HCl

[2] The value of $[Na^+]$ and $[Cl^-]$ becomes smaller than K_{sp} of NaCl

[3] The value of $[Na^+]$ and $[Cl^-]$ becomes greater than K_{sp} of NaCl

[4] HCl dissolves in the water

Q.11 In the reaction $NH_3 + BF_3 \rightleftarrows NH_3 \rightarrow BF_3$, BF_3 is

[1] Lewis acid [2] Lewis based

[3] Neither Lewis acid nor Lewis base [4] Lewis acid and Lewis base both

Q.12 Ksp value of $Al(OH)_3$ and $Zn(OH)_2$ are 8.5×10^{-23} and 1.8×10^{-14} respectively. If NH_4OH is added in a solution of Al^{3+} and Zn^{2+}, which will precipitate earlier

[1] $Al(OH)_3$ [2] $Zn(OH)_2$ [3] Both together [4] None

Q.13 In a saturated solution of electrolyte, the ionic product of their concentration are constant at constant temperature and this constant for electrolyte is known as

[1] Ionic product [2] Solubility product [3] Ionization costant [4] Dissociation constant

Q.14 One litre of water contains 10^{-7} mole hydrogen ions. The degree of ionization in water will be

[1] 1.8×10^{-7}% [2] 0.8×10^{-9}% [3] 3.6×10^{-7}% [4] 3.6×10^{-9}%

Q.15 The following reaction is known to occur in the body $CO_2 + H_2O \rightleftharpoons H_2CO_3 \rightleftharpoons H^+ + HCO_3^-$. If CO_2 escapes from the system

[1] pH will decrease [2] Hydrogen ion concentration will decrease

[3] H_2CO_2 concentration will be unaltered [4] The forward reaction will be promoted

Q.16 HClO is a weak acid. The concentration of H^+ ions in 0.1 M solution of HClO ($K_a = 5 \times 10^{-8}$) will be equal to

[1] 7.07×10^{-5} m [2] 5×10^{-9} m [3] 5×10^{-7} m [4] 7×10^{-4} m

Q.17 Acids are substances which can release hydrogen ions. In neutral solution

[1] There is complete absence of hydroxyl ions

[2] Hydrogen and hydroxyl ions are both in small amount but present in equivalent amounts

[3] There is a complete absence of hydrogen ions

[4] Hydrogen and hydroxyl ions are both completely absent

Q.18 The addition of solid sodium carbonate to pure water causes

[1] An increase in hydronium ion concentration [2] An increase in alkalinity

[3] No change in acidity [4] A decrease in hydroxide ion concentration

Q.19 Which of the following cannot be considered to be considered to be an acid (Lewis concept)

[1] H^+ [2] PH_3 [3] NH_4^+ [4] BF_3

Q.20 H_2O can act either as an acid or a base. Which of the following reaction bast illustrates the behaviour of water as a base

[1] $HCl + H_2O \rightarrow H_3O^+ + Cl^-$ [2] $HCl + NaOH \rightarrow NaCl + H_2O$

[3] $H_2O + NH_2^- \rightarrow NH_3 + OH^-$ [4] $H_2O + NH_3 \rightarrow NH_4^+ + OH^-$

Q.21 A solution of sodium acetate in water will

[1] True red litmus blue [2] Turn blue litmus red [3] No effect litmus [4] Decolourises litmus

Q.22 Which of the following oxides will not give OH^- in aqueous solution

[1] Fe_2O_3 [2] MgO [3] Li_2O [4] K_2O

Q.23 Solubility product of a sulphide MS is 3×10^{-25} and that of another sulphide NS is 4×10^{-40}. In ammonical solution

[1] Only NS gets precipitated [2] Only MS gets precipitated

[3] Neither sulphide precipitates [4] Both sulphide precipitate

Q.24 In the reaction $HCl + H_2O \rightleftharpoons H_3O^+ + Cl^-$

[1] H_2O is the conjugate base of HCl acid [2] Cl^- is the conjugate base of HCl acid

[3] Cl^- is the conjugate acid of H_2O base [4] H_3O^+ is the conjugate base of HCl

Q.25 Which of the anhydrous salts when come in contact with water turns blue

[1] Ferrous sulphate [2] Copper sulphate [3] Zinc sulphate [4] Cobalt sulphate

Q.26 In the reaction $2H_2O \rightleftharpoons H_3O^+ + OH^-$, water is

[1] A weak base [2] A weak acid

[3] Both a weak acid and a weak base [4] Neither an acid nor a base

Q.27 If the concentration of CrO_4^- ions in a saturated solution of silver chromate is 2×10^{-4}. Solubility product of silver chromat will be

[1] 4×10^{-8} [2] 8×10^{-12} [3] 16×10^{-12} [4] 32×10^{-12}

Q.28 The pH value of 1.0×10^{-8} M HCl solution is less than 8 because

[1] HCl is completely ionised at this concentration

[2] The ionization of water is negligible

[3] The ionization of water cannot be assumed to be negligible in comparison with this low concentration of HCl

[4] The pH cannot be calculated at such a low concentration of HCl

Q.29 In its 0.2 M solution, an acid ionises to an extent of 60%. Its hydrogen ion concentration is

[1] 0.6 M [2] 0.2 M [3] 0.12 M [4] None of these

Q.30 The colour of $CuCr_2O_7$ solution in water is green because

[1] Cu^{++} ion is blue and $Cr_2O_7^-$ ion is yellow [2] Both the ions are green

[3] $Cr_2O_7^-$ ion is green [4] Cu^{++} ion is green

Q.31 Which of the following does not make any change in pH when added to 10 ml dilute HCl

[1] 5ml pure water [2] 20 ml pure water [3] 10 ml HCl [4] Same 20 ml dilute HCl

Q.32 Which is incorrect for buffer solution

[1] It contains weak acid and its conjugate base

[2] It contains weak base and its conjugate acid

[3] In this there is very less change is pH value when very less amount of acid and base is mixed

[4] None of the above

Q.33 One weak acid (like CH_3COO_4) and its stronge base together with salt (like CH_3COONa) is a buffer solution. In which pair this type of characteristic is found

[1] HCl and NaCl [2] NaOH and $NaNO_3$ [3] KOH and KCl [4] NH_4OH and NH_4Cl

Q.34 Any precipitate is formed when

[1] Solution becomes saturated

[2] The value of ionic product is less that than the value of solubility product

[3] The value of ionic product is equal than the value of solubility product

[4] The value of ionic product is greater than the value of solubility product

Q.35 A solution of sodium bicarbonate in water turns

[1] Phenolphthalein pink [2] Methyl orange yellow [3] Methyl orange red [4] Blue litmus red

Q.36 Electrolytes when dissolved in water dissociate into their constituent ions. The degree of dissociation of an electolyte increases with

[1] Increasing concentration of the electrolyte [2] Decreasing concentration of the electrolyte

[3] Decreasing temperature [4] Presence of a substance yielding a common ion

Q.37 Some salts although containing two different metallic elements give test for only one of them in solution. Such salts are

[1] Double salts [2] Normal salts [3] Complex salts [4] Basic salts

Q.38 Correct statement is

[1] NH_4Cl gives alkaline solution in water [2] CH_3COONa gives acidic solution in water

[3] CH_3COOH is a weak acid [4] NH_4OH is a strong base

Q.39 The solubility product of $BaSO_4$ is 1.5×10^{-9}. The precipitation in a 0.01 M Ba^{2+} solution will start, on adding H_2SO_4 of concentration

[1] 10^{-9} M [2] 10^{-8} M [3] 10^{-7} M [4] 10^{-6} M

Q.40 The solubility product of a sparingly soluble salt AB at room temperature is 1.21×10^{-6}. Its molar solubility is

[1] 1.21×10^{-6} [2] 1.21×10^{-3} [3] 1.1×10^{-4} [4] 1.1×10^{-3}

Q.41 In the following reaction

$HC_2O_4^- + PO_4^{---} \rightarrow HPO_4^{--} + C_2O_4^{--}$

Which are the two Bronsted bases

[1] $HC_2O_4^-$ and PO_4^{---} [2] HPO_4^{--} and $C_2O_4^{--}$ [3] $HC_2O_4^-$ and HPO_4^{--} [4] PO_4^{---} and $C_2O_4^{--}$

Q.42 Under the same conditions, which mixture by volume of one molar potassium hydroxide and one molar nitric acid solution produces the highest temperature

[1] 20 – 80 [2] 25 – 75 [3] 50 – 50 [4] 75 – 25

Q.43 In the equilibrium $HClO_4 + H_2O \rightleftharpoons H_3O^+ + ClO_4^-$:

[1] $HClO_4$ is the conjugate acid of H_2O [2] H_2O is the conjugate acid of H_3O^+

[3] H_3O^+ is the conjugate base of H_2O [4] ClO_4^- is the conjugate base of $HClO_4$

Q.44 Addition of which chemical will decrease the hydrogen ion concentration of an acetic acid solution :

[1] NH_4Cl [2] $Al_2(SO_4)_3$ [3] $AgNO_3$ [4] NaCN

Q.45 The pH of a solution is 5.0. If its hydrogen ion concentration is decreased hundred times, then the solution will be :

[1] More acid [2] Neutral [3] Basic [4] Of the same acidity

Q.46 When a buffer solution of sodium acetate and acetic acid is diluted with water :

[1] Acetate ion concentration increases [2] H^+ ion concentration increases

[3] OH^- ion concentrtion increases [4] H^+ ion concentration remain unaltered

Q.47 The pH of a buffer solution containing 25 ml of 1M CH_3COONa and 25 ml of 1M CH_3COOH will be appreciably affected by 5ml of :

[1] 1M CH_3COOH [2] 5M CH_3COOH [3] 5M HCl [4] 1M NH_4OH

Q.48 0.2 molar solution of formic acid is ionized 3.2%. Its ionization constant is :

[1] 9.6×10^{-3} [2] 2.1×10^{-4} [3] 1.25×10^{-6} [4] 4.8×10^{-5}

Q.49 The pH of a simple sodium acetate buffer is given by $pH = pK_a + \log \frac{[Salt]}{[Acid]}$

K_a of acetaic acid = 1.8×10^{-5}

If [Salt] = [Acid] = 0.1M, the pH of the solution would be about :

[1] 7 [2] 4.7 [3] 5.3 [4] 1.4

Q.50 With reference to protonic acids, which of the following statements is correct :

[1] PH_3 is more basic than NH_3 [2] PH_3 is less basic than NH_3

[3] PH_3 is equally basic as NH_3 [4] PH_3 is amphoteric while NH_3 is basic

Q.51 Solubility of a slat M_2X_3 is y mol dm^{-3}. The solubility product of the salt will be

[1] $6y^4$ [2] $64y^4$ [3] $36\ y^5$ [4] $108\ y^5$

Q.52 If the solubility product of $AgBrO_3$ and Ag_2SO_4 are 5.5×10^{-5} and 2×10^{-5} respectively, the relationship between the solubilities of these can be correctly represented as

[1] $S_{AgBrO_3} > S_{Ag_2SO_4}$ [2] $S_{AgBrO_3} < S_{Ag_2SO_4}$ [3] $S_{AgBrO_3} = S_{Ag_2SO_4}$ [4] $S_{AgBrO_3} \approx S_{Ag_2SO_4}$

Q.53 The following equilibrium exists in an aqueous solution of hydrogen sulphide :

$H_2S \rightleftharpoons H^+ + HS^-$

If dilute HCl is added to an aqueous solution of H_2S without any change in temperature

[1] The equilibrium constant will change

[2] The concentration of HS^- will increase

[3] The concentration of undissociated H_2S will decrease

[4] The concentration of HS^- will decrease

Q.54 The hydrogen ion concentration of a 0.006 M benzoic acid solution is ($K_a = 6 \times 10^{-5}$)

[1] 0.6×10^{-4} [2] 6×10^{-4} [3] 6×10^{-5} [4] 3.6×10^{-4}

Q.55 If the solubility products of Agcl and AgBr are 1.2×10^{-10} and 3.5×10^{-13} respectively, then the relation between the solubilities (denoted by the symbol 'S') of these salts can correctly berepresented as

[1] S of AgBr is less than that of AgCl [2] S of AgBr is greater than that of AgCl

[3] S of AgBr is equal to that of AgCl [4] S of AgBr is 10^6 times greater than that of AgCl

Q.56 The sulphide ion concentration $[S^{2-}]$ in saturated H_2S solution is 1×10^{-22}. Which of the following sulphides should be quantitativel precipitated by H_2S in the presence of dil. HCl

Sulphide	Solubility product
(I)	1.4×10^{-16}
(II)	1.2×10^{-22}
(III)	8.2×10^{-46}
(IV)	5.0×10^{-34}

[1] I, II [2] III, IV [3] II, III, IV [4] Only I

Q.57 The solubility product constant K_{sp} of $Mg(OH)_2$ is 9.0×10^{-12}. If a solution is 0.010 M with respect to Mg^{2+} ion, what is the maximum hydroxide ion concentration which could be present without causing the precipitation of $Mg(OH)_2$

[1] 1.5×10^{-7} M [2] 3.0×10^{-7} M [3] 1.5×10^{-5} m [4] 3.0×10^{-5} M

Q.58 A physician wishes to prepare a buffer solution at pH = 3.85 that efficiently resists changes in pH yet contains only small concentration of the buffering agents. Which of the following weak acids together with its sodium salt would be best to use

[1] m-chlorobenzoic acid ($pK_a = 3.98$) [2] p-chlorocinnamic acid ($pK_a = 4.41$)

[3] 2,5-dihydroxy benzoic acid ($pK_a = 2.97$) [4] Acetoacetic acid ($pK_a = 3.58$)

Q.59 The hydride ion H^- is stronger base than its hydroxide ion OH^-. Which of the following reaction will occur if sodium hydride (NaH) is dissolved in water

[1] $H^-(aq) + H_2O \rightarrow H_2O$ [2] $H^-(aq) + H_2O(l) \rightarrow OH^- + H_2$

[3] $H^- + H_2O \rightarrow$ No reaction [4] None of these

Q.60 The solubility product of CuS, Ag_2S,HgS are 10^{-31}, 10^{-44}, 10^{-54} respectively. The solubilities of these sulphides are in the order

[1] $Ag_2S > CuS > HgS$ [2] $Ag_2S > HgS > CuS$

[3] $HgS > Ag_2S > CuS$ [4] $CuS > Ag_2S > HgS$

Q.61 For two acids A and B, $pK_a = 1.2$ $pK_b = 2.8$ respectively in value, then which is true

[1] A and B both are equally acidic [2] A is stronger than B

[3] B is stronger than A [4] Neither A nor B is strong

Q.62 pK_a of a weak acid is defined as

[1] $\log_{10} K_a$ [2] $\frac{1}{\log_{10} K_a}$ [3] $\log_{10} \frac{1}{K_a}$ [4] $-\log_{10} \frac{1}{K_a}$

Q.63 The dissociation constant of an acid HA is 1×10^{-5}. The pH of 0.1 molar solution of the acid will be

[1] Five [2] Four [3] Three [4] One

Q.64 If the pH of a solution of an alkali metal hydroxide is 13.6, the concentration of hydroxide is

[1] Between 0.1 M and 1 M [2] More than 1 M

[3] Less than 0.001 M [4] Between 0.01 M and 1 M

Q.65 If 50 ml of 0.2 M KOH is added to 40 ml of 0.5 M HCOOH, the pH of the resulting solution is ($K_a = 1.8 \times 10^{-4}$)

[1] 3.4 [2] 7.5 [3] 5.6 [4] 3.75

Q.66 A solution of weak acid HA containing 0.01 moles of acid per litre of solutions has pH = 4. The percentage degree of ionisation of the acid and the ionisation constant of acid are respectively

[1] 1% , 10^{-6} [2] 0.01%, 10^{-4} [3] 1%, 10^{-4} [4] 0.01% , 10^{-6}

Q.67 According to Bronsted-Lowry concept, the correct order of relative strength of bases follows the order

[1] $CH_3COO^- > Cl^- > OH^-$ [2] $CH_3COO^- > OH^- > Cl^-$

[3] $OH^- > CH_3COO^- > Cl^-$ [4] $OH^- > Cl^- > CH_3COO^-$

Q.68 How many grams of CaC_2O_4 (molecular weight = 128) on dissolving in distilled water will give a saturated solution [K_{sp} (CaC_2O_4) = 2.5×10^{-9} mol^2 l^{-2}]

[1] 0.0064 g [2] 0.1280g [3] 0.0128 g [4] 1.2800g

Q.69 The dissociation constant of HCN is 5×10^{-10}. The pH of the solution prepared by mixing 1.5 mole of HCN and 0.15 moles of KCN in water and making up the total volume to 0.5 dm^3 is

[1] 7.302 [2] 9.302 [4] 8.302 [4] 10.302

Q.70 What is the value of carbonate hardness of water sample if 100 ml of its took 5ml of 0.09N HCl solution (Molecular weight of Na_2CO_3 = 106)

[1] 4.50 mg-eq/litr [2] 1.80 mg-eq/litr [3] 0.042 mg-eq/litr [4] 477.00 mg-eq/litr.

Answer Key

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	1	3	2	4	2	1	2	1	3	1	1	2	1	2	1	2	2	2	1
Qus.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	1	1	4	2	2	3	4	3	3	1	4	3	4	4	3	2	3	3	3	4
Qus.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	4	3	4	4	2	4	3	2	2	2	4	2	4	2	1	1	4	3	2	4
Qus.	61	62	63	64	65	66	67	68	69	70										
Ans.	2	3	3	1	1	3	3	1	3	1										

Exercise # 3

Q.1 Which of the following is lewis acid **[MP PET-1994 ; NCERT-1978; EAMCET-1987]**

[1] BF_3 [2] Cl^- [3] H_2O [4] NH_3

Q.2 The pOH of beer is 10.0. The hydrogen ion concentration will be - **[MP PMT- 1994]**

[1] 10^{-2} [2] 10^{-10} [3] 10^{-8} [4] 10^{-4}

Q.3 Which is a buffer solution - **[MP PET- 1994; AIIMS- 1982 ; CPMT- 1994]**

[1] $CH_3COOH + CH_3COONa$ [2] $CH_3COOH + CH_3COONH_4$

[3] $CH_3COOH + NH_4Cl$ [4] NaOH + NaCl

Q.4 One weak acid (like CH_3COOH) and its strong base together with salt (like CH_3COONa) is a buffer solution. In which pair this type of characteristic is found - **[MP PET-1994; AIIMS-1982; CPMT-1994]**

[1] HCl and NaCl [2] NaOH and $NaNO_3$ [3] KOH and KCl [4] NH_4OH and NH_4Cl

Q.5 The pH of a solution is 2. If its pH is to be raised to 4, then the $[H^+]$ of the original solution has to be -

[1] Doubled [2] Halved

[3] Increased hundred times [4] Decreased hundred times

Q.6 The hydrogen ion concentration of a 0.006 M benzoic acid solution is ($K_a = 6 \times 10^{-5}$) **[MP PET-1994]**

[1] 0.6×10^{-4} [2] 6×10^{-4} [3] 6×10^{-5} [4] 3.6×10^{-4}

Q.7 pH of a solution is 4. The hydroxide ion concentration of the solution would be– **[MP PMT-1994]**

[1] 10^{-4} [2] 10^{-10} [3] 10^{-2} [4] 10^{-12}

Q.8 At 80ºC, distilled water has $[H_3O^+]$ concentration equal to 1×10^{-6} mole/litre. The value of K_W at this temperature will be - **[CBSE-1994]**

[1] 1×10^{-6} [2] 1×10^{-9} [3] 1×10^{-12} [4] 1×10^{-5}

Q.9 Which one of the following is most soluble - **[CBSE-1994]**

[1] CuS ($K_{SP} = 8 \times 10^{-37}$) [2] MnS ($K_{SP} = 7 \times 10^{-16}$) [3] Bi_2S_3 ($K_{SP} = 1 \times 10^{-70}$) [4] Ag_2S ($K_{SP} = 6 \times 10^{-51}$)

Q.10 Which of the following is a buffer - **[BHU-1995]**

[1] $NaOH + CH_3COONa$ [2] $NaOH + Na_2SO_4$

[3] $K_2SO_4 + H_2SO_4$ [4] $NH_4OH + CH_3COONH_4$

Q.11 If pH of A, B, C and D are 9.5, 2.5, 3.5, and 5.5 respectively, then strongest acid is - **[AFMC-1995]**

[1] A [2] C [3] D [4] B

Q.12 The dissociation of water at 25°C is 1.9×10^{-7} % and the density of water is 1.0 g/cm^3. The ionisation constant of water is- **[IIT-1995]**

[1] 3.42×10^{-6} [2] 3.42×10^{-8} [3] 1.00×10^{-14} [4] 2.00×10^{-16}

Q.13 If acetic acid mixed with sodium acetate, then H^+ ion concentration will be- **[Roorkee-1995]**

[1] Increased [2] Decreased [3] Remains unchanged [4] pH decreased

Q.14 Which one has pH 12 **[Roorkee-1995]**

[1] 0.01 M KOH [2] 1 N KOH [3] 1N NaOH [4] 1N $Ca(OH)_2$

Q.15 pH of 0.001 M NaOH is - **[MP PMT-1995]**

[1] 10^{-3} [2] 3 [3] 10^{-11} [4] 11

Q.16 Conjugate base of HPO_4^{2-} is **[MP PMT-1995]**

[1] PO_4^{3-} [2] $H_2PO_4^-$ [3] H_3PO_4 [4] H_4PO_3

Q.17 A precipitate of CaF_2 ($K_{SP} = 1.7 \times 10^{-10}$) will be obtained when equal volume of the following are mixed - **[MP PMT 1990, 95; MNR-1992]**

[1] 10^{-4} M Ca^{2+} and 10^{-4} M F^- [2] 10^{-2}M Ca^{2+} and 10^{-3} M F^-

[3] 10^{-5} M Ca^{2+} and 10^{-3} M F^- [4] 10^{-3} M Ca^{2+} and 10^{-5} M F^-

Q.18 Solubility of AgCl will be minimum in - **[CBSE-1995]**

[1] 0.001 M $AgNO_3$ [2] Pure water [3] 0.01 M $CaCl_2$ [4] 0.01 M NaCl

Q.19 If the solubility product of $BaSO_4$ is 1.5×10^{-9} in water, its solubility in moles per litre is - **[BHU 1995; MP PET -1995]**

[1] 1.5×10^{-9} [2] 3.9×10^{-5} [3] 7.5×10^{-5} [4] 1.5×10^{-5}

Q.20 The solubility of $PbCl_2$ is - **[MP PMT -1995]**

[1] $\sqrt{K_{SP}}$ [2] $3\sqrt{K_{SP}}$ [3] $3\sqrt{\frac{K_{SP}}{4}}$ [4] $\sqrt{8K_{SP}}$

Q.21 At 298 K, the solubility product of $PbCl_2$ is 1.0×10^{-6}. What will be the solubility of $PbCl_2$ in moles/litre - **[MP PMT -1990; CPMT 1985, 96]**

[1] 6.3×10^{-3} [2] 1.0×10^{-3} [3] 3.0×10^{-3} [4] 4.6×10^{-14}

Q.22 Sodium chloride is purified by passing hydrogen chloride gas in an impure solution of sodium chloride. It is based on **[MP PMT-1996]**

[1] Buffer action [2] Common ion effect [3] Association of salt [4] Hydrolysis of salt

Q.23 Which of the following cannot be hydrolysed **[MP PMT 1996]**

[1] A salt of weak acid and strong base [2] A salt of strong acid and weak base

[3] A salt of weak acid and weak base [4] A salt of strong acid and strong base

Q.24 100 ml of 0.2 M H_2SO_4 is added to 100ml of 0.2 M NaOH. The resulting solution will be - **[BHU 1996]**

[1] Acidic [2] Basic [3] Neutral [4] Slightly basic

Q.25 The pH of solution having $[OH^-] = 10^{-7}$ is - **[AIIMS 1996]**

[1] 7 [2] 14 [3] Zero [4] –7

Q.26 An example of zwitter ion is -

[1] Alanine [2] Glycine hydrochloride [3] Urea [4] Ammonium acetate

Q.27 What is the pH of $Ba(OH)_2$ if normality is 10^{-4} **[CPMT 1996]**

[1] 4 [2] 10 [3] 7 [4] 9

Q.28 pH value of N/10 NaOH solution is - **[CBSE 1996]**

[1] 10 [2] 11 [3] 12 [4] 13

Q.29 The ionic product of water at 25ºC is 10^{-14}. The ionic product at 90ºC will be - **[CBSE 1996]**

[1] 1×10^{-20} [2] 1×10^{-12} [3] 1×10^{-14} [4] 1×10^{-16}

Q.30 By adding a strong acid to the buffer solution, the pH of the buffer solution - **[Delhi PMT-1996]**

[1] Remains constant [2] Increases [3] Decreases [4] Becomes zero

Q.31 Boron compounds behave as lewis acids becase of their **[CBSE-1996]**

[1] Acidic nature [2] covalent nature [3] Electron deficiency [4] Ionisaton property

Q.32 The strength of an acid depends on its tendency **[MP PET- 1996]**

[1] Accept protons [2] Donate protons [3] Accept electrons [4] Donate electrons

Q.33 The pH of 10^{-5}M aqueous solution of NaOH is - **[MP PET-1996]**

[1] 5 [2] 7 [3] 9 [4] 11

Q.34 The conjugate base of NH_3 is - **[MP PET-1996]**

[1] NH_4OH [2] NH_2^- [3] NH^{2-} [4] N_2H_2

Q.35 100 ml of 0.2 M H_2SO_4 is added to 100 ml of 0.2 M NaOH. The resulting solution will be **[BHU-1996]**

[1] Acidic [2] Basic [3] Neutral [4] Slightly basic

Q.36 The pH of solution having $[OH^-] = 10^{-7}$ is – **[AIIMS-1996]**

[1] 7 [2] 14 [3] zero [4] –7

Q.37 An example of zwitter ion is - **[AIIMS-1996]**

[1] Alanine [2] Glycine hydrochloride [3] Urea [4] Ammonium acetate

Q.38 Which of the following is not a Lewis acid **[CBSE-1996]**

[1] BF_3 [2] $FeCl_3$ [3] SiF_4 [4] C_2H_4

Q.39 pH value of N/10 NaOH solution is **[CBSE-1996]**

[1] 10 [2] 11 [3] 12 [4] 13

Q.40 A compound whose aqueous solution will have the highest pH **[MP PET-1996; MP PAT-1993; CPMT-1974, 75, 78 ; Delhi PMT-1982, 83]**

[1] NaCl [2] Na_2CO_3 [3] NH_4Cl [4] $NaHCO_3$

Q.41 Which hydroxide will have lowest value of solubility product at normal temperature (25ºC) **[RPMT- 1997]**

[1] $Mg(OH)_2$ [2] $Ca(OH)_2$ [3] $Ba(OH)_2$ [4] $Be(OH)_2$

Q.42 Solubility of AgCl at 20ºC is 1.435×10^{-3} gm per litre. The solubility product of AgCl is - **[CPMT- 1989; BHU 1997]**

[1] 1×10^{-5} [2] 1×10^{-10} [3] 1.435×10^{-5} [4] 108×10^{-3}

Q.43 Solubility of a salt M_2X_3 is y mol dm^{-3}. The solubility product of the salt will be - **[IIT 90,97]**

[1] $6y^4$ [2] $64y^4$ [3] $36y^5$ [4] $108y^5$

Q.44 The solubility of $CaCO_3$ in water is 3.05×10^{-4} moles/litre. Its solubility product will be - **[MP PMT 1997]**

[1] 3.05×10^{-4} [2] 9.3 [3] 6.1×10^{-4} [4] 9.3×10^{-8}

Q.45 If pK_b for fluoride ion at 25ºC is 10.83, the ionisation constant of hydrofluoric acid in water at this temperature is **[IIT 1997]**

[1] 1.74×10^{-3} [2] 3.52×10^{-3} [3] 6.75×10^{-4} [4] 5.38×10^{-2}

Q.46 A sample of Na_2CO_3. H_2O weighing 0.62g is added to 100 ml of 0.1N H_2SO_4 solution. What will be the resulting solution- **[BHU 1997]**

[1] Acidic [2] Neutral [3] Basic [4] None of these

Q.47 The solubility product of Ag_2CrO_4 is 32×10^{-12}. What is the concentration of CrO_4^- ions in that solution **[BHU 1997]**

[1] 2×10^{-4} m/s [2] 16×10^{-4} m/s [3] 8×10^{-4} m/s [4] 8×10^{-8} m/s

Q.48 When 100 ml of M/10 NaOH solution and 50 ml of M/5 HCl solution are mixed, the pH of resulting solution would be - **[RPMT 1997]**

[1] 0 [2] Less than 7 [3] 7 [4] More than 7

Q.49 Which oxychloride has maximum pH – **[CPMT 1997]**

[1] NaClO [2] $NaClO_2$ [3] $NaClO_3$ [4] $NaClO_4$

Q.50 What is the solubility of calcium fluoride in a saturated solution, if its solubility product is 3.2×10^{-11} **[CPMT 1997]**

[1] 2.0×10^{-4} mole/litre [2] 12.0×10^{-3} mole/litre [3] 0.2×10^{-4} mole/litre [4] 2×10^{-3} mole/litre

Q.51 The hydride ion H^- is stronger base than its hydroxide ion OH^-. Which of the following reaction will occur if sodium hydride is dissolved in water - **[CBSE 1997]**

[1] H^- (aq) + $H_2O \rightarrow H_2O$ [2] H^- (aq) + H_2O (l) $\rightarrow OH^- + H_2$

[3] $H^- + H_2O \rightarrow$ No reaction [4] None of these

Q.52 The solubility product of CuS, Ag_2S HgS are 10^{-31}, 10^{-44}, 10^{-54} respectively. The solubilities of these sulphides are in the order - **[CBSE 1997]**

[1] $Ag_2S > CuS > HgS$ [2] $Ag_2S > HgS > CuS$

[3] $HgS > Ag_2S > CuS$ [4] $CuS > Ag_2S > HgS$

Q.53 A certain buffer solution contains equal concentration of X^- and HX. The K_b for X^- is 10^{-10}. The pH of the buffer is

[1] 4 [2] 7 [3] 10 [4] 14 **[RPMT-1997]**

Q.54 For preparing a buffer solution of pH 6 by mixing sodium acetate and acetic acid, the ratio of the concentration of salt and acid should be ($K_a = 10^{-5}$) **[MP PET-1997]**

[1] 1 : 10 [2] 10 : 1 [3] 100 : 1 [4] 1 : 100

Q.55 pH of water is 7. When a substance Y is dissolved in water, the pH becomes 13. The substance Y is a salt of
[1] Strong acid and strong base [2] Weak acid and weak base **[MP PMT-1997]**
[3] Strong acid and weak base [4] Weak acid and strong base

Q.56 If pK_b for fluoride ion at 25°C is 10.83, the ionisation constant of hydrofluoric acid in water at this temperature is **[IIT-1997]**
[1] 1.74×10^{-3} [2] 3.52×10^{-3} [3] 6.75×10^{-4} [4] 5.38×10^{-2}

Q.57 Which of the following is not a bronsted acid **[BHU-1997]**
[1] $CH_3NH_4^+$ [2] CH_3COO^- [3] H_2O [4] None

Q.58 Which of the following is not Lewis acid **[BHU-1997]**
[1] BF_3 [2] $AlCl_3$ [3] $FeCl_3$ [4] PH_3

Q.59 Which one of the following is Lewis acid **[RPMT-1997]**
[1] $AlCl_3$ [2] NH_3 [3] RNH_2 [4] H_2O

Q.60 Lewis base is **[RPMT-1997]**
[1] CO_2 [2] SO_3 [3] SO_2 [4] ROH

Q.61 According to Bronsted, acids are **[RPMT-1997]**
[1] Proton donor [2] Proton acceptor [3] Amphoteric [4] Protophillic

Q.62 The suitable indicator for strong acid and weak base is **[RPMT-1997]**
[1] Methyl orange [2] Methyl red [3] Phenol red [4] Phenolphthalein

Q.63 The concentration of which ion is to be decreased, when NH_3 solutions is added- **[RPMT-1997]**
[1] OH^- [2] NH_4^+ [3] H_3O^+ [4] O_2^-

Q.64 Which one is T–Lewis acid **[RPMT-1997]**
[1] ClF_3 [2] H_2O [3] NH_3 [4] None

Q.65 In the reaction $I_2 + I^- \longrightarrow I_3^-$, the Lewis base is **[CPMT-1997]**
[1] I_2 [2] I^- [3] I_3^- [4] None

Q.66 pH of HCl (10^{-12}M) is **[CPMT-1997]**
[1] 12 [2] – 12 [3] $\approx$ 7 [4] 14

Q.67 Which oxychloride has maximum pH **[CPMT-1997]**
[1] NaClO [2] $NaClO_2$ [3] $NaClO_3$ [4] $NaClO_4$

Q.68 When an acid or alkali is mixed with buffer solution, then pH of buffer solution **[CPMT-1997]**
[1] Not changes [2] Changes slightly [3] Increases [4] Decreases

Q.69 Which one is Lewis acid **[CPMT-1997]**
[1] Cl^- [2] Ag^+ [3] C_2H_5OH [4] S^{2-}

Q.70 A physician whishes to prepare of buffer solution at pH = 3.85 that efficiently resists changes in pH yet contains only small concentration of the buffering agents. Which of the following weak acids together with its sodium salt would be best to use **[CBSE-1997]**
[1] m-chlorobenzoic acid (pK_a = 3.98) [2] p–chlorochinnamic acid (pK_a = 4.41)
[3] 2,5–dihydroxy benzoic acid (pK_a = 2.97) [4] Acetoacetic acid (pK_a = 3.58)

Q.71 The hydride ion H^- is stronger base than its hydroxide ion OH^-. Which of the following reaction will occur if sodium hydride (NaH) is dissolved in water **[CBSE-1997]**
[1] H^- (aq) + $H_2O \rightarrow H_2O$ [2] H^- (aq) + H_2O (ℓ) $\rightarrow$ OH^- + H_2
[3] H^- + $H_2O \rightarrow$ No reaction [4] None

Q.72 BF_3 is an acid according to - **[AFMC-1997]**
[1] arrhenius [2] Lewis [3] bronsted and lowry [4] All

Q.73 What will be the pH of a 10^{-8} M HCl solution **[MP PET/PMT-1997]**
[1] 8.0 [2] 7.0 [3] 6.98 [4] 14.0

Q.74 A monoprotic acid in a 0.1 M solution ionizes to 0.001%. Its ionisation constant is **[MP PET-1997]**
[1] 1.0×10^{-3} [2] 1.0×10^{-6} [3] 1.0×10^{-8} [4] 1.0×10^{-11}

Q.75 If the K_b value in the hydrolysis reaction $B^+ + H_2O \rightleftharpoons BOH + H^+$ is 1.0×10^{-6}, then the hydrolysis constant of the salt would be - **[ROORKEE QUALIFYING 1998]**

[1] 1.0×10^{-6} [2] 1.0×10^{-7} [3] 1.0×10^{-8} [4] 1.0×10^{-9}

Q.76 240 g of urea is present in 10 litre solution, the active mass of urea will be - **[BHU 1998]**

[1] 0.2 mol/litre [2] 0.06 mol/litre [3] 0.4 mol/litre [4] 0.08 mol/litre

Q.77 The solubility of $BaSO_4$ in water is 2.33×10^{-3} gm/litre. Its solubility product will be (molecular weight of $BaSO_4$ = 233) – **[AIIMS 1998]**

[1] 1×10^{-5} [2] 1×10^{-10} [3] 1×10^{-15} [4] 1×10^{-20}

Q.78 pH values of HCl and NaOH solution each of strength $\frac{N}{100}$ will be respectively **[MP PMT-1999]**

[1] 2 and 2 [2] 2 and 12 [3] 12 and 2 [4] 2 and 10

Q.79 50 ml water is added to a 50 ml solution of $Ba(OH)_2$ of strength 0.01M. The pH value of the resulting solution will be - **[MP PMT-1999]**

[1] 8 [2] 10 [3] 12 [4] 6

Q.80 Amongst the following solutions, the buffer solution is - **[MP PMT-1999]**

[1] $NH_4Cl + NH_4OH$ solution [2] $NH_4Cl + NaOH$ solution

[3] $NH_4OH + HCl$ solution [4] NaOH + HCl solution

Q.81 Amongst the following, the one having characteristics of Lewis acid is - **[MP PMT-1999]**

[1] ClF_3 [2] BF_3 [3] NCl_3 [4] BrF_3

Q.82 A buffer solution can be prepared from a mixture of - **[IIT-1999]**

[1] Sodium acetate and acetic acid in water. [2] Sodium acetate and hydrochloric acid in water

[3] Ammonia and ammonium chloride in water [4] Both 1 & 3

Q.83 pH of a solution can be expressed as - **[CPMT-1999]**

[1] $-\log_e [H^+]$ [2] $-\log_{10} [H^+]$ [3] $\log_e [H^+]$ [4] $\log_{10} [H^+]$

Q.84 The pH of 10^{-8} molar aqueous solution of HCl is -

[CPMT-1988; MLNR-1983, 90; MP PMT-1987; IIT-1981; BHU-1995; AFMC-1998; MP PET-1989, 99]

[1] –8 [2] 8

[3] 6 > 7 (Between 6 and 7) [4] 7 > 8 (Between 7 and 8)

Q.85 The solubility of CaF_2 is 2×10^{-4} moles/litre. Its solubility product (K_{SP}) is -

[NCERT 1981; BHU 1983, 86; MP PET 1992; CBSE 1999]

[1] 2.0×10^{-4} [2] 4.0×10^{-3} [3] 8.0×10^{-12} [4] 3.2×10^{-11}

Q.86 If S and K_{SP} are respectively solubility and solubility product of a sparingly soluble binary electrolyte then **[CPMT 1988; MP PMT 1999]**

[1] $S = K_{SP}$ [2] $S = K^2_{SP}$ [3] $S = \sqrt{K_{SP}}$ [4] $S = \frac{1}{2} K_{SP}$

Q.87 The concentration of $[H^+]$ and concentration of $[OH^-]$ of a 0.1 aqueous solution of 2% ionised weak acid is [Ionic product of water = 1×10^{-14}] – **[CBSE 1999]**

[1] 0.02×10^{-3} M and 5×10^{-11} M [2] 1×10^{-3} M and 3×10^{-11} M

[3] 2×10^{-3} M and 5×10^{-12} M [4] 3×10^{-2} M and 4×10^{-13} M

Q.88 At infinite dilution, the percentage ionisation for both strong and weak electrolytes is **[CPMT 1999]**

[1] 1% [2] 20% [3] 50% [4] 100%

Q.89 Which of the following is not Lewis acid - **[RPET-2000]**

[1] $FeCl_3$ [2] $AlCl_3$ [3] BCl_3 [4] NH_3

Q.90 Concentration CN^- in 0.1 M HCN is - [$K_a = 4 \times 10^{-10}$] **[RPET-2000]**

[1] 2.5×10^{-6}M [2] 4.5×10^{-6} M [3] 6.3×10^{-6} M [4] 9.2×10^{-6} M

Q.91 In the process : $BCl_3 + PH_3 \longrightarrow Cl_3B : PH_3$. The Lewis acid is **[RPET-2000]**

[1] PH_3 [2] BCl_3 [3] Both 1 & 2 [4] None

Q.92 Henderson's equation is : $pH = pK_a + \log \frac{[salt]}{[acid]}$. If the acid gets half neutralized the value of pH will be :

[pKa = 4.03] **[RPET-2000]**

[1] 4.30 [2] 2.15 [3] 8.60 [4] 7

Q.93 The condition for minimum change in pH for a buffer solution is - **[RPET-2000]**

[1] Isoelectronic species are added [2] Conjugate acid or base is added

[3] $pH = pK_a$ [4] None

Q.94 The pH of 10^{-7} N HCl is - **[RPET-2000]**

[1] 6.0 [2] 6.97 [3] 8.0 [4] 10.0

Q.95 The dissociation constant of two acids HA_1 and HA_2 are 3.14×10^{-4} and 1.96×10^{-5} respectively. The relative strength of the acids will be approximately - **[RPMT-2000]**

[1] 1 : 4 [2] 4 : 1 [3] 1 : 16 [4] 16 : 1

Q.96 Weakest acid is - **[RPMT-2000]**

[1] HI [2] HBr [3] HCl [4] HF

Q.97 Acid strength of oxy acids of chlorine following the order - **[RPMT-2000]**

[1] $HClO < HClO_2 < HClO_3 < HClO_4$ [2] $HClO_4 < HClO_3 < HClO_2 < HClO$

[3] $HClO_4 < HClO_3 < HClO < HClO_2$ [4] None

Q.98 Review the equilibrium and choose the correct statement - **[RPMT-2000]**

$$HClO_4 + H_2O \rightleftharpoons H_3O^+ + ClO_4^-$$

[1] $HClO_4$ is the conjugate base of H_2O [2] H_3O^+ is the conjugate base of H_2O

[3] H_2O is the conjugate acid of H_3O^+ [4] ClO_4^- is the conjugate base of $HClO_4$

Q.99 At 90ºC pure water has $[H_3O^+] = 10^{-6}$ mole litre^{-1}. The value of K_w at 90ºC is - **[RPMT-2000]**

[1] 10^{-6} [2] 10^{-12} [3] 10^{-14} [4] 10^{-8}

Q.100 The hydrogen ion concentration for a weak acid of dissociation constant K_a and concentration C can be evaluate by **[RPMT-2000]**

[1] $\sqrt{K_aC}$ [2] $\sqrt{K_a}\ C^{-1/2}$ [3] K_aC [4] CK_a^{-1}

Q.101 Which of the following is most soluble in water - **[RPMT 2000]**

[1] MnS = ($K_{SP} = 8 \times 10^{-37}$) [2] ZnS ($K_{SP} = 7 \times 10^{-16}$)

[3] Bi_2S_3 ($K_{SP} = 1 \times 10^{-70}$)[4] Ag_2S ($K_{SP} = 6 \times 10^{-51}$)

Q.102 If the solubility product K_{SP} of a sparingly soluble state MX_2 at 25ºC is 1.0×10^{-11}, the solubility of the salt in mole litre^{-1} at this temperature will be - **[RPMT 2000]**

[1] 2.46×10^{14} [2] 1.36×10^{-4} [3] 2.60×10^{-7} [4] 1.20×10^{-10}

Q.103 At 90ºC pure water has $[H_3O^+] = 10^{-6}$ mole litre^{-1}. The value of K_W at 90ºC is - **[RPMT 2000]**

[1] 10^{-6} [2] 10^{-12} [3] 10^{-14} [4] 10^{-8}

Q.104 The correct representation of solubility product of SnS_2 is **[RPMT 2000]**

[1] $[Sn^{4+}]\ [S^{2-}]^2$ [2] $[Sn^{4+}]\ [S^{2-}]$ [3] $[Sn^{4+}]\ [2S^{2-}]$ [4] $[Sn^{4+}]\ [2S^{2-}]^2$

Q.105 Which of the following statement about AgCl is wrong - **[RPMT 2001]**

[1] AgCl is sparingly soluble in water

[2] AgI is less soluble in water as compared to AgCl

[3] AgCl precipitation takes place on mixing $AgNO_3$ and NaCl

[4] AgCl is more soluble in aqueous KI than water

Q.106 The solubility product of AgCl at 25ºC is 5×10^{-13} then its solubility is **[RPMT 2001]**

[1] 5×10^{-13} [2] 7.1×10^{-7} [3] 2.5×10^{-13} [4] 2.5×10^{-6}

Q.107 If s is the molar solubility of $Fe(OH)_2$. The value of solubility product K_{SP} would be - **[RPMT 2001]**

[1] s [2] $4s^3$ [3] s^3 [4] None

Q.108 Solubility product of AgCl at 373 K is 1.44×10^{-4} then its solubility is **[RPET 2001]**

[1] 1.2×10^{-2} [2] 1.2×10^{-4} [3] 0.72×10^{-2} [4] 0.72×10^{-4}

Q.109 K_{SP} for AgCl is 1×10^{-10}. Its solubility in 0.1 M KNO_3 is - **[RPET 2001]**

[1] 10^{-10} [2] 10^{-5} [3] 1.4×10^{-4} [4] 10^{-4}

Q.110 Solubility of a M_2S salt is 3.5×10^{-6} then find out solubility product - **[CPMT 2001]**

[1] 1.7×10^{-6} [2] 1.7×10^{-16} [3] 1.7×10^{-18} [4] 1.7×10^{-12}

Q.111 Molarity of liquid HCl is the density of solution is 1.17 gm/cc - **[CPMT 2001]**

[1] 36.5 [2] 18.25 [3] 32.05 [4] 42.10

Q.112 Ionisation constant of CH_3COOH is 1.7×10^{-5} and concentration of H^+ ions is 3.4×10^{-4}. Then find out initial concentration of CH_3COOH molecules - **[CPMT-2001]**

[1] 3.4×10^{-4} [2] 3.4×10^{-3} [3] 6.8×10^{-4} [4] 6.8×10^{-3}

Q113 Solution of 0.1 N NH_4OH and 0.1 N NH_4Cl has pH 9.25, Then find out pK_b of NH_4OH **[CPMT-2002]**

[1] 9.25 [2] 4.75 [3] 3.75 [4] 8.25

Q.114 Which has highest pH **[CPMT-2002]**

[1] CH_3COOK [2] Na_2CO_3 [3] NH_4Cl [4] $NaNO_3$

Q.115 Identify the correct order or solubility of Na_2S, CuS and ZnS in aqueous medium - **[MPPMT 2002]**

[1] CuS > ZnS > Na_2S [2] ZnS > Na_2S > CuS

[3] Na_2S > CuS > ZnS [4] Na_2S > ZnS > CuS

Q.116 An aqueous solution of a substance gives a white precipitate on treatment with dil. HCl, which dissolves on heating. When hydrogen sulphide is passed through the hot acidic solution, a black precipitate is obtained. The substance is **[MPPMT 2002]**

[1] Hg_2^{2+} salt [2] Cu^{2+} salt [3] Ag^+ salt [4] Pb^{2+} salt

Q.117 1M NaCl and 1 M HCl are present in an aqueous solution. The solution is **[AIEEE 2002]**

[1] Not a buffer solution with pH < 7 [2] Not a buffer solution with pH > 7

[3] A buffer solution with pH < 7 [4] A buffer solution with pH > 7

Q.118 Species acting as both Bronsted acid and base is **[AIEEE 2002]**

[1] $(HSO_4)^{-1}$ [2] Na_2CO_3 [3] NH_3 [4] OH^{-1}

Q.119 Let the solubility of an aqueous solution of $Mg(OH)_2$ be x then its k_{sp} is **[AIEEE 2002]**

[1] $4x^3$ [2] $108\ x^5$ [3] $27\ x^4$ [4] 9x

Q.120 Which of the following is not lewis base **[RPMT 2002]**

[1] NH_3 [2] PH_3 [3] $(CH_3)_3N$ [4] HN_3

Q.121 At 298 K, the solubility of $PbCl_2$ is 2×10^{-2} mol/lit, then k_{sp} **[RPMT 2002]**

[1] 1×10^{-7} [2] 3.2×10^{-7} [3] 1×10^{-5} [4] 3.2×10^{-5}

Q.122 The relationship between ionisation and change in concentration of any weak electrolyte is represented as **[RPMT 2002]**

[1] $\alpha = \frac{K_a}{C}$ [2] $\alpha = \sqrt{\frac{K_a}{C}}$ [3] $\alpha = K_\alpha . C$ [4] $\alpha = \frac{\sqrt{K_a}}{C^2}$

Q.123 An alcoholic drink substance pH = 4.7 then OH ion concentration of this solution is ($K_w = 10^{-14}\ mol^2/l^2$) **[RPMT 2002]**

[1] 3×10^{-10} [2] 5×10^{-10} [3] 1×10^{-10} [4] 5×10^{-8}

Q.124 Conjugate base of NH_3 is **[RPMT 2002]**

[1] $NH_4^{\oplus}$ [2] $NH_2^{\oplus}$ [3] $NH_2^{\ominus}$ [4] N_2

Q.125 Which is nucleophile **[RPMT 2002]**

[1] BF_3 [2] NH_3 [3] $BeCl_2$ [4] H_2O

Q.126 Which one of the following compound is not a protonic acid **[CBSE 2003]**

[1] $SO_2(OH)_2$ [2] $B(OH)_3$ [3] $PO(OH)_3$ [4] $SO(OH)_2$

Q.127 The solubility product of AgI at 25ºC is 1.0×10^{-16} mol^2 L^{-2}. The solubility if AgI in 10^{-4}N solution of KI at 25ºC is approximately (in mol^{-1}) **[CBSE 2003]**

[1] 1.0×10^{-8} [2] 1.0×10^{-16} [3] 1.0×10^{-12} [4] 1.0×10^{-10}

Q.128 Which one of the following substance has the highest proton affinity **[AIEEE 2003]**

[1] H_2O [2] H_2S [3] NH_3 [4] PH_3

Q.129 The solubility in water of a sparingly soluble salt B_2 is 1.0×10^{-5} mol l^{-1}. Its solubility product number will be **[AIEEE 2003]**

[1] 4×10^{-15} [2] 4×10^{-10} [3] 1×10^{-15} [4] 1×10^{-10}

Q.130 Which is not example of Bronsted Lowry theory **[AIEEE 2003]**

[1] $AlCl_3$ [2] H_2SO_4 [3] SO_2 [4] HNO_3

Q.131 When rain is accompained by a thunderstorm, the collected rain water will have a pH value **[AIEEE 2003]**

[1] Slightly lower than that of rain water without thunderstorm

[2] Slightly higher than that when the thunderstorm is not there

[3] Uninfluenced by occurrence of thunderstorm

[4] Which depends on the amount of dust in air

Q.132 Which one of the following statements is not true **[AIEEE 2003]**

[1] The conjugate base of $H_2PO_4^-$ is HPO_4^{2-}

[2] pH + pOH = 14 for all aqueous solutions

[3] The pH of 1×10^{-8} M HCl is 8

[4] 96,500 coulombs of electricity when passed through a $CuSO_4$ solution deposits 1 gram equivalent of copper at the cathode

Q.133 A solution which is 10^{-3} M each in Mn^{2+}, Fe^{2+}, Zn^{2+} and Hg^{2+} is treated with 10^{-16}M sulphide ion. If K_{sp} of MnS, FeS, ZnS and HgS are 10^{-15}, 10^{-23}, 10^{-20} and 10^{-54} respectively, which one will precipitate first **[IIT 2003]**

[1] FeS [2] MgS [3] HgS [4] ZnS

Q.134 H_3BO_3 is **[IIT 2003]**

[1] Monobasic and weak Lewis acid [2] Monobasic and weak Bronsted acid

[3] Monobasic and strong lewis acid [4] Tribasic and weak Bronsted acid

Q.135 Which one of the following is not a buffer solution **[AIIMS 2003]**

[1] 0.8 M H_2S + 0.8 M KHS [2] 2M $C_6H_5NH_2$ + 2M $C_6H_5N^+H_3Br$

[3] 3M H_2CO_3 + 3M $KHCO_3$ [4] 0.05 M $KClO_4$ + 0.05M $HClO_4$

Q.136 Ksp of an electrolyte AB is 1×10^{-10}. $[A^+] = 10^{-5}$M, which concentration of B^- will not give precipitate of AB **[BHU 2003]**

[1] 5×10^{-6} [2] 1×10^{-5} [3] 2×10^{-5} [4] 5×10^{-5}

Q.137 The pH of 0.1M NaOH is **[MP PET 2003]**

[1] 11 [2] 12 [3] 13 [4] 14

Q.138 pH of completely dissociated 0.005 M H_2SO_4 is **[RPET 2003]**

[1] 3 [2] 4 [3] 2 [4] 5

Q.139 A monoprotic acid in 0.1M solution, ionises to 0.001%. Its ionisation constant is **[CPMT 2003]**

[1] 1×10^{-3} [2] 1×10^{-6} [3] 1×10^{-8} [4] 1×10^{-11}

Q.140 The pH is less than 7, of the solution of **[MP PMT 2003]**

[1] $FeCl_3$ [2] NaCN [3] NaOH [4] NaCl

Q.141 pH of a solution of 10 ml. 1N sodium acetate and 50 ml 2N acetic acid (K_a = 1.8 x 10^{-5}), is approximately **[MP PMT 2003]**

[1] 4 [2] 5 [3] 6 [4] 7

Q.142 The values of K_{sp} for CuS, Ag_2S and HgS are 10^{-31}, 10^{42} and 10^{-54} respectively. The correct order of their solubility in water is **[MP PMT 2003]**

[1] Ag_2S > HgS > CuS [2] HgS > CuS > Ag_2S [3] HgS > Ag_2S > CuS [4] Ag_2S > CuS > HgS

Q.143 The pKa of a weak acid is 4.8. What should be the ratio of [Acid] / [Salt] of a buffer if pH = 5.8 is required **[MP PET 2003]**

[1] 10 [2] 0.1 [3] 1 [4] 2

Q.144 The molar solubility (in mol L^{-1}) of a sparingly soluble salt MX_4 is s'. The corresponding solubility product is K_{sp}. 's' is given in terms of K_{sp} by the relation : **[AIEEE 2004]**

[1] $s = (K_{sp}/256)^{1/5}$ [2] $s = (128\ K_{sp})^{1/4}$ [3] $s = (256\ K_{sp})^{1/5}$ [4] $s = (K_{sp}/128)^{1/4}$

Q.145 The concentration of KI and KCl in a certain solution containing both is 0.001 M each. If 20 mL of this solution is added to 20 mL of a saturated solution of AgI in water. What will happen ?

K_{sp} AgCl = 10^{-10} ; K_{sp} AgI = 10^{-16} **[MPP.E.T. 2004]**

[1] AgI will be precipitated [2] AgCl will be precipitated

[3] There will be no precipitate [4] Both AgCl and AgI will be precipitated

Q.146 What is the pH of 0.01 M glycine solution ? For glycine K_{a_1} = 4.5 × 10^{-3} ; K_{a_2} = 1.7 × 10^{-10} at 298 K ; **[AIIMS 2004]**

[1] 3.02 [2] 6.94 [3] 7.06 [4] 10.02

Q.147 The rapid change of pH near the stiochiometric point of an acid base titration is the basis of indicator detection. pH of the solution is related to the ratio of the concentrations of the conjugate acid HIn and base In^- forms of the indicator by the expression - **[CBSE PMT 2004]**

[1] $\log\frac{[In^-]}{[HIn]} = pK_{In} - pH$ [2] $\log\frac{[HIn]}{[In^-]} = pK_{In} - pH$

[3] $\log\frac{[HIn]}{[In^-]} = pH - pK_{In}$ [4] $\log\frac{[In^-]}{[HIn]} = pH - pK_{In}$

Q.148 A weak acid HX has the dissociation constant 1 × 10^{-5} M. It forms a salt NaX on reaction with alkali. The degree of hydrolysis of 0.1 M solution of NaX is - **[IIT (S) 2004]**

[1] 0.0001 % [2] 0.01 % [3] 0.1 % [4] 0.15 %

Q.149 The K_{sp} of $Mg(OH)_2$ is 1 × 10^{-12}. 0.01 M $Mg(OH)_2$ will precipitate at the limiting pH - **[DPMT 2005]**

[1] 3 [2] 9 [3] 5 [4] 8

Q.150 The correct expression for the solubility product of $Ca_3(PO_4)_2$ is - **[JEE Orissa 2005]**

[1] $108s^5$ [2] $27s^5$ [3] $16s^4$ [4] $81s^4$

Q.151 The solubility product of a salt, having the general formula MX_2. In water is 4 × 10^{-12}. The concentration of M^{2+} ions in the aqueous solution of the salt is - **[AIEEE 2005]**

[1] 2 × 10^{-6} M [2] 1 × 10^{-4} M [3] 1.6 × 10^{-4} M [4] 4 × 10^{-10} M

Q.152 If 0.1 M of a weak acid is taken and its precentage ionization is 1.34%, then the calculate is ionization constant **[AFMC 2005]**

[1] 0.8 × 10^{-5} [2] 1.79 × 10^{-5} [3] 0.182 × 10^{-5} [4] None of these

Q.153 The K_a values of formic acid and acitic acid are respectively 1.77 × 10^{-4} and 1.75 × 10^{-5}. The ratio of the acid strength of 0.1 M acid is - **[PMT Kerala 2005]**

[1] 10 [2] 3.178 [3] 0.3 [4] 0.1

Q.154 Equal volumes of the following Ca^{2+} and F^- solutions are mixed, In which solution will the precipitation occur

K_{sp} of $CaF_2 = 1.7 \times 10^{-10}$

1. 10^{-2} m Ca^{2+} + 10^{-5} M F^-
2. 10^{-3} M Ca^{2+} + 10^{-3} M F^-
3. 10^{-4}M Ca^{2+} + 10^{-2} M F^-
4. 10^{-2}M Ca^{2+} + 10^{-3} M F^-

Select the correct answer using the codes given below - **[PMT Kerela 2005]**

[1] In 4 only [2] In 1 and 2 [3] In 3 and 4 [4] In 2,3 and 4

Q.155 Given pH of a solution A is 3 and it is mixed with another solution B having pH 2. If both are mixed, then the resultant pH of the solution will be - **[BHU Pre 2005]**

[1] 3.2 [2] 1.9 [3] 3.4 [4] 3.5

Q.156 When 10 mL of 0.1 M acetic acid ($pK_a = 5$) is titrated against 10 mL of 0.1 M ammonia solution ($pk_b = 5$), the equivalent point will occur at pH - **[AIIMS 2005]**

[1] 5 [2] 6 [3] 7 [4] 9

Q.157 When 0.1 mole of CH_3NH_2 (ionization constant, $K_b = 5 \times 10^{-4}$) is mixed with 0.08 mole HCl and the volume is made up to 1 litre. find the $[H^+]$ of resulting solution - **[IIT 2005]**

[1] 8×10^{-2} [2] 2×10^{-11} [3] 1.23×10^{-4} [4] 8×10^{-11}

Q.158 At 25ºC, the dissociation constant of a base BOH is 1×10^{-12}, The concentration of hydroxyl ions in 0.01 M aqueous solution of the base would be - **[CBSE PMT Pre 2005]**

[1] 10^{-5} mol L^{-1} [2] 10^{-6} mol L^{-1} [3] 2×10^{-6} mol L^{-1} [4] 10^{-7} mol L^{-1}

Q.159 The pKa of a weak acid (HA) is 4.5. The pOH of an aqueous buffered solution of HA in which 50% of the acid is ionized is **[AIEEE 2007]**

[1] 9.5 [2] 7.0 [3] 4.5 [4] 2.5

Q.160 In a saturated solution of the sparingly soluble strong electrolyte $AgIO_3$ (Molecular mass = 283) the equilibrium which sets in is

$AgIO_{3(s)} \rightleftharpoons Ag^+_{(aq)} + IO_3^-{}_{(aq)}$

If the solubility product constant K_{sp} of $AgIO_3$ at a given temperature is 1.0×10^{-8}, what is the mass of $AgIO_3$ contained in 100 ml of its saturated solution ? **[AIEEE 2007]**

[1] 1.0×10^{-7} g [2] 1.0×10^{-4} g [3] 28.3×10^{-2} g [4] 2.83×10^{-3} g

Q.161 The first and second dissociation constants of an acid H_2A are 1.0×10^{-5} and 5.0×10^{-10} respectively. The overall dissociation constant of the acid will be **[AIEEE 2007]**

[1] 5.0×10^{-15} [2] 0.2×10^5 [3] 5.0×10^{-5} [4] 5.0×10^{15}

Answer Key

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Ans.	1	4	3	4	4	2	2	3	2	4	4	3	2	1	4	1	2	3	2	3	1	2	4	1	1
Qus.	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Ans.	1	2	4	1	1	3	2	3	2	1	1	1	4	4	2	4	2	4	4	3	2	1	3	1	1
Qus.	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	2	1	1	2	4	3	2	4	1	4	1	1	3	1	2	3	1	1	2	3	2	2	1	4	3
Qus.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Ans.	3	2	2	3	1	2	4	2	3	4	3	3	4	4	3	2	1	3	2	2	4	1	4	2	1
Qus.	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
Ans.	2	2	2	1	4	2	2	1	2	2	3	4	2	2	4	4	1	1	1	4	4	2	2	3	2
Qus.	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
Ans.	2	3	1	1	1	1	3	3	3	4	1	3	3	4	1	1	4	2	1	1	3	3	2	2	1
Qus.	151	152	153	154	155	156	157	158	159	160	161														
Ans.	2	2	2	4	2	3	4	4	1	4	1														