CHEMISTRY

FOR IIT JEE ASPIRANTS OF CLASS 11 FOR CHEMISTRY

IONIC EQUILIBRIUM

Example

1. The OH^- ion concentration of solution is $3 \times 10^{-4} M$. Find out the H^+ ion concentration of the same solution?

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2. $100 ml$ of $0.15 M$ HCl is mixed with $100 ml$ of $0.05 M$ HCl, is the pH of the resulting solution?

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3. 50 litres of $0.1M$ HCl is thoroughly mixed with 50 litres of $0.2MNaOH$. What is the pOH of the resulting solution?

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4. A solution is $1M$ in CH_3COONa. and $0.1M$ in CH_3COOH. if pK_a of CH_3COOH is 4.8, what is the pH of the solution?

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5. What is the pH of solution obtained by mixing $100mL$ of each $0.2MNH_4Cl$ and $0.2MNH_4OH$, if pK_b of NH_4OH is 4.2?

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6. When 0.2 mole of an acid is added to 4 lit of a buffer solution, the P^H of the buffer decreases by 0.5. What is the buffer capacity of the solution.?

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7. The solubility of Ag_2CrO_4 is $1 \times 10^{-2} \text{mol} / \text{lit}$. What is its solubiility product?

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8. The solubility of $PbSO_4$ in $0.1 M Na_2SO_4$ solution is (K_{sp} of $PbSO_4$ is 1.25×10^{-9})

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C.U.Q

1. NH_3 is not a base according to

A. Bronsted theory

B. Lewsi theory

C. Arrheniu theory

D. Lowery theory

Answer: C

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2. HCl gas cannot act as an acid in

A. Polar solvents

B. Highly polar solvents

C. NH_3 liquid

D. Non-polar solvents.

Answer: D

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3. Which of the following is an Arrhenius acid?

A. CO_2

B. SO_2

C. $FeCl_2$

D. HNO_2

Answer: D

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4. Arrhenius theory is failed to explain the acidic nature of

A. HCl

B. $HCOOH$

C. H_2SO_4

D. $AlCl_3$

Answer: D

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5. The conjugate acid of OH^- is

A. H_3O^+

B. H_2

C. OH^-

D. H_2O

Answer: D

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6. The strongest base among the following is

A. Cl^-

B. CH_2COO^-

C. HSO_4^-

D. NO_3^-

Answer: B

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7. Which of the following is not a Bronsted acid

A. Bisulphate ion

B. Nitride ion

C. Nitric acid

D. Hydroxide ion

Answer: B

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8. Which of the following is used as a differentiating solvent for acids,

A. CH_3COOH

B. NH_3

C. H_2O

D. HCl_4

Answer: A

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9. CH_3COOH does not act as an acid in presence of

A) HCl , B) Na_2CO_3 , C) H_2O , D) C_6H_6

A. All are wrong

B. A and D correct

C. A and B are correct

D. C and D correct

Answer: B

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10. Which of the following can act as both Bronsted acid and a Bronsted base?

i) $HCOO^{-}$ ii) NH_2 iii) NH_3 Iv) HSO_4^{-}

A. (i) & (ii)

B. (ii) & (iii)

C. (ii) & (iv)

D. (i) & (iv)

Answer: C

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11. Protolysis is transfer of

A. Hydroxide ions

B. Water molecules

C. Anions

D. Protons

Answer: D

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12. In the reaction $NH_3 + H_2O \Leftrightarrow NH_4^+ + \overline{O}H$, the conjugate acid-base pair is

A. NH_3 and H_2O

B. NH_3 and OH^-

C. H_2O and NH_{4^+}

D. NH_{4^+} and NH_3

Answer: D

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13. $H_3O^+ + OH^- \rightarrow 2H_2O$ is

A. Arrhenius neutralisation

B. Bronsted neutralisation

C. Lewis neutralisation

D. Both Lewis neutralization and Bronsted neutralisation.

Answer: B

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14. The conjugate bas of hydrazoic acid is

A. N_2H_4

B. $N_2H_{5^+}$

C. N_3^-

D. NH_2OH

Answer: C

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15. Which of the following is an amphiprotic ion

A. Chloirde ion

B. Acetate ion

C. Sulphate

D. Bicarbonate ion

Answer: D

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16. The strongest base among the following is

A. Chloirde ion

B. Cyanide ion

C. Formate ion

D. Acetate ion.

Answer: B

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17. Weskest base is

A. C_2H^-

B. NO_{3^-}

C. CN^-

D. HS^-

Answer: B

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18. Strongest Bronsted base is

A. ClO^-

B. ClO_2^-

C. ClO_3^-

D. ClO_4^-

Answer: A

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19. The following has no conjugate base

A. $H_2PO_4^-$

B. $H_2PO_2^-$

C. $H_2PO_3^-$

D. CH_3COOH

Answer: B

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20. The weakest base among the following

A. I^-

B. Cl^-

C. F^-

D. Br^{-}

Answer: A

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21. The strongest conjugate base results from

A. Fromic acid

B. Benzoic acid

C. Acetic Acid

D. Acetylene

Answer: D

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22. The conjugated acid of O^{-2} ions is

A. OH^{-}

B. OH^{+}

C. H_2O

D. HO_2^{-}

Answer: A

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23. Identify Bronsted -Lowry acids in the reactions given .

$$\left[Al(H_2O)_6\right]^{+3} + HCO_3^{-} \Leftrightarrow$$

$$\underset{C}{\left[Al(H_2O)_5(OH^{-})\right]^{2+}} + \underset{D}{H_2CO_3}$$

The correct Answer

A. A, C

B. B, D

C. A, D

D. B, C

Answer: C

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24. Which anions is strongest base?

A. $C_2H_5O^-$

B. NO_{2^-}

C. Cl^-

D. CH_3COOH^-

Answer: A

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25. The strongest base of the following species is

A. NH_{2^-}

B. OH^{-}

C. O^{-2}

D. S^{2-}

Answer: A

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26. Which of the following is the conjugate base of $[C_2H_5NH_3]^{+}$?

A. $[C_2H_5NH]^{-}$

B. $[C_6H_5NH_3]OH$

C. $C_2H_5NH_2$

D. $C_2H_5NH_2$

Answer: C

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27. HCl base not behave as acid in

A. Water

B. Ammonia

C. Benzene

D. AqNaOH

Answer: C

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28. Which of the following is not a Bronsted acid

A. $AlCl_3$

B. NH_4^+

C. BF_3

D. CH_3COOH

Answer: B

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29. Which of the following species acts as Bronsted base but not as acid

A. HSO_4^-

B. HCO_{3^-}

C. $H_2PO_{2^-}$

D. $H_2PO_{3^-}$

Answer: C

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30. The Species which one neither Bronsted acid but not Bronsted base?

A. HI

B. HSO_4^-

C. Cl^-

D. BF_3

Answer: D

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31. The substance which is a Bronsted acid but not Bronsted base?

A. H_2O

B. NH_3

C. H_2S

D. HCO_3^-

Answer: C

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32. Which of the following is not a conugate acidbase pair

A. HSO_4^-, SO_4^{2-}

B. $H_2PO_4^-, HPO_4^{2-}$

C. $H_2PO_4^-, H_3PO_4$

D. $H_2PO_{4^-}, PO_{4^{-3}}$

Answer: D

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33. In aqueous solution, H_2SO_4 and $HClO_4$ are Equally strong. This is because

A. Their basicities are same

B. Both are oxy acids of non-metals

C. Both have lower molecular weights

D. Levelling effect of water

Answer: D

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34. Glycine exists as the zwittr ion, $\overset{+}{N}H_3CH_2COO^-$. Its conjugate base is

A. $NH_2CH_2COOH^{2^+}$

B. $NH_2CH_2COO^-$

C. $\overset{+}{N}H_3CH_2COOH$

D. $NH_3CH_2COO\overset{+}{H}$

Answer: B

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35. Acetic acid in benzene can exist as

A. CH_3COO^-

B. H^{+}

C. H_3O^{+}

D. $(CH_3COOH)_2$

Answer: D

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36. Which of the following is a Lewis acid but not a Bronsted acid

A. HSO_4^{-}

B. BCl_3

C. NH_3

D. HNO_3

Answer: B

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37. Formation of detive bond is neutralization according to the following acid base theory

A. Arrhenius

B. Lewis

C. Bronsted-Lowry

D. Lowry theory

Answer: B

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38. In the reaction $AlCl_3 + \bar{C}l \rightarrow AlCl_4^-$, $AlCl_3$ is

A. Lewis acid

B. Lewis base

C. Lewis salt

D. Arrhenius acid

Answer: A

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39. Which of the following is wrong?

A. Arrhenius theory could explain relative strength of acids and bases.

B. Bronsted theory could explain relative strength of acids and bases

C. Lqwis theory cannot explain relatives strength of acids and bases.

D. Lewis theory cannot explain relative strength of acids and bases.

Answer: C

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40. Which of the following is not a Lewis base

A. $C_6H_5NH_2$

B. C_2H_5OH

C. NH_3

D. $SnCl_4$

Answer: D

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41. Which of the following is neither a Lewis acid nor a Lewis

A. HSO_4^-

B. $ZnCl_2$

C. NH_4^+

D. CH_3^+

Answer: C

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42. H^+ is an acid, accoding to

A. Arrhenius theory

B. Bronsted theory

C. Lewis theory

D. All theories

Answer: C

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43. The gaseous phase neutralisatin reaction can be explanied only on the basis of

A. Arrhenius theory

B. Bronsted theory

C. Lewis theory

D. Bohrs theory

Answer: C

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44. The following is a Lewis acid

A. O_2

B. N_2

C. F

D. O

Answer: D

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45. The following is neither a Lewis acid nor a Lewos base.

A. H_2O

B. O

C. H_2SO_4

D. H_3O^+

Answer: D

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46. In complex compounds the central metal atom can act as

A. A Lewis acid

B. A Lewis base

C. A Bronsted acid

D. A Arrhenius acid

Answer: A

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47. Which of thef following is not Lewis acid

A. $AlCl_3$

B. $BaCl_2$

C. BCl_3

D. $SnCl_4$

Answer: B

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48. Which of the following is Lewis base

A. BCl_3

B. CH_4

C. NH_3

D. HNO_3

Answer: C

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49. The followin statement is not true as far a BF_3 is concerned

A. Electron deficient

B. Lewis acid

C. Ionic compound

D. Covalent compound

Answer: C

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50. In the reaction $SnCl_2 + 2Cl^- \rightarrow SnCl_4 + 2e^-$ the Lewis acid is

A. $SnCl$

B. $SnCl_3$

C. $SnCl_2$

D. $SnCl_4$

Answer: C

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51. Which of the following is not Lewis base?

A. CH_4

B. C_2H_5OH

C. Acetone

D. Sec.Amine

Answer: A

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52. Among of the following is strong Lewis base?

A. NF_3

B. NCl_3

C. NBr_3

D. Ni_3

Answer: D

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53. Which of the following is string Lewis acid?

A. K^+

B. Ca^{2+}

C. Al^{3+}

D. All

Answer: C

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54. The Lewis acidic strength of SO_3 when compared to SO_2 is

A. Equal

B. Less

C. More

D. Can not be predicted

Answer: C

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55. Which of the following acts as Lewis acid?

A. Cu^{2+}

B. $AlCl_3$

C. CO_2

D. All

Answer: D

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56. Among the following is which one acts as Lewis base?

A. C_2H_2

B. C_2H_4

C. Pyridine

D. All

Answer: D

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57. The no. of conjugate acid-base pairs present in the aqueous solution of H_3PO_3 is

A. 2

B. 3

C. 4

D. 5

Answer: B

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58. Which of the following is not ture for acidic solutions at room temperature.

A. $\left[H^+\right] > \left[OH^-\right]$

B. $\left[H^+\right] > 10^{-7}M$

C. $\left[H^+\right] < 10^{-7}M$

D. $\left[OH^{-}\right] < 10^{-7}M$

Answer: C

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59. If HCl is added to pure water at $25^{\circ}C$ the ionic product of water will be

A. $> 10^{-14}$

B. $< 10^{-14}$

C. 10^{-14}

D. $> 10^{-10}$

Answer: C

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60. The ionic product of water changes when

A. An acid is added to it

B. A base is added to it

C. Either a base or acid is added to it

D. Temperature is changed

Answer: D

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61. If $NaOH$ is added to a solution of acetic acid

A. H^{+} is ions increases

B. pH decreases

C. $[CH_3COO^{-}]$ increases.

D. $[CH_3COOH]$ increases.

Answer: C

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62. Which of the following is a strong electrolyte?

A. NH_3

B. $Ca(OH)_2$

C. $BaCl_2$

D. H_3PO_4

Answer: C

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63. Ostwald dilution law is applicable to

A. Weak electrolytes

B. Non-electrolytes

C. Strong electrolytes

D. All types of electrolytes

Answer: A

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64. Among the following which one is wrong?

A. Degree of dissociation of a weak electrolyte increases with dilution.

B. Increase in temperature increases the ionisation

C. Strong electrolytes are ionised completely even at moderate concentrations.

D. Addition of NH_4Cl to NH_4OH increases the ionisation of the latter.

Answer: D

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65. The degree of ionisation does not depends on?

A. Temperature

B. Current

C. Nature of solvent

D. Concentration

Answer: B

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66. The highest acidic solution has a pH of

A. 14

B. 7

C. 1

D. 0

Answer: D

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67. The correct statements

A. All are correct

B. A & C correct

C. B,C & D correct

D. D is correct

Answer: B

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68. At any temperature for a neutral solution

A. $pH > P^{OH}$

B. $pH = P^{OH} = 7$

C. $pH = P^{OH}$

D. $pH < P^{OH}$

Answer: C

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69. At $50^{0}C, pH + pOH$ is

A. Less than 14

B. More than 14

C. Equal to 14

D. Equal to 4

Answer: A

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70. pH of rain water is approximately

A. 4

B. 7

C. 10

D. 0

Answer: B

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71. The pH of $0.1M$ ammonium hydroxide is

A. 14

B. < 13

C. > 13

D. < 7

Answer: B

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72. The pH value of pure water at $300K$ is

A. exactly 7

B. Slightly > 7

C. zero

D. Slightly < 7

Answer: D

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73. The aqueous solution P^{H} is zero. What is the nature of the solution.

A. Slightly acidic

B. Strongly acidic

C. Neutral

D. Basic

Answer: B

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74. If pH_a is more than pH_b, the p_H of the aqueous solution of the salt formed by the above acidic and base is

A. 7

B. > 7

C. < 7

D. 0

Answer: B

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75. Which of the following is an acidic salt/

A. Na_2SO_4

B. $NaHSO_3$

C. Na_2SO_3

D. K_2SO_4

Answer: B

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76. The following has lowest p^H

A. $MgSO_4$

B. $MgCO_3$

C. $NaCl$

D. Sodium oxalate

Answer: A

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77. Aqueous solution of ammonium sulphate

A. Truns blue litmus to red

B. Turns red litmus to blue

C. Bleaches litmus

D. Has no action on litmus

Answer: A

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78. Salt hydrolysis in water is due to following nature of water

A. Neutral nature

B. Acidic nature

C. Basic nature

D. Amphiprotic nautre

Answer: A

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79. Which of the following is not a salt?

A. $NaCl$

B. $Ca(OH)_2$

C. PbS

D. $Zn(NO_3)_2$

Answer: B

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80. Which of the following salts undergo anionic hydrolysis?

A. KNO_3

B. KCN

C. Pot. Succinate

D. pot. Carbonate

Answer: A

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81. Aqueous solution of which of the following shows lower p^H?

A. KNO_3

B. $ZnCl_2$

C. CH_3COONa

D. CH_3COONH_4

Answer: B

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82. Which of thef following salts undergo anionic hydrolysis?

A. $ZnSO_4$

B. NH_4Cl

C. $AlCl_3$

D. $NaHCO_3$

Answer: D

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83. Which can act as buffer

A. $NH_4Cl + HCl$

B. $CH_3COOH + H_2CO_3$

C. $40mL$ of $0.1M NaCN + 20mL$ of $0.1M HCN$

D. $NaCl + NaOH$

Answer: C

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84. When CH_3COONa is added to an aqueous solution of CH_3COOH

A. The pH of solution decreases

B. The pH of solution increases

C. The pH of the solution remains unaltered

D. An acid salt is produced

Answer: B

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85. The mixed solution of pthalic acid potassium hydrogen pthalate is

A. Basic buffer

B. Acid buffer

C. Not buffer

D. An acid

Answer: B

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86. When the ionic product of a solution exceeds the solubility product, the solution becomes

A. Saturated

B. Unsaturated

C. A colloid

D. Super saturated and precipitation of salts occurs.

Answer: D

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87. Which pair will show common ion effect?

A. $AgNO_3 + KNO_3$

B. $NaCl + HCl$

C. $NH_4OH + NH_4Cl$

D. $BaCl_2 + Ba(NO_3)_2$

Answer: C

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Level-I

1. At $25^{\circ}C$, the $[H^{+}]$ of a solution is $2 \times 10^{-9}M$, the nature of the solution is

A. Neutral

B. Acidic

C. Basic

D. Can not be predicted

Answer: C

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2. At any temperature , the proton concentration of water is

A. $10^{-14}M$

B. Kw

C. $> 10^{-7}M$

D. $\sqrt{K_w}$

Answer: D

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3. The ionic product of wate is 10^{-14}. The H^{+} ion concentration in $0.01 M NaOH$ solution is

A. $10^{-11} M$

B. $10^{-12} M$

C. $10^{-1} M$

D. $10^{-4} M$

Answer: B

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4. For a strong acid

A. α is very high

B. K_a is very high

C. P^{K_a}, is a very low

D. All are correct

Answer: D

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5. For a conjugated acid-base pair the relation b/wK_a and K_b

A. $K_a.\ K_b = 1$

B. $K_a/K_b = K_w$

C. $K_a \times K_b = K_w$

D. $K_a.\ K_b = 14$

Answer: C

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6. For a dibasic acid, $H_2A \Leftrightarrow HA^- + H^+(K_1)$

$HA^- \Leftrightarrow A^{2-} + H^+(K_2)$

$H_2A \Leftrightarrow 2H^+ + A^{-2}(K)$ then

A. $K = K_1 + K_2$

B. $K = K_1 - K_2$

C. $K = K_1 / K_2$

D. $K = K_1 . K_2$

Answer: D

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7. For $H_3PO_4, H_3PO_4 \Leftrightarrow H_2PO_4^- + H^+(K_1)$

$H_2PO_4^- \Leftrightarrow HPO_4^{2-} + H^+(K_2)$

$HPO_4^{2-} \Leftrightarrow PO_4^{3-} + H^+(K_3)$ then

A. $K_1 > K_2 > K_3$

B. $K_1 < K_2 < K_3$

C. $K_1 = K_2 = K_3$

D. $K_1 . K_2 . K_3 = K_w$

Answer: A

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8. $0.4g$ of $NaOH$ is present in one litre of the solution shows that H^+ concentration of the solution is

A. 10^{-2}

B. 10^{-4}

C. 10^{-10}

D. 10^{-12}

Answer: D

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9. The strength of acid is highest in

A. $pK_a = 6$

B. $pK_a = 5$

C. $pK_a = 10$

D. $K_a = 10^{-11}$

Answer: B

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10. If $K_a = 10^{-5}$ for a weak acid, then pK_b for its conjugate base would be

A. 7

B. 5

C. 9

D. 6

Answer: C

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11. The pH of a $0.005 M H_2SO_4$ solution is

A. 2.5

B. 4.5

C. 2.0

D. 1.0

Answer: C

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12. The pH of a $0.001M$ aqueous solution of sodium hydroxide will be

A. 5.0

B. 7.5

C. 9.0

D. 11.0

Answer: D

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13. The pH of $0.001MHCN$ is

A. 3

B. 11

C. Between 3 & 7

D. 7

Answer: C

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14. The pH of solution is 4.0 what should be the change in the hydrogen ion concentration of the solution if its pH is to be increased to 5.0

A. Halved

B. Doubled

C. Decreases to $\frac{1}{2}$ of its original concetration

D. Decreased by 10 times.

Answer: D

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15. The P^{H} of HCl is 5, its is diluted by 1000 times Its P^{H} will be

A. 5

B. 8

C. 2

D. 7

Answer: D

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16. The pH of gestric juice is normally

A. Greter than 1.5 and less than 2

B. Less than 1.5

C. Greater than 2 and less than 3

D. Less than 1 and greater than 0

Answer: A

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17. A solution of $pH = 9$ is one thousand times as basic as a solution of pH.

A. 4

B. 7

C. 10

D. 6

Answer: D

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18. pH of one litre solution containing 40gm of $NaOH$

A. 2

B. 10

C. 8

D. 14

Answer: D

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19. The p^H of a 1 lit solution is 2. It is diluted with water till it becomes 4.

How many liters of water is added?

A. 99

B. 9

C. 999

D. 9.9

Answer: A

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20. If pH of solution of $NaOH$ is 12.0 the pH of H_2SO_4 solution of same molarity will be

A. 2.0

B. 12.0

C. 1.7

D. $10.0387.$

Answer: C

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21. pH of $10MHCl$ (aq) on Sorenson's scale is :

A. -1

B. 0

C. 10

D. 5

Answer: B

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22. $100 mL$ of $0.2 N NaOH$ is mixed with 100 mL $0.1 N HCl$ and the solution is made 1L. The pH of the solution is :

A. 4

B. 8

C. 10

D. 12

Answer: D

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23. How many H^{+} ions are present in $10 mL$ of a solution having $pH = 10$?

A. 10^{10}

B. 10^{-10}

C. 6.02×10^{23}

D. 6.02×10^{11}

Answer: D

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24. pH of sample of KOH and another of $NaOH$ are 10 and 12 respectively. Their normalities are related as $N_{NaOH} = xN_{KOH}$. What is the value of x?

A. $5/6$

B. $6/5$

C. 10^{2}

D. 10^{-2}

Answer: C

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25. $10ml$ of $0.1 NHCl$ is added to $990ml$ solution of $NaCl$ the P^H of resulting solution

A. Zero

B. 2

C. 3

D. 10

Answer: C

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26. At $90^\circ C$, pure water has $[H_3O^+]$ as 10^{-6} mol L^{-1}. What is the value of K_w at $90^\circ C$?

A. 10^{-14}

B. 10^{-8}

C. 10^{-6}

D. 10^{-12}

Answer: D

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27. MX is the salt of a weak base and strong acid then which of the following is correct at $25^{0}C$?

A. $K_h. K_a = 10^{-14}$

B. $K_h. K_b = 10^{-14}$

C. $K_a. K_b = 10^{-14}$

D. All the above

Answer: B

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28. pH of aqueous K_2S solution is

A. > 7

B. 7

C. < 7

D. 14

Answer: A

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29. The aquoeous solution of sodium cyanide is basic in nature. This is due to the hudrolysis of

A. Sodium ion

B. Cyanide ion

C. Cyanide ion and sodium ion

D. Iso cyanide ion

Answer: B

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30. Which of the following has a higher value for K_h at $27^0 c$

A. NaF

B. $NaCl$

C. $NaBr$

D. NaI

Answer: A

Watch Video Solution

31. Aqueous solution of the detertgents are

A. Neutral

B. Acidic

C. Basic

D. Amphoteric

Answer: C

Watch Video Solution

32. Aqueous solution of salt of strong base and weak acid

A. Undergoes anionic hydrolysis

B. Is basic in nature

C. Has P^H greater than 7

D. All the above

Answer: D

Watch Video Solution

33. A salt of weak acid and weak base undergoes

A. Only cationic hydrolysis

B. Only anionic hydrolysis

C. Both cationic and anionic hydrolysis

D. Neither cationic nor anionic hydrolysis

Answer: C

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34. $1MNaCl$ and $1MHCl$ are present in an aqueous solution. The solution is

A. Not a buffer solution with $pH < 7$

B. Not a buffer solution with $pH > 7$

C. A buffer solution with $pH < 7$

D. A buffer solution with $pH > 7$

Answer: A

Watch Video Solution

35. The hydrolysis constant of CH_3COONa given by

A. $K_h = \frac{K_w}{K_a}$

B. $K_h = \frac{K_w}{K_b}$

C. $K_h = \frac{K_w}{K_a . K_b}$

D. $K_h = K_a + K_b$

Answer: A

Watch Video Solution

36. One litre of a buffer solution contains $0.1 M NH_4OH$. The p^{kb} of base is 5. pH value of the solution is

A. 9

B. 10

C. 4

D. 6

Answer: B

Watch Video Solution

37. The pH of buffer solution prepared by mixing $50 mL$ of $0.2 M CH_3COCOOH$ and $25 mL$ of CH_3COONa? P^{Ka} of $CH_3COOH = 4.8$

A. $0.2 M$

B. $0.4M$

C. $0.5M$

D. $0.8M$

Answer: B

Watch Video Solution

38. Which of the following mixture in aqueous solution of equimolar concentration acts as a buffer solution.

A. $HNO_3 + NaOH$

B. $H_2SO_4 + KOH$

C. $NH_4OH(\text{excess}) + HCl$

D. $CH_3COOH + NaOH(\text{large excess})$

Answer: C

Watch Video Solution

39. For an acid buffer solution the P^H is 3. The p^H can be increased by

A. Increasing the concentration of salt

B. Increasing the concentration of acid

C. Decreasing the concentrationpf salt

D. Independent of concentration of acid & salt

Answer: A

Watch Video Solution

40. For the buffer solution containing NH_4OH and NH_4Cl, P^H of the buffer solution can be increased by

A. Adding some more H_2O

B. Adding some more NH_4OH

C. Removing NH_4Cl

D. Both 2 and 3

Answer: D

Watch Video Solution

41. The solubility product of a sparingly soluble salt AX_2 is 3.2×10^{-11}.

Its solubility (in mo/L) is

A. 5.6×10^{-6}

B. 3.1×10^{-4}

C. 2×10^{-4}

D. 4×10^{-4}

Answer: C

Watch Video Solution

42. The solubility of calcium fluoride in saturated solution, it its solubility product is 3.2×10^{-11} is :

A. $2.0 \times 10^{-4} M$

B. $12.0 \times 10^{-3} M$

C. $0.2 \times 10^{-4} M$

D. $2.0 \times 10^{-3} M$

Answer: A

Watch Video Solution

43. K_{sp} of salt A_3B_2, for solubility $x mol L^{-1}$, is

A. $36x$

B. $72x^6$

C. $108x^5$

D. $108x^6$

Answer: C

Watch Video Solution

44. In the third group of qualitive analysis, the precipitating reagent is NH_4CI / NH_4OH. The function of NH_4CI is to

A. Increase the ionization of NH_4OH

B. Supress the ionization of NH_4OH

C. Stabilise the hydroxides of group cations

D. Convert the ions of group third into their respective chlorides.

Answer: C

Watch Video Solution

45. Dissociation of CH_3COOH is supressed by adding

A. HNO_3

B. $HClO_4$

C. CH_3COONa

D. Any of the above

Answer: D

Watch Video Solution

46. For the electrolyte of type, A_2B, K_{sp} is given then its solubility is calculated by

A. $K_{sp}/4$

B. $3\sqrt{\frac{K_{sp}}{4}}$

C. $3\sqrt{K_{sp}}$

D. $\sqrt{\frac{K_{sp}}{4}}$

Answer: B

Watch Video Solution

47. The solubility of the salt M_mA_n in water is $'s'$ moles per litre. The solubility product of the salt is (at constant temperature)

A. $M^m A^n$

B. $(m+n)S^{m+n}$

C. $m^m n^n s^{m+n}$

D. $M^m A^n s$

Answer: C

Watch Video Solution

48. The addition of KCl to $AgCl$ decreases the solubility of $AgCl$, because

A. K_{sp} of $AgCl$ decreases

B. K_{sp} of $AgCl$ increases

C. Solution becomes unsaturated

D. Ionic product exceeds the K_{sp} value

Answer: D

Watch Video Solution

49. Out of Ca^{2+}, Al^{3+}, Fe^{3+}, Mg^{2+} and Zn^{2+} the reagents NH_4Cl and aqueous NH_3 and precipitate

A. Ca^{2+}, Al^{3+}

B. Al^{3+}, Fe^{3+}

C. Fe^{3+}, Mg^{2+}

D. Mg^{2+}, Zn^{2+}

Answer: B

View Text Solution

Level-II

1. At $70^{\circ}C$ the concentration of H^{+0} ion in aqueous solution of $NaCl$ is $10^{-6}\text{mole}/\text{lit}.$ The OH^{-} ion concentration is

A. $10^{-8}\text{moles}/\text{lit}.$

B. $10^{-6}\text{moles}/\text{lit}.$

C. $10^{-7}\text{moles}/\text{lit}.$

D. $10^{-9}\text{moles}/\text{lit}.$

Answer: B

Watch Video Solution

2. A weak mono acidic base is 5% ionized in $0.01M$ solution. The Hydroxide ion concentration in the solution is

A. 5×10^{-2}

B. 5×10^{-4}

C. 5×10^{-10}

D. 2×10^{-11}

Answer: B

Watch Video Solution

3. A monobasic acid solution has pH value of 5. Its molarity is $0.005M$. The degree of ionisation of the acid is

A. 5×10^{-3}

B. 2×10^{-3}

C. 5×10^{-2}

D. 2×10^{-2}

Answer: B

Watch Video Solution

4. One litre of water contains 10^{-7} mole H^{+} ions. Degree of ionisation of water is:

A. 1.8×10^{-7}

B. 1.8×10^{-9}

C. 3.6×10^{-7}

D. 3.6×10^{-9}

Answer: A

Watch Video Solution

5. Determine the degree of ionisation of $0.05 M NH_3$ at $25^0 C$ in a solution $pH = 11 \left(K_b = 1.76 \times 10^{-5}\right)$

A. 0.0173

B. 0.173

C. 1.73

D. 17.3

Answer: A

Watch Video Solution

6. The dissociation constant of two acids HA_1 and HA_2 are 4.5×10^{-4} and 1.8×10^{-5} respectively. If both are having equal concentrations the relative strength of acids is

A. $5:2$

B. $2:5$

C. $5:1$

D. $1:5$

Answer: C

Watch Video Solution

7. The no. of H_3O^+ ions present in $10mL$ of water at 25^0C is

A. 6.023×10^{-14}

B. 6.023×10^{14}

C. 6.023×10^{-19}

D. 6.023×10^{19}

Answer: B

Watch Video Solution

8. What is the pH of the following solutions:

a. $10^{-7}MNaOH$ b. $10^{-8}MNaOH$

c. 10^2MNaOH

A. 7.04

B. 8

C. 6

D. 6.96

Answer: A

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9. The pH of z solution at $25^{0}C$ is 2. If its pH is to be changed to 4, conc. of H^{+} of the original has to be

A. Doubled

B. Halved

C. Increased by 100 times

D. Decreased by 100 times

Answer: D

Watch Video Solution

10. $75mL$ of $0.2MHCl$ is mixed with $25mL$ of $1MHCl$. To this solution $300mL$ of distilled water is added. What is the pH of the resultant solution ?

A. 1

B. 2

C. 4

D. 0.2

Answer: A

Watch Video Solution

11. Equal volumes of two solutions with $P^H = 3$ and $P^H = 11$ are mixed. Then P^H of resulting solution is

A. 8

B. 7

C. 6

D. 0

Answer: B

Watch Video Solution

12. The P^H of a solution is 6. Its H^+ concentrations is decreased by 1000 times. Its P^H will be

A. 9

B. 6.96

C. 7.04

D. 8

Answer: A

Watch Video Solution

13. At certain temperature the K_{D_2O} is $10^{-16}M$. Then the pD of pure D_2O at that temperature is

A. 7

B. 16

C. 8

D. 6

Answer: C

Watch Video Solution

14. The ionisatioln constant of a mono basic acid is 5×10^{-2}. The pH of $0.01M$ acid solution is

A. 1.30

B. 3.30

C. 5.0

D. 1.65

Answer: D

Watch Video Solution

15. The pH of a solution obtaine by mixing $50mL$ of $0.4NHCl$ and $50mL$ of $0.2NNaOH$ is

A. $\log 2$

B. $-\log 0.2$

C. 1.0

D. 2.0

Answer: C

Watch Video Solution

16. pH of a centimolar solution of a mono basic acid is 6. The dissociation constant is approximately equal to

A. 10^{-12}

B. 10^{-8}

C. 10^{-10}

D. 10^{-6}

Answer: C

Watch Video Solution

17. Degree of dissocation of CH_3COOH and NH_4OH are the same. If $0.1M$ solution of CH_3COOH has $pH=4.0$, them pH of $0.01MNH_4OH$ will be

A. 4

B. 7

C. 10

D. 14

Answer: C

Watch Video Solution

18. Equal volumes of two solutions containing $3.65g$ of HCl and $4.0g$ of $NaOH$ respectively are mixed. The pH of the mixture is

A. 7

B. < 7

C. > 7

D. 0

Answer: A

Watch Video Solution

19. When $1ml$ of $0.1NHCI$ is added to 1 litre of a solution of pH value 4, the pH will be nearly

A. 5

B. 4.477

C. 3

D. 3.699

Answer: D

Watch Video Solution

20. A 0.001 M ammonia solution is 5% ionized the concentration of OH^{-} ion is

A. $0.005M$

B. $0.0001M$

C. $0.0005M$

D. $0.05M$

Answer: C

Watch Video Solution

21. The number of H^{+} ions in 1 of a solution of $pH = 13$

A. 6.023×10^{7}

B. 1×10^{-13}

C. 6.023×10^{13}

D. 1×10^{16}

Answer: A

Watch Video Solution

22. 50 mL of H_2O is added to $50mL$ of $1 \times 10^{-3}M$ barium hydroxide solution. What is the pH of the resulting solution?

A. 3

B. 3.3

C. 11

D. 11.7

Answer: C

Watch Video Solution

23. pH of solution produced when aqueous solution of pH of 6 is mixed with an equal

A. 4.3

B. 3.3

C. 4.0

D. 4.5

Answer: B

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24. The hydrogen ion concentration in pure water is $10^{-7}g$. Ions/lit. An aqueous solution will be acidic , if its hydrogen ions concentration in g. ions/lit, is

A. 10^{-6}

B. 10^{-7}

C. 10^{-8}

D. 10^{-9}

Answer: A

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25. A solution has $10^{-2}M$ hydrogen ions in it. The solution is diluted by 100 times. The `pH of the solution is

A. 2

B. 4

C. 7

D. 3

Answer: B

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26. The Hydrolysis constant of MX is (Given, K_b of MOH is 2×10^{-6} and K_a of HX is 5×10^{-7})

A. 10^2

B. 10^{-2}

C. 10^{-3}

D. 10^3

Answer: B

Watch Video Solution

27. The hydrolysis constant K_h of a salt of $NaOH$ and a weak acid (HX) if the Ka of the acid is $2 \times 10^{-6}$is

A. 5×10^{-8}

B. 5×10^{-6}

C. 5×10^{-9}

D. 2.5×10^{-7}

Answer: C

Watch Video Solution

28. K_a for HCN is $5 \times 10 \wedge (-10)$ at $25^\circ C$. For maintaining a constant pH of 9.0, the volume of $5MKCN$ solution required to be added to $10mL$ of $2MHCN$ solution is

A. $5ml$

B. $2ml$

C. $6.95ml$

D. $10.2ml$

Answer: B

Watch Video Solution

29. $100mL$ of $0.3N$-Acetic acid solution is mixed with same volume of $0.2N$ sodium hydroxide solution. Ionisation constant of acetic acid is 2×10^{-5} the pH of the mixture is

A. 10

B. 7

C. 5

D. 9

Answer: C

Watch Video Solution

30. When the following is added to $20ml$ of $0.1MCH_3COOH + 20ml0.1M$ of CH_3COONa. The pH of the solution does not change

A. $10mL$ of $0.1MCH_3COOH$

B. $10mL$ of $0.1MCH_3COONa$

C. $10mL$ of water

D. $20mL$ of $0.2MCH_3COOH$

Answer: C

Watch Video Solution

31. An acidic buffer contains equal concentrations of acid and salt. The dissociation constant of acid is 10^{-5}. The P^{H} of the buffer solution is

A. 5

B. 9

C. 4.49

D. 5.5

Answer: A

Watch Video Solution

32. $50mL$ of $0.1M$ solution of sodium acetate and $50mL$ of $0.01M$ acetic acid mixed. The pK_a of acetic acid is 4.76. The P^{H} of the buffer solution is

A. 3.76

B. 4.76

C. 5.76

D. 9.24

Answer: C

Watch Video Solution

33. The K_b of weak base is 10^{-4}. The $[\text{salt}]$ to $[\text{base}]$ ratio to be maintained to keep the P^H of buffer solution as 9 is .

A. $1:4$

B. $4:2$

C. $1:10$

D. $10:1$

Answer: D

Watch Video Solution

34. The ionisation constant of acetic acid is 2×10^{-5} The pH of buffer containing acetic acid and sodium acetate is 4.7. The ratio of [acid] to [salt]

A. $1:1$

B. $10:1$

C. $1:10$

D. $2:1$

Answer: A

Watch Video Solution

35. When 0.1 mole of an acid is added to $2L$ of a buffer solution, the P^{H} of the buffer decreases by 0.5. The buffer capacity of the solution is

A. 0.6

B. 0.4

C. 0.2

D. 0.1

Answer: D

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36. 5 moles of acid is required to change the pH of 1 litre of buffer by 2 units. Find buffer capacity.

A. 5

B. 3.5

C. 2.5

D. 15

Answer: C

Watch Video Solution

37. A certain buffer solution contains equal concentrations of B^{+} & BOH. If the K_b of BOH is 10^{-10}. The pH of buffer is

A. 14

B. 4

C. 10

D. 7

Answer: B

Watch Video Solution

38. P^{H} of CH_3COOH and CH_3COONa buffer is 4.8 in Which of the following conc. Conditions, the buffer capacity will be maximum

$[CH_3COOH]$ & $[CH_3COONa]$

A. $0.1M, 02M$

B. $0.2M, 0.1M$

C. $0.34M, 0.34M$

D. $0.34M, 03M$

Answer: C

Watch Video Solution

39. NH_4OH is weak base but it becomes still weaker in the aqueous solutions of

A. $0.1MHCl$

B. $0.1MNH_4Cl$

C. $0.1MH_2SO_4$

D. $0.1MH_2SO_4$

Answer: B

Watch Video Solution

40. Soluility product of $Ba(OH)_2$ and $Al(OH)_3$ are 1.8×10^{10} and 2.4×10^{-20} respectively. If both Al^{3+} and Ba^{+2} ions are present in a solution, which one will be ppt on addition of Ammonium hydroxide solution

A. $Ba(OH)_2$

B. $Al(OH)_3$

C. Both are precipitated at same time

D. Both are not precipitated

Answer: B

Watch Video Solution

41. The solubility of CaF_2 is $2 \times 10^{-4} \text{mole}/\text{litre}$. Its solubility product is

A. $2 \times 8 \times 10^{-12}$

B. 4.0×10^{-8}

C. $4 \times 8.0 \times 10^{-12}$

D. 3.2×10^{-4}

Answer: C

Watch Video Solution

42. The solubility of $AgCl$ in $0.1 M NaCl$ is (K_{sp} of $AgCl = 1.2 \times 10^{-10}$)

A. $0.05M$

B. 1.2×10^{-6}

C. 2×10^{-5}

D. 1.2×10^{-9}

Answer: D

Watch Video Solution

43. If the solubility of $AgCl$ in $0.1M$ NaCl is (K_{sp} of $AgCl = 1.2 \times 10^{-10}$)

A. 11

B. 9

C. 13

D. 5

Answer: B

Watch Video Solution

44. What is minimum concentration of SO_4^{2-} required to precipitate $BaSO_4$ in solution containing 1×10^{-4} mole of Ba^{2+} ? (K_{sp} of $BaSO_4 = 4 \times 10^{-10}$)

A. $2 \times 10^{-3} M$

B. $2 \times 10^{-5} M$

C. $4 \times 10^{-10} M$

D. 4×10^{-6}

Answer: D

Watch Video Solution

45. The P^{H} of saturated aqueous solution of $Ba(OH)_2$ is 10. If the K_{sp} of $Ba(OH)_2$ is 5×10^{13}, then the concentration of Ba^{2+} ions in the solution is

A. 1×10^{-5}

B. 1×10^{-3}

C. 5×10^{-5}

D. 1×10^{-2}

Answer: C

Watch Video Solution

46. Find the change in pH when 0.01 mole CH_3COONa is added to one litre of $0.01 M CH_3COOH$ soluton $(pK_a = 4.74)$

A. 3.27

B. 4.74

C. 1.37

D. 2.74

Answer: C

Watch Video Solution

47. $2g$ of $NaOH$ per $250 mL$ of solution is added to a buffer solution of buffer capacity 0.2. Then the change in pH is

A. 0.5

B. 1

C. 1.5

D. 2.0

Answer: B

Watch Video Solution

48. The precipitate of $CaF_2\left(K_{sp} = 1.7 \times 10^{-10}\right)$ is obtained when equal volumes of the following are mixed

A. $10^{-4} MCa^{2+} + 10^{-4} MF^{-}$

B. $10^{-2} MCa^{2+} + 10^{-3} MF^{-}$

C. $10^{-5} MCa^{2+} + 10^{-3} MF^{-}$

D. $10^{-3} MCa^{2+} + 10^{-5} MF^{-}$

Answer: B

Watch Video Solution

Level-III

1. The specific gravity of H_2SO_4 is $1.8g/cc$ and this solution is found to contain $98\,\%\ H_2SO_4$ by weight. $10cc$ of this solution is mixed with $350cc$ of pure water. $25mL$of this dil. H_2SO_4 solution neutralises $500mL$ of $NaOH$ solution. Then the P^H of $NaOH$ solution is

A. 12.398

B. 1.602

C. 12.699

D. 12.301

Answer: C

Watch Video Solution

2. The first and second dissociation constants of an acid H_2A are 1×10^{-5} and 5×10^{-10} respectively. The overall dissociation constant of the acid will be

A. 9.6×10^{-6}

B. 1.4×10^{-1}

C. 1.2×10^{-6}

D. 1.3×10^{-8}

Answer: B

Watch Video Solution

3. K_1 & K_2 for oxalic acid are 6.5×10^{-2} and 6.1×10^{-5} respectively . What will be the $\left[OH^{-}\right]$ in a $0.01M$ solution of sodium oxalate

A. 9.6×10^{-6}

B. 1.4×10^{-1}

C. 1.2×10^{-6}

D. 1.3×10^{-8}

Answer: C

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4. The P^H of a sample of H_2SO_4 is 1.3979. The percentage of the solution is $73.5\,\%\,(w/w)$, the density of the solution is

A. $2.66 \times 10^{-3} g/cc$

B. $5.32 \times 10^{-3} g/cc$

C. $1.33 \times 10^{-3} g/cc$

D. $0.01 g/cc$

Answer: A

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5. The P^H of a sample of KOH solution is 12.3979. The weight of solid KOH of $70\,\%$ pure required to prepare 2.5 lit of this solution is

A. $3.5g$

B. $5g$

C. $8g$

D. $6g$

Answer: B

Watch Video Solution

6. $100ml$ of a solution of HCl with pH value 3 is diluted with $400ml$ of water. The new P^H of the solution is

A. 3.7

B. 5.3

C. 4.2

D. 5.6

Answer: A

Watch Video Solution

7. Equal volume of solutions pH values $8, 10, 12$ are mixed with each other, the pH of resultant solution is nearly

A. 11.52

B. 2.48

C. 11.7

D. 12.3

Answer: A

Watch Video Solution

8. Urine normally has a pH of 6. If a patient eliminates 1.3 litres of urine per day how many m oles ogf H^{+} ions does he uriante?

A. 1.3×10^{-3}

B. 1.3×10^{-6}

C. 1.3×10^{-7}

D. 1.3×10^{-6}

Answer: B

Watch Video Solution

9. The mass of acetic acid present in $500 ml$ of solution in which it is 1% ionides (Ka of $CH_3COOH = 1.8 \times 10^{-4}$)

A. 5.4

B. 12.6

C. 6.4

D. 10.8

Answer: A

Watch Video Solution

10. Boric acid $Br(OH)_3$ is monobasic Lewis acid if gives H^+ ions in aquoeus soluions as follows $B(OH)_3 + H_2O \Leftrightarrow [B(OH)_4]^- + H^+$ $K_a = 5.9 \times 10^{-10}$ The P^H of $0.025M$ aqueous solution is $[\log 5.9 = 0.771]$

A. 5.42

B. 4.52

C. 2.45

D. 4.675

Answer: A

Watch Video Solution

11. Calculate the amount of $(NH_4)_2SO_4$ in grams which must be added to $500ml$ of $0.2MNH_3$ to yield a solution of $pH = 9$, K_b for $NH_3 = 2 \times 10^{-5}$

A. 5.35

B. 6.6

C. 1.67

D. 10.2

Answer: B

Watch Video Solution

12. $2g$ of $NaOH$ per $250mL$ of solution is added to a buffer solution of buffer capacity 0.2. Then the change in pH is

A. 0.5

B. 1

C. 1.5

D. 2.0

Answer: B

Watch Video Solution

13. A one litre contains 0.08 moleof acetic acid $\left(K_a = 1.75 \times 10^{-5}\right)$. To this solution of resulting solution is $[\log 1.75 = 0.243]$

A. 5.234

B. 5.058

C. 4.28

D. 4.456

Answer: C

Watch Video Solution

14. The volume of water that must be added to $100ml$ of $NaOH$ solution to change its pH value from 12.6990 to 12 is

A. $500mL$

B. $400 mL$

C. $100 mL$

D. $200 mL$

Answer: B

Watch Video Solution

15. A certain volume of $0.001 N NaOH$ solution is diluted with $900 mL$ of water. The decrease in pH of the soluton is one unit. The original volume of the solution is

A. $1 mL$

B. $10 mL$

C. $100 mL$

D. $1000 mL$

Answer: C

Watch Video Solution

16. A basic buffer contains 0.8 mole of NH_4Cl and 0.2 mole of NH_4OH for litre of a solution the K_b of base is 1.8×10^{-5}. Then the P^H of the buffer solution is $(\log 1.8 = 0.2553)$

A. 8.6532

B. 6.345

C. 2.301

D. 7.635

Answer: A

Watch Video Solution

17. From the following table

Which of the two sets of buffer solutions have least P^H?

A. I & II

B. I & III

C. II & III

D. II & IV

Answer: B

Watch Video Solution

18. The P^H of a buffer solution is 5. It consists of a weak acied HA and its conjugate base A^-. P^{K_a} of HA is 4.699. Which of the following is correct combination of solutions present in the buffer solution?

A. $100mL$ of $1.1MHA$ and $200mL$ of $0.1MA^-$

B. $200mL$ of $0.1MHA$ and $100mL$ of $0.1MA^-$

C. $100mL$ of $0.1MHA$ and $200mL$ of $0.2MA^-$

D. $100mL$ of $0.2MHA$ and $200mL$ of $0.1MA^-$

Answer: A

Watch Video Solution

19. When CO_2 is bubbled in excess of water, the following equilibrium is established.

$CO_2 + 2H_2O \Leftrightarrow H_3O^+ + HCO_3^-$

$K_c = 3.8 \times 10^{-7}, p^H = 6$

What would be the $\left[HCO_3^-\right] / [CO_2]$

A. 6

B. 0.0038

C. 0.038

D. 0.38

Answer: D

Watch Video Solution

20. A solution which is $10^{-3}M$ each in Mn^{2+}, Fe^{2+}, Zn^{3+} and Hg^{3} is is treated with $10^{-6}M$ sulphide ion. If K_{sp} of MnS, ZnS and HgS are 10^{-15}, 10^{-23}, 10^{-20} and 10^{-54} respectively. Which of the following will be precipitated first?

A. ZnS

B. FeS

C. MnS

D. HgS

Answer: D

Watch Video Solution

21. The correct order of increasing solubility of $AgCl$ in (a) water (b) $0.1MNaCl$ (c) $0.1BaCl_2$ (d) $0.1MNH_3$ is

A. $d > a > b > c$

B. $d > c > b > a$

C. $b > a > d > c$

D. $a > d > b > c$

Answer: A

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22. The pH of a buffer solution is 4.745. When 0.044 mole of $Ba(OH)_2$ is added to 1 lit. of the buffer, the pH changes to 4.756. Then the buffer capcity is 4

A. 4

B. 0.25

C. 0.5

D. 8

Answer: D

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23. The pH of $0.1M\ K_2SO_4$ is 7. The solutin is diluted by 10 times. Then the pH of resulting solution is

A. 7

B. 6

C. 8

D. 14

Answer: A

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24. Let the solubilities of $AgCI$ in H_2O, and in $0.01 MCaCI_2, 0.01 MNaCI$, and $0.05 MAgNO_3$ be S_1, S_2, S_3, S_4, respectively. What is the correct relationship between these quantites.

A. $S_1 > S_2 > S_3 > S_4$

B. $S_1 > S_2 = S_3 > S_4$

C. $S_1 > S_3 > S_2 > S_4$

D. $S_4 > S_2 > S_3 > S_1$

Answer: C

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25. At $298K$ the Ksp of M_2SO_4 is 3.210^{-5}. The max. concentration of SO_4^{-2} ions that colud be attain in saturated solution of this solid at $298K$ is ?

A. $2 \times 10^{-3}M$

B. $7 \times 10^{-4}M$

C. $3 \times 10^{-5}M$

D. $2 \times 10^{-2}M$

Answer: D

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26. When equal volumes of following solution are mixed, precipitation of $AgCl$?

$(K_{sp} = 1.8 \times 10^{-10})$ will occur only with

A. $10^{-4} M Ag^{+}$ and $10^{-4} M Cl^{-}$

B. $10^{-6} M Ag^{+}$ and $10^{-6} M Cl^{-}$

C. $10^{-7} M Ag^{+}$ and $10^{-7} M Cl^{-}$

D. $10^{-5} M Ag^{+}$ and $10^{-5} M Cl^{-}$

Answer: A

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27. A solution contain $0.1 M Zn^{2+}$ and $0.01 M Cu^{+2}$ ins. This solution is saturated by passing H_2S concentration is $8.1'10^{-21} M$. Ksp for ZnS and CuS are $3'10^{-22}$ and$8'10^{-36}$ respectively. Which of the following will occur in solution.

A. CuS gets precipitated.

B. Both CuS and ZnS get precipitated

C. neither CuS nor ZnS precipitated

D. ZnS get precipitated

Answer: A

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28. The dissoctiation of water of $25^{\circ} C$ is $1.9 \times 10^{-7} \%$ and the density of water is $1 g / cm^3$ the ionisation constant of water is

A. 3.42×10^{-6}

B. 3.42×10^{-8}

C. 1.00×10^{-14}

D. 2.00×10^{-16}

Answer: D

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29. If pK_b for floride at 25^0C is 11, the ionisation constant of hydrofluoric acid in water at this temperature is

A. 10^{-3}

B. 10^{-4}

C. 10^{-2}

D. 10^{-5}

Answer: A

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30. The solubility of $C_6H_5NH_{3^+}Cl^-$ would be highest among the following solvents in:

A. Acidic buffer of pH = 3

B. Basic buffer of pH = 10

C. Neutral buffer of pH = 7

D. Pure water

Answer: B

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31. The ionization constant of aniline and acetic acid and water at 25^0C are respectively 3.83×10^{-10}, 1.75×10^{-5} and 1×10^{-14}. Calculate the percentage hydrolysis of aniline acetate in a decinormal solution

A. 54.95

B. 9.54

C. 4.6

D. 42.3454

Answer: A

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32. A weak acid HX has the dissociation constant $1 \times 10^{-5} M$. It forms a salt NaX on reaction with alkali. The percentage hydrolysis of $0.1M$ solution of NaX is

A. $0.0001\ \%$

B. $0.01\ \%$

C. $0.1\ \%$

D. $0.15\ \%$

Answer: B

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33. In the equilibrium $A^{-} + H_2O \Leftrightarrow HA + OH^{-} \left(K_a = 1.0 \times 10^{-5}\right)$. The degree of hydrolysis of $0.001M$ solution of the salt is

A. 10^{-3}

B. 10^{-4}

C. 10^{-5}

D. 10^{-6}

Answer: A

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34. The pK_a of HCN is 9.30. The pH of a solutin prepared by mixing 2.5 moles of KCN and 2.5 moles of HCN in water and making up the total volume to $500mL$ is

A. 9.30

B. 7.30

C. 10.30

D. 8.30

Answer: A

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35. The K_b for $AgCl$ is 2.8×10^{-10} at a given temperature. The solubility of $AgCl$ in 0.01 molar HCl solution at this temperature will be :

A. $2.5 \times 10^{-8} molL^{-1}$

B. $2.8 \times 10^{-12} molL^{-1}$

C. $5.6 \times 10^{-8} molL^{-1}$

D. $2.8 \times 10^{-4} molL^{-1}$

Answer: A

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36. The molar solubility of AgCl in $1.8 M AgNO_3$ solution is (K_{sp} of $AgCl = 1.8 \times 10^{-10}$)

A. 10^{-5}

B. 10^{-10}

C. 1.8×10^{-5}

D. 1.8×10^{-10}

Answer: B

Watch Video Solution

37. 0.1 mole of $CH_3CH\left(K_b = 5 \times 10^{-4}\right)$ is mixed with 0.08 mole of HCl and diluted to one litre. What will be the H^+ concentration in the solution

A. $8 \times 10^{-2} M$

B. $8 \times 10^{-11} M$

C. $1.6 \times 10^{-11} M$

D. $8 \times 10^{-5} M$

Answer: B

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38. K_{sp} of a salt $ZnCl_2$ is 3.2×10^{-8} its P^H is

A. 2.3980

B. 11.6020

C. 2.6990

D. Do not calculated exactly

Answer: A

Watch Video Solution

39. In a saturated solution of the spatingly soluble strong electrolyte $AgIO_3$ (molecular mass $= 283$) the equilibrium which sets in is

$AgIO_3(s) \Leftrightarrow Ag^+(aq) + IO_3^-(aq)$

If the solubility product constant K_{SP} of $AgIO_3$ at a given temperature is 1.0×10^{-8}, what is the mass of $AgIO_3$ cotained in $100mL$ of its saturated solution?

A. $28.3 \times 10^{-2} g$

B. $2.83 \times 10^{-3} g$

C. $1.0 \times 10^{-7} g$

D. $1.0 \times 10^{-4} g$

Answer: B

Watch Video Solution

40. pH of saturated solution of $Ba(OH)_2$ is 12. The value of solubility product (K_{sp}) of $Ba(OH)_2$ is

A. $5.0 \times 10^{-7} m^3$

B. $0.6 \times 10^{-12} M^3$

C. $4.0 \times 10^{-8} M^3$

D. $5.0 \times 10^{-9} M^3$

Answer: A

Watch Video Solution

41. The wight of HCl present in one litre of solution if `pH of the solution is one

A. $3.65g$

B. $36.5g$

C. $0.365g$

D. $0.0365g$

Answer: A

Watch Video Solution

42. A sample of AgCI was treated with $5.00mL$ of $1.5M$ Na_2CO_3 solubility to give Ag_2CO_3 . The remaining solution contained $0.0026gofCI^-$ per litre. Calculate the solubility product of AgCI. $\left(K_{SP}f \text{ or } Ag_2CO_3 = 8.2 \times 10^{-12}\right)$

A. 1.1×10^{-2}

B. 1.71×10^{-11}

C. 1.71×10^{-10}

D. 1.32×10^{-9}

Answer: C

Watch Video Solution

43. The sulphide ion concentration $\left[S^{2-}\right]$ in saturated H_2S solution is 1×10^{-22}. Which of the following sulphides should be quantitavely 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}

A. I,II

B. III,IV

C. II,III,IV

D. Only I

Answer: B

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44. What is the pH of $0.01M$ glycine solution? For glycine, $K_{a_1} = 4.5 \times 10^{-3}$ and $K_{a_2} = 1.7 \times 10^{-10}$ at $298K$

A. 3.0

B. 10.0

C. 6.1

D. 7.1

Answer: D

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45. The solubility of $Mg(OH)_2$ in pure water is $9.57 \times 10^{-3} gL^{-1}$. Calculate its solubility (in gL^{-1}) in $0.02M Mg(NO_3)_2$ solution.

A. 1.5×10^{-4}

B. 8.69×10^{-4}

C. 0.5×10^{-3}

D. 0.5×10^{-5}

Answer: B

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46. The ionisation constant of an acid base indicator (a weak acid) is 1.0×10^{-6}. The ionised form of the indicator is red and unionised form is blue. The pH change required to alter the colour of indicator form 80% red is

A. 1.40

B. 1.20

C. 0.80

D. 2.00

Answer: B

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47. An aqueous solution of a metal bromide $MBr_2(0.05M)$ is saturated with H_2S. What is the minimum pH at which MS will precipitate ? K_{SP} for

$MS = 6.0 \times 10^{-21}$. Concentration of saturqated $H_2S = 0.1M, K_1 = 10^{-7}$ and $K_2 = 1.3 \times 10^{-13}$ for H_2S .

A. $pH = 1.6$

B. $pH = 0.67$

C. $pH = 0.98$

D. $pH = 0.771$

Answer: C

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48. A solution is saturated with respect to $SrCO_3$ and SrF_2. The $[CO_3^{2-}]$ was found to be $1.2 \times 10^{-3} M$. The concnetration of F^{Θ} in the solution would be

Given K_{sp} of $SrCO_3 = 7.0 \times 10^{-10} M^2$,

$K_{sp} \text{of} SrF_2 = 7.9 \times 10^{-10} M^3$,

A. $1.3 \times 10^{-3} M$

B. $3.7 \times 10^{-2} M$

C. $5.8 \times 10^{-7} M$

D. $2.6 \times 10^{-2} M$

Answer: B

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49. The maximum pH of a solution which is $0.10M$ is Mg^{2+} from which $Mg(OH)_2$ is not precipitated is [K_{sp} of $Mg(OH)_2 = 1.2 \times 10^{-11} M^3$]

A. 4.96

B. 6.96

C. 7.04

D. 9.04

Answer: D

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50. Match the following

A. $\begin{array}{cccc} A & B & C & D \\ 1 & 3 & 2 & 5 \end{array}$

B. $\begin{array}{cccc} A & B & C & D \\ 4 & 1 & 2 & 3 \end{array}$

C. $\begin{array}{cccc} A & B & C & D \\ 4 & 1 & 3 & 2 \end{array}$

D. $\begin{array}{cccc} A & B & C & D \\ 2 & 3 & 1 & 5 \end{array}$

Answer: 1

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51. Match the following columns

SET -1 (Conc)	SET-2 (P^H)
I) 10^{-1} $M\ HCl$	A) 0.6990
II) 10^{-1} $M\ H_2SO_4$	B) Between 1&2
III) 10^{-1} $M\ CH_3COOH$	C) Between 6&7
IV) 10^{-8} $M\ HCl$ solution	D)1

The correct match is

A. $\begin{array}{cccc} A & B & C & D \\ III & II & I & IV \end{array}$

B. $\begin{array}{cccc} A & B & C & D \\ II & III & IV & I \end{array}$

C. $\begin{array}{cccc} A & B & C & D \\ IV & I & III & II \end{array}$

D. $\begin{array}{cccc} A & B & C & D \\ I & IV & II & III \end{array}$

Answer: 2

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52. Match the following columns

SET -1 (Solution)

I) Aqueous solution of $AlCl_3$

II) Aqueous solution of $(NH_4)_2CO_3$

III) Aqueous solutioncationic of NaCl

IV) Aqueous solution of CH_3COONa

SET-2 (Hydrolysis type)

A) only anionic hydrolysis

B) only cationic hydrolysis

C) Neither nor anionic hydrolysis

D) both cationic and anionic hydrolysis

Correct the matching is

A. $\begin{matrix} I & II & III & IV \\ D & C & B & A \end{matrix}$

B. $\begin{matrix} I & II & III & IV \\ B & D & C & A \end{matrix}$

C. $\begin{matrix} I & II & III & IV \\ A & B & C & D \end{matrix}$

D. $\begin{matrix} I & II & III & IV \\ C & A & B & C \end{matrix}$

Answer: 2

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Level-IV

1. The ionic product of water at $60^\circ C$ is $9.55 \times 10^{-14} \text{mole}^2 L^{-2}$. The dissociation constant of water at the same temperature is

A. 1.09×10^{-15}

B. 5.2×10^{-16}

C. 1.8×10^{-16}

D. 1.72×10^{-15}

Answer: D

Watch Video Solution

2. If the ionic product of water is 1.96×10^{-14} at $35^0 C$,What is the value at $10^0 C$

A. 2.95×10^{-14}

B. 1.96×10^{-7}

C. 2.95×10^{-15}

D. 3.9×10^{-12}

Answer: C

Watch Video Solution

3. Conjugate base of $\left[Al(H_2O)_6\right]^{3+}$ is

A. $\left[Al(H_2O)_5OH\right]^{3+}$

B. $\left[Al(H_2O)_6\right]^{2+}$

C. $\left[Al(H_2O)_5OH\right]^{2+}$

D. $\left[Al(H_2O)_5OH\right]^{+}$

Answer: C

Watch Video Solution

4. The ionisation cosntabnt of an acid, K_a is the meaure of strength of an acid. The K_a values of acetic acid, hypochlorous acid and formic acid are 1.74×10^{-5}, 3.0×10^{-8} and 1.8×10^{-4} respectively. Which of the following orders of ph of 0.1 mol dm^{-3} solutions of these acids is correct ?

A. acetic acid $>$ hypochlorous acid $>$ formic acid

B. hypochlorous acid $>$ acetic acid $>$ formic acid

C. formic acid $>$ hypochlorus acid $>$ acetic acid

D. formic acid $>$ acetic acid $>$ hpochlorus acid

Answer: D

Watch Video Solution

5. Ka_1, Ka_2 and Ka_3 are the respective constants for the following reactions

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

$HS^- \Leftrightarrow H^+ + S^{2-}$

$H_2S \Leftrightarrow 2H^+ + S^{2-}$

The correct relationship between Ka_1, Ka_2 and Ka_3 is

A. $K_{a3} = K_{a1} \times K_{a2}$

B. $K_{a3} = K_{a1} + K_{a2}$

C. $K_{a3} = K_{a1} - K_{a2}$

D. $K_{a3} = K_{a1} / K_{a2}$

Answer: A

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6. What will be the volume of pH of 0.01 moldm^{-3}

$CH_3COOH\left(K_a = 1.74 \times 10^{-5}\right)$

A. 3.4

B. 3.6

C. 3.9

D. 3.0

Answer: A

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7. The correct order of increasing basicity of the given conjugate bases $(R = CH_3)$ is

A. $RCO\overline{O} < HC \equiv \overline{C} < \overline{R} < \overline{N}H_2$

B. $\overline{R} < HC \equiv \overline{C} < RCO\overline{O} < \overline{N}H_2$

C. $RCO\overline{O} < \overline{N}H_2 < HC \equiv \overline{C} < \overline{R}$

D. $RCO\overline{O} < HC \equiv \overline{C} < \overline{N}H_2 < \overline{R}$

Answer: D

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8. Solubility product of silver bromide is 5.0×10^{-13}. The quantity of potassium bromide (molar mass taken as $120 g mol^{-1}$) to be added to $1L$ of $0.05M$ solution of silver nitrate to start the precipitation of $AgBr$ is

A. $1.2 \times 10^{-10} g$

B. $1.2 \times 10^{-9} g$

C. $6.2 \times 10^{-5} g$

D. $5.0 \times 10^{-8} g$

Answer: B

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9. At $25^{\circ}C$, the solubility product of $Mg(OH)_2$ is 1.0×10^{-11}. At which pH, will Mg^{2+} ions start precipitating in the form of $Mg(OH)_2$ from a solution of $0.001 M Mg^{2+}$ ions ?

A. 9

B. 10

C. 11

D. 8

Answer: B

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10. Solid $Ba(NO_3)$ is gradually dissolved in a $1.0 \times 10^{-4} M Na_2CO_3$ solution. At what concentrations of Ba^{2+}, will a precipitate begin to form?

(K_{SP} for $BaCO_3 = 5.1 \times 10^{-9}$)

A. $4.1 \times 10^{-5} M$

B. $5.1 \times 10^{-5} M$

C. $8.1 \times 10^{-8} M$

D. $8.1 \times 10^{-7} M$

Answer: B

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11. Higher the amount of acid or base used to product a deinite change of pH in a buffer solution, higher will be its buffe capacity. Buffer capcity of solution is maximum under the following conditions

[Salt] = [Acid](in acid buffer)

[Salt] = [Base] (in base capacity]

pH of buffer solution lies inthe range given below $pH = pH_a \pm 1$

In other words,any buffer solution can be used as buffer up to two pH units only, depending upon the value of pK_a or pK_b. A buffer is said to be efficient when $pH = pK_a$ or $pOH = pK_b$

Any buffer can be used as a buffer up to :

A. $10pH$ units

B. $5pH$ units

C. $2pH$ units

D. $1pH$ units

Answer: C

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12. Higher the amount of acid or base used to product a deinite change of pH in a buffer solution, higher will be its buffe capacity. Buffer capcity of solution is maximum under the following conditions

[Salt] = [Acid](in acid buffer)

[Salt] = [Base] (in base capacity]

pH of buffer solution lies inthe range given below $pH = pH_a \pm 1$

In other words,any buffer solution can be used as buffer up to two pH units only, depending upon the value of pK_a or pK_b. A buffer is said to be efficient when $pH = pK_a$ or $pOH = pK_b$

Which among the following solution will the most efficient buffer

A. $0.1MCH_{32}COONa + 0.01MCH_3COOH$

B. $0.1MNH_4Cl + 0.1MNH_4OH$

C. $0.001MHCOOH + 0.002MHCOONa$

D. All the above

Answer: B

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13. Higher the amount of acid or base used to product a deinite change of pH in a buffer solution, higher will be its buffe capacity. Buffer capcity of solution is maximum under the following conditions

[Salt] = [Acid](in acid buffer)

[Salt] = [Base] (in base capacity]

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In other words,any buffer solution can be used as buffer up to two pH units only, depending upon the value of pK_a or pK_b. A buffer is said to be efficient when $pH = pK_a$ or $pOH = pK_b$

The buffer capacity is equal to

A. $\frac{\Delta n}{\Delta pH}$

B. $\frac{pH}{\Delta n}$

C. $\pm 1pK_a$

D. None of these

Answer: A

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14. Higher the amount of acid or base used to product a deinite change of pH in a buffer solution, higher will be its buffe capacity. Buffer capcity of solution is maximum under the following conditions

[Salt] = [Acid](in acid buffer)

[Salt] = [Base] (in base capacity]

pH of buffer solution lies inthe range given below $pH = pH_a \pm 1$

In other words,any buffer solution can be used as buffer up to two pH units only, depending upon the value of pK_a or pK_b. A buffer is said to be efficient when $pH = pK_a$ or $pOH = pK_b$

A buffer of acetic acid $(pK_a = 4.8)$ with sodium acetate will be, when CH_3COOH and CH_3COONa are present in equivalent amounts has pH limits equal to

A. 0 to 4.8

B. 3.8 to 5.8

C. 4.3 to 5.3

D. 4.8

Answer: B

Watch Video Solution

15. Higher the amount of acid or base used to product a deinite change of pH in a buffer solution, higher will be its buffe capacity. Buffer capcity of solution is maximum under the following conditions

[Salt] = [Acid](in acid buffer)

[Salt] = [Base] (in base capacity]

pH of buffer solution lies inthe range given below $pH = pH_a \pm 1$

In other words,any buffer solution can be used as buffer up to two pH units only, depending upon the value of pK_a or pK_b. A buffer is said to be efficient when $pH = pK_a$ or $pOH = pK_b$

Buffer capacity is maximum when

A. One mole of NH_4Cl is added to two moles of NH_4OH

B. One mole of NH_4Cl is added to one moles of NH_4OH

C. One mole of NH_4Cl is added to one moles of $NaOH$

D. One mole of $NHCl$ is added to one moles of $NaOH$

Answer: B

Watch Video Solution

16. Higher the amount of acid or base used to product a deinite change of pH in a buffer solution, higher will be its buffe capacity. Buffer capcity of solution is maximum under the following conditions

[Salt] = [Acid](in acid buffer)

[Salt] = [Base] (in base capacity]

pH of buffer solution lies inthe range given below $pH = pH_a \pm 1$

In other words,any buffer solution can be used as buffer up to two pH units only, depending upon the value of pK_a or pK_b. A buffer is said to be efficient when $pH = pK_a$ or $pOH = pK_b$

Acifity of BF_3 can be explained on the basis of which of the following concepts

A. Arrehenius concept

B. Bronsted Lowry concept

C. Lewis concept

D. Bronsted Lowry as well as Lewis concept

Answer: C

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17. Which of the following will produce a buffer solution when mixed in equal volumes

A. $0.1 \text{mol} dm^{-3} NH_4OH$ and $0.1 \text{mol} dm^{-3} HCl$

B. $0.05 \text{mol} dm^{-3} NH_4OH$ and $0.1 \text{mol} dm^{-3} HCl$

C. $0.1 \text{mol} dm^{-3} NH_4OH$ and $0.05 \text{mol} dm^{3} NaOH$

D. $0.1 \text{mol} dm^{-3} CH_4COONa$ and $0.1 \text{mol} dm^{-3} NaOH$

Answer: C

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18. Higher the amount of acid or base used to product a deinite change of pH in a buffer solution, higher will be its buffe capacity. Buffer capcity of solution is maximum under the following conditions

[Salt] = [Acid](in acid buffer)

[Salt] = [Base] (in base capacity]

pH of buffer solution lies inthe range given below $pH = pH_a \pm 1$

In other words,any buffer solution can be used as buffer up to two pH units only, depending upon the value of pK_a or pK_b. A buffer is said to be efficient when $pH = pK_a$ or $pOH = pK_b$

K_a for CH_3COOH is $1.8 \times 10^{-5}$and K_b for NH_4OH is 1.8×10^{-5}. The ph of ammonium acetate will be

A. 7.005

B. 4.75

C. 7.0

D. Between 6 and 7

Answer: C

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19. Higher the amount of acid or base used to product a deinite change of pH in a buffer solution, higher will be its buffe capacity. Buffer capcity of solution is maximum under the following conditions

[Salt] = [Acid](in acid buffer)

[Salt] = [Base] (in base capacity]

pH of buffer solution lies inthe range given below $pH = pH_a \pm 1$

In other words,any buffer solution can be used as buffer up to two pH units only, depending upon the value of pK_a or pK_b. A buffer is said to be efficient when $pH = pK_a$ or $pOH = pK_b$

A sparingly soluble salt gets precipitated only when the product of concentration of its ions in the solution (Q_{sp}) becomes greater than its solubility product. If the solubility of $BaSO_4$ in water is $8 \times 10^{-4}\text{mol}dm^{-3}$ calculate its solubility in $0.01\text{mol}dm^{-3}$ of H_2SO_4

A. 6×10^{-5}

B. 5×10^{-3}

C. 2×10^{-3}

D. 6×10^{-8}

Answer: A

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20. Higher the amount of acid or base used to product a deinite change of pH in a buffer solution, higher will be its buffe capacity. Buffer capcity of solution is maximum under the following conditions

[Salt] = [Acid](in acid buffer)

[Salt] = [Base] (in base capacity]

pH of buffer solution lies inthe range given below $pH = pH_a \pm 1$

In other words,any buffer solution can be used as buffer up to two pH units only, depending upon the value of pK_a or pK_b. A buffer is said to be efficient when $pH = pK_a$ or $pOH = pK_b$

pH of $0.08 \mathrm{mol} dm^{-3}$ HOCl soluton is 2.85. Calculate its ionization constant.

A. 1.5×10^{-5}

B. 2.5×10^{-5}

C. 1.5×10^{-8}

D. 2.25×10^{-8}

Answer: B

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21. Higher the amount of acid or base used to product a deinite change of pH in a buffer solution, higher will be its buffe capacity. Buffer capcity of solution is maximum under the following conditions

[Salt] = [Acid](in acid buffer)

[Salt] = [Base] (in base capacity]

pH of buffer solution lies inthe range given below $pH = pH_a \pm 1$

In other words,any buffer solution can be used as buffer up to two pH units only, depending upon the value of pK_a or pK_b. A buffer is said to be efficient when $pH = pK_a$ or $pOH = pK_b$

The solubility product of $Al(OH)_3$ is 2.7×10^{-11}. Calculate its solubility in gL^{-1} and also find out pH of this solution. (Atomic mass of $Al = 27u$).

A. 11.47

B. 2.55

C. 10.6

D. 3.5

Answer: A

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22. Higher the amount of acid or base used to product a deinite change of pH in a buffer solution, higher will be its buffe capacity. Buffer capcity of solution is maximum under the following conditions

[Salt] = [Acid](in acid buffer)

[Salt] = [Base] (in base capacity]

pH of buffer solution lies inthe range given below $pH = pH_a \pm 1$

In other words,any buffer solution can be used as buffer up to two pH units only, depending upon the value of pK_a or pK_b. A buffer is said to be efficient when $pH = pK_a$ or $pOH = pK_b$

Calculate the volume of water requried to dissolve $0.1g$ lead (II) chloride to get a saturated solution . (K_{sp} of $PbCl_2 = 3.2 \times 10^{-8}$, atomic mass of $Pb = 207u$)

A. 0.1798

B. 0.3

C. 0.652

D. 0.412

Answer: A

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Level-I (H.W)

1. Which of the following is relatively stronger acid? K_a values are given in brackets

A. $HA(1.8 \times 10^{-3})$

B. $HB(3 \times 10^{-5})$

C. $HC(1 \times 10^{-2})$

D. $HD(9.6 \times 10^{-10})$

Answer: C

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2. For a weak acid (α is very small)

A. $K_a = C\alpha^2$

B. $\alpha = \sqrt{\frac{K_a}{C}}$

C. $\left[H^+\right] = C\alpha$

D. All the above

Answer: D

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3. A weak acid is 0.1% ionised in $0.1M$ solution. Its ionisation constant is

:

A. 10^{-5}

B. 10^{-6}

C. 10^{-8}

D. 10^{-9}

Answer: D

Watch Video Solution

4. The dissociation constant of a weak monobasic acid in $0.01M$ solution is 10^{-8}. What is its $[OH^{-}]$ concentration?

A. 10^{-6}

B. 10^{-8}

C. 10^{-9}

D. 10^{-10}

Answer: C

Watch Video Solution

5. Which of the following is the best conductor of electricity ?

A. $1MHNO_3$

B. $1MCH_3COOH$

C. $1MNH_4OH$

D. $1MH_2SO_4$

Answer: D

Watch Video Solution

6. At infinite dilution, the percentage ionisation of both strong and weak electrolytes is

A. 25%

B. 10%

C. 75%

D. 100%

Answer: D

Watch Video Solution

7. Calculate The $[H^+]$ ions of $0.008 M Ca(OH)_2$ is

A. $2 \times 10^{-7} M$

B. $6.25 \times 10^{-13} M$

C. $1.4 \times 10^{-12} M$

D. $1.25 \times 10^{-11} M$

Answer: B

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8. At some high temperature the value of K_w is equal to $10^{-12} M^2$. Calculate the H^+ ion concentration of water at same temperature is

A. $10^{-12} M$

B. $10^{-8} M$

C. $10^{-7} M$

D. $10^{-6} M$

Answer: D

Watch Video Solution

9. At certain temperature the H^+ ions concentration of water is $4 \times 10^{-7} M$ then the value of K_w at the same temperature is

A. $10^{-14} M^2$

B. $2.5 \times 10^{-13} M^2$

C. $1.6 \times 10^{-13} M^2$

D. $4 \times 10^{-7} M^2$

Answer: C

Watch Video Solution

10. The pH of mono-acidic base 12.6990. The molarity of the base is

A. $0.02 \text{moles} / \text{litre}$

B. $0.05 \text{moles} / \text{litre}$

C. $0.05 \text{moles} / \text{litre}$

D. $0.2 \text{moles} / \text{litre}$

Answer: B

Watch Video Solution

11. $0.1M$ solution of the following has the highest pH

A. Na_2CO_3

B. $NaHCO_3$

C. $NaOH$

D. CH_3COOH

Answer: C

Watch Video Solution

12. pH of $0.1M$ Acetic acid is

A. Less than 1

B. Greater than 1

C. 1

D. 7

Answer: B

Watch Video Solution

13. P^H of P^{OH} of $0.1M$ aqueous solution of HNO_3

A. $0, 14$

B. $14, 0$

C. $1, 13$

D. $13, 1$

Answer: C

Watch Video Solution

14. Which of the following would not change the pH of $10c.\ c.$ of dil HCl when added ?

A. $5c.\ c.$ of pure water

B. $20c.\ c$ of pure water

C. $10c.\ c.$ of pure water

D. $20 c. c.$ of dil HCl of same conentration

Answer: D

Watch Video Solution

15. pH of a solution solution at $25^{\circ} C$ is 2. If the pH is to be doubled , the hydronium ion concentration of the solution should be

A. Halved

B. Increased to 100 times

C. Doubled

D. Decreased to 100 times

Answer: D

Watch Video Solution

16. When ammonium chloride is added to ammonia solution the pH of the resulting solution will be

A. Increased

B. Seven

C. Decreased

D. Not changed

Answer: C

Watch Video Solution

17. K_a for HA is 4.9×10^{-8}. After making the necessary approximation, calculate for its decimolar solution,

a. $\%$ dissociation b. $\overset{\Theta}{O}H$ concentration

c. pH

A. 3.5

B. 4.2

C. 5.3

D. 2.5

Answer: B

Watch Video Solution

18. When $50mL$ of $0.1M-NaOH$ and $50mL$ of $0.1M-H_2SO_4$ solutions are mixed, the nature of resulting solution is

A. Neutral

B. Acidic

C. Basic

D. Amophoteric

Answer: B

Watch Video Solution

19. What will be the pH of a solution formed by mixing $40cm^2$ of $0.1MHCl$ with $10cm^3$ of $0.45MNaOH$

A. 10

B. 8

C. 5

D. 12

Answer: D

Watch Video Solution

20. Among the following

a) On dilution, the P^H of an acid increases

b) A solutions with $P^H = 61000$ times more basic than a solution with $P^H = 3$

c) A Solution with $p^H = 9$ is 1000 times more acidic than a solution with

$P^H = 12$

d) The P^H of $10^9 MNaOH$ is slightly greater tha n 7

A. a,b are correct only

B. a.d are ony correct

C. a,b,c are only correct

D. All are correct

Answer: D

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21. The hydrolysis constant of NaX (K_a of HX is 2×10^{-6}) is

A. 5×10^{-9}

B. 2×10^{-8}

C. 5×10^{-6}

D. 10^{-7}

Answer: A

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22. Calculate the hydrolysis constant of a salt of week acid $\left(K_a = 2 \times 10^{-6}\right)$ and of a weak base $\left(K_b = 5 \times 10^{-7}\right)$

A. 10^{-4}

B. 10^{-2}

C. 10^{-6}

D. 10^{-8}

Answer: B

Watch Video Solution

23. MX is the salt of weak base, MOH and weak acid, HX. Aqueous solution of MX is

A. Acidic , if $K_a > K_b$

B. Basic, if $K_a < K_b$

C. Neutral, ig $K_a = K_b$

D. All the above

Answer: D

Watch Video Solution

24. The p^H of an aqueous solution of a salt is 10. the salt is

A. KCl

B. NH_4NO_3

C. $NaCN$

D. $(NH_4)_2SO_4$

Answer: C

Watch Video Solution

25. The aqueous solution of potash alum is acidic due to hydrolysis of

A. K^{+}

B. Al^{3+}

C. SO_4^{2-}

D. Na^{+}

Answer: B

Watch Video Solution

26. The hydrolysis constant of ammonium acetate is given by

A. $\frac{K_w}{K_a}$

B. $\frac{K_w}{K_b}$

C. $\frac{K_w}{K_a.K_b}$

D. $\frac{K_a, K_b}{K_w}$

Answer: C

Watch Video Solution

27. Aqueous solution of $NaCl$ is neutral because

A. Na^+ undergoes hydrolysis

B. Cl^- undergoes hydrolysis

C. Both Na^+ and Cl^- undergo hydrolysis

D. Does not undergo hydrolysis

Answer: D

Watch Video Solution

28. The p^H of $0.1M$ solution of the following compounds increase in the order

A. $NaCl < NH_4Cl < NaCN < HCl$

B. $HCl < NH_4Cl < NaCl < NaCN$

C. $NaCN < NaCl < NH_4Cl < NaCN$

D. $NaCN < NH_4Cl < NaCl < HCl$

Answer: B

Watch Video Solution

29. Nature of $0.1M$ solution of potassium bisulphate is

A. Acidic

B. Alkaline

C. Neutral

D. Amphoteric

Answer: A

Watch Video Solution

30. The no.of hydroxyl ions produced by one molecule of Na_2CO_3 on hydrolysis is

A. 4

B. 2

C. 3

D. 0

Answer: B

Watch Video Solution

31. A buffer solution is prepared by mixing $10ml$ of $1.0M$ acetic acid & $20ml$ of $0.5M$ sodium acetate and then diluted to $100ml$ with distilled water. If the pK_a of CH_3COOH is 4.76. What is the pH of the buffer solution prepared?

A. 3.84

B. 4.76

C. 4.34

D. 5.21

Answer: B

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32. The P^{K_a}, weak acid is 4.8 what is the ratio of salt to acid, if P^H of buffer is 5.8 is to be prepared

A. $1:1$

B. $1:10$

C. $10:1$

D. $2:1$

Answer: C

Watch Video Solution

33. In acid buffer solution $(pH = 4.4)$, the ratio of concentrations of acid to salt is $2:1$. The value of dissociation constant of weak acid may be

A. 1.8×10^{-4}

B. 2×10^{-7}

C. 4×10^{-5}

D. 2×10^{-8}

Answer: D

Watch Video Solution

34. A solutions is $10M$ in CH_3COONa and $1M$ in CH_3COOH. If pK_a of CH_3COOH is 4.8, what is the pH of the solution?

A. 9

B. 5

C. 7

D. 5.301

Answer: B

Watch Video Solution

35. A solution is $10M$ in CH_3COONa and $1M$ in CH_3COOH. If pK_a of CH_3COOH is 4.8, what is the pH of the solution?

A. 0.48

B. 5.8

C. 4.9

D. 6.8

Answer: B

Watch Video Solution

36. What is the pH of solution obtained by mixing $100mL$ of each $0.2MNH_4Cl$ and $0.2MNH_4OH$, if pK_b of NH_4OH is 4.2?

A. 9.8

B. 4.2

C. 7.0

D. 8.4

Answer: A

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37. Choose the correct combination among the following

A) A mixture of weak acid and its salt of strong base acts as acidic buffer

B) As number of moles of acid or base required to change the P^H of the buffer by one unit increase, the quality of buffer increases.

C) Buffer action is maximum at $P^H = P^{Ka}$ in case of acidic buffer

A. All are correct

B. A only correct

C. B only correct

D. A only false

Answer: A

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38. Buffer capacity of acid buffer solution is more when

A. $P^{Ka} = P^H$

B. $[\text{Salt}] = [\text{Acid}]$

C. $P^{Ka} = 7$

D. $\left[H^{+}\right] = P^{Ka}$

Answer: C

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39. Which of the following solution cannot act as buffer?

A. $NaH_2PO_4 + H_3PO_4$

B. $CH_3COOH + CH_3COONa$

C. $HCl + NH_4Cl$

D. $H_3PO_4 + Na_2HPO_4$

Answer: C

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40. Which of the following salts when added to pure water will not alter its P^H

A. Ammonium cyanide

B. Ferric chloride

C. Potassium cyanide

D. Borax

Answer: A

Watch Video Solution

41. Which of the following solutions can act as buffer?

A. 0.1 molar aq.$NaCl$

B. 0.1 molar aq.$CH_3COOH + 0.1$ molar $NaOH$

C. 0.1 molar aq.Ammonium acetate

D. 0.1 molar H_3PO_4

Answer: C

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42. Which of the following has highest value of K_{sp} ?

A. $Mg(OH)_2$

B. $Ca(OH)_2$

C. $Ba(OH)_2$

D. $Be(OH)_2$

Answer: D

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43. The molar solubility of PbI_2 in $0.2MPb(NO_3)_2$ solution in terms of solubility product, K_{sp}

A. $(K_{sp}/0.2)^{1/2}$

B. $(K_{sp}/0.8)^{1/3}$

C. $(K_{sp}/0.4)^{1/2}$

D. $(K_{sp}/0.8)^{1/2}$

Answer: D

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44. The solubility product of a salt having general formula MX_2 in water is 4×10^{-12}. The concentration of $M^{2+} ions$ in the aqueous solution of the salt is:

A. $4 \times 10^{-10} M$

B. $1.6 \times 10^{-4} M$

C. $1 \times 10^{-4} M$

D. $2 \times 10^{-6} M$

Answer: C

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45. Which of the following is most soluble?

A. $Bi_2S_3\left(K_{sp}=1\times10^{-17}\right)$

B. $MnS\left(K_{sp}=7\times10^{-16}\right)$

C. $CuS\left(K_{sp}=8\times10^{37}\right)$

D. $Ag_2S\left(K_{sp}=6\times10^{-51}\right)$

Answer: B

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46. In the following reaction,

$AgCl+NaI\Leftrightarrow NaCl+AgI.$ As NaI is added, the equilibrium is shifted towards right giving more Ag I precipitate , because

A. Both $AgCl$ and AgI are sparingly soluble

B. The K_{sp} of AgI is lower than K_{sp} of $AgCl$

C. The K_{sp} of AgI is higher than K_{sp} of $AgCl$

D. Both $AgCl$ and AgI have same solubility product

Answer: B

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47. At $25^{\circ}C$, the K_{sp} value of $Fe(OH)_2$ in aquoeus solution is 3.8×10^{-38}. The solubility of Fe^{3+} ions will increases when

A. P^{H} is increased

B. P^{H} is 7

C. P^{H} is decreased

D. $P^{H} = 14$

Answer: C

Watch Video Solution

48. In which of the following, the solubility of $AgCl$ will be maximum?

A. $0.1 M AgNO_3$

B. Water

C. $0.1 M NaCl$

D. $0.1 M AgBr$

Answer: B

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49. Among the following statements

a) if two salts have equal solubility then their solubility products are equal

b) $BaSO_4$ in more soluble in water than in dil H_2SO_4

c) When KI is added to PbI_2 then the $[Pb^{2+}]$ decreases

d) In any solution containing $AgCl$, the value of $[Ag^{+}][Cl^{-}]$ is constant at constant temperature,

A. All are correct

B. a,b and d are correct

C. a,c, and d are correct

D. b,c and d are correct

Answer: D

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50. In 1L saturated solution of $AgCI[K_{sp}(AgCI) = 1.6 \times 10^{-10}], 0.1 mol$ of $CuCI[K_{sp}(CuCI) = 1.0 \times 10^{-6}]$ is added. The resultant concentration of Ag^{+} in the solution is 1.6×10^{-x}. The value of "x" is.

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Level-II (H.W)

1. Find out the OH^- ion concentration in $100mL$ of $0.015MHCl$ is

A. $2.0 \times 10^{-9}M$

B. $6.7 \times 10^{-13}M$

C. $3 \times 10^{-10}M$

D. $5 \times 10^{-12}M$

Answer: B

Watch Video Solution

2. The $[OH^-]$ of $0.005M$ is H_2SO_4

A. $2 \times 10^{-12}M$

B. $5 \times 10^{-3}M$

C. $10^{-12}M$

D. $10^{-14}M$

Answer: C

Watch Video Solution

3. The OH^{-} ion concentration of a solution is $3.2 \times 10^{-4}M$. find out the H^{+} ion concentration of the same solution is

A. $3 \times 10^{-6}M$

B. $6 \times 10^{-13}M$

C. $3.125 \times 10^{-11}M$

D. $2 \times 10^{-4}M$

Answer: C

Watch Video Solution

4. In $0.1M$- solution, a mono basic acid is 1% ionized. The ionisation constant of the acid is `

A. 1×10^{-3}

B. 1×10^{-7}

C. $1 \times 10^{-5}M$

D. 1×10^{-14}

Answer: C

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5. At $25^{0}C$, the hydroxyl ion of a basic solution is $6.75 \times 10^{-3}M$. Then the value of K_w is

A. $13.5 \times 10^{-12}M^2$

B. $1.35 \times 10^{-12}M^2$

C. $13.5 \times 10^{-8}M^2$

D. $10^{-14}M^2$

Answer: D

Watch Video Solution

6. At some high temperature, K_w of water is 10^{-13}. Then the P^H of the water at the same temperature is

A. 8.3

B. 6.5

C. 7.42

D. 6

Answer: B

Watch Video Solution

7. The pH of a solution ois 3.7. The concentrations of proton is in the order of

A. $10^{-2}M$

B. $10^{-4}M$

C. $10^{-6}M$

D. $10^{-8}M$

Answer: B

Watch Video Solution

8. pH of a $10^{-10}MNaOH$ is nearest to

A. 10

B. 7

C. 4

D. 10

Answer: B

Watch Video Solution

9. 50 litres of $0.1 MHCl$ is thoroughly mixed with 50 litres of $0.2 MNaOH$ The pOH of the resulting solution is

A. 1.0

B. 0.0

C. 7.0

D. 1.30

Answer: D

Watch Video Solution

10. $1 c. c$ of $0.1 NHCl$ is added to 1 litres of $0.1 NNaCl$ solution. The pH of the resulting solution will be

A. 7

B. 1

C. 3

D. 4

Answer: D

Watch Video Solution

11. $100mL$ of $0.15MHCl$ is mixed with $100mL$ of $0.005MHCl$, what is the pH of the following solution approxmately

A. 2.5

B. 1.15

C. 2

D. 4

Answer: B

Watch Video Solution

12. The pH of $NaOH$ solution is 12. What is the amount in grams of $NaOH$ present in one litre of a solution?

A. 40

B. 4

C. 0.4

D. 20

Answer: C

Watch Video Solution

13. The pH of a solution is 5. Its H^+ ion concentration is decreased by 100 times, then the nature of the solution formed is

A. Acidic

B. Basic

C. Neutral

D. Amphoteric

Answer: C

Watch Video Solution

14. The pH of a solution increased from 3 to 6. Its $\left[H^{\oplus}\right]$ will be

A. Reduced to half

B. Doubled

C. Reduced by 1000 times

D. Increased by 1000 times

Answer: C

Watch Video Solution

15. $0.1 MHCl$ solution is diluted by 100 times The pH of the solution formed is

A. 3

B. 2

C. 4

D. 6

Answer: A

Watch Video Solution

16. The pH of solution is 9. It is ……… times more basic than a solution with $pH = 6$

A. 3

B. 2

C. 4

D. 6

Answer: C

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17. The concentration of an oxlic acid solution is x mol $litre^{-1}$. 40mL of this solution reacts with 16 mL of 0.05 M acidified $KMnO_4$. What is the pH x M oxalic acid solution ? (Assume that oxalic acid dissociates completely.)

A. 1.3

B. 1.699

C. 1

D. 2

Answer: C

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18. The pH of $0.1M$ solution of CH_3COOH if it ionizes to an extent of 1% is .

A. 1

B. 2

C. 3

D. 4

Answer: C

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19. The dissociation constant of weak acid HA is 1×10^{-5}. Its concentration is $0.1M$. pH of that solution is

A. 1.0

B. 2.0

C. 3.0

D. 5.0

Answer: C

Watch Video Solution

20. The P^{H} of $0.01M$ solution of acetic acid is 5.0 What are the values of $[H^{+}]$ and Ka respectively ?

A. $2 \times 10^{-4}M, 2 \times 10^{-8}$

B. $1 \times 10^{-5}M, 1 \times 10^{-9}$

C. $1 \times 10^{-5}M, 1 \times 10^{-8}$

D. $1 \times 10^{-4}M, 1 \times 10^{-6}$

Answer: C

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21. The degree of dissociation of $0.1 N CH_3COOH$ is $\left(K_a = 1 \times 10^{-5}\right)$

A. 10^{-6}

B. 10^{-7}

C. 10^{-3}

D. 10^{-2}

Answer: D

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22. The pH of the $10^{-3} M NH_4OH\left(Kb = 10^{-5}\right)$ is

A. 3

B. 11

C. 10

D. 4

Answer: C

Watch Video Solution

23. An aquoeous solution twice alkaline as water, The pH of the solution is near to

A. 7.3

B. 12

C. 10

D. 13

Answer: A

Watch Video Solution

24. The pH of an aquoeus solution of H_2O_2 is 6.0 . Some chlorine is bubbled through this solution. The pH of the resulting solution will be

A. 6

B. 7

C. Less than 6

D. More than 7

Answer: C

Watch Video Solution

25. The pH of NaOH solution is 13. What is the amount in grams of $NaOH$ present in one litre of a solution?

A. 40

B. 4

C. 0.4

D. 20

Answer: B

Watch Video Solution

26. Equal volums of solutions pH values $1, 3, 5, 6$ are mixed with each other . The pH of resultant solution is nearly

A. 1.3

B. 2.7

C. 1.6

D. 3.6

Answer: C

Watch Video Solution

27. The p^H of HCl is 3. Then the P^H of $NaOH$ solution having same molar concentration is

A. 3

B. 6

C. 9

D. 11

Answer: D

Watch Video Solution

28. If pH of A, B, C and D are $9.5, 2.5, 3.5,$ and 5.5 respectively, the strongest acid is

A. A

B. B

C. C

D. Does not undergo hydrolysis

Answer: B

Watch Video Solution

29. Equal volume of $0.1M$ potassium hydroxide and $0.1M$ sulphuric acid are mixed. The P^H of resulting solution is

A. 7

B. 0

C. > 7

D. < 7

Answer: D

Watch Video Solution

30. The pH of solution is 5.0 to a $10mL$ of solution $990mL$ of water is add then pH of the resulting solution is

A. 7

B. 3

C. 9

D. 6.96

Answer: D

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31. The correct order of increasing $\left[H_3O^+\right]$ in the following aqueous solution is :

A. $0.01 M H_2S < 0.01 M H_2SO_4$

$< 0.01 M NaCl < 0.01 M NaNO_2$

B. $0.1 M NaCl < 0.01 M NaNO_2$

$< 0.01 M H_2S < 0.01 M H_2SO_4$

C. $0.01 M NaNO_2 < 0.01 M NaCl$

$< 0.01 M H_2S < 0.01 M H_2SO_4$

D. $0.01MH_2S < 0.01MNaNO_2$

$< 0.01MNaCl < 0.01MH_2SO_4$

Answer: C

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32. HA is a weak acid $[K_a = 10^{-4}]$ and BOH is a weak base $[K_b = 10^{-5}]$. BA is the salt formed from them, In the aquoeus solution of BA

A. $[H^+] > 10^{-7}$

B. $P^H < 7$

C. $K_h = 10^{-5}$

D. All

Answer: D

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33. K_h of salt obtained from strong acid and weak base is 2×10^{-5}. The K_b of weak base is

A. 2×10^{-19}

B. 5×10^{-10}

C. 2×10^{-10}

D. 5×10^{-9}

Answer: B

Watch Video Solution

34. Which of the following solution will have P^H closer to 1.0?

A. $100ml$ of $M/10HCl +$

$45ml$ of $M/10NaOH$

B. $55ml$ of $M/10HCl +$

$45ml$ of $M/10NaOH$

C. $10ml$ of $M/10HCl +$

$90ml$ of $M/10NaOH$

D. $75ml$ of $M/5HCl +$

$25ml$ of $M/5NaOH$

Answer: D

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35. Which of the following mixture is not a buffer solution

A. $100mL$ of $0.5NCH_3COOH + 100mL$ of $0.05NNaOH$

B. $100mL$ of $0.6NHCN + 100mL$ of $0.4NaOH$

C. $100mL$ of $0.5NNH_4OH + 10mL$ of $0.2NCH_3COOH$

D. $100mL$ of $0.4NHCL + 100mL$ of $0.4NNaOH$

Answer: D

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36. The pK_a of HCN is 9.30. The pH of a solutin prepared by mixing 2.5 moles of KCN and 2.5 moles of HCN in water and making up the total volume to $500mL$ is

A. 9.3

B. 7.3

C. 10.3

D. 8.3

Answer: D

Watch Video Solution

37. An acidic buffer contains $0.06M$ salt and $0.02M$ acid. The dissociation constant of acid is 10^{-4}. The P^{H} of the buffer solution is

A. 4

B. 10

C. 4.48

D. 9.52

Answer: C

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38. $25mL$ of $0.4M$ of a weak base and $75mL$ of 0.2 M of its salt forms a buffer solution. The dissocation constant of base is 2×10^{-5} the $(\log 1.5 = 0.176)$

A. 4.876

B. 9.476

C. 4.524

D. 9.124

Answer: D

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39. A solution consist of $0.2 M NH_4OH$ and $0.2 M NH_4Cl$. If K_b of NH_4OH is 1.8×10^{-5}, the $[OH^-]$ of the resulting is

A. $0.9 \times 10^{-5} M$

B. $1.8 \times 10^{-5} M$

C. $3.2 \times 10^{-5} M$

D. $3.6 \times 10^{-5} M$

Answer: B

Watch Video Solution

40. Concentration of NH_4Cl and NH_4OH in a buffer solution are in the ratio of $1:10$, Kb for NH_4OH is 10^{-10}. The pH of the buffer is

A. 4

B. 5

C. 9

D. 11

Answer: B

Watch Video Solution

41. A basic buffer contains equal concentration of base and its salt. The dissociation constant of base is 10^{-6}. Then the pH of the buffer solution is

A. 9

B. 8

C. 5

D. 6

Answer: B

Watch Video Solution

42. When 0.48 moles of base is added to $1L$ buffer solution itsP^H of changes from 4.01 to 4.03. Calculate buffer capacity.

A. 104

B. 0.0096

C. 0.042

D. 24

Answer: D

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43. 0.002 moles of an acid is added to a litre of buffer solution, decreases the pH of the buffer by 0.02. Then the buffer capacity is

A. 0.2

B. 0.1

C. 0.6

D. 0.4

Answer: B

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44. $12g$ of CH_3COOH and $4g$ of $NaOH$ are mixed and diluted to 1 litre solution. If P^{Ka} of CH_3COOH is 4.8 the P^H of the solution is

A. 4.8

B. 5

C. 5.6990

D. 5.3010

Answer: A

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45. 1 lit of buffer solution contains 0.1 mole each of NH_4OH and NH_4Cl. What will be the P^H of the solution when 0.01 mole of HCl is added to it

$[P^{Kb}$ of $NH_4OH = 4.74]$

A. 9.26

B. 9.17

C. 4.74

D. 4.65

Answer: B

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46. A solution contains $60mL$ of $0.1MNH_4OH$ and $30mL$ of $0.1MHCl$.

The P^H of the resulting mixture is

(Given K_b of $NH_4OH = 1.8 \times 10^{-5}$,

$1.8 = 0.2553$)

A. 4.7447

B. 3.7447

C. 9.2553

D. 12.523

Answer: C

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47. The solubility of AgCl will be miniumum in

A. $0.01MNa_2SO_4$

B. $0.1MCaCl_2$

C. Pure water

D. $0.001 M AgNO_3$

Answer: B

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48. The solubility of Ag_2CrO_4 is $2 \times 10^{-2} \text{mol} / \text{lit}$ its solubility product is

A. 3.2×10^{-5}

B. 32×10^{-8}

C. 16×10^{-8}

D. 3.32×10^{-10}

Answer: A

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49. The solubility product of a rare earth metal hydroxide $M(OH)_3$ at room temperature is 4.32×10^{-14}, its Solubililty is

A. $1.25 \times 10^{-10} M$

B. $2.0 \times 10^{-6} M$

C. $2.0 \times 10^{-4} M$

D. $1.25 \times 10^{-7} M$

Answer: C

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50. The solubility of $PbSO_4$ in $0.1 M Na_2SO_4$ solution is (K_{sp} of $PbSO_4$ is 1.25×10^{-9})

A. $0.1 M$, $02 M$

B. $1.25 \times 10^{-10} M$

C. $1.25 \times 10^{-7} M$

D. $1.25 \times 10^{-9} M$

Answer: C

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51. The molar solubility of $M(OH)_3$ in $0.4 M M(NO_3)_3$ solution inters of solubility product of $M(OH)_3$

A. $(K_{sp}/10.8)^{1/3}$

B. $(K_{sp}/3.6)^{1/3}$

C. $(K_{sp}/10.8)^{1/4}$

D. $(K_{sp}/0.4)^{1/3}$

Answer: A

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Level-V (H.W)

1. A solution contains $0.1 M H_2S$ and $0.3 M HCI$. Calculate the conc.of S^{2-} and HS^{-} ions in solution. Given K_{a_1} and K_{a_2} for H_2S are 10^{-7} and 1.3×10^{-13} respectively.

A. $1.44 \times 10^{-19}, 3.3 \times 10^{-7}$

B. $1.44 \times 10^{-20}, 3.3 \times 10^{-8}$

C. $1.44 \times 10^{-22}, 3.3 \times 10^{-3}$

D. $1.44 \times 10^{-18}, 3.3 \times 10^{-5}$

Answer: B

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

A. 0.982

B. 0.0983

C. 1.96

D. 2.96

Answer: A

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3. A solution contains $0.1M$ is Cl^{-} and $10^{-4} MCrO_4^{2-}$. If solid $AgNO_3$ is gradually added to this solution, what will be the concentration of Cl^{-} when Ag_2CrO_4 begins to precipitate?

$\left(Ksp(AgCl) = 10^{-10} M^2,\right.$

$\left.K_{sp}(Ag_2CrO_4) = 10^{-12} M^3\right)$

A. $10^{-6} M$

B. $10^{-4} M$

C. $10^{-5} M$

D. $10^{-9}M$

Answer: A

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4. One litre of a buffer solution containing 0.02 mol of propanoic acid and some sodium propanate has $pH = 4.75$. What will be the pH if 0.01 mol of hydrogen chloride is dissolved in the above buffer solution ?

[Dissociation constant of propanoic acid at $25^{\circ}C$ is 1.34×10^{-5}].

A. 4.11

B. 2.11

C. 0.11

D. 3.11

Answer: A

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5. A weak base (BOH) with $K_b = 10^{-5}$ is titrated with a strong acid (HCl), At $3/4$ th of the equivalence point, pH of the solution is:

A. $5 + \log 3$

B. $14 - 5 - \log 3$

C. $14 - 5 + \log 3$

D. $9.523.$

Answer: B

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6. In a solution of $0.04 M FeCl_2$ and $0.01 M FeCl_3$, how large may be its pH of without being precipitation of either $Fe(OH)_2$ or $Fe(OH)_3$?

[Given $K_{sp} Fe(OH)_2 = 16 \times 10^{-6}$ and $K_{sp} Fe(OH)_3 = 8 \times 10^{-26}$]

A. 5.7

B. 6.3

C. 8.3

D. 10.7

Answer: B

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7. The K_{sp} of $Mg(OH)_2$ is 8.9×10^{-12} at $25^2 C$. the pH of solution is adjusted to 9. How much Mg^{2+} ion will be precipitated as $Mg(OH)_2$ from a $0.1 M MgCl_2$ solution at $25^\circ C$? Assume that $MgCl_2$ is completely dissociated.

A. 0.011

B. 0.89

C. 0.11

D. 0.89

Answer: A

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8. Two buffer, (X) and (Y) of pH 4.0 and 6.0 respectively are prepared from acid HA and the salt NaA. Both the buffers are 0.50 M in HA. What would be the pH of the solution obtained by mixing equal volumes of the two buffers ? $\left(K_{HA} = 1.0 \times 10^{-5}\right)$

A. 4.7033

B. 5.7033

C. 6.7033

D. 8.7033

Answer: B

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9. The K_{sp}) values of $Al(OH)_3$ and 1.8×10^{-14} respectively at room temp. If a salt contains equal concentration of Al^{+3} and Zn^{+2} ions, the

ion first precipitated by adding NH_4OH is ?

A. Zn^{+2}

B. Al^{+3}

C. both starts precipitation at same time

D. no ion precipitates

Answer: B

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10. If equal volumes of $BaCI_2$ and NaF solutions are mixed, which of these combination will not give a precipitate? $(K_{sp} of BaF_2 = 1.7 \times 10^{-7})$.

A. $10^{-3} MBaCl_2$ nd $2 \times 10^{-2} MNaF$

B. $10^{-3} MBaCl_2$ and $1.5 \times 10^{-2} MNaF$

C. $1.5 \times 10^{-2} MBaCl_2$ and $10^{-3} MNaF$

D. $2 \times 10^{-2} MBaCl_2$ and $2 \times 10^{-2} MNaF$

Answer: C

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11. K_a for the reaction,

$Fe^{3+}(aq) + H_2O(l) \Leftrightarrow Fe(OH)^{2+}(aq) + H_3O^{\oplus}(aq)$ is 6.5×10^{-3}, what is the maximum pH value which could be used so that at least 80% of the total iron (III) in a dilute solution exsists as Fe^{3+}?

A. 2.0

B. 2.4

C. 2.8

D. 1.6

Answer: D

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12. $ZnCl_2$ undeoes hydrolysis $ZnCl_2 + H_2O \Leftrightarrow Zn(OH)_2 + 2HCl$. The overall K_b for $Zn(OH)_2$ is 2.5×10^{-12} at $25^0 C$. The degree of hydrolysis of $0.001 M ZnCl_2$ solution isx

A. $\left(\sqrt{\dfrac{K_H}{10^{-3}}}\right)^{1/2}$

B. $\dfrac{K_H}{10^{-6}}$

C. $\left[\dfrac{K}{4 \times 10^{-6}}\right]^{1/3}$

D. $\left[\dfrac{K_H}{8 \times 10^{-6}}\right]^{1/4}$

Answer: C

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13. The following pH range where the indicator shows change in colour are given

i. $4 - 9.7$ ii. $7.46 - 10.0$ iii. $6.5 - 4$

Which of the above pH range represent titration of

I. Strong acid/strong base (S_A / S_B),

II. Weak acid/strong base (W_A / S_B),

III. Weak base/strong acid (W_B / S_A)

A. $(i) \rightarrow I, (ii) \rightarrow II, (iii) \rightarrow III$

B. $(iii) \rightarrow I, (ii) \rightarrow II, (i) \rightarrow III$

C. $(ii) \rightarrow I, (iii) \rightarrow II, (i) \rightarrow III$

D. $(i) \rightarrow I, (III) \rightarrow II, (ii) \rightarrow III$

Answer: A

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14. What will be the pH of an aqueous solution of 1.0 M ammonium formate?

Given :$pK_a = 3.8 \text{ and } pK_b = 4.8$

A. 7.5

B. 3.4

C. 6.5

D. 10.2

Answer: C

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15. The percentage degree of hydrolysis of a salt of weak acid (HA) and weak base (BOH) in its 0.1 M solution is found to be 10%. If the molarity of the solution is 0.05 M, the percentage hydrolysis of the salt should be :

A. 5%

B. 10%

C. 20%

D. 30%

Answer: B

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16. 0.1 M formic acid solution is titrated against 0.1 M NaOH solution. What would be the difference in pH between 1/5 and 4/5 stages of neutralization of acid?

A. $2\log 3 / 4$

B. $2\log 1 / 5$

C. $\log 1 / 3$

D. $2\log 4$

Answer: D

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17. The pH of the a solution containing $0.4 M HCO_3^-$ is :

$\left[K_{a_1}(H_2CO_3) = 4 \times 10^{-7}, K_{a_2}\left(HCO_3^-\right) = 4 \times 10^{-11}\right]$

A. 10.4

B. 10.1

C. 6.1

D. 8.4

Answer: D

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18. The pH of the resultant solution of 20 mL of 0.1 M H_3PO_4 and 20 mL of 0.1 M Na_3PO_4 is :

A. $pK_{a_1}+\log 2$

B. pK_{a_1}

C. pK_{a_2}

D. $\dfrac{pK_{a_1}+pK_{a_2}}{2}$

Answer: C

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19. In a saturated solution of AgCl, NaCl is added gradually. The concentration of Ag^{+} is plotted against the concentration of Cl^{-}. The graph appears as :

A.

B.

C.

D.

Answer: C

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20. During the titration of a weak diprotic acid (H_2A) against a strong base $(NaOH)$, the pH of the solution half-way to the first equivalent point and that at the first equivalent point are given respectively by:

A. pK_{a_1} and $pK_{a_1} + pK_{a_2}$

B. $\sqrt{K_{a_1}c}$ and $\dfrac{pK_{a_1} + pK_{a_2}}{2}$

C. pK_{a_1} and $\dfrac{pK_{a_1} + pK_{a_2}}{2}$

D. pK_{a1} and pK_{a2}

Answer: C

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21. Find moles of NH_4Cl required to prevent $Mg(OH)_2$ from precipitating in a litre of solution which contains 0.02 mole NH_3 and 0.001 mole Mg^{2+} ions.

Given : $K_b(NH_3) = 10^{-5}, \ K_{sp}\left[Mg(OH)_2\right] = 10^{-11}$.

A. 10^{-4}

B. 2×10^{-3}

C. 0.02

D. 0.1

Answer: B

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22. A certain indicator (an organic dye) has $pK_a = 5$. For which of the following titrations may it be suitable

A. Acetic acid against $NaOH$

B. Aniline hydrochloride against $NaOH$

C. Sodium carbonate against HCl

D. Barium hydroxide against oxalice acid

Answer: C

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23. $50ml$ of $0.05MNa_2CO_3$ is titrated against $0.1MHCl$. On adding $40ml$ of HCl, pH of the resulting solution will be

$$\begin{bmatrix} H_2CO_3 : pK_{a_1} = 6.35 & pK_{a_2} = 10.33 \\ \log 3 = 0.477 & \log 2 = 0.30 \end{bmatrix}$$

A. 6.35

B. 6.526

C. 8.34

D. 6.173

Answer: D

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24. Equilibrium constants of T_2O $\left(T \text{ or } {}_1^3 Hisaniso \top e \text{ of } {}_1^1 H\right)$ and H_2O are different at 298 K. Let at 298 K pure T_2O has pT (like pH) is 7.62. The pT of a solution prepared by adding 10 mL. of 0.2 M TCl to 15 mL of 0.25 M NaOT is:

A. $2 - \log 7$

B. $14 + \log 7$

C. $13.24 - \log 7$

D. $13.24 + \log 7$

Answer: D

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25. The ionisation constant of an acid base indicator is $3' 10^{-5}$. The acid from of the indictor is red and the basic form is blue. By how much must the p^{H} change in order to change the indicator from 75% red to 75% blue?

A. 1.95

B. 2.95

C. 0.95

D. 3.95

Answer: C

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26. 20 mL of 0.1 M weak acid $HA(K_a = 10^{-5})$ is mixed with solution of 10 mL of 0.3 M HCl and 10 mL. of 0.1 M NaOH. Find the value of $[A^-]$ //([HA]+[A^(-)])` in the resulting solution :

A. 2×10^{-4}

B. 2×10^{-5}

C. 2×10^{-3}

D. 5×10^{-2}

Answer: A

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27. Calculate the ratio of $[HXOO^-]$ and $[F^-]$ in a mixture of 0.2 M HCOOH $(K_a = 2 \times 10^{-4})$ and 0.1 M HF $(K_a = 6.6 \times 10^{-4})$:

A. $1 : 6.6$

B. $1:3.3$

C. $2:3.3$

D. $3.3:2$

Answer: C

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28. If first dissociation of $X(OH)_{32}$ is 100% where as second dissociation is 50% and third dissciation is negligible then the pH of $4 \times 10^{-3} M, X(OH)$ is :

A. 11.78

B. 10.78

C. 2.5

D. 2.22

Answer: A

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29. H_3A is a weak triprotic acid

$\left(K_{a1}=10^{-5}, K_{a2}=10^{-9}, K_{a3}=10^{-13}\right.$

What is the value of pX of 0.1 M H_3A (aq.) solution ? Where pX=-log X and X=$\frac{\left[A^{3-}\right]}{\left[HA^{2-}\right]}$

A. 7

B. 8

C. 9

D. 10

Answer: D

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30. A solution cotaning $0.10M$ in $Ba(NO_3)_2$ and $0.10M$ in $Sr(NO_3)_2$. If solid Na_2CrO_4 is added to the solution, what is $\left[Ba^{2+}\right]$, when $SrCrO_4$

beings to precipitate?

$\left[K_{sp}(BaCrO_4) = 1.2 \times 10^{-10}, K_{sp}(SrCrO_4) = 3.5 \times 10^{-5}\right]$

A. 7.4×10^{-7}

B. 2.0×10^{-7}

C. 6.1×10^{-7}

D. 3.4×10^{-7}

Answer: D

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31. A solution is 0.01 M KI and 0.1 M KCl. If solid $AgNO_3$ is added to the solution, what is the $\left[l^-\right]$ when AgCl begins to precipitate?

$\left[K_{SP}(Agl) = 1.5 \times 10^{-16}, K_{SP}(AgCl) = 1.8 \times 10^{-10}\right]$

A. 3.5×10^{-7}

B. 6.1×10^{-8}

C. 2.2×10^{-7}

D. 8.3×10^{-8}

Answer: D

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32. What is maximum pH required to prevent the precipitation of ZnS in a solution that is 0.01 M $ZnCl_2$ and saturated with 0.10M H_2S?

[Given : $K_{sp}(ZnS) = 10^{-21}$,

$K_{a_1} \times K_{a_2}$ (of H_2S)=10^{-20}]

A. 0

B. 1

C. 2

D. 4

Answer: B

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33. Which of the following statements is correct for a solution saturated with $AgCl$ and $AgBr$ if their solubilities in moles per litre in separate solutions are x and y respectively?

A. $[Ag^+] = [Br^-] + [Cl^-]$

B. $[Cl^-] > [Br^-]$

C. $[Br^-] > y$

D. $[Ag^+] = x + y$

Answer: A::B::C

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34. A solution contians $0.1 M NaCl$, $0.01 M NaBr$ and $0.001 M Nal$.solid $AgNO_3$is gradually added to the solution and its addition

$K_{sp}AgCl = 10^{-10}$, $K_{sp}AgBr = 10^{-13}$,

$K_{sp}AgI = 10^{-17}$

choose the correct statements

A. AgI precipitates first

B. The maximum $[I^-]$ which can be maintained in the solution so that only AgI is precipitate is $10^{-6}M$.

C. When the precipitation of $AgCl$ just starts, $[I^-]$ in the solution is $10^{-8}M$

D. If sufficient NaI is added to a saturated solutions of $AgCl$, precipitate of Agl is obtained.

Answer: A::B::C::D

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35. Choose the correct statement/s:

A. pH of acidic buffer solution decreases if more salt is added

B. pH of acidic buffer solution increase if more salt is added

C. pH of basic buffer decrases if more salt is added

D. pH of basic buffer incrases if more salt is added

Answer: B::C

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36. If you have a saturated solution of CaF_2, then

A. $\left[Ca^{2+}\right] = (k_{sp}/4)^{1/3}$

B. $2 \times \left[Ca^{2+}\right] = \left[F^{-}\right]$

C. $\left[Ca^{2+}\right] = 2\left[F^{-}\right]$

D. $\left[Ca^{2+}\right] = \sqrt{K_{sp}}$

Answer: A::B

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37. If concentration of two weak acids are C_1 and $C_2 \text{mol}/L$ and degree of ionization are α_1 and α_2 respectively then their relative strength can be compared by :

A. $\dfrac{[H^+]_1}{[H^+]_2}$

B. $\dfrac{\alpha_1}{\alpha_2}$

C. $\dfrac{C_1\alpha_1}{C_2\alpha_2}$

D. $\dfrac{K_{a_1}C_1}{k_{a_1}C_2}$

Answer: A::C

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38. If K_{a_1}, K_{a_2} are the first, second and third ionization constants of H_2PO_4 respectively and $K_{a_1} > \; > K_{a_2} > \; > K_{a_3}$. Which is/are correct:

A. $[H^+] = \sqrt{k_{a_1}[H_3PO_4]}$

B. $[H^+] = [HPO_4^{2-}]$

C. $K_{a_2} = \left[HPO_4^{2-}\right]$

D. $K_{a_1} = \left[HPO_4^{2-}\right]$

Answer: A::C

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39. Which of the following mixtures can act as a buffer?

A. $NaOH + HCOONa(1:1\text{molar ratio})$

B. $HCOOH + NaOH(2:1\text{molar ratio})$

C. $NH_4Cl + NaOH(2:1\text{molar ratio})$

D. $HCOOH + NaOH(1:1\text{molar ratio})$

Answer: B::C

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40. The solution which consumes $\left[H^{+}\right]$ or $\left[OH^{-}\right]$ or both simultaneously from externally added base in order to give negligible change in pH, is known as buffer solution. In general, the solution resists the change in pH. Buffer solution does not mean that there does not occur a pH change in pH. Buffer solution des not mean that there does not occur a pH change at all. It implies the pH change occurs but in neglibible amount. There are two types of buffer

(i) Acidic buffer: it is a mixture of weak acid and its salt acid strong base.

(ii) Basic buffer : It is a mixture of weak base and its salt with strong acid.

Which of the following mixture will be a buffer solution when dissolved in $500mL$ of water:

A. 0.200 mol of aniline and 0.200 mol of HCl

B. 0.200 mol of aniline and 0.400 mol of $NaOH$

C. 0.200 mol of NaCl and 0.100 mol of HCl

D. 0.200 mol of aniline and 0.100 mol of HCl

Answer: D

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41. The solution which consumes $\left[H^{+}\right]$ or $\left[OH^{-}\right]$ or both simultaneously from externally added base in order to give negligible change in pH, is known as buffer solution. In general, the solution resists the change in pH. Buffer solution does not mean that there does not occur a pH change in pH. Buffer solution des not mean that there does not occur a pH change at all. It implies the pH change occurs but in neglibible amount. There are two types of buffer

(i) Acidic buffer: it is a mixture of weak acid and its salt acid strong base.

(ii) Basic buffer : It is a mixture of weak base and its salt with strong acid.

pH of $0.01M(NH_4)_2SO_4$ and $0.02MNH_4OH$ buffer (pK_a of $NH_{4^+} = 9.26$) is

A. $4.74 + \log 2$

B. $4.74 - \log 2$

C. $4.74 + \log 1$

D. $9.26 + \log 1$

Answer: D

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42. The solution which consumes $[H^+]$ or $[OH^-]$ or both simultaneously from externally added base in order to give negligible change in pH, is known as buffer solution. In general, the solution resists the change in pH. Buffer solution does not mean that there does not occur a pH change in pH. Buffer solution des not mean that there does not occur a pH change at all. It implies the pH change occurs but in neglibible amount. There are two types of buffer

(i) Acidic buffer: it is a mixture of weak acid and its salt acid strong base.

(ii) Basic buffer : It is a mixture of weak base and its salt with strong acid.

To prepare a buffer of $pH 8.26$, amount of $(NH_4)_2OH$ solution $[pK_a(NH_{4^+} = 9.26]$

A. 0.05mol

B. 0.025 mol

C. 0.01 mol

D. 0.005 mol

Answer: B

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43. If a springly soluble salt is placed in water, after some time an equilibrium is established when the rate of dissolution of ions form the soid equal to the rate of precipitation of ions from the saturated solution at a particular temperature. Thus, a dynamic equilibrium exists between the undissociated solid species and the dissolved ionic species in a saturated and the dissolved ionic species in a saturated solution at a particular temperature. For example, in $AgCl$, we have the following equilibrium:

$$AgCl_{(aq.)} Ag^{+}_{(aq)} + Cl^{-}_{(aq)}$$

The equilibrium constant

$$K_{eq} = \frac{[Ag^{+}][Cl^{-}]}{[AgCl]}$$

$$K_{eq} \times [AgCl] = [Ag^{+}][Cl^{-}]$$

$\Rightarrow K_{sp}(AgCl) = [Ag^+][Cl^-]$........$(A)$

$\because [AgCl]$ is constant

If there would not have been a saturated solution, then from equation (A), $Keq. [AgCl] \neq K_{sp}$, but $K_{eq}. [AgCl] = Q_{AgCl}$, where Q is ionic product, it implies that for a saturated solution,

$Q = K_{sp}$

K_{sp} is temperature dependent.

When $Q < K_{sp}$, then the solution is unsaturated and there will be no precipitate formation.

When $Q = K_{sp}$, then solution will be saturated, no and ppt. will be formed

When $Q > K_{sp}$, the solution will be supersaturated and there will be formation precipitate.

The solubility product of ferric hydroxide in aqueous solution is 6×10^{-38} at $298K$. The solubility of Fe^{3+} ions will increase when the :

A. pH is increased

B. pH is 7.0

C. pH is decreased

D. saturated solution is exposed to the atmosphere

Answer: C

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$$AgCl_{(aq.)} Ag^{+}_{(aq)} + Cl^{-}_{(aq)}$$

The equilibrium constant

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When $Q = K_{sp}$, then solution will be saturated, no and ppt. will be formed

When $Q > K_{sp}$, the solution will be supersaturated and there will be formation precipitate.

A solution is a mixutre of $0.05 M NaI$. The concentration of iodide ion in the solution when $AgCl$ just starts precipitating is equal to :

$(K_{sp} AgCl = 1 \times 10^{-10} M^2:$

$K_{sp} Ag = 4 \times 10^{-16} M^2)$

A. $4 \times 10^{-6} M$

B. $2 \times 10^{-8} M$

C. $2 \times 10^{-7} M$

D. $8 \times 10^{-15} M$

Answer: C

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45. If a springly soluble salt is placed in water, after some time an equilibrium is established when the rate of dissolution of ions form the soid equal to the rate of precipitation of ions from the saturated solution at a particular temperature. Thus, a dynamic equilibrium exists between the undissociated solid species and the dissolved ionic species in a saturated and the dissolved ionic species in a saturated solution at a particular temperature. For example, in $AgCl$, we have the following equilibrium:

$AgCl_{(aq.)} Ag^{+}_{(aq)} + Cl^{-}_{(aq)}$

The equilibrium constant

$$K_{eq} = \frac{[Ag^{+}][Cl^{-}]}{[AgCl]}$$

$$K_{eq} \times [AgCl] = [Ag^{+}][Cl^{-}]$$

$\Rightarrow K_{sp}(AgCl) = [Ag^+][Cl^-]$........$(A)$

$\because [AgCl]$ is constant

If there would not have been a saturated solution, then from equation (A), $Keq. [AgCl] \neq K_{sp}$, but $K_{eq}. [AgCl] = Q_{AgCl}$, where Q is ionic product, it implies that for a saturated solution,

$Q = K_{sp}$

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When $Q < K_{sp}$, then the solution is unsaturated and there will be no precipitate formation.

When $Q = K_{sp}$, then solution will be saturated, no and ppt. will be formed

When $Q > K_{sp}$, the solution will be supersaturated and there will be formation precipitate.

At $25^0 C$, will a precipitate of $Mg(OH)_1$ form when a 0.0001 M solution of $Mg(NO_3)_2$ is adjusted to a pH of 9.0 ? At what minimum value of pH will precipitation start?

[Given : $K_{sp}(Mg(OH)_2) = 10^{-11} M^3$]

A. No, pH $= 3.5$

B. No, pH $= 10.5$

C. No, pH $= 6.0$

D. $8 \times 10^{-15} M$

Answer: B

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46. If a springly soluble salt is placed in water, after some time an equilibrium is established when the rate of dissolution of ions form the soid equal to the rate of precipitation of ions from the saturated solution at a particular temperature. Thus, a dynamic equilibrium exists between the undissociated solid species and the dissolved ionic species in a saturated and the dissolved ionic species in a saturated solution at a particular temperature. For example, in $AgCl$, we have the following equilibrium:

$AgCl_{(aq.)} Ag^{+}_{(aq)} + Cl^{-}_{(aq)}$

The equilibrium constant

$$K_{eq} = \frac{[Ag^{+}][Cl^{-}]}{[AgCl]}$$

$$K_{eq} \times [AgCl] = [Ag^{+}][Cl^{-}]$$

$$\Rightarrow K_{sp}(AgCl) = [Ag^{+}][Cl^{-}]........(A)$$

$\because [AgCl]$ is constant

If there would not have been a saturated solution, then from equation (A), $Keq.[AgCl] \neq K_{sp}$, but $K_{eq}.[AgCl] = Q_{AgCl}$, where Q is ionic product, it implies that for a saturated solution,

$$Q = K_{sp}$$

K_{sp} is temperature dependent.

When $Q < K_{sp}$, then the solution is unsaturated and there will be no precipitate formation.

When $Q = K_{sp}$, then solution will be saturated, no and ppt. will be formed

When $Q > K_{sp}$, the solution will be supersaturated and there will be formation precipitate.

Slaked lime, $Ca(OH)_2(s) \Leftrightarrow Ca^{2+}(aq) + 2OH^{-}(aq)$:

$$K_{sp} = 5.5 \times 10^{-6}$$

A. 1.66

B. 12.34

C. 7

D. 14

Answer: B

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47. Acidity or alkalinity of a solution depend upon the concentration of hydrogen ion relative to that of hydroxyl ions. The product of hydrogen ion & hydroxyl ion concentration is given by

$K_w = [H^+][OH^-]$

the value of which depends only on the temperature & not on the individual ionic concentration. If the concentratoin of hydrogen ions exceeds that of the hydroxyl ions, the solution is said to be acidic, whereas, if concentrations of hydroxyl ion exceeds that of the hydrogen ions, the solution is said to be alkaline. The pH corresponding to the acidic and alkaline solutions at $25^\circ C$ will be less than and greter than seven, respectively. To confirm the above facts $0.5 M CH_3COOH$ is taken fro the experiments.

[Given : K_a of acetic acid $= 1.8 \times 10^{-5}$]

pH of the solution will be:-

A. 2.52

B. 2.22

C. 5

D. 3.92

Answer: A

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48. Acidity or alkalinity of a solution depend upon the concentration of hydrogen ion relative to that of hydroxyl ions. The product of hydrogen ion & hydroxyl ion concentration is given by

$K_w = \left[H^+\right]\left[OH^-\right]$

the value of which depends only on the temperature & not on the individual ionic concentration. If the concentratoin of hydrogen ions exceeds that of the hydroxyl ions, the solution is said to be acidic, whereas, if concentrations of hydroxyl ion exceeds that of the hydrogen ions, the solution is said to be alkaline. The pH corresponding to the acidic and alkaline solutions at $25^{\circ} C$ will be less than and greter than seven, respectively. To confirm the above facts $0.5 M CH_3COOH$ is taken fro the experiments.

[Given : K_a of acetic acid $= 1.8 \times 10^{-5}$]

If pH of solution is double what will be the concentration of acetic acid-

A. $1.8 \times 10^{-5} M$

B. $1.0 M$

C. $4.6 \times 10^{-6} M$

D. $1.25 \times 10^{-3} M$

Answer: C

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49. Acidity or alkalinity of a solution depend upon the concentration of hydrogen ion relative to that of hydroxyl ions. The product of hydrogen ion & hydroxyl ion concentration is given by

$K_w = \left[H^+\right]\left[OH^-\right]$

the value of which depends only on the temperature & not on the individual ionic concentration. If the concentratoin of hydrogen ions exceeds that of the hydroxyl ions, the solution is said to be acidic, whereas, if concentrations of hydroxyl ion exceeds that of the hydrogen ions, the solution is said to be alkaline. The pH corresponding to the acidic and alkaline solutions at $25^\circ C$ will be less than and greter than seven, respectively. To confirm the above facts $0.5 M CH_3COOH$ is taken fro the experiments.

[Given : K_a of acetic acid $= 1.8 \times 10^{-5}$]

To what volume at $25^\circ C$ must $1 dm^3$ of this solution be diluted in order to double the pH

A. $3.37 \times 10^4 dm^3$

B. $1 \times 10^3 dm^3$

C. $1.68 \times 10^4 dm^3$

D. $3.18 \times 10^3 dm^3$

Answer: B

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50. In qualitative analysis, cations of group II as well as group IV precipitated in the form of sulphides. Due to low value of Ksp of group II sulphides, group reagent is H_2S in presence of dil. HCl and due to high value of Ksp of group IV sulphides, group reagent is H_2S in presence of NH_4OH and NH_4Cl.

In $0.1 M H_2S$ solution, Sn^{2+}, Cd^{2+} and Ni^{2+} ions are present in equimolar concentration $(0.1M)$. Given : $Ka_1(H_2S) = 10^{-7}, Ka_2(H_2S) = 10^{-14}, K_{sp}(SnS) = 8 \times 10^{-29}, K_{sp}(CdS$

At what pH precipitate of NiS will form

A. 12.76

B. 7

C. 1.24

D. 4

Answer: C

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51. In equalitative analysis, cations of graph II as well as group IV both are precipitated in the form of sulphides. Due to low value of K_{sp} of group II sulphides, group reagent is H_2S in the presence of dil. $HC1$, and due to high value of K_{sp} of group IV sulphides, group reagent is H_2S in the presence of NH_4OH and NH_4C1. In a solution containing $0.1M$ each of Sn^{2+}, Cd^{2+}, and Ni^{2+} ions, H_2Sgas is passed.

$K_{sp}ofSnS = 8 \times 10^{-29}, K_{sp}ofCdS = 1510^{-28}, K_{sp}ofNiS - 3 \times 10^{-21}, K$

Which of the following sulphides is more soluble in pure water?

A. CdS

B. NiS

C. SnS

D. all have equal solubility

Answer: B

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52. Solution of an acid and it's anion (that is it's conjugate base) or of a base and it's common cation are buffered. When we add a small amount of acid or base to any one of them, the pH of solution changes very little pH of buffer solution can be compoted

as , for , acidic , buffer

$$pH = pK_a + \log\frac{[\text{Conjugate base}]}{[\text{Acid}]}$$

for basuc buffer

$$pOH = pK_b + \log\frac{[\text{Conjugated base}]}{[\text{base}]}$$

it is generally accepteed that a solution has useful buffer capacity (pH change resistng power) provided that the value of [salt or conjugate base]/[acid] for acidic acid buffer lies within the range of $1:10$ to $10:1$.

Buffer capacity is max.

When [conjugate base]=[acid]

One litre of an aqueous solution contaion 0.15 mole of $CH_3COOH(pK_a = 4.8)$ and 0.15 mole of CH_3COONa. After the addition of 0.05 moe of solid $NaOH$ to this solution, the pH will be:

A. 4.5

B. 4.8

C. 5.1

D. 5.4

Answer: C

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53. Solution of an acid and it's anion (that is it's conjugate base) or of a base and it's common cation are buffered. When we add a small amount of acid or base to any one of them, the pH of solution changes very little pH of buffer solution can be compoted

as , for , acidic , buffer

$$pH = pK_a + \log\frac{[\text{Conjugate base}]}{[\text{Acid}]}$$

for basuc buffer

$$pOH = pK_b + \log \frac{[\text{Conjugated base}]}{[\text{base}]}$$

it is generally accepteed that a solution has useful buffer capacity (pH change resistng power) provided that the value of [salt or conjugate base]/[acid] for acidic acid buffer lies within the range of $1:10$ to $10:1$. Buffer capacity is max.

When [conjugate base]=[acid]

Calculate the pH of the solution made by adding 0.01 mole of HCl in 100 ml. of solution which is $0.2M$ in $NH_3(pK_b = 4.74)$ and $0.3M$ in NH_4^+:

A. 5.34

B. 8.66

C. 7.46

D. 4.46

Answer: B

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54. Solution of an acid and it's anion (that is it's conjugate base) or of a base and it's common cation are buffered. When we add a small amount of acid or base to any one of them, the pH of solution changes very little pH of buffer solution can be compoted

as , for , acidic , buffer

$$pH = pK_a + \log \frac{[\text{Conjugate base}]}{[\text{Acid}]}$$

for basuc buffer

$$pOH = pK_b + \log \frac{[\text{Conjugated base}]}{[\text{base}]}$$

it is generally accepteed that a solution has useful buffer capacity (pH change resistng power) provided that the value of [salt or conjugate base]/[acid] for acidic acid buffer lies within the range of $1:10$ to $10:1$. Buffer capacity is max.

When [conjugate base]=[acid]

Useful buffer range of weak acid $HA\left(k_a = 10^{-5}\right)$ is :

A. 5 to 7

B. 4 to 6

C. 3 to 5

D. 9 to 8

Answer: B

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55. Solution of an acid and it's anion (that is it's conjugate base) or of a base and it's common cation are buffered. When we add a small amount of acid or base to any one of them, the pH of solution changes very little pH of buffer solution can be compoted

as , for , acidic , buffer

$$pH = pK_a + \log\frac{[\text{Conjugate base}]}{[\text{Acid}]}$$

for basuc buffer

$$pOH = pK_b + \log\frac{[\text{Conjugated base}]}{[\text{base}]}$$

it is generally accepteed that a solution has useful buffer capacity (pH change resistng power) provided that the value of [salt or conjugate base]/[acid] for acidic acid buffer lies within the range of $1:10$ to $10:1$. Buffer capacity is max.

When [conjugate base]=[acid]

Select correct statement:

A. When we add shall amount of $NaOH$ in acidic buffer solution, pOH of the solution is increases

B. When we add small amount of NaOH in basic buffer solution, pH of the solution is incrases

C. When we add small amount of water of the acidic buffer solution, pH of the solution is decreases

D. When $100ml$ of $0.2MCH_3COOH$ react with $200ml$ of $0.1MNaOH$, buffer solution is formed

Answer: B

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56. When $100ML$ of $1.0MHCl$ was mixed $100MI$ of $1.0MNaOH$ in an insulated beakertat constant pressure, a temperature incease of 5.7^0C

was measured for the beaker and its contents (Expt.1) Because th enthalpy of neutralization of a c $5.7^0 C$ strong acid with a strong base is constant $(-57.0 kJmoL - I)$, this experiment could be used to measure the calorimeter constant. In a second experiment (Expt.2) , $100 ML$ of $2.0 M$ acetic acid $\left(K_a = 2.0 \times 10^{-5}\right)$ was mixed with $100 ML$ of $1.0 mNaOH$ (under identical conditions to Expt. 1) Where a temperature rise of $5.0^0 C$ was measured.

(Consider heat capcity of all solution as $4.2 Jg^{-1}$ and density of all solution as $1.0 gmL^{-1}$)

Enthalpy of dissociation (in $KJMol^{-1}$) of acetic acid obtained from Expt, 2 is

A. 1.0

B. 10.0

C. 24.5

D. 51.4

Answer: A

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57. When $100 ML$ of $1.0 MHCl$ was mixed $100 MI$ of $1.0 MNaOH$ in an insulated beakertat constant pressure, a temperature incease of $5.7^0 C$ was measured for the beaker and its contents (Expt.1) Because th enthalpy of neutralization of a c $5.7^0 C$ strong acid with a strong base is constant $(-57.0 kJmoL - I)$, this experiment could be used to measure the calorimeter constant. In a second experiment (Expt.2) , $100 ML$ of $2.0 M$ acetic acid $\left(K_a = 2.0 \times 10^{-5}\right)$ was mixed with $100 ML$ of $1.0 mNaOH$ (under identical conditions to Expt. 1) Where a temperature rise of $5.0^0 C$ was measured.

(Consider heat capcity of all solution as $4.2 Jg^{-1}$ and density of all solution as $1.0 gmL^{-1}$)

The p^H of the solution after Expt.2 is

A. 2.8

B. 4.7

C. 5.0

D. 7.0

Answer: B

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58. Consider a buffe of CH_3COOH and CH_3COONa of maximum buffer-capacity and match and following:

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59. Mathc the operations in column-I with compounds in column-II

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60. Match the column-I with Column-II

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61. Match the Column of I and II

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62. What will the pH of the solution of the salt of weak acid and weak base?

$(K_b = 1 \times 10^{-6}$ and $K_a = 1 \times 10^{-4})$

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63. Conjugate base of $\left[Al(H_2O)_6\right]^{+3}$ is $Al(H_2O)_x(OH)_y$, the value of x/y is,

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64. The mixture of $10ml 0.5N CH_3COOH$ and $10ml 0.25M NaOH$, having $pH = 5$, then find the value of pKa?

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65. Among the mixutre

(i) $50ml$ of $N/10 HCl + 50ml$ of $N/10 NaOH$

(ii) $55ml$ of $N/10 HCl + 45ml$ of $N/10 NaOH$

(iii) $75ml$ of $N/10 HCl + 25ml$ of $N/10 NaOH$

(iv) $30ml$ of $N/5 HCl + 70ml$ of $N/5 NaOH$

For how many of the above mixutres pH lies between 1 to 7

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66. 0.1 millimole of $CdSO_4$ are present in 10 mL acid solution of $0.08N HCI$. Now H_2S is passed to precipitate all the Cd^{2+} ions. The pH of the solution after filtering off precipitate, boiling of H_2S and making the solution 100 mL by adding H_2O, is:

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67. Amonst the following, the total number of compounds whose aqueous solution turns red litmus paper blue is:

KCN	K_2SO_4	$(NH_4)_2C_2O_4$	$NaCI$
$Zn(NO_3)_2$	$FeCI_3$	K_2CO_3	NH_4NO_3
$LiCN$			

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68. A certain buffer solution contains equal concentartion of X^{Θ} and HX. The K_b for X^{Θ} is 10^{-10}. The pH of the buffer is

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69. Neutralisation constant of $HCOOH$ with a strong base is 10^8. What is the pH of $0.01M$ HCOOK solution? At 25^0C

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70. A maximum 10^{-x} moles of $MgCl_2$ could be dissolbed in one litre of a solution containing $0.1 M NH_3$ and $0.01 M NH_4^+$, without causing precipitation of $Mg(OH)_2$, what is the value of $'x'$? (K_a of $NH_4^+ = 10^{-8}$, K_{sp} of $Mg(OH)_2$ is 10^{-16})

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71. $10 ml$ of $0.1 M CH_3COOH$ is mixed with $990 ml$ of $0.01 M NaCl$ solution. What is the change in pH of CH_3COOH solution

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72. If solubility of AgCl in 0.2 M solution of $AgNO_3$ is represented as $y \times 10^{-10}$ then find the value of y.

$\left(\text{Given}: K_{sp(AgCl)} = 10^{-10}\right)$

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73. When one litre of a saturated solution of $PbCl_2$ (mol. Mass=278) is evaported, the residue is found to weight 2.78g. If K_{sp} of $PbCl_2$ is represented as $y \times 10^{-6}$ then find the value of y.

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74. A solution of glycine hydrochloride contains the chloride ion and the glycinium ion, $.^{+}NH_3 - CH_2 - COOH$, which is a diprotic acid,

$H_3N^+ - CH_2 - COOH + H_2O \Leftrightarrow$

$H_3N^+ - CH_2 - COO^- + H_3O^+, K_1 = 4.47x10^{-3}$

$H_3N^+ - CN_2 - COO^- + H_2O \Leftrightarrow$

$H_2N - CH_2 - COO^- + H_3O^+, K_2 = 1.66x10^{-10}$

Calculate pH of a $0.05M$ of glycine hydrochloride.

A. 1.89

B. 2.52

C. 8.91

D. 9.18

Answer: A

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75. Which one of the following curves represents the graph pH during the titration of $NaOH$ and HCl(aq)

A.

B.

C.

D.

Answer: A

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76. The best indicator for the detection of the end point in the titration of a weak acid and a strong base is

A. Methyl orange $(3.1$ to $4.4)$

B. Methyl red $(4.2$ to $6.3)$

C. Bromothymol blue $(6$ to $7.6)$

D. Phenolphthalein $(8.2$ to $10)$

Answer: D

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77. Select the indicator form the given table for titratioin of $20mL$ of $0.02MCH_3COOH$ with $0.02MNaOH$. Given $pK_a(CH_3COOH) = 4.74$

A. I

B. II

C. III

D. IV

Answer: D

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78. Silver ions are added to a solution with $[Br^{-}] = [Cl^{-}] = [CO_3^{2-}] = [AsO_4^{3-}]$=0.1M. Which compound will precipitate with lowest $[Ag^{+}]$?

A. $AgBr(K_{sp} = 5 \times 10^{-13})$

B. $AgCl(K_{sp} = 1.8 \times 10^{-10})$

C. $Ag_2CO_3(K_{sp} = 8.1 \times 10^{-12})$

D. $Ag_3AsO_4(K_{sp} = 1 \times 10^{-22})$

Answer: A

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79. At $25^\circ C$, pH of a $0.01M$ solution of a monobasic acid $[HA]$ is 4. The correct statement(s) regarding HA and its given solution is (are)

A. HA is a weak acid

B. The ionization constant (K_a) of acid is approximately 10^{-6} at $25^\circ C$.

C. Increasing the temperature of solution would cause the pH to decrease.

D. Addition of $0.1MHCl$ solution would lower pH by increasing degree of ionization

Answer: A::B::C

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80. Which of the following solutions will have pH close to 1.0 ?

A. $100mLM/10HCl + 100mLM/10NaOH$

B. $160mL 0.075 M H_2SO_4 + 40 mL M/10 NaOH$

C. $55 mL M/10 HCl + 45 mL M/10 NaOH$

D. $75 mL M/5 HCl + 25 mL M/5 NaOH$

Answer: B::D

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81. The equilibrium constant (K_c) for the reaction of a weak acid HA with strong base $NaOH$ is 10 at $25^\circ C$. Which of the following are correct deduction

A. The ionization constant K_a at $25^\circ C$ is 10^{-5}

B. pH of a $0.01M$ aqueous solution of HA at $25^\circ C$ will be 3.5

C. pH of a $0.01M$ aqueous solution of NaA at $25^\circ C$ will be 9.

D. If K_b of weak base BOH is 10^{-4} at $25^\circ C$, equilibrium constant for neutralization of HA with BOH at $25^\circ C$ will be 10^5

Answer: A::B::C::D

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82. If $500ml$ of $0.4MAgNO_3$ is mixed with $50ml$ of $2MNH_3$ solution then what is the concentration of $[Ag(NH_3)]^+$ in solution $\left(K_t, [Ag_{NH_3}]^+ = 10^3, K_{f_2}\left[Ag(NH_3)_2\right]^+ = 10^4\right)$

A. $3.33 \times 10^{-7}M$

B. $3.33 \times 10^{-5}M$

C. $3 \times 10^{-4}M$

D. $10^{-7}M$

Answer: B

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83. Solution of X is being titrated against a solution of Y. If phenolphathalen is found to be a suitabe indicator. X and Y could be respectively.

A. $NaOH$ and HCl

B. HCl and $NaOH$

C. CH_3COOH and $NaOH$

D. HCl and $NH_3(aq)$

Answer: A::B::C

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84. Titration curves for $0.10M$ solution of three weak acids HX, HY and HZ with ionization constants H_1, K_2 and K_3 respectively are plotted as shown in the figure below:

A. $K_2 = \frac{K_1 + K_2}{2}$

B. $K_1 < K_3$

C. $K_1 > K_2$

D. $K_2 > K_3$

Answer: C::D

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85. Two sparnigly soluble salts AX and BX_2 have their solubility product constant equal . Which of the following is (are) correct deduction(s) ?

A. Solubility of AX isw greater than solubility of BX_2.

B. If S_1 and S_2 are molar solubility of AX and BX_2 then $S_1 = (S_2)^{3/2}$

C. If X is a conjugate base of a weak acid, addition of HNO_3 will increase solubility of both AX with BX_2.

D. Increasing the temperature, increase the solublity of both AX and BX_2.

Answer: A::C

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86. pH of saturated aquoeus solution of $Ba(OH)_2$ is 12. Identify the correct statement.

A. The solubility of $Ba(OH)_2$ in a buffer solution of $pH = 13$ is 5×10^{-5} moles/L

B. The solubility of $Ba(OH)_2$ decreases in the presence of NH_4Cl

C. The solubility of $Ba(OH)_2$ in a buffer solution of $pH = 1$ is 5×10^{-5} moles/L

D. The solubility of $Ba(OH)_2$ is $5 \times 10^{-7} M^3$

Answer: A::D

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87. Which of the following is true about an aqeous solution (saturated) of $AgCl$?

A. Adding $NaCl$ loweres the solubility of $AgCl$.

B. Adding Na_2CO_3 has no effect

C. Adding aquoeus ammonia increases solubility of $AgCl$

D. Adding $NaBr$ doesn't effect the solubility of $AgCl$.

Answer: A::C

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88. $K_{sp}(25^\circ C)$ of Ag_2CrO_4 is 4×10^{-12}. Which of the following mixer will bring about precipitatin of Ag_2CrO_4.

A. $10mL3 \times 10^{-4}MAgNO_3 + 10mL10^{-4}MNa_2CrO_4$

B. Adding 10 milli moles of Na_2CrO_4 to 100 mL ofsaturated $AgCl(K_{sp} = 2 \times 10^{-10})$ solution

C. Mixing equal volumes of $10^{-4} M AgNO_3$ with $10^{-4} M Na_2CrO_4$ solution

D. $10 mL 10^{-3} M AgNO_3 + 15 mL 10^{-3} M Na_2CrO_4$

Answer: B::D

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89. Which of the following statement is/are correct?

A. The conjugate acid of $NH_{2(-)}$ is NH_3

B. Kxp increases with increases in concentration of ions

C. on dilution of a buffer solution, p^H change is negligible

D. In alkaline buffer solution, if some HCl is added it's $[OH^-]$ will increase

Answer: A::C

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90. $H_3PO_4 \Leftrightarrow H^{\oplus} + H_2PO_4^{\Theta}, K_{a1}$:

$H_2PO_4^{\Theta} \Leftrightarrow H^{\oplus} + HPO_4^{2-}, 'K_{a2}$:

$HPO_4^{2-} \Leftrightarrow H^{\oplus} + PO_4^{3-}, K_{a3}$:

Mark out the incorrect statements:

A. $K_{a_1} > K_{a_2} > K_{a_3}$

B. pH of $\left(H_2PO_4^T\right) = \dfrac{pKa_2 + pKa_3}{2}$

C. Both H_2PO_4 and $H_2PO_4^T$ are more acidic than HPO_4^{2-}

D. Only HPO_4^{2-} and $H_2PO_4^{2-}$ is amphiprotic anion in the solution

Answer: B::D

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91. Which of the following statement(s) is (are) correct?

A. The p^H of 10^{-8} M solution of HCl is 8

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

C. Auto protolysis constant of water increases with temperature

D. When a solution of weak monoprotic acid is titrated against a strong base, at half of neutraliastion point $p^H = 1/2p^{Ka}$

Answer: B::C

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92. Which one is correc for H_2O at 25^0C

A. Ionic product of water $K_w = 10^{-14}$

B. Equilibrium constant for dissociation of water $(Kc = 1.8 \times 10^{-16})$

C. Autoprotolysis constant of water $(k = 3.2 \times 10^{-} \times 10^{18})$

D. K_w increases with rise in temperature

Answer: A::B::C::D

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93. Ksp of $AgBr, AgCl, Ag_2CO_3$ and Ag_3AsO_4 are $5 \times 10^{-13}, 1.8 \times 10^{-10}, 8.1 \times 10^{-12}$ and 10^{-22} respectively. Silver nitrate is added to the solution each having $0.1M$ concentration of Br^-, Cl^-, CO_3^+ and AsO_4^{3-}. Select the correct statements

A. $AgBr$ will be precipitated before $AgCl$

B. Ag_2CO_3 will be precepitated afte Ag_3AsO_4

C. Ag_3AsO_4 will be precipitated after $AgCl$

D. Ag_3AsO_4 will be precipitated after Ag_2CO_3

Answer: A::B::C

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94. An acid-base indicator has $K_a = 10^{-5}$. The acid form of the indicator is red and basic form is blue. Which of the following is//are correct?

A. At $pH = 4.52$ solution is red

B. At $pH = 5.47$ solution is red

C. At $pH = 6$ solution is 75% red.

D. At $pH = 8$ solution is 75% blue.

Answer: A::B

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95. Which of the following statement(s) is/are corect

A. Water equalies the strength of $NaOH, KoH, CsOH$ and $Ba(OH)_2$

B. Relative Strength of acids $HClO_4, H_2SO_4, HNO_3HI$ etc. is determied by taking them in CH_3COOH

C. Relative strength of bases like $NaOH, Ba(OH)_2, CaOH$ and KOH can be determined by taking them in H_2O

D. $H_3BO_3$is a weak Lewis acid but not a Bronsted acid

Answer: A::B::D

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96. Choose the correct set of True/False for following statements

A. Silver chloride in mor soluble in very concentrated sodium choride solution than in pure water.

B. The pH of a a buffer solution does not change on addition of small amount of an acid or a base

C. Degree of hydrolysis of ammonia acetate does not depend upon the concentration of ammonium acetate solution

D. A mixture of acetic acid and sodium acetate can act as buffer solution.

Answer: A::B::C::D

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97. Acid base indicators are either weak organic acids or weak organic bases. Indicator change colour in dilute solution when the hydronium ion concentration reaches a particular value. For example, phenopthalein is a colour less substance in any aqueous solution with a pH less than 8.3 in between the pH range 8.3 to 10, transaction of colour (colourless to pink) takes place and if pH of solution is greater than 10, then solution colour is dark pin. Considering an acid indicator HIn, base In^{-} can be represented as :

$$HIn \Leftrightarrow H^{+} + In^{-}$$

acidic form basic form pH of solution can be computed as :

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

In general, transition of colour takes place in between the pH range

$pK_{In} \pm 1$

An indicator is a weak acid and pH range is 4.0 to 6.0. If indicator is 50% ionized in a given solution then what is ionization consatant of the acid?

A. 10^{-4}

B. 10^{-5}

C. 10^{-6}

D. 10^{-7}

Answer: B

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98. Acid base indicators are either weak organic acids or weak organic bases. Indicator change colour in dilute solution when the hydronium ion concentration reaches a particular value. For example, phenopthalein is a colour less substance in any aqueous solution with a pH less than 8.3 in between the pH range 8.3 to 10, transaction of colour (colourless to pink) takes place and if pH of solution is greater than 10, then solution colour is dark pin. Considering an acid indicator HIn, base In^{-} can be represented as :

$HIn \Leftrightarrow H^{+} + In^{-}$

acidic form basic form pH of solution can be computed as :

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

In general, transition of colour takes place in between the pH range $pK_{In} \pm 1$

Select the correct statement among the following

A. In the complete ionisation of indicator its $pH = pK_{In}$

B. Methyl orange (working range : 3.1 to 4.4) is a suitable indicator for weak acid and strong base

C. Bromothymol blue (working range of 6.0 to 7.6) is a good indicator for titration of HCl and $NaOH$

D. Thymal blue (working range 1.2 to 2.8) is good indicator for titration of $100ml$ of $0.1 M NH_4OH (pK_b = 4.74)$ and $0.1 M HCl$.

Answer: C

View Text Solution

99. Acid base indicators are either weak organic acids or weak organic bases. Indicator change colour in dilute solution when the hydronium ion concentration reaches a particular value. For example, phenopthalein is a colour less substance in any aqueous solution with a pH less than 8.3 in between the pH range 8.3 to 10, transaction of colour (colourless to pink) takes place and if pH of solution is greater than 10, then solution colour is dark pin. Considering an acid indicator HIn, base In^{-} can be represented as :

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

In general, transition of colour takes place in between the pH range $pK_{In} \pm 1$

The ionization constant of an indicator is 5×10^{-5} at $25^{0}C$. Its acid form is deep orange while its basic is yellow colour in aqeous solution. which of the following statement is true for this indicator

A. The work range of the indicator is 3.3 to 5.3

B. It cannot be used in the titration of $0.1MHCl$ with $0.1MNaOH$

C. If an acid is titrated using this indicator, at the end point colour of solution changes from yellow to orange.

D. It can be used in the titration of CH_3COOH to orange.

Answer: A

View Text Solution

100. Acid base indicators are either weak organic acids or weak organic bases. Indicator change colour in dilute solution when the hydronium ion concentration reaches a particular value. For example, phenopthalein is a colour less substance in any aqueous solution with a pH less than 8.3 in between the pH range 8.3 to 10, transaction of colour (colourless to pink) takes place and if pH of solution is greater than 10, then solution colour is dark pin. Considering an acid indicator HIn, base In^{-} can be represented as :

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acidic form basic form pH of solution can be computed as :

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

In general, transition of colour takes place in between the pH range

$pK_{In} \pm 1$

If an indicator is to be used in an acid base titration having an equivalence point in pH range 8 to 10, the indicator must

A. be a weak base

B. have K_a of about 1×10^{-9}

C. ionise in two steps

D. be added to the solution only after it become alkaline

Answer: B

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101. Acid base indicators are either weak organic acids or weak organic bases. Indicator change colour in dilute solution when the hydronium ion concentration reaches a particular value. For example, phenopthalein is a colour less substance in any aqueous solution with a pH less than 8.3 in between the pH range 8.3 to 10, transaction of colour (colourless to pink) takes place and if pH of solution is greater than 10, then solution colour is dark pin. Considering an acid indicator HIn, base In^{-} can be represented as :

$$HIn \Leftrightarrow H^{+} + In^{-}$$

acidic form basic form pH of solution can be computed as :

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

In general, transition of colour takes place in between the pH range $pK_{In} \pm 1$

Which of the following indicator is most suitable for titration of HBr with strong base:

A. Phenolphthalein $(8.3 - 10)$

B. Bromothymol blue $(6 - 7.6)$

C. Methyl red $(4.2 - 6.3)$

D. Malachite green $(11.4 - 13)$

Answer: A

View Text Solution

102. Considering the following titration curve and answer the questions that follows:

$20mL$ of the solution being titrated is present initially

The species being titrated is

A. weak base

B. weak acid

C. dilute solution of strong acid

D. CH_3COONa

Answer: B

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103. Considering the following titration curve and answer the questions that follows:

$20mL$ of the solution being titrated is present initially

The point of optimal buffering on the curve is `

A. P

B. Q

C. R

D. S

Answer: A

View Text Solution

104. Considering the following titration curve and answer the questions that follows:

$20mL$ of the solution being titrated is present initially

The initial concentration of the species being titrated is

A. $0.1M$

B. $0.2M$

C. $0.3M$

D. $0.001M$

Answer: A

View Text Solution

105. Considering the following titration curve and answer the questions that follows:

$20mL$ of the solution being titrated is present initially

the approximate value of ionization constant of the species being titrated is

A. $0.1M$

B. $0.2M$

C. $0.3M$

D. $0.001M$

Answer: B

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106. $1.2g$ of a monoprotic acid HA,is titrated with $0.222M NaOH$ solution. The pH of the analyte solution is tiration curve is shown in the diagram. The different indicators used in this titratation and their pK_a values are as follows :

Methyl Red $(pK_a = 5.8)$, Neutral Red $(pK_a = 7.2)$, Cresol Purple $(pK_a = 8.6)$

How many mL of $NaOH$ is required to bring about the titration to its equivalence point

A. 4.00

B. 9.00

C. 19.00

D. 21.00

Answer: C

View Text Solution

107. $1.2g$ of a monoprotic acid HA,is titrated with $0.222 M NaOH$ solution. The pH of the analyte solution is tiration curve is shown in the diagram. The different indicators used in this titratation and their pK_a values are as follows :

Methyl Red $(pK_a = 5.8)$, Neutral Red $(pK_a = 7.2)$, Cresol Purple $(pK_a = 8.6)$

What is the pH of analyte at the equivalence point

A. 3.50

B. 7.00

C. 8.40

D. 10

Answer: C

View Text Solution

108. $1.2g$ of a monoprotic acid HA,is titrated with $0.222 M NaOH$ solution. The pH of the analyte solution is tiration curve is shown in the diagram. The different indicators used in this titratation and their pK_a values are as follows :

Methyl Red $(pK_a = 5.8)$, Neutral Red $(pK_a = 7.2)$, Cresol Purple $(pK_a = 8.6)$

What is the molar mass of HA

A. 180

B. 222

C. 282

D. 390

Answer: C

View Text Solution

109. $1.2g$ of a monoprotic acid HA,is titrated with $0.222 M NaOH$ solution. The pH of the analyte solution is tiration curve is shown in the diagram. The different indicators used in this titratation and their pK_a values are as follows :

Methyl Red $(pK_a = 5.8)$, Neutral Red $(pK_a = 7.2)$, Cresol Purple $(pK_a = 8.6)$

Which of the following terms most appropriately decribe the beheviour of the analyte solution between points P and Q

A. Acidic

B. Basic

C. Neutral

D. Buffer

Answer: D

View Text Solution

110. $1.2g$ of a monoprotic acid HA,is titrated with $0.222 M NaOH$ solution. The pH of the analyte solution is tiration curve is shown in the diagram. The different indicators used in this titratation and their pK_a values are as follows :

Methyl Red $(pK_a = 5.8)$, Neutral Red $(pK_a = 7.2)$, Cresol Purple $(pK_a = 8.6)$

Choose the correct statement from the following

A. In the titration using methyl red a premature end point is obtained and the calculated molar mass of HA is found to be greater than the actual value.

B. In the titration using methyl red a premature end point is obtained and the calculated molar mass of HA is found to be smaller than the actual value.

C. In the titration using cresol purple end point is crossed and the calculated molar mass of HA is found to be smaller than the actual value.

D. In the titration using cresol purple the correct choice of indicator for this titration is neutral red.

Answer: A

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111. Read of the following passage giving the role of CO_2 buffer in controlling pH of blood. The importance of pH maintance in Blood. Maintenance of the pH in blood and intracellur fluids is absolutely crucial to the processes the occur in living ogranisms. This is primarily because the functioning of enzymes-catalysts for these processe- is sharply pH dependent. The normal pH value of blood plasma i 7.4. Severe illness or dear can result from subtained variations fo a few tenths of pH unit.

Among the factors that lead to a condition of acidosis, in which there is decreas in the pH of blood are heart failure, kidney failure, diabetis mellitus, persistent diarroheoa or a long term high protein diet, temporary condition acidosis may result from proglonged, intensive in ph of blood, may several factors are involved in the control of the pH of blood. A particularly important one is the ratio of

dissolved , OH_3^- to H_2CO_3. $CO_2(g)$ is moderarately soluble in water and in aqeous solution reactns only a limilated extent to product

H_2CrO_3

$CO_2 + H_2O \Leftrightarrow H_2CO_{3\,(aq)}$

$H_2CO_3 + H_2O \Leftrightarrow HCO_3^- + H_3O^+, pK_{al} = 6.11$

$HCO_3^- + H_2O \Leftrightarrow CO_3^{2-} + H_3O^+, pK_{a2} = 10.25$

In the H_2CO_3, HCO_3^- buffer system we deal only with the first ionisation step $(K_{al})H_2CO_3$ is a wear acid and HCO_3^- is the conjugate base (salt). CO_2 enters the blood from issues as the by product metabolic reaction. In lungs, $CO_2(g)$ is exchanged for $O_2(g)$, which is transported throughout the body the blood.

The pH of blood system is maintained by a proper balance of H_2CO_3 and $NaHCO_2$ concentration. The volume of $5MNaHCO_3$ solution should be mixed with a $10m$ sample of blood which is $2M$ in H_2CO_3 order to maitain its pH

A. $40mL$

B. $38mL$

C. $50mL$

D. $78mL$

Answer: D

View Text Solution

112. Read of the following passage giving the role of CO_2 buffer in controlling pH of blood. The importance of pH maintance in Blood. Maintenance of the pH in blood and intracellur fluids is absolutely crucial to the processes the occur in living ogranisms. This is primarily because the functioning of enzymes-catalysts for these processe- is sharply pH dependent. The normal pH value of blood plasma i 7.4. Severe illness or dear can result from subtained variations fo a few tenths of pH unit.

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Important diagnostic analysis in the blood is

A.

B.

C.

D.

Answer: B

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113. Read of the following passage giving the role of CO_2 buffer in controlling pH of blood. The importance of pH maintance in Blood. Maintenance of the pH in blood and intracellur fluids is absolutely crucial to the processes the occur in living ogranisms. This is primarily because the functioning of enzymes-catalysts for these processe- is sharply pH dependent. The normal pH value of blood plasma i 7.4. Severe illness or dear can result from subtained variations fo a few tenths of pH unit.

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Following reaction occurs in the body

If CO_2 escape from the system

A. pH will decreases

B. pH will increase

C. $[H_2CO_3]$ remains unchanged

D. Forward reactions is promoted

Answer: B

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114. In the titration of weak acid against strong base match the pH of the solution at different stage of titration.

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115.

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116. Match the following (in list-1) with its equation of pH (in list-II)

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117. Match column I with column II.

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118. Neutralisation constant of $HCOOH$ with a strong bse is 10^8. What is the pH of $0.01 M HCOOK$ solution at $25^0 C$?

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119. A buffer solution is formeed by mixing $100mL$ of $0.1MCH_3COOH$ with $200mL$ of $0.02MCH_3COONa$. If this buffer solution is made to $1.0L$ by adding $700mL$ of water, pH will change by a factor of

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120. If the equilibrium constant for the reaction of weak acid HA with strong base is 10^9, then pH of $0.1M$ Na A is:

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121. Solublility product constant of a sparingly soluble salt MCl_2 is 4×10^{-12} at $25^\circ C$. Also, at $25^\circ C$, solublity of MCl_2 in an aquoneous solutoion of $CaCl_2$, is 4×10^8 times less compared to its solubility in pure water. Hence, concentration (molarity) of $CaCl_2$ solution is

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122. The solubility product constant of a metal carbonate MCO_3 is 2×10^{-12} at $25^{\circ} C$. A solution is $0.1 M$ in $M(NO_3)_2$ and it is saturated with $0.01 MCO_3$. Also the ionization constant of CO_2 are : $K_{a_1} = 4 \times 10^{-7}$ and $K_{a_2} = 5 \times 10^{-11}$ at $25^{\circ} C$. The minimum pH that must be maintained to start any precipitation is

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123. Calculate pH at which an acid indicator Hin with concentration $0.1 M$ changes its colour (K_a for $\mathrm{Hin} = 1 \times 10^{-5}$)

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124. The sum of bascities of H_3PO_4, H_3PO_3 and H_3PO_2 is

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125. Ksp of $M(OH)_2$ is 5×10^{-16} at $25^0 C$. The pH of its saturated solution at $25^0 C$ is

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Level-VI (H.W)

1. The self ionization constant for pure formic acid, $K = [HCOOH_{2^+}][HCOO^-]$ has been estimated as 10^{-6} a room temperature. What percentage of formic acid molecules in pure formic acid are converted to formate ion? The density of formic acid is $1.22 g / cm^3$.

A. 0.037

B. 0.037

C. 0.37

D. 1.037

Answer: A

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2. What should be the minimum concentration of NH_4Cl that must be present to prevent precipitation, when $0.01 M NH_4OH$ is added to $0.01(M) M^{2+}$ solution?

(K_b of $NH_4OH = 1.75'10^{-5}$ and K_{sp} of $M(OH)_2 = 44.1'10^{-13}$)

A. $0.025M$

B. $0.01M$

C. $0.25M$

D. $0.083M$

Answer: D

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3. Solid $AgNO_3$ is added to a solution which $0.1M$ in Cl^- and $0.1M$ in CrO_4^{2-}. K_{sp} values for $AgCl$ and Ag_2CrO_4 are 1.7×10^{-10} and 1.9×10^{-12} respectively. The concentration of Cl^- when Ag_2CrO_4 starts precitating will be

A. $3.9 \times 10^{-5} M$

B. $2.9 \times 10^{-5} M$

C. $3.9 \times 10^{-3} M$

D. $1.9 \times 10^{-2} M$

Answer: A

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4. An aqeous solution contains 10% ammonia by mass and has density of $0.99 gmcm^{-3}$. The pH of this solution is

[Ka of $NH_3 = 5 \times 10^{-10} M$]

A. 11.033

B. 12.033

C. 9.033

D. 7.2033

Answer: B

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5. The solubility product of $Ca(OH)_2$ at $250^0 C$ 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 $Ca(OH)_2$ on milligram is precipitated?

A. $758.2 mg$

B. $725.2 mg$

C. $785.2 mg$

D. $658.2 mg$

Answer: A

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6. Calcium lactate is a salt of weak organic acid and strong base represented as $Ca(LaC)_2$. A saturated solution of $Ca(LaC)_2$ contains 0.6 mole in 2 litre solution. pOH of solution is 5.60. If 90% dissociation of the salt takes place then what is pK_a of lactic acid?

A. $2.8 - \log(0.54)$

B. $2.8 + \log(0.54)$

C. $2.8 + \log(0.27)$

D. $2.8 - \log(0.27)$

Answer: A

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7. A 1.025 g sample containing a weak acid HX (mol. Mass=82) is dissolved in 60 mL. water and titrated with 0.25 M NaOH. When half of the acid was neutralised the pH was found to be 5.0 and at the equivalence point the pH is 9.0. Calculate mass precentage of HX in sample :

A. 50%

B. 75%

C. 80%

D. 90%

Answer: C

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8. A solution of weak acid HA was titrated with base NaOH. The equivalent point was reached when 40 mL. Of 0.1 M NaOH has been added. Now 20 mL of 0.1 M HCl were added to titrated solution, the pH was found to be

5.0 What will be the pH of the solution obtained by mixing 20 mL of 0.2 M NaOH and 20 mL of 0.2 M HA?

A. 7

B. 9

C. 10

D. 11

Answer: B

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9. A buffer solution 0.04 M in Na_2HPO_4 and 0.02 in Na_3PO_4 is prepared. The electrolytic oxidation of 1.0 milli-mole of the organic compound RNHOH is carried out in 100 mL of the buffer. The reaction is RNHOH+H_(2)OrarrRNO_(2)+4H^(+)+4e^(-) The approximate pH of solution after the oxidation is complete is :

$[Given: f \text{ or } H_3PO_4, pK_{a1} = 2.2, pK_{a2} = 7.20, pK_{a3} = 12]$

A. 6.90

B. 7.20

C. 7.5

D. 8.2

Answer: C

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10. When a 20 mL of 0.08 M weak base BOH is titrated with 0.08 M HCl, the pH of the solution at the end point is 5. What will be the pOH if 10 mL of 0.04 M NaOH is added to the resulting solution?

$[Given: \log 2 = 0.30 \text{ and } \log 3 = 0.48]$

A. 5.40

B. 5.88

C. 4.92

D. 6.2

Answer: B

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11. What is $\left[Ag^{+}\right]$ in a solution made by dissolving both Ag_2CrO_4 and $Ag_2C_2O_4$ until saturation is reached with respect to both salt ?

$\left[K_{sp} = (Ag_2C_2O_4) = 2 \times 10^{-11}, K_{sp}(Ag_2CrO_4) = 2 \times 10^{-12}\right]$

A. 2.80×10^{-4}

B. 7.6×10^{-5}

C. 6.63×10^{-6}

D. 3.52×10^{-4}

Answer: D

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12. Which of the following describes the following titration curve?

A. A strong base is added to a strong acid

B. A strong base is added to a weak acid

C. A strong base is added to a diopromatic acid

D. A strong base is added to a weak acid

Answer: B

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13. Which of the following curves corresponds to the titration of a weak base with a strong acid?

A.

B.

C.

D.

Answer: C

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14. What is the pH at the equivalenve point for the titration of $0.20M$ aniline $\left(K_b = 7.95 \times 10^{-10}\right)$ with $0.20MHCL$

A. 2.8

B. 11.1

C. 5.2

D. 9.42

Answer: A

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15. Consider the titration of $0.1000M\ NH_3(K_b = 1.76 \times 10^{-5})$ with $0.1000 M HNO_3$. The pH at the equivalence point is

A. between 2.0 and 4.0

B. between 4.5 and 6.5

C. approximately 7.0

D. between 7.5 of 9.5

Answer: B

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16. In the titration of a weak acid of known concentratin with a standard solution of a strong base, a ph water was used to follow the progress of the titration. Which of the following is true of this experiment.

A. The pH at the equivalence point depends on the indicator used

B. The graph of pH versus volume of base added rises gradually at first and then much more rapidly.

C. The graph of pH versus volume of base added shows no sharp rise.

D. The $[H^+]$ at the equivalence point equals the ionization constant of the acid

Answer: B

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17. When phenolphthalein is used as the indicator in a titration of an HCl solution with a solution of $NaOH$, the indicator undergoes a colour change from colourless to poink at the end point of the tiration. This colour change occurs abruptly because

A. Phenolphthalein is a very strong acid that is capable of rapid dissociation

B. the solution being titrated undergoes a large

C. the solution being titrated undergoes a large pH change near the end point of the tiration

D. phenolphthaein undergoes an irreversible reaction in basic solution

Answer: B

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18. During the titration of a weak base with a strong acid, one should use an acid-base indicator that changes colour in the :

A. acid range

B. basic range

C. buffer range

D. neutral range

Answer: A

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19. What is the pH at the equivalence point in a titration of $0.2 M NH_3(aq)$ with $0.02 M HBr$ (aq). For the ammonia $K_b = 1.8 \times 10^{-5}$

A. 5.48

B. 5.6

C. 7.0

D. 8.5

Answer: B

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20. A sample of $100 mL$ of $0.10 M$ weak acid, HA $\left(K_a = 1.0 \times 10^{-5}\right)$ is tirated with standard $0.10 M KOH$. What volume of KOH must have been addeed when the pH in the titration flask is 5

A. 10

B. 25

C. 50

D. 100

Answer: C

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21. In the titration of 25.0 mL of $0.1M$ aqueous acetic acid $\left(K_a = 1.8 \times 10^{-5}\right)$ with $0.1MNaOH$ (aq), the pH after addition of $10.0mL$ of tirant is

A. 5.34

B. 4.57

C. 6.76

D. 2.92

Answer: B

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22. The simulaneous solubility of $AgCN(Ksp = 2.5 \times 10^{-16})$ and $AgCl(Ksp = 1.6 \times 10^{-10})$ in $1.0 M NH_{3(aq)}$ are respectively $\left(K_f\left[Ag(NH_3)_2\right]^+ = 10^7\right)$

A. $0.037, 5.78 \times 10^{-8}$

B. $5.78 \times 10^{-8}, 0.037$

C. $0.04, 6.258 \times 10^{-8}$

D. $1.58 \times 10^{-3}, 1.26 \times 10^{-5}$

Answer: B

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23. The salt $Al(OH)_3$ is involved in the following two equilibria,

$Al(OH)_{3(s)} \Leftrightarrow Al^{3+}_{(aq)} + 3OH^{\odot}_{(aq)}, ksp$

$Al(OH)_{3(s)} + OH^-_{(aq)} \Leftrightarrow \left[Al(OH)_4^-\right]_{(aq)}, kc$

Which of the following relationship is correct at which solubility is minimum?

A. $\left[OH^{-}\right] = \left(\frac{Ksp}{Kc}\right)^{1/3}$

B. $\left[OH^{-}\right] = \left(\frac{Kc}{Ksp}\right)^{1/4}$

C. $\left[OH^{-}\right] = \sqrt{\left(\frac{Ksp}{Kc}\right)^{1/4}}$

D. $\left[OH^{-}\right] = \left(\frac{3Ksp}{Kc}\right)^{1/4}$

Answer: D

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24. An indicator is a weak acid and pH range of its colour is 3.1 to 4.5. If the neutral point of the indicator lies in the centre of the hydrogen ion concentrations correspondin to the given pH range, calculate the ionisation constain of the indicator.

A. 4.13×10^{-8}

B. 4.13×10^{-4}

C. 2.13×10^{-4}

D. 3.27×10^{-4}

Answer: B

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25. $AgBr_{(s)} + 2S_2O^{2-}_{3(aq)} \Leftrightarrow \left[Ag(S_2O_3)_2\right]^{3-}_{(aq)} + Br^{-}_{(aq)}$

$[Ksp(AgBr) = 5 \times 10^{-13}$,

$K_f\left[Ag(S_2O_3)_2\right]^{3-} = 5 \times 10^{13}]$

What is the molar solubility of $AgBr$ in $0.1 M Na_2S_2O_3$?

A. $0.5M$

B. $0.45M$

C. $0.045M$

D. $0.65M$

Answer: C

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26. A $25.0mL$ of $0.1M$ weak acid HA is titrated with $0.1MNaOH$ to the equivalence point. If the pH at the equivalence point is 8.28 Calculate K_a for this acid

A. 2.8×10^{-4}

B. 1.3×10^{-4}

C. 5.2×10^{-9}

D. 1.9×10^{-6}

Answer: B

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27. The $[H^+]$ in a solution containing $0.1MHCOOH$ and $0.1MHOCN$ [Ka for $HCOOH$ and $HOCN$ are 1.8×10^{-4} and 3.3×10^{-4}] respectively will be

A. $7.13 \times 10^{-2} M$

B. $7.13 \times 10^{-3} M$

C. $7.13 \times 10^{-5} M$

D. $7.13 \times 10^{-6} M$

Answer: B

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28. The P^{H} of pure water at $25^{0}C$ and $35^{0}C$ are 7 and 6 respectively. The heat of formation of water from H^{+} and OH^{-} will be.

A. $+84.551 KCal \text{Mole}^{-1}$

B. $-84.551 KCal \text{Mole}^{-1}$

C. $+8.4551 KCal \text{Mole}^{-1}$

D. $-8.455 KCal \text{Mole}^{-1}$

Answer: B

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29. Calculate the percentage hydrolysis in $0.003M$ aqueous solution of NaOCN. $\left(K_a f \text{ or } HOCN = 3.33 \times 10^{-4}\right)$

A. 10^{-3}

B. 10^{-2}

C. 10^{-4}

D. 10^{-5}

Answer: B

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30. The amount of $(NH_4)_2SO_4$ in grams which must be added to $500ml$ of $0.2MNH_2$ to yield a solution og $p^H = 9.35$ $(K_b$ for $NH_3 = 1.78 \times 10^{-5})$ will be

A. $7.248g$

B. $6.248g$

C. $5.248g$

D. $52.48g$

Answer: C

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31. $100ml$ of sample is removed from an aqueous solution saturated with $CaSO_4$ at 25^0C. The water is completely evaported from the sample and deposit of $0.24g$ of $CaSO_4$ is obtained. The Ksp of $CaSO_4$ at 25^0C will be.

A. 3.115×10^{-4}

B. 3.115×10^{-5}

C. 3.115×10^{-6}

D. 3.115×10^{-3}

Answer: A

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32. An aqueous solution of metal chloride $MCI_2(0.05M)$ is saturated with $H_2S(0.1M)$. The minimum pH at which metal sulphide will be precipiated is

$[K_{sp}MS = 5 \times 10^{-21}, K_1(H_2S) = 10^{-7}, K_2(H_2S) = 10^{-14}.$

A. 3.25

B. 2.50

C. 1.50

D. 1.25

Answer: C

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33. The ratio of pH of solution (1) containing 1 mole ofCH_3COONa and 1 mole of HCl and solution (II) containing 1 mole of CH_3COONa and 1 mole of acetic acid in one litre is :

A. $1:2$

B. $2:1$

C. $1:3$

D. $3:1$

Answer: A

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34. Calculate pH a) NaH_2PO_4 b) Na_2HPO_4 respectively, for $H_3PO_4pKa_1 = 2.25, pKa_2 = 7.20, pKa_3 = 12.37$)

A. $9.78, 4.68$

B. $4.68, 4.68$

C. $9.78, 9.78$

D. $4.68, 9.78$

Answer: D

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35. At 25°C, K_{sp} for $PbBr_2$ is equal to 8×10^{-5}. If the salt is 80% dissociated, What is the solubility of $PbBr_2$ in mol//litre?

A. $\left[\frac{10^{-4}}{1.6 \times 1.6}\right]^{1/3}$

B. $\left[\frac{10^{-5}}{1.6 \times 1.6}\right]^{1/3}$

C. $\left[\frac{10^{-4}}{0.8 \times 0.8}\right]^{1/3}$

D. $\left[\frac{10^{-3}}{1.6 \times 1.6}\right]^{1/2}$

Answer: A

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