CHEMISTRY

BOOKS - NARENDRA AWASTHI

IONIC EEQUILIBRIUM

Exercise

1. Morphine $(C_{17}H_{19}NO_3)$, Which is used medically to relieve to pain is a base. What is its conjugate acid?

A. $C_{17}H_{18}NO_3^+$

B. $C_{17}H_{18}NO_3$

C. $C_{17}H_{20}NO_3^-$

D. $C_{17}H_{20}NO_3^+$

Answer:

Watch Video Solution

2. The conjugate base of $H_2PO_4^-$ is :

a) H_3PO_4

b) $H_2PO_4^-$

c) HPO_4^{2-}

d) PO_4^{3-}

A. H_3PO_4

B. $H_2PO_4^-$

C. HPO_4^{2-}

D. PO_4^{3-}

Answer:

Watch Video Solution

3. In the following, strongest acid is

A. CN^-

B. Cl^-

C. I^-

D. Br^-

Answer:

Watch Video Solution

4. What salt can furnish H^+ in its aqueous solution?

A. NaH_2PO_2

B. Na_2HPO_3

C. Na_2HPO_4

D. All of these

Answer:

Watch Video Solution

5. Which is the set of amphiprotic species?

A. $H_3O^+, HPO_4^{2-}, HCO_3^-$

B. $H_2O, HPO_3^{2-}, H_2PO_2^-$

C. $H_2PO_4^-, H_2PO_3^-, H_2O$

D. All of these

Answer:

Watch Video Solution

6. The K_a values for HPO_4^{2-} and HSO_3^- are 4.8×10^{-13} and 6.3×10^8 repectively. Therefore, it follows the HPO_4^{2-} is ... acid than HSO_3^- and PO_4^{3-} is a ..... base than SO_3^{2-}

A. weaker, stronger

B. stronger, weaker

C. weaker, weaker

D. stronger, stronger

Answer:

Watch Video Solution

7. Given the following equations and ΔH° values, determine the enthalpy of reaction at 298 K for the reaction :

$C_2H_4(g) + 6F_2(g) \rightarrow 2HF_4(g) + 4HF(g)$

$H_2(g) + F_2(g) \rightarrow 2HF(g), \qquad \Delta H_1^{\circ} = -537 \text{ kJ}$

$C(s) + 2F_2(g) \rightarrow CF_4(g), \qquad \Delta H_2^{\circ} = -680 \text{ kJ}$

$2C(s) + 2H_2(g) \rightarrow C_2H_4(g), \qquad \Delta H_3^{\circ} = 52 \text{ kJ}$

A. CO_3^{2-}

B. H_2SO_4

C. SO_4^{2-}

D. HPO_4^{2-}

Answer:

Watch Video Solution

8. Given that K_w for water is $10^{-13}\ M^2$ at 62° C, compute the sum of pOH and pH for a neutral aqueous solution at 62° C:

A. 7.0

B. 13.30

C. 14.0

D. 13.0

Answer:

Watch Video Solution

9. The value of the ion product constant for water, (K_w) at 60° C is $9.6 \times 10^{-14}\ M^2$ what is the $\left[H_3O^+\right]$ of a neutral aqueous solutoin at

60° C and an aqueous solution with a pH=7.0 at 60° C are respectively?

A. 3.1×10^{-8} acidic

B. 3.1×10^{-7}, neutral

C. 3.1×10^{-8}, basic

D. 3.1×10^{-7}, basic

Answer:

Watch Video Solution

10. Molality of pure water is..... .

A. pH increases while pOH decreases with rise in temperature

B. pH decreases while pOH increases with rise in temperature

C. both pH and pOH decreases with rise in temperature

D. both pH and pOH increases with rise in temperature

Answer:

Watch Video Solution

11. A beer has a pH of 4.30. What is the $\left[H_3O^+\right]$?

A. 3.0×10^{-4}

B. 2.0×10^{-4}

C. 2.0×10^{5}

D. 5.0×10^{-5}

Answer:

Watch Video Solution

12. The hydrogen ion concentration of the oceans is about 2×10^{-9} M. What is the pH?

A. 8.85

B. 9.3

C. 7.85

D. 8.7

Answer:

Watch Video Solution

13. The hydroxide ion concentration of a wine is 8×10^{-11} M. What is the pH of the wine?

A. 2.10

B. 2.9

C. 3.9

D. 4.9

Answer:

Watch Video Solution

14. Write structure of 2-methyl pentane.

Watch Video Solution

15. A solution has a pH=9. It is 1000 times more basic than the original solution. What was the pH of the original solution?

A. 12

B. 6

C. 9

D. 10

Answer:

Watch Video Solution

16. Equal volumes of two HCl solutions of $pH = 3$ and $pH = 5$ were mixed. What is the pH of the resulting solution ?

A. 3.5

B. 4.0

C. 4.5

D. 3.3

Answer:

Watch Video Solution

17. Write structure of 2,2-dimethyl propane.

Watch Video Solution

18. Number of equivalents of HCl present in 100 mL of its solution whose pH is 4:

A. 10^{-4}

B. 10^{-3}

C. 10^{-2}

D. 10^{-5}

Answer:

Watch Video Solution

19. To a $10mL$ of $10^{-3}NH_2SO_4$ solution water has been to make the total volume of one litre. Its pOH would be :

A. 3

B. 12

C. 9

D. 5

Answer:

Watch Video Solution

20. The pH of a solution of H_2SO_4 is 1. Assuming complete ionisation, find the molarity of H_2SO_4 solution :

A. 0.1

B. 0.2

C. 0.05

D. 2.0

Answer:

Watch Video Solution

21. pH of a strong diprotic acid (H_2A) at concentrations:

(i) 10^{-4} M, (ii) 10^{-4} N

are respectively:

A. 3.7 and 4.0

B. 4 and 3.7

C. 4 and 4

D. 3.7 and 3.7

Answer:

Watch Video Solution

22. Write structure of neopentane

Watch Video Solution

23. pH of 10^{-6} M HCl (aq.) is :

A. just less then 6

B. exactly equal to 6

C. just greater than 6

D. just less than 7

Answer:

Watch Video Solution

24. What is the pH of solution in which 25.0 mL of 0.1 M NaOH is added to 25 mL of 0.08M HCl and final solution is diluted to 500 mL?

A. be equal to 8

B. lie between 7 and 8

C. lie between 6 and 7

D. remain unchanged

Answer:

Watch Video Solution

25. 4.0 g of NaOH and 4.9 g of H_2SO_4 are dissolved in water and volume is made upto 250 mL.

The pH of this solution is:

A. 7.0

B. 1.0

C. 2.0

D. 12.0

Answer:

Watch Video Solution

26. Write iupac name of CH3-CH(OH)-CH3

Watch Video Solution

27. What is the pH of solution in which 25.0 mL of 0.1 M NaOH is added to 25 mL of 0.08M HCl and final solution is diluted to 500 mL?

A. 3

B. 11

C. 12

D. 13

Answer:

Watch Video Solution

28. What is the pH of a solution in which 10.0 mL of 0.010 M Sr(OH)_(2) is added to 10.0 mL of 0.010 M HCl?

A. 2.30

B. 1.50

C. 11.70

D. 7.00

Answer:

Watch Video Solution

29. At 90° C, pure water has $\left[H^+\right] = 10^{-6}$ M.If 100 mL of 0.2 M HCl is added to 200 mL of 0.1 M KOH at 90° C then pH of the resulting solution will be :

A. 5

B. 6

C. 7

D. None of these

Answer:

Watch Video Solution

30. What change will occur for the following reaction if the hypochlorous acid solution is diluted from 0.1 to 0.01 M?

$HOCl(aq.) + H_2O(l) \Leftrightarrow OCl^-(aq.) + H_3O + (aq.)$

A. a decrease in the fraction of acid ionized

B. an increase in the fraction of acid ionized

C. no change in the fraction of acid ionized

D. we can not predict

Answer:

Watch Video Solution

31. Given K_a values of 5.76×10^{-10} and 4.8×10^{-10} for NH_4^+ and HCN respectively. What is the equilibrium constant for the following reaction?

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

A. 0.83

B. 1.2

C. 8.0×10^{-11}

D. 27.6×10^{-10}

Answer:

Watch Video Solution

32. Draw structure of hex - 3-en-1-oic acid?

Watch Video Solution

33. The functional group present in 3-iodobutanol is.....

Watch Video Solution

34. Draw bond line formula of 3-methylpentane.

Watch Video Solution

35. What is the precent dissociation (α) of a 0.01 M HA solution? $\left(K_a = 10^{-4}\right)$

A. $9.5\ \%$

B. $1\ \%$

C. $10\ \%$

D. $17\ \%$

Answer:

Watch Video Solution

36. Write iupac name of CH2 = CH-CH = CH2

Watch Video Solution

37. Write iupac name CH2 = CH2

Watch Video Solution

38. Write structure of aniline.

Watch Video Solution

39. The structural formula of 2-bromobutanoic acid

Watch Video Solution

40. If degree of dissociation is 0.01 of decimolar solution of weak acid HA then pK_a of acid is :

A. 2

B. 3

C. 5

D. 7

Answer:

Watch Video Solution

41. What concentration of $HCOO^-$ is present in a solution of weak of 0.01 M HCOOH $\left(K_a = 1.8 \times 10^{-4}\right.$ and 0.01 M HCl?

A. 1.8×10^{-3}

B. 10^{-2}

C. 1.8×10^{-4}

D. 10^{-4}

Answer:

Watch Video Solution

42. What is the pH of a 0.10 M $C_6H_5O^-$ solution? The K_a of C_6H_5OH is 1.0×10^{-10}

A.

P	Q	R	S
1	2	4	3

B.

P	Q	R	S
4	3	2	1

C.

P	Q	R	S
2	1	4	3

D.

P	Q	R	S
1	2	3	4

Answer:

Watch Video Solution

43. How much water must be added to $300mL$ of a $0.2M$ solution of CH_3COOH for the degree of dissociation of the acid to double ? (Assume K_a of acetic is of order of $10^{-5}M$)

A. 600 mL

B. 900 mL

C. 1200 mL

D. 1500 mL

Answer:

Watch Video Solution

44. What is $\left[NH_4^+\right]$ in a solution that contain 0.02 M $NH_3\left(K_b = 1.8 \times 10^{-5}\right)$ and 0.01 M KOH?

A. 9×10^{-6}

B. 1.8×10^{-5}

C. 3.6×10^{-5}

D. None of these

Answer:

Watch Video Solution

45. Find the mass of glucose that should be dissolved in 50g of water in order to produce the same lowering of vapour pressure as produce by

dissolving 1 g of urea in the same quantity of water

A. 1

B. 2

C. 4

D. 6

Answer:

Watch Video Solution

46. The $\left[H^{+}\right]$ of a resulting solution that is 0.01 M acetic acid $\left(K_a = 1.8 \times 10^{-5}\right)$ and 0.01 M in benzoic acid $\left(K_a = 6.3 \times 10^{-5}\right)$:

A. 9×10^{-4}

B. 81×10^{-4}

C. 9×10^{-5}

D. 2.8×10^{-3}

Answer:

Watch Video Solution

47. 6.0 g weak acid HA (mol.mass=60 g/mol.) is dissolved in water and formed 10 m^3 solution. If $K_a(HA) = 10^{-9}$, then pOH of solution is : [Given: log 4=0.6]

A. 7

B. greater than 6.7 and less than 7.0

C. greater than 7.0 and less than 7.3

D. greater than 7.3

Answer:

Watch Video Solution

48. Carbonic acid (H_2CO_3), a diprotic acid has $K_{a1} = 4.0 \times 10^{-7}$ and $K_{a2} = 7.0 \times 10^{-11}$. What is the $\left[CO_3^{2-}\right]$ of a 0.025 M solution of carbonic acid?

A. 7.8×10^{-3}

B. 6.6×10^{-4}

C. 10^{-10}

D. 1.0×10^{-4}

Answer:

Watch Video Solution

49. Carbonic acid (H_2CO_3), a diprotic acid has $K_{a1} = 4.0 \times 10^{-7}$ and $K_{a2} = 7.0 \times 10^{-11}$. What is the $\left[CO_3^{2-}\right]$ of a 0.025 M solution of carbonic acid?

A. 5.5×10^{-9}

B. 5.5×10^{-8}

C. 7.0×10^{-9}

D. 7.0×10^{-11}

Answer:

Watch Video Solution

50. Carbonic acid (H_2CO_3), a diprotic acid has $K_{a1} = 4.0 \times 10^{-7}$ and $K_{a2} = 7.0 \times 10^{-11}$. What is the $\left[CO_3^{2-}\right]$ of a 0.025 M solution of carbonic acid?

A. 2.85×10^{-3}

B. 5.0×10^{-6}

C. 3.5×10^{-12}

D. 3.5×10^{-13}

Answer:

Watch Video Solution

51. Which of the hydrated species may exist?

I : $H_5O_2^+$, II : H_3O^+ , III : $H_3O_2^-$, IV : $H_7O_3^+$

A. II only

B. I and II

C. I, II and IV

D. I, II, III and IV

Answer:

Watch Video Solution

52. Consider the following salts. Which one(s) when dissolved in water will produce an acidic solution?

1. NH_4Cl , 2. $KHSO_4$, 3. $NaCN$, 4. KNO_3

A. 2 and 3

B. 1 and 2

C. only 3

D. 2 and 4

Answer:

Watch Video Solution

53. Consider the following salts. Which one(s) when dissolved in water will produce an acidic solution?

1. NH_4Cl , 2. $KHSO_4$, 3. $NaCN$, 4. KNO_3

A. 1 and 3

B. only 2

C. 1 and 2

D. 3 and 4

Answer:

Watch Video Solution

54. At 25°C dissociation constants of acid HA and base BOH in aqueous solution are same. The pH of 0.01 M solution of HA is 5. The pOH of 10^{-4} M solution of BOH at the same temperature is :

A. 3.5

B. 4

C. 6

D. None of these

Answer:

Watch Video Solution

55. Which of the following solutions has the highest pH?

A. $0.2MHClO_4$

B. $0.20MCH_3COOH$

C. $0.020MHCl$

D. $0.2MNaCl$

Answer:

Watch Video Solution

56. pH of solutions of four sodium salts NaW, NaX, NaX, NaY and NaZ were found to be 7.0, 9.0, 10.0 and 11.0 respectively. If each solution has concentration 0.1 M, the weakest acid is :

A. HW

B. HX

C. HY

D. HZ

Answer:

Watch Video Solution

57. The pH values 0.1 M solution of $HCOONa(I)$, $HCOOH(II)$, CH_3COONH_4 (III), $NaOH(IV)$, $HCl(V)$, will be in the order :

A. $IV > III > I > II > V$

B. $IV > I > III > II > V$

C. $II > III > I > IV > V$

D. $V > II > III > I > IV$

Answer:

Watch Video Solution

58. pH of an aqueous NaCl solution at 50° C should be :

A. 7

B. gt7

C. lt7

D. 0

Answer:

Watch Video Solution

59. Upon hydrolysis of sodium carbonate, the reaction takes place between:

A. Na^+ and water

B. Na^+ and OH^-

C. CO_3^{2-} and water

D. CO_3^{2-} and H^+

Answer:

Watch Video Solution

60. Explain why an aqueous solution of $CuSO_4$ is acidic in nature ?

A. $CuSO_4$ reacts with water

B. Cu^+ reacts with water

C. SO_4^{2-} reacts with water

D. $CuSO_4$ renives OH^- ions from water

Answer:

Watch Video Solution

61. If 20 mL of 0.1 M NaOH is added to 30 mL of 0.2 M CH_3COOH (pK_(a)=4.74), the pH of the resulting solution is :

A. 7

B. 4

C. 2

D. 1

Answer:

Watch Video Solution

62. which of the following plots will obtained for a conductometric titration of strong acid against a weak base?

A. $\alpha = \frac{\sqrt{K_w}}{K_a . a}$

B. $\alpha = \frac{\sqrt{K_w}}{K_b . a}$

C. $\alpha = \frac{\sqrt{K_w}}{K_a . K_b}$

D. None of these

Answer: b

Watch Video Solution

63. The correct formula to calculate the hydroxyl ion concentration of an aqeous solution of NH_4NO_3 is:

A. $\sqrt{\frac{C \times K_w}{K_b}}$

B. $\sqrt{\frac{K_w \times K_b}{C}}$

C. $\sqrt{\frac{C \times K_w}{K_a}}$

D. $\sqrt{\frac{K_a \times K_w}{C}}$

Answer: B

Watch Video Solution

64. $\left[H^+\right] = \sqrt{\frac{K_w K_a}{C}}$ is suitable for

A. $NaCl, NH_4Cl$

B. $CH_3COONa, NaCN$

C. $CH_3COONa, (NH_4)_2SO_4$

D. $CH_3COONH_4, (NH_4)_2CO_3$

Answer: b

Watch Video Solution

65. What is the hydrolysis constant of the OCl^- ion? The ionization constant of $HOCl$ is 3.0×10^{-8}.

A. 3.33×10^{-8}

B. 3.33×10^{-7}

C. 3.0×10^{-7}

D. 3.33×10^{-6}

Answer:

Watch Video Solution

66. What is the pH of a 0.10 M $C_6H_5O^-$ solution? The K_a of C_6H_5OH is 1.0×10^{-10}

A. 10.51

B. 11.04

C. 11.50

D. 12

Answer:

Watch Video Solution

67. Calculate the $\left[OH^{-}\right]$ in $0.01M$ aqueous solution of $NaOCN(K_b$ for $OCN^{-} = 10^{-10})$:

A. 10^{-6} M

B. 10^{-7} M

C. 10^{-8} M

D. None of these

Answer:

Watch Video Solution

68. What is the ionization constant of an acid if the hydronium ion concentration of a 0.40 M solution is 1.40×10^{-4} M?

A. 1.96×10^{-8}

B. 1.22×10^{-9}

C. 4.90×10^{-8}

D. 1.40×10^{-6}

Answer:

Watch Video Solution

69. The degree of hydrolysis of 0.1 M RNH_3Cl solution is $1.0\,\%$. If the concentration of RNH_3Cl is made 0.4 M, what is the new degree of hydrolysis (in percentage)?

A. 0.01

B. 0.001

C. 0.2

D. 0.5

Answer:

Watch Video Solution

70. $\%$ hydrolysis of 0.1M CH_3COONH_4, when $K_a(CH_3COOH) = K_b(NH_4OH) = 1.8 \times 10^{-5}$ is:

A. 0.55

B. 7.63

C. 0.55×10^{-2}

D. 7.63×10^{-3}

Answer:

Watch Video Solution

71. The enthalpy of neutralisation of four acids HA,HB,HC and HD witgh NaOH are 13,-12,-11,-10 Kcal//mol. Which salt has maximum degree of hydrolysis?

A. 1 M NaA

B. 1 M NaB

C. 1 M NaC

D. 1 M NaD

Answer:

Watch Video Solution

72. Calculate pOH of 0.1 M aq. Solution of weak base BOH $\left(K_b = 10^{-7}\right)$ at $25^\circ C$.

A. 3×10^{-9}

B. 1.732×10^{-9}

C. 8

D. 10

Answer:

Watch Video Solution

73. what type of bond is present in NaCl

A. sp

B. sp2

C. sp3

D. all of the above

Answer:

Watch Video Solution

74. pH of an aqueous NaCl solution at 50° C should be :

A. 7.5

B. 3.4

C. 6.5

D. 10.2

Answer:

Watch Video Solution

75. What will be the pH of a soft drink if hydronium ion concentration is sample is 3.8/10 3M?

A. $5, 1\ \%$

B. $7, 10\ \%$

C. $9, 0.01\ \%$

D. $7, 0.01\ \%$

Answer:

Watch Video Solution

76. 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. None of these

Answer:

Watch Video Solution

77. What is the hydronium ion concentration of a 0.02 M solution of Cu^{2+} solution of copper(II) perchlorate? The acidity constant of the following reaction is 5×10^{-9}.

$$Cu^{2+}(aq.) + 2H_2O(l) \Leftrightarrow Cu(OH)^{+}(aq.) + H_3O^{+}(aq.)$$

A. 1×10^{-5}

B. 7×10^{-4}

C. 5×10^{-4}

D. 1×10^{-4}

Answer:

Watch Video Solution

78. What is the acidity constant for the following reaction given that the hydronium ion concentration of a 0.04 M solution of Ni^{2+} solution of nickel(II) perchlorate is 4.5×10^{-6}?

$$Ni^{2+}(aq.) + 2H_2O(l) \Leftrightarrow Ni(OH)^{+}(aq.) + H_3O^{+}(aq.)$$

A. 2×10^{-12}

B. 4×10^{-6}

C. 5×10^{-12}

D. 5×10^{-10}

Answer:

Watch Video Solution

79. Reduction involves :

A. a. gain of electrons

B. b. addition of oxygen

C. c. loss of electrons

D. d. all of the above

Answer:

Watch Video Solution

80. Approximate pH of 0.01 M NaHA is calculated by :

$\left(K_{a1} = 10^{-6} \text{ and } K_{a2} = 10^{-8} \text{ are ionization constants of } H_2A\right)$

A. $pH = 7 + \frac{pK_{a1}}{2} + \frac{\log C}{2}$

B. $pH = 7 - \frac{pK_{a1}}{2} - \frac{\log C}{2}$

C. $pH = \frac{pK_{a1} + pK_{a2}}{2}$

D. None of these

Answer:

Watch Video Solution

81. H_3PO_4 is a weak triprotic acid, approximate pH 0.1 M $NaHPO_4$(aq.) is calculated by:

A. $\frac{1}{2}[pK_{a1} + pK_{a2}]$

B. $\frac{1}{2}[pK_{a2} + pK_{a3}]$

C. $\frac{1}{2}[pK_{a1} + pK_{a3}]$

D. $pK_{a1} + pK_2$

Answer:

Watch Video Solution

82. Which of the following is a buffer solution?

A. 500 mL of 0.1 N CH_3COOH + 500 mL of 0.1 N NaOH

B. 500 mL of 0.1 N CH_3COOH + 500 mL of 0.1 N HCl

C. 500 mL of 0.1 N CH_3COOH + 500 mL of 0.2 N NaOH

D. $500mLof0.1NCH_3COOH$+ $500mLof0.1NNaOH$

Answer:

Watch Video Solution

83. At 90°C, pure water has $\left[H^+\right] = 10^{-6}$ M.If 100 mL of 0.2 M HCl is added to 200 mL of 0.1 M KOH at 90°C then pH of the resulting solution will be :

A. 4.44

B. 9.56

C. 8.96

D. 9.26

Answer:

Watch Video Solution

84. $H_2CO_3 + NaHCO_3$ found in blood helps in maintaining pH of the blood close to 7.4. An excess of acid entering the blood stream is removed by:

A. HCO_3^-

B. H_2CO_3

C. H^+ ion

D. CO_3^{2-} ion

Answer:

Watch Video Solution

85. What is the oxidation number of S in Na2S2

Watch Video Solution

86. What is the pH of a solution of 0.28 M acid and 0.84 M of its conjugate base if the ionization constant of acid is 4×10^{-4}?

A. 3.88

B. 3.34

C. 7

D. 10.12

Answer:

Watch Video Solution

87. Oxidation number of P in PO4(-3)

Watch Video Solution

88. Equilibrium constant for the following reaction is 1×10^{-9} :

$C_5H_5N(aq.) + H_2O(l) \Leftrightarrow C_5H_5NH^+(aq.) + OH^-(aq.)$

Determine the moles of pyridinium chloride $(C_5H_5N.HCl)$ that should be added t0 500 mL solution of 0.4 M pyridine (C_5H_5N) to obtain a buffer solution of pH=5 :

A. 0.1 mole

B. 0.2 mole

C. 0.3 mole

D. 0.4 mole

Answer:

Watch Video Solution

89. Which one of the following mixture does not act as a buffer solution?

A. Boric acid and borax

B. Sodium phosphate & disodium hydrogen phosphate

C. Sodium propionate and propionic acid

D. Sod. Acetate and sodium propionate

Answer: d

Watch Video Solution

90. The acid dissociation constant of uric acid is $K_a = 4.0 \times 10^{-6}$ M. The pH of a sample of urine is 6.0. What is the ratio of concentration of urate ion to uric acid in the urine?

A. 2.0

B. 4.0

C. 6.0

D. 0.25

Answer:

Watch Video Solution

91. What is the oxidation number of each carbon in the following : CO2

Watch Video Solution

92. An aqueous solution at room temperature contains 0.1 M NH_4Cl and 0.01M $NH_4OH(pK_b = 5)$, the pH of the solution is :

A. 7.5

B. 6.8

C. 6.5

D. 8.0

Answer:

Watch Video Solution

93. What is the oxidation number of each carbon in the following : CaC2

Watch Video Solution

94. 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:

Watch Video Solution

95. The total number of different kind of buffers obtained during the titration of H_3PO_4 with $NaOH$ are:

A. 3

B. 1

C. 2

D. 4

Answer:

Watch Video Solution

96. What is the oxidation number of carbon in the following : H2CO3

Watch Video Solution

97. The pH of a solution of 0.10 M CH_3COOH increases when which of the following substances is added?

A. $NaHSO_4$

B. $HClO_4$

C. KNO_3

D. K_2CO_3

Answer:

Watch Video Solution

98. H^+ ion concentration of water does not change by adding:

A. CH_3COONa

B. $NaNO_3$

C. $NaCN$

D. Na_2CO_3

Answer:

Watch Video Solution

99. pK_a of NH_4^+ is 9.26. Hence, effective range for $NH_4OH - NH_4Cl$ buffer is about pH:

A. 8.26 to 10.26

B. 4.74 to 5.74

C. 3.74 to 5.74

D. 8.26 to 9.26

Answer:

Watch Video Solution

100. What is the oxidation number of carbon in the following : HCN

Watch Video Solution

101. What is arrhenius concept of acid?

Watch Video Solution

102. What is arrhenius concept of base?

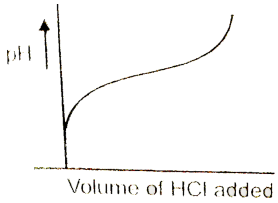
Watch Video Solution

103. The functional group present in 2- butanol is .....

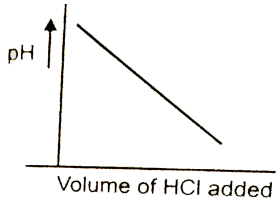
Watch Video Solution

104. When 100 mL of 0.1 M NaCN solution is titrated with 0.1 M HCl solution the variation of pH of solution with volume of HCl added will be :

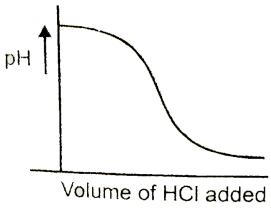
A.

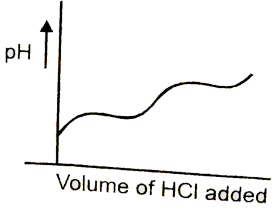


B.



C.



D. 

Answer:

Watch Video Solution

105. Factor influencing the degree of ionization of a weak electrolyte 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:

Watch Video Solution

106. Calculate approximate pH of the resultant solution formed by titration of 25 mL of 0.04 M Na_2CO_3 with 50 mL of 0.025 M HCl. $[Given: pK_{a1} = 6.4 \text{ and } pK_{a2} = 10.3f \text{ or } H_2CO_3]$

A. I

B. II

C. III

D. IV

Answer:

Watch Video Solution

107. Bromothymol blue is an indicator with a K_a value of 6×10^{-5}. What $\%$ of this indicator is in its basic form at a pH of 5 ?

A. 40

B. 85.7

C. 14.3

D. 60

Answer:

Watch Video Solution

108. An acid-base indicator has a K_a of 3.0×10^{-5}. The acid form of the indicator is red and the basic form is blue. (a) By how much must the pH change in order to change the indicator from $75\ \%$ red to $75\ \%$ blue?

A. 8×10^{-5}M

B. 9×10^{-5}M

C. 1×10^{-5}M

D. 3×10^{-4}M

Answer:

Watch Video Solution

109. An acid-base indicator which is a weak acid has a pK_{In} value =5.45. At what concentration ratio of sodium acetate to acctic acid would the indicator show a colour half-way between those of its acid and conjugate base forms ?

$[pK_a$ of acetic acid =4.75, log 2=0.3]

A. $4:1$

B. $6:1$

C. $5:1$

D. $3:1$

Answer:

Watch Video Solution

110. A 20.0 mL sample of a 0.20 M solution of the weak diprotic acid H_2A is titrated with 0.250 M NaOH. The concentration of solution at the second equivalent point is:

A. 0.10 M NaHA

B. $0.153MNa_2A$

C. $0.10MNa_2A$

D. $0.0769MNa_2A$

Answer:

Watch Video Solution

111. 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_{a1} and $pK_{a1} + pK_{a2}$

B. $\sqrt{K_{a1}C}$ and $\frac{pK_{a1} + pK_{a2}}{2}$

C. pK_{a1} and $\frac{pK_{a1} + pK_{a2}}{2}$

D. pK_{a1} and pK_{a2}

Answer:

Watch Video Solution

112. In which of the following cases is the solution of $AgCl$ unsaturated?

A. $\left[Ag^+\right]\left[Cl^-\right] < K_{sp}$

B. $\left[Ag^+\right]\left[Cl^-\right] > K_{sp}$

C. $\left[Ag^+\right]\left[Cl^-\right] = K_{sp}$

D. $\left[Ag^+\right]\left[Cl^-\right] \leq K_{sp}$

Answer:

Watch Video Solution

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

$\left[\text{Given}: K_{sp} = 10^{-21}, K_{a_1} \times K_{a_2} = 10^{-20}\right]$

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

B. $10^{-5}M(Ag^{+})$ and $10^{-5}M(Cl^{-})$

C. $10^{-5}M(Ag^{+})$ and $10^{-6}M(Cl^{-})$

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

Answer:

Watch Video Solution

114. Choose the correct set of True/Fasle for following statements:

(i) Silver chloride is more soluble in very concentrated sodium chloride solution than in pure water.

(ii) The pH of a buffer solution does not change on addition of small amount of an acid or a base.

(iii) Addition of NH_4Cl does not affect the pH of a solution of NH_4OH

(iv) Degree of hydrolysis of ammonium acetate does not depend upon the concentration of ammonium acetate solution.

(v) A mixture of acetic acid and sodium acetate can act as buffer solution.

A. TTFTT

B. FTTTF

C. TFTFT

D. FFTTT

Answer:

Watch Video Solution

115. A 1 litre solution containing NH_4Cl and NH_4OH has hydroxide ion ion concentration of 10^{-6}) mol//litre. Which of the following hydroxides could be precipitated when the solution is added to 1 litre solution of 0.1 M metal ions?

(I) $Ba(OH)_2\left(K_{sp}=5\times10^{-3}\right)$, (II) $Ni(OH)_2\left(K_{sp}=1.6\times10^{-16}\right)$

(III) $Mn(OH)_2\left(K_{sp}=2\times10^{-13}\right)$, (IV) $Fe(OH)_2\left(K_{sp}=8\times10^{-16}\right)$

A. I,II,IV

B. IV

C. II and IV

D. II,III,IV

Answer:

Watch Video Solution

116. 150 mL of 0.0008 M ammonium sulphate is mixed with 50 mL of 0.04 M calcium nitrate. The ionic product of $CaSO_4$ will be : $\left(K_{sp} = 2.4 \times 10^{-5} f \text{ or } CaSO_4\right)$

A. $< K_{sp}$

B. $> K_{sp}$

C. $\approx K_{sp}$

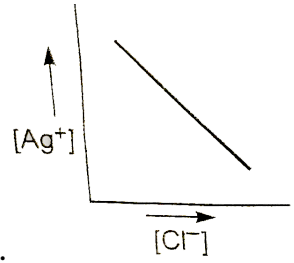
D. None of these

Answer:

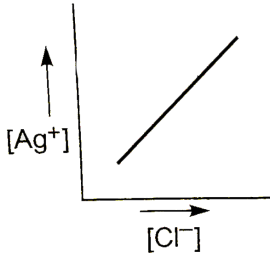
Watch Video Solution

117. 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 :

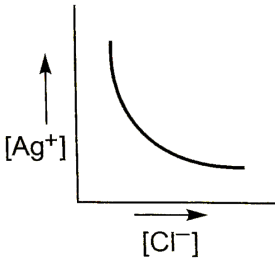
A.



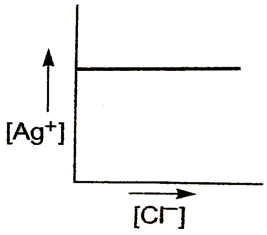
B.



C.



D.



Answer:

Watch Video Solution

118. K_{sp} of AgCl is 1×10^{-10}. Its solubility in 0.1 M KNO_3 will be :

A. 10^{-5} moles/litre

B. $> 10^{-5}$ moles/litre

C. $< 10^{-5}$ moles/litre

D. None of these

Answer:

Watch Video Solution

119. $50mL$ of a solution containing 10^{-3} mole of Ag^+ is mixed with $50mL$ of a $0.1MHCl$ solution. How much Ag^+ remains in solution ? $(K_{sp}$ of $AgCl = 1.0 \times 10^{-10})$

A. 2.5×10^{-9}

B. 2.5×10^{-7}

C. 2.5×10^{-8}

D. 2.5×10^{-10}

Answer:

Watch Video Solution

120. At a certain temperature, the solubility of the salt A_xB_y is S moles per litre. The general expression for the solubility product will be

A. S^2

B. `x^(y) y^(x).S^(x)+^(y)

C. $x^x y^y . S^x + y$

D. $S^x + y$

Answer:

Watch Video Solution

121. What is the molarity of a saturated solution of $CaCO_3$? $\left(K_{sp} = 2.8 \times 10^{-9}\right)$

A. 2.6×10^{-5}

B. 2.8×10^{-9}

C. 5.2×10^{-5}

D. 5.6×10^{-9}

Answer:

Watch Video Solution

122. K_{sp} of $Zr_3(PO_4)_4$ in terms of solubility (S) is :

A. $108S^7$

B. $4S^3$

C. $6912S^7$

D. None of these

Answer:

Watch Video Solution

123. The solubility of electrolytes MX_1, MX_2 and $MX_3 is 1 \times 10^{-3}$ moles per litre. Hence their respective solubility products are :

A. $10 \times^{-6}, 4 \times 10^{-9}, 27 \times 10^{-12}$

B. $10^{-9}, 4 \times 10^{-9}, 32 \times 10^{-12}$

C. $10^{-9}, 8 \times 10^{-8}, 32 \times 10^{-12}$

D. None of these

Answer:

Watch Video Solution

124. A saturated solution of $Ca_3(PO_4)_2$ has $\left[Ca^{2+}\right] = 2 \times 10^{-8}$ M and $\left[PO_4^{3-}\right] = 1.6 \times 10^{-5}$ M K_{sp} of $Ca_3(PO_4)_2$ is :

A. 3.2×10^{-13}

B. 3.2×10^{-34}

C. 2.048×10^{-33}

D. None of these

Answer:

Watch Video Solution

125. Which of the following is most soluble in water?

A. $Ba(PO_4)_2 \left(K_{sp} = 6 \times 10^{-39}\right)$

B. $ZnS \left(K_{sp} = 7 \times 10^{-16}\right)$

C. $Fe(OH)_3 \left(K_{sp} = 6 \times 10^{-38}\right)$

D. $Ag_3(PO_4) \left(K_{sp} = 1.8 \times 10^{-18}\right)$

Answer:

Watch Video Solution

126. Silver ions are added to a solution with $\left[Br^{-}\right]=\left[Cl^{-}\right]=\left[CO_3^{2-}\right]=\left[AsO_4^{3-}\right]$=0.1M. Which compound will precipitate with lowest $\left[Ag^{+}\right]$?

A. $AgBr\left(K_{sp}=5\times10^{-13}\right)$

B. $AgCl\left(K_{sp}=1.8\times10^{-10}\right)$

C. $Ag2CO_3\left(K_{sp}=8.1\times10^{-12}\right)$

D. $Ag_3AsO_4\left(K_{sp}=1\times10^{-22}\right)$

Answer:

Watch Video Solution

127. The solubility of different springly soluble salts are given as under :

$S.\ No$	Formula Type	Solubility product
(1)	AB	4.0×10^{-20}
(2)	A_2B	3.2×10^{-11}
(3)	AB_3	2.7×10^{-31}

The correct increasing order of solubility is :

A. 1,2,3

B. 2,1,3

C. 1,2,3

D. 3,1,2

Answer:

Watch Video Solution

128. If K_{sp} for $HgSO_4$ is 6.4×10^{-5}, then solubility of this substance in mole per m^3 is

A. 8×10^{-3}

B. 6.4×10^{-5}

C. 8×10^{-6}

D. None of these

Answer:

Watch Video Solution

129. The solubility of $Ba_3(AsO_4)_2$(formula mass=690) is 6.9×10^{-2} g//100 mL. What is the K_{sp}?

A. 1.08×10^{-11}

B. 1.08×10^{-13}

C. 1.0×10^{-15}

D. 6.0×10^{-13}

Answer:

Watch Video Solution

130. The solubility of $Ba_3(AsO_4)_2$(formula mass=690) is 6.9×10^{-2} g//100 mL. What is the K_{sp}?

A. 2.2×10^{-8}

B. 3.0×10^{-10}

C. 3.0×10^{-5}

D. 9.3×10^{-10}

Answer:

Watch Video Solution

131. The solubility of PbF_2 (formula mass =245) is 0.46 g/L. What is the solubility product?

A. 1.1×10^{-10}

B. 2.6×10^{-8}

C. 1.1×10^{-7}

D. 6.8×10^{9}

Answer:

Watch Video Solution

132. How many grams of MgC_2O_4 (formula mass =112) will dissolve in 1.5 L of water?

$\left(K_{sp} = 8.1 \times 10^{-5}\right)$

A. 1.0

B. 1.29

C. 1.512

D. 4.65

Answer:

Watch Video Solution

133. What is the molarity of F^- ions in a saturated solution of BaF_2? $\left(K_{sp} = 1.0 \times 10^{-6}\right)$

A. 1.0×10^{-2}

B. 1.0×10^{-3}

C. 1.26×10^{-2}

D. 6.3×10^{-3}

Answer:

Watch Video Solution

134. What is the molarity of F^- in a saturated solution of In F_3? $\left(K_{sp} = 7.9 \times 10^{-10}\right.$

A. 2.3×10^{-3}

B. 8.3×10^{-3}

C. 1.0×10^{-3}

D. 7.0×10^{-3}

Answer:

Watch Video Solution

135. What is the pH of a saturated solution of $Cu(OH)_2$? $\left(K_{sp} = 2.6 \times 10^{-19}\right.$

A. 6.1

B. 7.30

C. 8.42

D. 7.90

Answer:

Watch Video Solution

136. The solubility product of $AgCl$ is $10^{-10}M^2$. The minimum volume (in m^3) of water required to dissolve $14.35mg$ of $AgCl$ is approximately :

A. 0.01

B. 0.1

C. 100

D. 10

Answer:

Watch Video Solution

137. What is the molar solubility of $Fe(O)_2$ (K_(sp)=8.0xx10^(-16))$atpH$ 13.0`?

A. 8.0×10^{-18}

B. 8.0×10^{-15}

C. `8.0xx10^(-17)

D. 8.0×10^{-14}

Answer:

Watch Video Solution

138. What is the minimum pH necessary to cause a precipitate of $Pb(OH)_2$ $\left(K_{sp} = 1.2 \times 10^{-5}\right)$ to form in a 0.12 M $PbCl_2$ solution?

A. 12.4

B. 10.8

C. 12.0

D. 11.1

Answer:

Watch Video Solution

139. Which of the following would increase the solubility of $Pb(OH)_2$?

A. Add hydrochloric acid

B. Add a solution of $Pb(NO_3)_2$

C. Add a solution of NaOH

D. None of the above-the solubility a compound is constant a constant temperature

Answer:

Watch Video Solution

140. What is the molar solubility of $Ag_2CO_3\left(K_{sp} = 4 \times 10^{-13}\right)$ in $0.1MNa_2CO_3$ solution ?

A. 10^{-6}

B. 10^{-7}

C. 2×10^{-6}

D. 2×10^{-7}

Answer:

Watch Video Solution

141. What is the concentration of Pb^{2+} when $PbSO_4$ $\left(K_{sp} = 1.8 \times 10^{-8}\right)$ begins to precipitate from a solution that is 0.0045 M in SO_4^{2-}?

A. 4.0×10^{-8} M

B. 1.0×10^{-6} M

C. 2.0×10^{-8} M

D. 4.0×10^{-6} M

Answer:

Watch Video Solution

142. What is the concentration of Ba^{2+} when BaF_2 $\left(K_{sp} = 1.0 \times 10^{-6}\right)$ begins to precipitate from a solution that is 0.30 M F^- ?

A. 9.0×10^{-7}

B. 3.3×10^{-5}

C. 1.1×10^{-5}

D. 3.0×10^{-5}

Answer:

Watch Video Solution

143. Solubility of AgCl in 0.2 M NaCl is x and that in 0.1 M $AgNO_3$ is y. Then which of the following is correct?

A. $x = y$

B. $x > y$

C. $x < y$

D. We cannot predict

Answer:

Watch Video Solution

144. What is the molarity of $Fe(CN)_6^{4-}$ in a saturated solution of $Ag_4[Fe(CN)_6]$?

$(K_{sp} = 1.6 \times 10^{-41})$

A. 1.6×10^{-8}

B. 5.2×10^{-8}

C. 2.0×10^{-8}

D. 2.3×10^{-9}

Answer:

Watch Video Solution

145. If K_{sp} for $HgSO_4$ is 6.4×10^{-5}, then solubility of this substance in mole per m^3 is :

A. $\left[\frac{10^{-4}}{1.6 \times 1.6}\right]^{1/2}$

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. $\left[\frac{10^{-5}}{1.6 \times 1.6}\right]^{1/2}$

Answer:

Watch Video Solution

146. What is the molar solubility of $Mn(OH)_2\left(K_{sp} = 4.5 \times 10^{-14}\right)$ in a buffer solution containing equal amounts of NH_4^+ and NH_3 $\left(K_b = 1.8 \times 10^{-5}\right)$?

A. 3.0×10^{-4}

B. 1.38×10^{-4}

C. 1.38×10^{-3}

D. 7.3×10^{-4}

Answer:

Watch Video Solution

147. 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:

Watch Video Solution

148. What mass of AgI will dissolve in 1.0 L of 1.0 M NH_3? Neglect change in conc. Of NH_3.

[Given: $K_{sp}(AgI) = 1.5 \times 10^{-16}$), $K_f\left[Ag(NH_3)_2^+\right] = 1.6 \times 10^7$], (At. Mass Ag=108,I=127)

A. 4.9×10^{-5} g

B. 0.0056 g

C. 0.035 g

D. 0.011 g

Answer:

Watch Video Solution

149. Choose the correct set of True/Fasle for following statements:

(i) Silver chloride is more soluble in very concentrated sodium chloride

solution than in pure water.

(ii) The pH of a buffer solution does not change on addition of small amount of an acid or a base.

(iii) Addition of NH_4Cl does not affect the pH of a solution of NH_4OH

(iv) Degree of hydrolysis of ammonium acetate does not depend upon the concentration of ammonium acetate solution.

(v) A mixture of acetic acid and sodium acetate can act as buffer solution.

A. only I is correct

B. only II is correct

C. only III is correct

D. II and III are correct

Answer:

Watch Video Solution

150. The equilibrium constant for the reaction $CO(g) + H_2O(g) \Leftrightarrow CO_2(g) + H_2(g) is 5$ how many moles of CO_2 must

be added to 1 litre container alrady containing 3 moles each of CO and H_2O to make 2 M equilibrium conentration of CO?

A. $2 - \log 7$

B. $14 + \log 7$

C. $13.24 - \log 7$

D. $13.24 + \log 7$

Answer:

Watch Video Solution

151. Liquid NH_3 dissociation to a slight extent, At a certain temp. its self dissociation constant $K_{SDC(NH_3)} = 10^{-30}$. The number of NH_4^+ ions are present per 100 cm^(3)` of pure liquid are :

A. 10^{-15}

B. 6.022×10^8

C. 6.022×10^7

D. 6.022×10^6

Answer:

Watch Video Solution

152. To what volume of 10 litre of 0.5 M CH_3COOH $\left(K_a = 1.8 \times 10^{-5}\right)$ be diluted in order to double the hydroxide ion concentration :

A. 20 L

B. 30 L

C. 40 L

D. None of these

Answer:

Watch Video Solution

153. If 20 mL of 0.1 M NaOH is added to 30 mL of 0.2 M CH_3COOH (pK_(a)=4.74), the pH of the resulting solution is :

A. 2×10^{-4}

B. 2×10^{-5}

C. 2×10^{-3}

D. 0.05

Answer:

Watch Video Solution

154. What concentration of FCH_2COOH $\left(K_a = 2.6 \times 10^{-3}\right)$ is needed so that $\left[H^+\right]$=2xx10^(-3)`?

A. 2×10^{-3} M

B. 2.6×10^{-3} M

C. 5.2×10^{-3} M

D. 3.53×10^{-3} M

Answer:

Watch Video Solution

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

A. $1:6.6$

B. $1:3.3$

C. $2:3.3$

D. $3.3:2$

Answer:

Watch Video Solution

156. For the dissociation reaction $N_2O_{\$}(g) \Leftrightarrow 2NO_2(g)$, the degree of dissociation (α)interms of K_p and total equilibrium pressure P is:

A. 11.78

B. 10.78

C. 2.5

D. 2.22

Answer:

Watch Video Solution

157. H_3A is a weak triprotic acid $(K_{a1} = 10^{-5}, K_{a2} = 10^{-9}, K_{a3} = 10^{-13}$

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

A. 7

B. 8

C. 9

D. 10

Answer:

Watch Video Solution

158. 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 0.13 mole in 0.5 litre solution. pOH of solution is 5.60. What is pK_a of lactic acid?

Watch Video Solution

159. What is the concentration of $CH_3COOH(aq.)$ in a solution prepared by dissolving 0.01 mole of $NH_4^+CH_3COO^-$ in 1 L H_2O? $\left[K_{a(CH_3COOH)} = 1.8 \times 10^{-5}\right), K_{b(NH_4OH)=1.8\times10^{-5}}\Big]$

A. 5.55×10^{-5}

B. 0.10

C. 6.4×10^{-4}

D. 5.55×10^{-3}

Answer:

Watch Video Solution

160. For the auto-ionization of water at $25^{\circ}C$, $H_2O(l) \Leftrightarrow H^{+}(aq) + OH^{-}$ (aq) equilibrium constant is 10^{-14}. What is ΔG° for the process?

A. 2

B. 2.41

C. 2.79

D. 0.59

Answer:

Watch Video Solution

161. Carbonic acid (H_2CO_3), a diprotic acid has $K_{a1} = 4.0 \times 10^{-7}$ and $K_{a2} = 7.0 \times 10^{-11}$. What is the $\left[CO_3^{2-}\right]$ of a 0.025 M solution of carbonic acid?

A. 4×10^{-9}

B. 2.5×10^{-6}

C. 10^{-10}

D. 10^{-14}

Answer:

Watch Video Solution

162. How many millilitres of $0.1MH_2SO_4$ must be added to $50mL$ of $0.1MNaOH$ to give a solution that has a concentration of $0.05M$ in H_2SO_4 ?

A. 0.458

B. 0.327

C. 5.19

D. None of these

Answer:

Watch Video Solution

163. Fixed volume of 0.1 M benzoic acid $(pK_a = 4.2)$ solution is added into 0.2 M sodium benzoate solution and formed a 300 mL, resultant acidic buffer solution. If pH of this buffer solution is 4.5 then find added volume of benzoic acid :

A. 100 mL

B. 150 mL

C. 200 mL

D. None of these

Answer:

Watch Video Solution

164. 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. None of these

Answer:

Watch Video Solution

165. Which of the following expression for $\%$ dissociation of a monoacidic base (BOH) in aqueous solution at appreciable concentration is not correct?

A. $100 \times \sqrt{\frac{K_b}{c}}$

B. $\frac{1}{1+10^{(pK_b - pOH)}}$

C. $\frac{K_w[H^+]}{K_b + K_w}$

D. $\frac{K_b}{K_b + [OH^-]}$

Answer:

Watch Video Solution

166. 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. 11

D. None of these

Answer:

Watch Video Solution

167. An aqueous solution at room temperature contains 0.1 M NH_4Cl and 0.01M $NH_4OH(pK_b = 5)$, the pH of the solution is :

A. 6.90

B. 7.20

C. 7.5

D. None of these

Answer:

Watch Video Solution

168. 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. None of these

Answer:

Watch Video Solution

169. Calculate approximate pH of the resultant solution formed by titration of 25 mL of 0.04 M Na_2CO_3 with 50 mL of 0.025 M HCl. $[Given: pK_{a1} = 6.4 \text{ and } pK_{a2} = 10.3 f \text{ or } H_2CO_3]$

A. 5.92

B. 6.88

C. 6.4

D. 5.88

Answer:

Watch Video Solution

170. In the titration of solution of a weak acid HA and NaOH, the pH is 5.0 after 10 mL of NaOH solution has been added and 5.60 after 20 mL NaOH has been added.

What is the value of pK_a for HA?

A. 5.15

B. 5.3

C. 5.6

D. None of these

Answer:

Watch Video Solution

171. A_3B_2 is a sparingly soluble salt with molar mass $M(gmol_{-})$ and solubility x gm $litre_{-1}$, the ratio of the molar concentration of B^{3-} to the solubilty product of the salt is : $-$

A. $108\frac{x^5}{m^5}$

B. $\frac{1}{108}\frac{M^4}{x^4}$

C. $\frac{1}{54}\frac{M^4}{x^4}$

D. None of these

Answer:

Watch Video Solution

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

Watch Video Solution

173. A solution is 0.01 M Kl 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:

Watch Video Solution

174. Which of the following are conjugate acid-base pairs ?

A. $HCO_3^- CO_3^{2-}$

B. $C_6H_5\overset{+}{N}H_3, C_6H_5NH_2$

C. $H_2PO_2^-, H_2PO_3^-, HC_2O_4^-$

D. OH^-, H^+

Answer: A,B

Watch Video Solution

175. If K_{a_1}, K_{a_2} and K_{a_3} be the first, second and third dissociation constant of H_3PO_4 and $K_{a_1} > > K_{2_a} > > K_{a_3}$ whis is/are correct :

A. $\left[H^+\right] \approx \sqrt{K_{a_1}[H_3PO_4]}$

B. $\left[H^+\right] \approx \left[HPO_4^{2-}\right]$

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

D. $\left[HPO_4^{-2}\right] = \left[PO_4^{3-}\right]$

Answer:

Watch Video Solution

176. H_2A is a weak diprotic acid. If the pH of 0.1 M H_2A solution is 3 and concentration of A^{2-} is 10^{-12} at $25^\circ C$.

Select correct statement (s)

A. $\left[H^+\right]_{\text{total}} \approx \left[H^+\right]$ from first step of ionization of acid H_2A

B. Concentration of OH^- in solution is 10^{-3} M

C. The value of K_{a_1} is nearly 10^{-5}

D. $pK_{a_2} - pK_{a_1} = 9$

Answer:

Watch Video Solution

177. Statement-1: pH value of acidic buffer solution changes , If buffer solution is diluted upto very large extent.

Statement-2: $\left[H^+\right]$ decreases due to change in concentration as well as

α increases and decreases in concentration is more as compared to increases in α .

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

178. Assertion : In a titration of weak monoprotic acid with strong base, the pH at the half equivalent point is pK_a.

Reason : At half equivalence point, it will form acidic buffer at its maximum capacity where [acid] $=$ [salt].

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

179. Assertion: In the titration of Na_2CO_3 with HCl using methyl orange indicator, the volume of acid required is twice that of the acid required using phenolphthalein as indicaton.

Reason: Two moles of HCl are required for the complete neutralisation of one mole of Na_2CO_3.

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

180. STATEMENT-1: Solubility of AgCN in acidic solution is greater than that in pure water.

STATEMENT-2: Solubility equilibrin of AgCN in acidic solution is shifted in forward direction due to formation of HNC.

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

181. Assertion (A): Solubility of $AgCN$ in acidic solutions is greater than in pure water.

Reason (R) : Solubility equilibrium of $AgCN$ is shifted in formwed direction due to the formation of HCN.

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

182. Calculate pOH of 0.1 M aq. Solution of weak base BOH $\left(K_b = 10^{-7}\right)$ at $25^\circ C$.

Watch Video Solution

183. pH of 0.01 M aq. Solution of HA is 4. Find the value of pK_a of HA at $25^\circ C$.

Watch Video Solution

184. Calculate approximate pH of 10^{-10} M NaOH at $25^\circ C$.

Watch Video Solution

185. Calclate pH of a resultant solution of 25 mL of 0.1 M HCl, 50 mL of 0.02 M HNO_3 and 25 mL of 0.1M NaOH

Watch Video Solution

186. Calculate pH of a resultant solution of 0.1 M HA $\left(K_a = 10^{-6}\right)$ and 0.45 M HB $\left(K_a = 2 \times 10^{-6}\right)$ at $25^\circ C$.

Watch Video Solution

187. 4.0 g of NaOH and 4.9 g of H_2SO_4 are dissolved in water and volume is made upto 250 mL.

The pH of this solution is:

Watch Video Solution

188. Calculate pH of a buffer solution that contains 0.1M $NH_4OH\left(K_b = 10^{-5}\right)$ and 0.1 M NH_4Cl.

Watch Video Solution

189. Calculate the ratio of sodium formate and formic acid $\left(K_a = 2 \times 10^{-4}\right)$ in a buffer solution of pH=4.3.

Watch Video Solution

190. What is the pOH of 0.1 M KB (salt of weak acid and strong base) at $25^\circ C$? (Given : $pK_b of B^-$ =7)

Watch Video Solution

191. A certain weak acid has $K_a = 10^{-5}$. If the equilibrium constant for it reaction with a strong base is represented as 1×10^y then find the value of y.

Watch Video Solution

192. 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.

$\left(\text{Given}: K_{sp(AgCl)} = 10^{-10}\right)$

Watch Video Solution

193. 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.

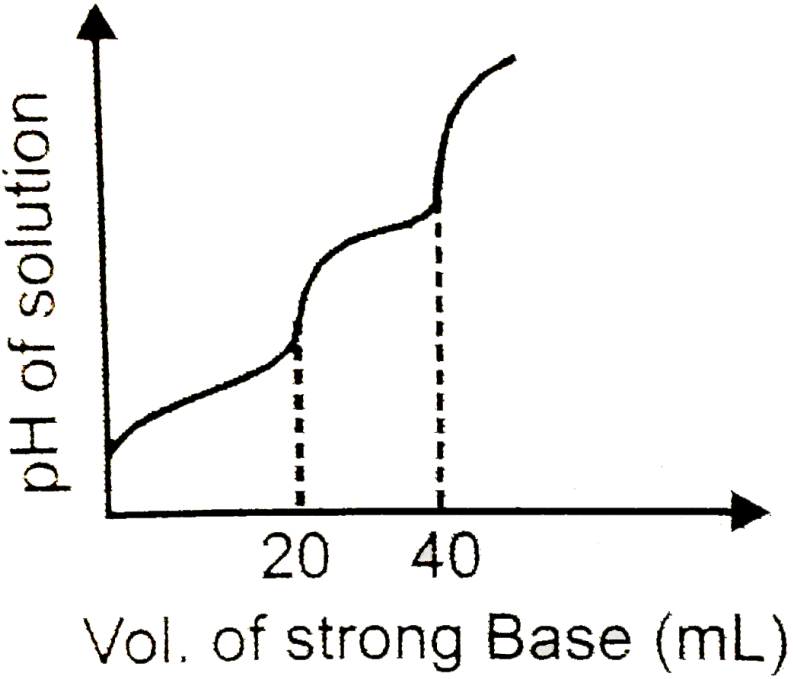
Watch Video Solution

194. A solution is saturated in $SrCO_3$ and SrF_2 The CO_3^{2-} was found to be 10^{-3} mol/L. If the concentratuonof F^- in solution is represented as $y \times 10^{-2}$ M then what is the value of y ?

$\left[\text{Given}: K_{sp}(SrCO_3) = 2.5 \times 10^{-10}, K_{sp}(SrF_2) = 10^{-10}\right]$

Watch Video Solution

195. 10 mL of H_2A(weak diprtic acid) solutio is titrated against 0.1M NaOH. pH of the solution is plotted against volume of strong base added and following obserbation is made



Ip pH of the solution at first equivalence point is pH_1 and at secnd equibalence point is $pH_2 \cdot Calcatethevalueof$(pH_(2)-pH_(1))$at$25^(@)C $Givenf$ or H_(2)A,pK_(a_1) $= 4.6$ and pK_(a_2)` =8, log 25=1.4

Watch Video Solution

196. Amongst the following, the total number of compounds whose equesous solution turns red litmus paper blue is:

$NaCN$ KCl CH_3COONH_4 NaH_2PO_4 $ZnCl_2$ Na_3PO_4
$Fe(NO_3)_3$ Na_2CO_3 NH_4Cl $NaHCO_3$ $Na_2C_2O_4$ Na_2HPO

Given:

Acid	ka_1	ka_2	ka_3
H_3PO_4	10^{-3}	10^{-8}	10^{-12}
H_2CO_3	10^{-6}	10^{-11}	–
H_2CO_3	10^{-2}	10^{-5}	–

Watch Video Solution

Level 1

1. What is the oxidation number of each carbon in the following : CO

Watch Video Solution

Level 2

1. 50 mL of 0.05 M $Na_2CO_3 is titrated aga \in st 0.1 M HCl. On add \in g 40 mL of HCl, pH of thes$

[Given : For H_(2)CO_(3),pK_(a1)=6.35,pK_(a2)=10.33,log 3=0.477,log 2=0.30]`

A. 6.35

B. 6.526

C. 8.34

D. 6.173

Answer:

Watch Video Solution

2. When 100 mL of 0.1 M NaCN solution is titrated with 0.1 M HCl solution the variation of pH of solution with volume of HCl added will be :

A. $\cong 10^{-4}$

B. $\cong 10^{+4}$

C. $\cong 10^{-7}$

D. $\cong 10^{+6}$

Answer:

Watch Video Solution

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

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

A. 10^{-6} M

B. 10^{-4} M

C. 10^{-5} M

D. 10^{-9} M

Answer:

Watch Video Solution

4. What is the molar solubility of Ag_2CO_3 $\left(K_{sp} = 4 \times 10^{-13}\right)$ in 0.1 M $NaCO_3$ solution?

A. $0.037, 5.78 \times 10^{-8}$

B. $5.78 \times 10^{-8}, 0.037$

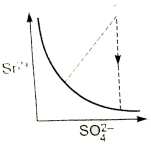
C. $0.04, 6.25 \times 10^{-8}$

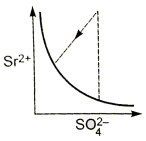
D. $1.58 \times 10^{-3}, 1.26 \times 10^{-5}$

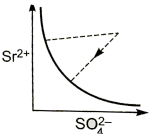
Answer:

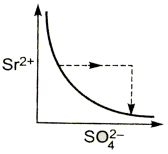
Watch Video Solution

5. There exist an equilibrium between solid $SrSO_4$ and Sr^{2+} and SO_4^{2-} ion in aqueous medium. The possible equilibrium states are shown in figure as thick line. Now, if equlibrium is disturbed by addition of (a) $Sr(NO_3)_2$ and (b) K_2SO_4 and dotted line represent approch of system towards equilibrium. Match the column given below :

(iii) 

(iv) 

(v) 

(vi) 

(I) addition of $Sr(NO_3)_2$

(II) addition of K_2SO_4

A. (I) (iii), (II) (iv)

B. (I) (iv), (II) (v)

C. (I) (vi),(II) (v)

D. (I) (iv), (II) (vi)

Answer:

Watch Video Solution

6. Solubility of AgCN is maximum in :

A. acidic buffer solution

B. basic buffer solution

C. in pure water

D. equal in all solution

Answer:

Watch Video Solution

7. AgBr (s) + $2S_2O_3^{2}(aq.) \Leftrightarrow Ag(S_2O_3)_2^{3-}(aq.) + Br^{-}(aq)$

$[\text{Using: } K_{sp}(AgBr) = 5 \times 10^{-13} \quad K_f\left(Ag(S_2O_3)_2^{3-}\right) = 5 \times 10^{13}]$

What is the molar solubility of AgBr in 0.1 M Na_2SO_3 ?

A. 0.5 M

B. 0.45 M

C. 0.045 M

D. None of these

Answer:

Watch Video Solution

8. 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 salts ?

$[K_{sp}(Ag_2C_2O_4) = 2 \times 10^{-11}, \quad K_{sp}(Ag_2CrO_4) = 2 \times 10^{-12}]$

A. 2.80×10^{-4}

B. 7.6×10^{-5}

C. 6.63×10^{-6}

D. 3.52×10^{-4}

Answer:

Watch Video Solution

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

$\left[\text{Given}: K_{sp} = 10^{-21}, K_{a_1} \times K_{a_2} = 10^{-20}\right]$

A. 0

B. 1

C. 2

D. 4

Answer:

Watch Video Solution

10. The Al $(OH)_3$ is involved in the following two equilibria,

$Al(OH)_3(s) \Leftrightarrow Al^{3+}(aq) + 3OH^-(aq), K_{sp}$

$Al(OH)_3(s) + OH^-(aq.) \Leftrightarrow Al(OH)_4^-(aq), K_c$

Which of the following relationship is correct at which solubility is minimum?

A. $[OH^-] = \left(\frac{K_{sp}}{K_c}\right)^{1/3}$

B. $[OH^-] = \left(\frac{K_c}{K_{sp}}\right)^{1/4}$

C. $[OH^-] = \sqrt{\left(\frac{K_{sp}}{K_c}\right)^{1/4}}$

D. None of these

Answer:

Watch Video Solution

Level 3

1. one litre of an aqueous solution contains 0.15 mole of $CH_3COOH(pK_a = 4.8))$ and 0.15 mole of CH_3 COONa. After the addition of 0.05 mole of solid NaOH to this solution, the pH will be :

A. 4.5

B. 4.8

C. 5.1

D. 5.4

Answer:

Watch Video Solution

2. Solution of a weak acid and its anion (that is,its conjugate base) or of a base and its common cation are buffered. When we add a small amount of acid or base to any one of the, the pH of solution change very little. pH of buffer solution can be computed as for acidic buffer : $pH = pK_a + \log. \frac{[\text{Conjugate base}]}{[\text{Acid}]}$

for basic buffer : $pOH = pK_b + \log. \frac{[\text{Conjugate acid}]}{[Base]}$

It is generly accepted that a has useful buffer cpacity (pH change resisting power) provided that the value of [salt or conjugate base] /[acid] for acidic buffer lies within the range of 1 : 10 to 1. Buffer capacity is maximum when [conjugate base] = [acid]

Calculater the pH of a solution made by adding 0.01 mole of HCl in 100 mL of a solution which is 0.2 M in $NH_3 (pK_b = 4.74)$ and 0.3 M in NH_4^+ : (Assuming no change in volume)

A. 5.34

B. 8.66

C. 7.46

D. None of these

Answer:

Watch Video Solution

3. Solution of a weak acid and its anion (that is,its conjugate base) or of a base and its common cation are buffered. When we add a small amount of acid or base to any one of the, the pH of solution change very little. pH of buffer solution can be computed as for acidic buffer : $pH = pK_a + \log. \frac{[\text{Conjugate base}]}{[\text{Acid}]}$

for basic buffer : $pOH = pK_b + \log. \frac{[\text{Conjugate acid}]}{[Base]}$

It is generly accepted that a has useful buffer cpacity (pH change resisting power) provided that the value of [salt or conjugate base] /[acid] for acidic buffer lies within the range of 1 : 10 to 1. Buffer capacity is maximum 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 6

D. None of these

Answer:

Watch Video Solution

4. Solution of a weak acid and its anion (that is,its conjugate base) or of a base and its common cation are buffered. When we add a small amount of acid or base to any one of the, the pH of solution change very little. pH of buffer solution can be computed as for acidic buffer : $pH = pK_a + \log. \frac{[\text{Conjugate base}]}{[\text{Acid}]}$

for basic buffer : $pOH = pK_b + \log. \frac{[\text{Conjugate acid}]}{[Base]}$

It is generly accepted that a has useful buffer cpacity (pH change resisting power) provided that the value of [salt or conjugate base] /[acid] for acidic buffer lies within the range of 1 : 10 to 1. Buffer capacity is maximum when [conjugate base] = [acid]

Useful buffer range of weak acid $HA\left(K_a = 10^{-5}\right)$ is :

A. When we add small amount of NaOH in acidic buffer aolution, pHO of solution is increases

B. When we add small amount of NaOH in vasic buffer solution, pH of solution is increases

C. When we add small amount of water in acidic buffer solution , pH of solution is decreases

D. When 100 mL of 0.2 M CH_3 COOH react with 200 mL of 0.1 M NaOH buffer solution is

Answer:

Watch Video Solution

5. 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. KCl undrgoes hydrolysis

B. $K_h = K_b(A^-)$ and $K_h = K_a(B^+)$

C. 0.1 M solution of NACN is acidic

D. resultant solution of equal volume of 0.1 M NH_3 and 0.1M HCl is basic

Answer:

Watch Video Solution

6. When pure ammonium chloride is dissolved in pure water, the pH of the resulting not 7. This is because :

A. Ammonium ions accept protons from water molecules leaving fee OH^- ions in solution

B. ammonium ions donate protons to water molecules forming H_3O^+ ions in solution

C. Ammonium ions combine with water molecule to give the weak base, ammonium hydroxide

D. chloride ion made the solution acidic

Answer:

Watch Video Solution

7. Write the formula of xylene.

Watch Video Solution

8. Acid-base indicators are either weak organic acids or weak organic bases. Indicator change colour in dilute solution when the hydonium ion concentration reaches a particular calur For example. Phenolphthalein is a coloureless stbstance in any aqueous solution with a pH less than 8.3 In between the pH range 8.3 to 10, transition of colour (colourless to pink) takes place and if pH of solution is greater than 10 solution is dark pink.

Considering an acid indicator Hln, the equilibrium involving it and its conjgate base In^- can be represented as :

$$\underset{\text{acidic from}}{HIn} \Leftrightarrow H^+ \underset{\text{basic from}}{In^-}$$

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 (s) :

A. 10^{-4}

B. 10^{-5}

C. 10^{-6}

D. None of these

Answer:

Watch Video Solution

9. Acid-base indicators are either weak organic acids or weak organic bases. Indicator change colour in dilute solution when the hydonium ion concentration reaches a particular calur For example. Phenolphthalein is a coloureless stbstance in any aqueous solution with a pH less than 8.3 In between the pH range 8.3 to 10, transition of colour (colourless to pink) takes place and if pH of solution is greater than 10 solution is dark pink. Considering an acid indicator Hln, the equilibrium involving it and its conjgate base In^- can be represented as :

$$\underset{\text{acidic from}}{HIn} \Leftrightarrow H^+ \underset{\text{basic from}}{In^-}$$

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 (s) :

A. At midway in the transition of an acidic indicator, $pH = pK_{\text{in}}$

B. Methyl orange (3.1 to 4.4) is a suitable indicator for titration of weak acid and strong base

C. Bromothymol blue (6.0 to 7.6) is a good indicator for tatration of HCl and NaOH

D. Thymol blue (1.2 "to" 2.8) is a very good indicator for titration of 100 ML of 0.1 M NH_4OH (pK_b = 4.74) and 0.1 M HCl

Answer:

Watch Video Solution

10. Acid-base indicators are either weak organic acids or weak organic bases. Indicator change colour in dilute solution when the hydonium ion concentration reaches a particular calur For example. Phenolphthalein is a coloureless stbstance in any aqueous solution with a pH less than 8.3 In between the pH range 8.3 to 10, transition of colour (colourless to pink) takes place and if pH of solution is greater than 10 solution is dark pink. Considering an acid indicator Hln, the equilibrium involving it and its conjgate base In^- can be represented as :

$$\underset{\text{acidic from}}{HIn} \Leftrightarrow H^+ \underset{\text{basic from}}{In^-}$$

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 HB with strong base :

A. 10

B. 0.1

C. 10^{-7}

D. None of these

Answer:

Watch Video Solution

11. Acid-base indicators are either weak organic acids or weak organic bases. Indicator change colour in dilute solution when the hydonium ion concentration reaches a particular calur For example. Phenolphthalein is

a coloureless stbstance in any aqueous solution with a pH less than 8.3 In between the pH range 8.3 to 10, transition of colour (colourless to pink) takes place and if pH of solution is greater than 10 solution is dark pink. Considering an acid indicator Hln, the equilibrium involving it and its conjgate base In^- can be represented as :

$$\underset{\text{acidic from}}{HIn} \Leftrightarrow H^+ \underset{\text{basic from}}{In^-}$$

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 (s) :

A. 8.75

B. 8.85

C. 9.0

D. None of these

Answer:

Watch Video Solution

12. Acid-base indicators are either weak organic acids or weak organic bases. Indicator change colour in dilute solution when the hydonium ion concentration reaches a particular calur For example. Phenolphthalein is a coloureless stbstance in any aqueous solution with a pH less than 8.3 In between the pH range 8.3 to 10, transition of colour (colourless to pink) takes place and if pH of solution is greater than 10 solution is dark pink. Considering an acid indicator Hln, the equilibrium involving it and its conjgate base In^- can be represented as :

$$\underset{\text{acidic from}}{HIn} \Leftrightarrow H^+ \underset{\text{basic from}}{In^-}$$

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 (s) :

A. Phenolphthalein (8.3-10)

B. Bromothhmol blue (6-7.6)

C. Methyl red (4.2-6.3)

D. Malachite green (11.4-13)

Answer:

Watch Video Solution

13. Will a precipitate from if 50 cm^3 of 0.01 M $AgNO_3$ and 50 cm^3 of 2×10^{-5} M NaCl are mixed?

$[\text{Given}: K_{sp}(AgCl) = 10^{-10} M^2]$

A. Yes

B. No

C. Ionic product is less than solubility product, hence precipitate will from

D. Data insufficient

Answer:

Watch Video Solution

14. Will a precipitate from if 1 volume of 0.1 MPb^{2+} ion solution in mixed with 3 volume of 0.3 M Cl^{-} ion solution ? $\left[\text{Givem}: K_{sp}(PbCl_2) = 1.7 \times 10^{-5} M^3\right]$

A. Yes

B. No

C. Ionic product is less than solubility product, hence precipitate will from

D. Data insufficient

Answer:

Watch Video Solution

15. At $25^{\circ}C$, will a precipitate of Mg $(OH)_2$ from 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 precipition start ?

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

A. No,pH=3.5

B. No pH 10.5

C. No,pH=6.0

D. Yes, pH=8.5

Answer:

Watch Video Solution

16. Determine the molar solubility of MgF_2 from its solubility product $K_{sp} = 4 \times 10^{-9}$:

A. 10^{-3}

B. 6.32×10^{-5}

C. 2×10^{-5}

D. None of these

Answer:

Watch Video Solution

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

A. pH is increased

B. pH is 7.0

C. pH is decreased

D. strurated solution is exposed to the atomosphere

Answer:

Watch Video Solution

One Or More Answer Is Are Correct

1. Which is/are wrong statement (s) ?

A. Arrhenius acids are also Bronsted acids but all Arrhenius bases are not Bronsted base

B. All Lewis bases are Bronsted bases

C. All Bronsted acids are Lewis acids

D. Conjugate base of a strong acid is weak

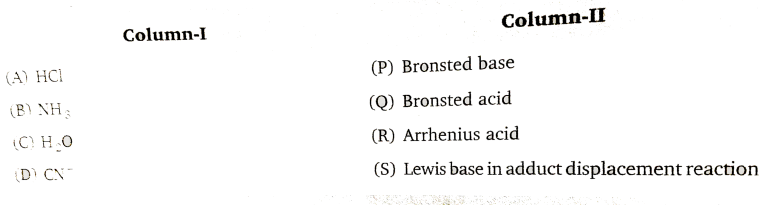
Answer:

Watch Video Solution

Match The Column

1. Column-I and Column-II contains four entries each. Entries of Column-I are to be matched with some entries of Column-II. One or more than one entries of Column-I may have the matching with the same entries of

Column-II



Watch Video Solution

Assertin Reason Type Questions

1. STATEMENT-1: All strong monoprotic acid with same concentration in dilute solution show same pH.

STATEMENT-2: Water shows levelling effect.

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

Others

1. Which are the set of amphiprotic species ?

A. $H_2O, H_2PO_4^-, HPO_4^-$

B. HPO_4^{2-}, HCO_3^-

C. $H_2PO_2^-, H_2PO_3^-, HC_2O_4^-$

D. $HPO_3^{2-}, H_2O, CO_3^{2-}$

Answer:

Watch Video Solution

2. Which of the following statements is/are not correct ?

A. A substance which can provide OH^- in aqueous medium is a base

B. A substance which can accept a pair of electronis a base

C. A sumstance which can accept a proton in aqueous medium is a base

D. A substance which can donate a pair of electron is a base

Answer:

Watch Video Solution

3. Factor influencing the degree of ionization of a weak electrolyte is :

A. Directly proportional to the square root of volume of solution

B. inversel proportainal to the dilution

C. inversely proportional to the square root of concentration

D. directly proportional to concentrartion

Answer:

Watch Video Solution

4. Factor influencing the degree of ionization of a weak electrolyte is :

A. dilution

B. temperature

C. presence of other ions

D. nature of solvent

Answer:

Watch Video Solution

5. Which of the following statement (s) is/are correct about the ionic prodict of water ?

A. K_i (ionization constant of water) $< K_w$ (ionic product of water)

B. $pK_i > pK_w$

C. $At 25^\circ C$, $K_i = 1.8 \times 10^{-14}$

D. Ionic product of water at $10^\circ C \text{is} 10^{-14}$

Answer:

Watch Video Solution

6. Which among the following statement is/are correct ?

A. $pH = -\log_{10}\left[H_3O^+\right]$ for dilute solution

B. pH of H_2O decreases with increase of temperature

C. pH can not more than 14

D. If a solution is diluted ten times, its pH always increases by 1

Answer:

Watch Video Solution

7. If concentration of two weak bases are same and D.O.D (α) are very less their ralative strength can be compared by :

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

B. $\frac{\alpha 1}{\alpha 2}$

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

D. $\frac{K_{a1}C_1}{K_{a2}C_2}$

Answer:

Watch Video Solution

8. If concentration of two weak bases are same and D.O.D (α) are very less their ralative strength can be compared by :

A. $\frac{[OH^-]_1}{[OH^-]_2}$

B. $\frac{Kb_1}{Kb_2}$

C. $\frac{\alpha 1}{\alpha 2}$

D. $\frac{\sqrt{Kb_1}}{\sqrt{Kb_2}}$

Answer:

Watch Video Solution

9. Which of the following expression is/are true ?

A. $\left[H^+\right] = \left[OH^-\right] = \sqrt{K_w}$ for a netural solution

B. $\left[OH^-\right] < \sqrt{K_w}$

C. pH+pOH=14 at all temperature

D. $\left[H^-\right] = 10^{-7}$ M for a netural solution at $25^\circ C$

Answer:

Watch Video Solution

10. Which of the following mixture can act as a buffer?

A. HCOOH+HCOONa

B. $Na_2CO_3 + NaHCO_3$

C. NaCl+HCl

D. $NH_4Cl + (NH_4)_2SO_4$

Answer:

Watch Video Solution

11. Which of the following will function as buffer ?

A. NaOH+HCOONa (1:1 molar ratio)

B. HCOOH+NaOH (2:1 molar ratio)

C. $NH_4Cl + NaOH$ (2:1 molar ratio)

D. HCOOH+NaOH (1:1 molar ratio

Answer:

Watch Video Solution

12. Which of the following will function as buffer ?

A. NaCl+NaOH

B. Borax + boric acid

C. $NaH_2PO_4 + Na_2HPO_4$

D. $NH_4Cl + NH_4OH$

Answer:

Watch Video Solution

13. Which of the following statements is/are correct?

A. The conjugate acid of NH_2^- of NH_(3)`

B. Solubility product constant increases with increase in concentration of ions

C. On diluting a buffer solution pH change is negligible

D. In alkaline buffer solution, if some HCl is added, its $\left[OH^{-}\right]$ will increase

Answer:

Watch Video Solution

14. 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. independent of dilution

B. increases with dilution

C. increases with decreases in K_b

D. increases with increase n temperature

Answer:

Watch Video Solution

15. The compound whose 0.1 M solution is acidic :

A. Ammonium formate

B. Ammonium sulphate

C. Ammonium chloride

D. Sodium formate

Answer:

Watch Video Solution

16. Formic acid is a weak acid and hydrochloric acid is a strong acid. It shows that the :

A. $\left[OH^{-}\right]$ of 0.01 M HCl (aq.) will be less than that of 0.01 M HCOOH (aq.)

B. aolution containing 0.1 M NaOH (aq.) and 0.1 M MCOONa (aq.) is a buffer solution

C. pH of 10^{-9} M HCl (aq.) will be approximately 7 at $25^{\circ} C$

D. ph of a solution formed by mixing equimolar quantities of HCOOH and HCl will be less than that of a similar solution formed HCOOH and HCOOONa

Answer:

Watch Video Solution

17. 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:

Watch Video Solution

18. Which is /are correct statement ?

A. Solubiolity of AgCl in pure water is 10^{-5} gm/litre

B. Solubility of AgCl in 2 M KBr is 10^{-5} mol/litre

C. Solubility of AgCl in 2 M $AgNO_3$ is 5×10^{-11} M

D. Solubility of AgCl in 2M NH_3 is 0.166 M

Answer:

Watch Video Solution

19. Which is /are correct statement ?

A. CH_3COONH_4 have greater degree of hydrolysis in 0.2 M solution in comparision os 0.4 M solution.

B. Ahnions which are weaker base than OH^-, do not hydrolyse

C. The CH_3COO^-, have greater of hydrolysis in comparision of $HCOO^-$ when their salt solution have equal conc.

D. SO_4^{2-} hydrolyses but HSO_4^- does not undergo hydrolysis

Answer:

Watch Video Solution

20. 0.01 M NH_4Cl (aq) solution at $25^\circ C$ has:

A. $[C]^-(aq) < 10^{-2}M$

B. $\left[NH_4^+(aq) < 10^{-2}M\right.$

C. $pOH < 7$

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

Answer:

Watch Video Solution

21. Acid-base indicators are either weak organic acids or weak organic bases. Indicator change colour in dilute solution when the hydonium ion concentration reaches a particular calur For example. Phenolphthalein is a coloureless stbstance in any aqueous solution with a pH less than 8.3 In between the pH range 8.3 to 10, transition of colour (colourless to pink) takes place and if pH of solution is greater than 10 solution is dark pink. Considering an acid indicator Hln, the equilibrium involving it and its conjgate base In^{-} can be represented as :

$$\underset{\text{acidic from}}{HIn} \Leftrightarrow H^{+} \underset{\text{basic from}}{In^{-}}$$

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 in 50% ionized in a given solution then what is the inization constant of the acid ?

A. The pH range of ndicator is 7 to 9

B. Change in pH is 0.96 when 75% yellow colour change to 75% red colour

C. This inkdicator is suitable for the titrationof strong acid vs. strong base

D. pH of indicator is 8.3 when ration of acid from to alkaline from is 2.

Answer:

Watch Video Solution

22. Match the following columns

Column-I	Column-II
(A) Conjugate acid-base pair	(P) Bronsted-Lowry concept
(B) Acid-base adduct	(Q) Lewis concept
(C) An acid-base reaction	(R) Arrhenius concept
(D) Proton donation	(S) $K_a \cdot K_b = K_w$

Watch Video Solution

23. Match the following columns

Column-I	Column-II
(A) $Fe(NO_3)_2(aq.)$	(P) Only cationic hydrolysis
(B) $KClO_4(aq.)$	(Q) Only anionic hydrolysis
(C) $HCOONa(aq.)$	(R) Both cationic as well as anionic hydrolysis
(D) $NH_4CN(aq.)$	(S) No hydrolysis

Watch Video Solution

24. Match the following columns

Column-I	Column-II
(A) Salt of weak acid and weak base	(P) $pH = 1/2\,[pK_w + pK_a + \log C]$
(B) Salt of weak acid and strong base	(Q) $pH = 1/2\,[pK_w + pK_a - pK_b]$
(C) Salt of strong acid and strong base	(R) $pH = 1/2\,[pK_w - pK_b - \log C]$
(D) Salt of strong acid and weak base	(S) $pH = 1/2\,[pK_w]$

Watch Video Solution

25. Match the following columns

Column-I	Column-II
(A) Salt of weak acid and weak base ($pK_a = pK_b$)	(P) pH of solution at 25°C less than 7
(B) Salt of weak acid and strong base	(Q) pH of solution at 25°C greater than 7
(C) Salt of strong acid and strong base	(R) pH of solution at 25°C equal to 7
(D) Salt of strong acid and weak base	(S) pH cannot be find until the value of K_a / K_b is given

Watch Video Solution

26. Match the following columns

Column-I	Column-II
(A) pH of 0.1 M HA ($pK_a = 5$) and 0.01 M NaA	(P) 4
(B) pH of 0.1 M BOH ($pK_b = 6$) and 0.1 M BCl	(Q) 7
(C) pH of 0.1 M salt of weak acid ($pK_a = 5$) and weak base ($pK_b = 7$)	(R) 6
(D) pH of 500 litre of 0.02 M HNO_3 and 500 litre 0.01 M $Sr(OH)_2$	(S) 8

Watch Video Solution

27. Match the following columns

Column-I	Column-II
(A) Titration of a strong acid with strong base	(P) Methyl orange (3.1 – 4.4)
(B) Titration of weak acid with strong base	(Q) Methyl red (4.2 – 6.3)
(C) Titration of strong acid with weak base	(R) Phenolphthalein (8.3 – 10)
(D) Titration of weak acid with weak base	(S) No general indicator is suitable

Watch Video Solution

28. Match the following columns

Column-I	Column-II
(A) At the start of titration	(P) Buffer solution of HCO_3^- and CO_3^{2-}
(B) Before the first equivalent point	(Q) Buffer solution of H_2CO_3 and HCO_3^-
(C) At the first equivalent point	(R) Amphiprotic anion, $pH = 1/2\,(pK_{a_1} + pK_{a_2})$
(D) Between the first and second equivalent points	(S) Hydrolysis of CO_3^{2-}

Watch Video Solution

29. Match the following columns

Column-I		Column-II
(A) Mercurous iodide	(P)	$108\,S^5$
(B) Aluminium phosphate	(Q)	$4\,S^3$
(C) Calcium phosphate	(R)	S^2
(D) Zirconium phosphate	(S)	$6912\,S^7$

Watch Video Solution

30. statement-1: If water is heated of $50^{\circ} C$ then pH will increase.

STATEMENT-2: K_w increases with increase in temperature.

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

31. STATEMENT-1: Addition of HCl (aq.) to HCOOH(aq.) decrease the dissociation of HCOOH(aq.)

STATEMENT-2: Due to common ion effect of H^+, dissociation of HCOOH decrease.

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

32. STATEMENT-1: Ph of 10^{-7} M HCl is less than 7 at $25^{\circ}C$.

STATEMENT-2: At very low concentration of HCl, contribution of H^{+} from water is considerable.

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

33. STATEMENT-1: The dissociation constants of weak diprotic acid are in the order of $K_{a_1} > K_{a_2}$

STATEMENT-2: Removal of H^+ from anion is difficult as compared to neutral molecule.

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

34. Selenious acid (H_2SeO_3), a diprotic acid has $K_{a1} = 3.0 \times 10^{-3}$ and $K_{a2} = 5.0 \times 10^{-8}$. What is the $\left[OH^-\right]$ of a 0.30 M solution of selenious acid?

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

35. STATEMENT-1: In the acid-base titration involving strong base and weak acid, methyl red can be usedd as an indicator.

STATEMENT-2: Methyl red changes its colour in the pH range 4.2 to 6.3.

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

36. STATEMENT-1: Sparingly soluble salts AB and XY_2 with the same solubility product, will have different solubility.

STATEMENT-2: Solubiluty of sparingly soluble salt depend upon solubility product.

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

37. STATEMENT-1: Solubility product of BaF_2 will increase on dilution.

STATEMENT-2: Solubility of BaF_2 will change on changing temperature.

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution

38. STATEMENT-1: Solubility of sparingly soluble salt decreases due to common ion effect.

STATEMENT-2: Solubility product constant does not depend on common ion effect.

A. If both the statements are TRUE and STATEMENT-2 is the correct explation of STATEMENT-1

B. If both the statements are TRUE AND STATEMENT-2 is NOT the correct explanation of STATEMENT-1

C. If STATEMENT-1 is TRUE and STATEMETN-2 is FLASE

D. If STATEMENT-1 is FLASE and STATEMENT-2 is TRUE

Answer:

Watch Video Solution