Exercise 2(Going step-by-step**)**

Acid and Bases

1. C_2H_5OH ionises as
   a) $C_2H_5OH \longleftrightarrow C_2H_5O^- + H^+$
   b) **$2C_2H_5OH \longleftrightarrow C_2H_5OH_2 + C_2H_5O^-$**
   c) $C_2H_5OH \longleftrightarrow C_2H_5^+ + OH^-$
   d) $C_2H_5OH + H_2O \longleftrightarrow C_2H_5O^{--} + H_3O^+$
2. C_2H_5Ona is a ……in C_2H_5OH.
   a) **Strong base** b) Strong acid
   c) Weak acid d) weak base
3. NH_4NO_3 is a
   a) Strong base in NH_3 b) weak base in NH_3
   c) **Strong acid in NH_3** d) weak acid in NH_3
4. Select the correct statement(s).
   a) Arrhenius theory isrestricted to aqueous solution
   b) Franklin's theory is applicable also to other ionisable
   c) Both a&b
   d) None of the above
5. In the following equilibrium,
   $B + H_2O \longleftrightarrow BH^+ + OH^-$
   a) Arrhenius acid-base concept is observed
   b) Franklins acid –base concept is observed
   c) Both a&b
   d) None of the above
6. Consider the following reactions,
   A: $H_2CO_3(aq) + HSO^-_4(aq) \longleftrightarrow H_2SO_4(aq) + HCO_3^-(aq)$
   B: **$HF(aq) + Cl^-(aq) \longleftrightarrow HCl(aq) + F^-(aq)$**
   C: $HF(aq) + NH_3(aq) \longleftrightarrow NH_4^+ + F^-(aq)$
   D: $HSO_4^-(aq) + CN^-(aq) \longleftrightarrow HCN(aq) + SO_4^{2-}(aq)$
   Reactions proceeding to the right are
   a) A,B b) C,D c) A,C d) B,D
7. Conjugate base of H_2 is
   a) H^+ b) H_3^+ **c) H^-** d) H_3^-
8. Conjugate base of $HO_2^-$is
   a) O_2^- (superoxide ion) b) H_2O_2
   c) O_2^{2-} (peroxide ion) d) O_2^+

9. In the following

$[Al(H_2O)_6]^3 + HCO_3 \longleftrightarrow [Al(H_2O)_5OH]^2 + H_2CO_3$

(A) (B) (C) (D)

Species behaving as Bronsted- Lowry acids are

a) **(A), (D)** b) (B), (C) c) (B), (D) d) (A), (C)

10. Which is Bronsted-Lowry acid as well as Arrhenius acid?

a) H_2 **b) HCO_3^-** c) NH_3 d) NH_2^-

11. Following reaction,

$NH_4^+(aq) + CN^-(aq) \longleftrightarrow HCN(aq) + NH_3(aq)$

Proceeds in

a) Forward direction **b) backward direction**

c) In both sides equally d) can't be predicted

12. Out of the following, amphiprotic species are

I: $H_2PO_2^-$ II: HPO_3^{2-}

III: HCO_3^- IV: $CH_3CO_2^-$

V: HPO_4^{2-}

a) I,II,III,IV b) I,V

c) III,V d) II,III,IV

13. What are th correct statement(s) about H^- (hydride)

a) It is Bronsted-Lowry base of H_2

b) It resembles halide

c) It is isoelectronic of He

d) All the above are correct statements

14. Consider the following reactions

I: $[Al(OH)_3(H_2O)_3] + OH^- \longleftrightarrow [Al(OH)_4(H_2O)_2^-] + H_2O$

II. $[Al(OH)_3(H_2O)_3] + H_3O^+ \longleftrightarrow [Al(OH)_2(H_2O)_4^-] + H_2O$

Select the correct statement.

a) X is an acid in I and base in II

b) X is a base in I and acid in II

c) X is a base in I and II both

d) X is an aid in I and II both

15.If the following proceed in forward side

$HNO_2 + HF \rightleftharpoons H_2F^+ + NO_2^-$

$CH_3COOH + HF \rightleftharpoons F^- + CH_3COOH_2^+$

$`H_2O + CH_3COOH \rightleftharpoons H_3O^+ CH_3COO^-$

Then increasing order of acid strength is

a) $H_2O < CH_3COOH < HF < HNO_2$

b) $HNO_2 < HF < CH_3COOH < H_2O$

c) $HNO_2 < HF < H_2O < CH_3COOH$

d) $HNO_2 < CH_3COOH < HF < H_2O$

16.Select the correct statement(s) about $H_2PO_4^-$ and NH_4^+

a) Both behave as Bronsted- lowry acid

b) $H_2PO_4^-$ is a lewis –baseas well as Bronsted- lowry base

c) $H_2PO_4^-$ is amphiprotic

d) All the above are correct statemanets

17.In the interaction of $B(CH_3)_3$ with $N(CH_3)_3$

a) $B(CH_3)_3$ is a lewis base and $N(CH_3)_3$ is a lewis acid

b) $B(CH_3)_3$ is a lewis acid and $N(CH_3)_3$ is a lewis base

c) Both are lewis acids

d) Both are lewis bases

18.A carbocation (as CH_3^+) is

a) A lewis acid b) an electrophilic reagent

c) Both a&b d) None of these

19.Which is/are Lewis acids out of CH_3^- (carbon ion), CH_5^+(carbonium ion), CH_3^+ , (carbenium ion)?

a) CH_5^+, CH_3^+ b) CH_3^+ , CH_3^- **c) CH_3^+** d) CH_5^+

20.Which behaves as a lewis base as well as Bronsted-Lowry base?

a) Carbonium ion b) carbenium ion

c) carbanion d) All of these

21.Which s strongest acid?

a) **$HClO_4$** b) H_2SO_4 c) HNO_3 d) HCl

22.Relative strength cannot be compared in aqueous solution of the following pair

a) $HClO_4$ and HBr b)$HClO_4$ and HNO_3

c) H_2SO_4 and HNO_3 **d) All of these**

23.CH_3COOH (a weak acid)behaves as strong acid in

a) HF **b) NH_3** c) H_2O HNO_3

24.Select the correct acid –base equilibrium

a) $HNO_3 + HF \rightleftharpoons H_2NO_3^+ + F^-$

b) $HNO_3 + HF \rightleftharpoons H_2F^+ + NO_3^-$

c) $CH_3COOH + NH_3 \rightleftharpoons CH_3COOH_2^+ + NH_2^-$

d) $HF + H_2O \rightleftharpoons H_2F^+ + OH^-$

25. Consider following statements

I: CH_3COOH(a weak acid) behaves as a strong acid in NH_3

II: HNO_3 (a astrong acid) behaves as a base in HF

III: H_2SO_4 dissociates to a very small extent in glacial CH_3COOH.

Select correct alternate for these statements

a) I, III b) II, III c) I,II **d) I,II, III**

26.100 ml of I M HCl is mixed with 50ml of 2 M HCl. Hence, $[H_3O^+]$ is

a) 1.00M b)1.50M **c)1.33M** d)3.00M

27.$[Cl^-]$ in a mixture of 200ml of 0.01M HCl and 100 ml of 0.01 M $BaCl_2$ is

a) 0.01 M **b) 0.0133 M** c) 0.03M d) 0.02M

28.B;ue litmjus turns red in the following mixture of acid and base

a) 100ml of 1×10^{-2} M H_2SO_4 + 100Ml of 1×10^{-2} M $Ca(OH)_2$

b) 100ml of 1×10^{-2} M HCl + 100Ml of 1×10^{-2} M $Ba(OH)_2$

c) 100ml of 1×10^{-2} M H_2SO_4 + 100Ml of 1×10^{-2} M NaOH

d) 100ml of 1×10^{-2} M HCl + 100Ml of 1×10^{-2} M NaOH

29.$[H_2O]$ in M H_2SO_4

a) **2M** b) 1M c) 0.2M d) 0.1M

30.HCl exists as

a) Cl b) H_2O^+ c) HCl **d) H_3O^+ Cl**

31.Select aprotic solvnts out of

Water, benzene, methylamine, carbntetrachloride

I II III IV

a) I b) II,IV **c) II,III,IV** d) I,III,IV

32.Strongest acid and strongest base pair is

a) H_3O^+ , H_2O **b) H_3O^+ , OH^-** c) H_2O, H_3O^+ d) OH^-, H_3O^+

33. Autoprotolysis constant of NH_3 is

a) $[NH_4]\,[NH_3]$ b)$[NH_2]\,[NH_4]$

c)$[NH_4]\,[NH_2]$ d)$[NH_4^+]/\,[NH_2^-]$

34. Autoprotolysis constant of a weak acid HA is 4×10^{-8} hence,

[A] is

a) **2×10^{-4} M** b) 0.25×10^{-6} M

c) 16×10^{15} M d) 4×10^{-8} M

35. At -50°C autoprotolysis of NH_3 gives $[NH_4^+]=1 \times 10^{-15}$ M hence,

autoprotolusis constant of NH_3 is

a) $\sqrt{1 \times 10^{-15}}$ b)**$\sqrt{1 \times 10^{-30}}$**

c) 1×10^{-15} d)2×10^{-15}

PH-Scale

36. pH of 10^{-8} N NaOH is

a) 8.0 b) 6.0 c) 6.98 **d) 7.02**

37. Milliequivqlent of $Ba(OH)_2$ present in 100ml solution to have pH = 13, is

a) 10^{-2} **b) 10** c) 0.1 d)0.01

38.At a temperature under high pressure

$K_w(H_2O) = 1\times10^{-10}$

A solution of pH 5.4 under these conditons is said to be

a) Acidic **b) basic** c) neutral d) amphoteric

39.A weak monobasic acid is 0.1% ionised at 0.1M hence, its pH is

a) 2 b) 3 **c)4** d)5

40.Which has maximum pH?

a) 0.01 M H_2SO_4 b) 0.01 M HCl

c) 0.01 M $Ca(OH)_2$ d) 0.01 M NaOH

41.In which case change in pH is maximum?

a) 1ml of pH =2 is diluted to 100ml

b) 0.01 mol of NaOH is added into 100ml of 0.01M NaOH solution

c) 100ml of H_2O is added into 900ml of 10^{-6} M HCl

d) 100ml of pH =2 solution is mixed with 100ml of pH =12

42.A weak monoacid base has pH =10 at 0.01M% ionisation of base is

a) 0.01% b)0.001% c) 0.0001% **d) 1.0%**

43.100ml of solution of pH =6 is diluted to 1000mlresulting solution has pH

a) 7.0 **b) 6.7** c)7.3 d)6.4

44.In a basic solution pH is 12.3. Hence$[OH^-]$ is

a) **2×10^{-2} M** b)5×10^{-13} M

c)3×10^{-12} M d))4×10^{-16} M

45. When you calculate pHof a solution [H_3O^+] from H_2O is required in the following

a) 10^{-5} M HCl b)10^{-5} M NaOH

c)10^{-8} M NaOH d)10^{-6} M $Ca(OH)_2$

Ostwald's Dilute Law

46. The K_a value for the acid HA is 1.0 ×$10^{-6.}$ What is the vaue of K for the reaction?

$$A^- + H_3O \Longleftrightarrow HA + H_2O$$

a) 1.0 ×10^{-8} b) 1.0×10^{8} c) 1.0×10^{-3} **d) 1.0×10^{6}**

47. pK_b of aq. NH_3 is 1.74, hence pH of 0.01 M NH_3 solution is

a) 3.37 **b)10.63** c) 2.00 d)12.00

48. CH_3COOH is 2.0% ionised (K_a =1.8 ×10^{-5}), hence its molar concentration is

a) **0.045 M** b)0.02 M c) 3.6×10^{-5} M d)0.090 M

49. A weak monobasic acid is 0.01% ionised when its concentration is 1M. Hence, [OH^-] is

a) 1×10^{-4} M **b)1×10^{-10} M** c) 1×10^{4} M d) 1×10^{10} M

50. % ionisation of a weak acid is 1% at 1M, hence % solution is ……. At 4M

a) 4% b)5% **c)0.5%** d)0.2%

51.A mixture of weak acid is 0.1 M in HCCOH ($K_a = 1.8 \times 10^{-4}$) and 0.1 M in HOCN ($K_a = 3.3 \times 10^{-4}$) hence $[H_3O^+]$ is

a) **7.14×10^{-3} M** b) 4.1×10^{-4} M c)0.20M d)4.1×10^{-3}

52. At 25°C, $[H_3O^+] = 1 \times 10^{-7}$ M in water, hence K_a is

a) 1×10^{-14} b)5.55×10^{-15}

c) 1.8×10^{-16} d) 55.5×10^{-10}

53. What is the value of K_w in 0.01 M NaOH?

a) 1×10^{-15} b)1×10^{-13} c)1×10^{-16} **d) 1×10^{-14}**

54.0.1M solution of CH_3COOH should be diluted to -------- times so that pH is doubled.

a) Four times **b) 5.55×10^4 times**

c) 5.55×10^6 times d) 10^{-2} times

55.$[H_3O^+]$ in 0.1 M H_2SO_4 at two stages

$H_2SO_4 \leftrightarrow H^+ + HSO_4^-$

$HSO_4^- \leftrightarrow H^+ + SO_4^{2-}$ are

a) 0.1M, 0.1 M b) 0.1M > 0.01M

C) >0.1M, >0.1M **d) 0.1M<0.1M**

Buffer solution

56. The pH of blood is 7.40. what is the ratio of $[HPO_4^{2-}]/[H_2PO_4^-]$ in the blood? (pK_a ($H_2PO_4^-$) =7.10)

a) **2:1** b) 1.:2 c) 3:1 d)1:3

57. 20 ml of 0.2M NaOH is added to 50ml of 0.2M CH_3COOH, Hence (pH-pK_a) is

a) $\log\frac{3}{2}$ **b)** $\log\frac{2}{3}$ **c) log 2** d) 2log 2

58. 50.0 ml of 0.3 M HCl is mixed with 5.ml of 0.4M NH_3 solution. If pK_a of NH_4^+ is 9.26, pH of the mixture is

a) 5.22 b)1.30 **c) 8.78** d)12.70

59. pH of a solution made by mixing 50 of 0.2M NH_4Cl and 75ml of 0.1 M NaOH is[pK_a of NH_3 9(aq) = 4.74]

a) 7.02 b) 13.0 c) 4.26 **d)9.74**

60. pH of a mixture which is 0.1M in CH_3COOH and 0.05M in $(CH_3COOH)_2$ Ba is [pK_a of CH_3COOH = 4.74]

a) **4.74** b) 5.04 c) 4.44 d) 7.00

61. We have acidic buffer of CH_3COONa and CH_3COOH. One or more of the following operations will not change pH

I. Diluting the mixture ten times

II. Adding some HCl

III. Adding some NaOH

IV. Adding equal moles of CH_3COONa and CH_3COOH into the buffer

Select correct alternate.

a) I, II,III,IV b)II,III **c)I,IV** d) II,IV

62.Which buffer solution has maximum pH?

a) Mixture which is 0.1M in CH_3COOH and 0.1 M in CH_3COONa [pK_a (CH_3COOH)=4.74]

b) Mixture which is 0.2M in CH_3COOH and 0.2 M in CH_3COONa

c) Mixture which is 0.1M in NH_4Cl and 0.1 M in NH_4OH [pK_a (NH_4^+)=9.26]

d) All the solutions have equal pH which is 4.74

63.The pK_a of an amino acid is 9.15. at what pH amino acid is 5% dissociated?

a) 9.15 b) 4.85 c) 9.44 **d)7.87**

64.In what volume ratio should you mix 1.0M solution of NH_4Cl and NH_3 to produce buffer solution of pH 9.80?[pK_a (NH_3) =4.74]

a) **1:3.5** b) 3.5:1 c) 2:1 d)1:2

65.A weak acid HA has degree of dissociation X, thus (pH – pK_a) is

a) P_x b) P_{1-x} c) $P_{1-x}+ P_x$ **d) $P_{1-x} - P_x$**

66.pH of blood is

a) **7.4** b) 6.4 c) 8.0 d)7.0

67.pK_{a1} of carbonic acid in blood at body temperature (37°C) is 6:1, hence ratio $[HCO_3^-]/[H_2CO_3]$ is approximately

a) 1.3:1 b)1:1.3 **c) 20:1** d)1:20

68.Acidosis may cause----------of the pH of blood

a) Increase **b) decrease**

c) no change d)is not related term

69.Important diagnosic analysis in the blood is

a) $[H_2PO_4^-]/[H_2PO_{42}^{2-}]$ **b)** $\mathbf{[HCO_3^-]/[CO_2]}$

c) $[CO_3^{2-}]/[HCO_3^{2-}]$ d) $[PO_3^{2-}]/[HCO4^{2-}]$

70.Oxygen from inhaled air combines with haemoglobin, and oxygenated haemoglobin ionises releasing a proton which is removed in the following reactions

a) $H^+ + CO_2 \leftrightarrow HCO_3^-$

b) $HCO_3^- + H_2O \leftrightarrow H_3O^+ + CO_{3-}^{2-}$

c) $\mathbf{HCO_3^- + H^+ \leftrightarrow H_2CO_3}$

d) in all the above

Common Ion Effect

71. Which of the following reagents affect per cent dissociation

Of C_6H_5COH ?

a) NaOH b) NH_4OH c) HBr **d) All of these**

72. Ionisation of NaoH is decreased in presence of

a) AcOH b) MeOH

c) EtOH **d) None of these**

73. K_a of AcOH is 1.8×10^{-5} . what is $[H_3O^+]$ in a solution which is .001 M AcOH and 0.005M calcium acetate?

a) **1.8×10^{-5} M** b) 3.6×10^{-5} M

c) 0.9×10^{-5} M d) 0.005M

74. pK_b of NH_3 is 4.74; moles of ammonium sulphate to be added to 0.5L of 0.01M aq NH_3 to have pH of 9.26 is

a) 0.005 **b)0.0025** c) 0.01 d)0.002

75. $[Ag^+]$ in saturated AgCl in presence of 1M KCl[K(AgCl) = 1×10^{-10}] is

a) 1×10^{-5} M b) 1×10^{-20} M **c)1×10^{-10} M** d) 2×10^{-10} M

76. Degree of ionisation of 1 M HCOOH is decreased to a maximum extent in presenceof

a) I M HCHO b) 1 M NaOH

c) 1 M HCOONa d) equally for all

77. Solubility of Ag_2CrO_4 is decreased in presence of

a) **$AgNO_3$** b)AgCl c)$BaCrO_4$ d)$PbCrO_4$

78. Blood pH is controlled by concentration of H_2CO_3 and HCO_3^-. in presence of $NaHCO_3$, pH of blood is

a) **Increased** b) decreased

c) no change d) statement is wrong

79. A weak acid (HA) is 4% ionised at 1 M percent ionisation is 1% presence of A^- of

a) 0.04M **b)0.16M** c)0.02M d)0.10M

80. $[OH^-]$ in a solution prepared by mixing equal volumes of 0.M methyl amine (CH_3NH_2, $K_b = 3.7\times10^{-4}$) and 0.60 M $CH_3NH_3^+Cl^-$

a) 3.7×10^{-4} M b)7.4×10^{-4} M c) 3.7×10^{-2}M **d)1.85×10^{-4} M**

Solubility Product

81. Expression for K_{sp} of $Hg_2(NO_3)_2$ is

a) $[Hg^+]^2[NO_3^-]^2$ b)$[Hg_2^+]^2[NO_3^-]^2$

c) $[Hg^{2+}][NO_3^-]^2$ d) $[Hg_2^{2+}]^2[NO_3^-]^2$

82. Solubility of $BaSO_4$ in aqueous solution is 1×10^{-5} M. hence, solubility in 0.1M $BaCl_2$ is

a) 1×10^{-1} M b) 1×10^{-9} M **c) 1×10^{-4} M** d) 1×10^{-5} M

83. Molar solubility of $Al(OH)_2$ is increased in presence of

a) NaOH b) HCl

c) Both a&b d) None of these

84. A saturated solution prepared by dissolving Ag_2CO_3 in water has $[Ag^+]$ = 2.56×10^{-4} M, its K_{sp} is

a) **8.4×10^{-12}** b) 1.68×10^{-13}

c) 6.6×10^{-8} d) 1.6×10^{-2}

85. K_{sp} ($BaSO_4$) is 1.1×10^{-10}. in which caseis $BaSO_4$ precipitated?

a) 100 ml of 4×10^{-3} M $BaCl_2$ + 300ml of 6.0×10^{-4} M Na_2SO_4

b) 100 ml of 4×10^{-4} M $BaCl_2$ + 300ml of 6.0×10^{-8}M Na_2SO_4

c) 300 ml of 4×10^{-4} M $BaCl_2$ + 300ml of 6.0×10^{-8} M Na_2SO_4

d) In all cases

86. K_{sp} of $Al(OH)_3$ is 1.0×10^{-15}. pH of the saturated solution is about

a) 5.0 b) 9.0 c) 4.1 **d)10.4**

87. K_{sp} of H_2S is 1×10^{-22}. $[S^{2-}]$ in a buffer of pH 6 is

a) 1×10^{-16} M b)1×10^{-12} M **c)1×10^{-10} M** d)1×10^{-8} M

88. K_{sp} of CdS is 8.0×10^{-27} and that of H_2S is 1×10^{-22} . 1×10^{-14} M, $CdCl_2$ solution is precipitated on passing H_2S when pH ia about

a) 4 b) 6 **c) 5** d)7

89. K_{sp} of $Mg(OH)_2$ is 1.8×10^{-11} at 30°C. Its molar solubility is……at pH =12

a) 1.8×10^{-11} M b)1.8×10^{-9} M c)1.8×10^{-54} M **d)1.8×10^{-7} M**

90. In group III analysis buffer used to precipitate cations as hydroxide is

a) NH_4Cl +NH_4OH

b) HCO_3 +CO_2

c) CH_3COOH + C_6H_5COONa

d) C_6H_5COOH + C_6H_5COONa

Hydrolysis

91. 100 ml of 0.02 M benzoic acid (pK_n = 4.2) is titrated using 0.02M NaOH. pH after 50ml and 100ml of NAOH have been added are

a) 3.50, 7 b)4.2, 7 **c)4.2, 8.1** d)4.2, 8.25

92. pH of 0.01 M aqueous solution of NaX, NaY and NaZ are 8,9 and 10 respectively. Strongest acidof HX, HY and HZ is

a) **HX** b)HY c) HZ d) Cant be predicted

93.40 ml of 0.025M solution of the protonated form of the amino acid phenyl alanine (H_2A^+) is treated with ml of 0.1M NaOH. pH at this stage is

(pK_{a1} =1.82, pK_{a2} =9.13 of H_2A^+)

a) **5.48** b)7.00 c)1.82 d)9.13

94.pH of 0.05M calcium acetate solution (pK_a =4.74) is

a) 8.72 **b) 8.87** c)7.00 d)1.30

95.Which of the aqueous solution turns blue litmus red?

a) NH_4Cl b) $Al(H_2O)_6^{3+}$ c) $Fe(H_2O)_6^{3+}$ **d) all of these**

96.pK_{a1} , pK_{a2} , and pK_{a3} of H_3PO_4 are respectively x,yand z. pH of 0.01 M Na_2HPO_4 solution is

a) 2 b) $\frac{x+y}{2}$ **c)** $\frac{y+z}{2}$ d) $\frac{x+y+z}{2}$

97.100ml of 0.01 M CH_3COOH is titrated with 0.01 MKOH. At wat point pH is maximum?

a) After addition of 100ml of KOH

b) After addition of 75ml of KOH

c) After addition of 50ml of KOH

d) After addition of 25ml of KOH

98.pK_b of NH_3 is 4.74 and pK_b of A^-, B^- , and $C^-$are 4,5,and 6 respectively. Aqueous solution of 0.01 M ha pH in the increasing order

a) NH_4A <NH_4B < NH_4C

b) $NH_4C < NH_4B < NH_4A$

c) $NH_4C < NH_4A < NH_4B = 7$

d) All have equal pH being salt of weak acid and weak base

99. pK_1 and pK_2 of H_2CO_3 are respectively 6.38 and 10.26. pH of 1M and 0.1M $NaHCO_3$ are respectively

a) 8.32, 7.32 b) 7.32, 8.32 **c) 8.32, 8.32** d)7.32 , 7.32

100. Degree of hydrolyss of the following is independent od concentration

I. NH_4CN

II. NH_4HCO_3

III. NaHS

IV. CH_3NH_3Cl

a) I,II,III,IV b)I,IV c) I,III,IV **d) I,II,III**

Acid – base Titration and indicator

101. Following are some of the certain facts of Ostwalds theory of acid-base indicators

A. Ionised and unionised foms have different colours

B. Colour change is indicated at the end point when unionised form changes to ionised form due to change in pH

C. Benzenoid form changes to quinonoid form and vice-versa due to change in pH

Select the correct facts.

a) A,B,C b) A,C **c) A,B** d) B, C

102. Select the correct statements

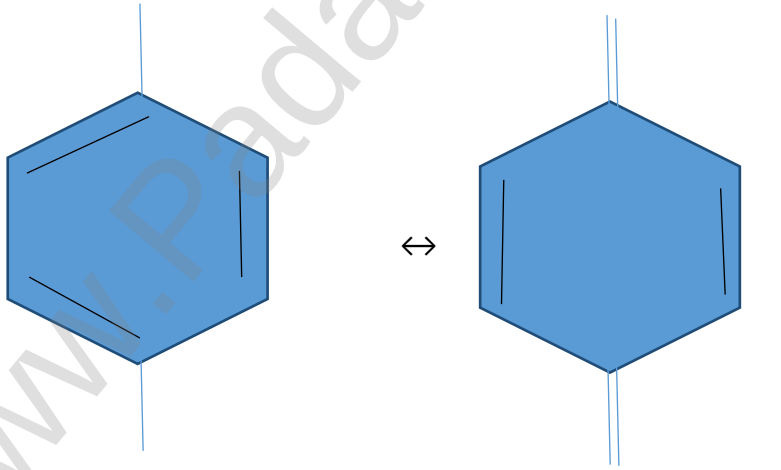
a) Methyl orange is red in alkali solution and yellow in acid solution

b) Phenolphthalein is pink in alkali solution and colourless in acid solution

c) Both a&b

d) None of the above

103. Indicator can exist in two forms depending on the medium



Select the correct statements.

a) Methyl orange assumes form (A) in alkali solution and form (B) in acid solution
b) Phenolphthalein assumes form (A) in acid solution and form (B) in alkaline solution
c) Thymoohthalein assumes form (A) ain acid solution and form (B) in alkali solution
d) All Of the above

104. For any weak acid indicator HIn ionising as

$HIn \leftrightarrow H^+ + In^-$

Colour the unionised form (HIn) is observed when

a) $\frac{In}{HIn} = \frac{1}{10}$ b) pH =pK_n -1

c) Both a&b d) None of these

105. In the above case colour of the ionised form (In^-) is observed when

a) $\frac{In}{HIn} = 10$ b) pH =pK_a +1

c) both a&b d) None of thes

106. Select the correct statements about indicators.

a) Near the equivqlence point pH = pK_a for weak acid indicator and pH = (14- pK_b) for weak base indicator

b) Most indicators have a transition range of two pH points

c) Methyl orange assumes quinonoid form in acid solution

d) All of the above statements are correct

107. pK_a of the indicator is. At the equivalence point pH is

a) 5 **b)10** c) 7.5 d)7.0

108. An indicator is a weak acid and pH range of its colour s 3 to5. If the neutral points of the indicator lies in the centre of the hydrogen ion concentration corresponding to given pH range then pH at the equivalence points is

a) **3.3** b)4.0 c)7.0 d)5.0

109. In the titration of weak acid with strong base which indicator cant be used

a) **Methyl orange** b) phenolphthalein

c)both a&b d) none of these

110. In the titration of weak base with strong acid indicator cant be used

a) Methyl orange b) **phenolphthalein**

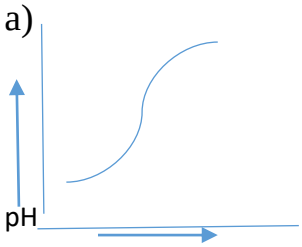
c)both a&b d) none of these

111. Suitable indicator to be used in the titration of weak acid versus strong base is

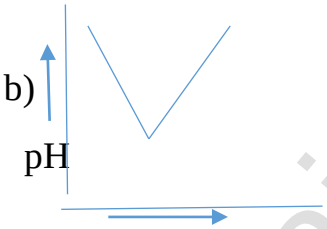
a)**phenolphthalein** b)thymophthalein c)botha&b d)None of these

112. Titration curve if a strong base is titratd with stron acid is

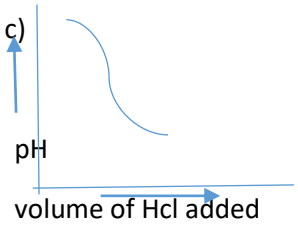
a)



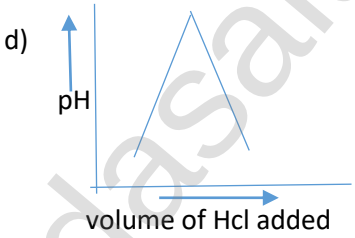
b)



c)



d)



ans: (c)

113. Phenolphthalein cant be used in the titration of

a) HCl with NaOH b) CH_3COOH with NaOH

c) HCl with NH_4OH d)CH_3COOH with NH_4OH

114. In the titration of Na_2CO_3 with HCl, indicator used is

a) Phenolphthalein **b)methyl red**

c) both a&b d) none of these

115. 100ml of 0.1M HCl is titrate using 0.1M NaOH using phenolphthalein indicator. pH after 50ml of NaOH has been added is

a) 7.0 b)-1.48 c)6.0 **d)1.48**