

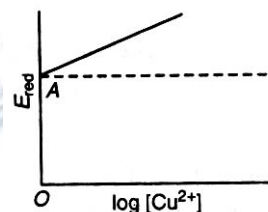
# CHEMISTRY

51. The conjugate acid of  $\text{NH}_2^-$  is
- (1)  $\text{NH}_3$  (2)  $\text{NH}_2\text{OH}$   
 (3)  $\text{NH}_4^+$  (4)  $\text{N}_2\text{H}_2$
52. Nucleophiles are :
- (1) Lewis acids (2) Lewis bases  
 (3) Bronsted acids (4) None of these
53.  $\text{Mg}^{2+}$  is ..... than  $\text{Al}^{3+}$ .
- (1) strong Lewis acid (2) strong Lewis base  
 (3) weak Lewis acid (4) weak Lewis base
54. The following equilibrium exists in aqueous solution  
 $\text{CH}_3\text{COOH} \rightleftharpoons \text{H}^+ + \text{CH}_3\text{COO}^-$ . If dilute HCl is added to this solution :
- (1) the equilibrium constant will increase  
 (2) the equilibrium constant will decrease  
 (3) acetate ion concentration will increase  
 (4) acetate ion concentration will decrease
55. The osmotic pressure of a dilute solution is given by:
- (1)  $P = P_0 \times N_1$  (2)  $\pi V = nST$   
 (3)  $\Delta P = P_0 N_2$  (4)  $\frac{\Delta P}{P_0} = \frac{P_0 - P_S}{P_0}$
56. The decreasing trend of acidic nature of trihalides of boron is:
- (1)  $\text{BF}_3 < \text{BCl}_3 < \text{BBr}_3 < \text{BI}_3$   
 (2)  $\text{BI}_3 < \text{BBr}_3 < \text{BCl}_3 < \text{BF}_3$   
 (3)  $\text{BBr}_3 < \text{BCl}_3 < \text{BF}_3 < \text{BI}_3$   
 (4)  $\text{BCl}_3 < \text{BI}_3 < \text{BF}_3 < \text{BBr}_3$
57. The  $\text{pK}_a$  for acid A is greater than  $\text{pK}_a$  for acid B. The strong acid is:
- (1) acid A (2) acid B  
 (3) are equally strong (4) none of these
58. Given,  $\text{HF} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{F}^-$   
 $\text{F}^- + \text{H}_2\text{O} \rightleftharpoons \text{HF} + \text{OH}^-$   
 which relation is correct?
- (1)  $K_b = K_w$  (2)  $K_b = \frac{1}{K_w}$   
 (3)  $K_a \cdot K_b = K_w$  (4)  $\frac{K_a}{K_b} = K_w$
59. pH of the solution of salt undergoing anionic hydrolysis (say  $\text{CH}_3\text{COONa}$ ) is given by
- (1)  $\text{pH} = \frac{1}{2}[\text{pK}_w + \text{pK}_a + \log c]$   
 (2)  $\text{pH} = \frac{1}{2}[\text{pK}_w + \text{pK}_a - \log c]$   
 (3)  $\text{pH} = \frac{1}{2}[\text{pK}_w + \text{pK}_b - \log c]$   
 (4) none of these
60. Which statement / relationship is correct?
- (1) Upon hydrolysis salt of a strong base and weak acid gives a solution with  $\text{pH} < 7$   
 (2)  $\text{pH} = -\log \frac{1}{[\text{H}^+]}$   
 (3) Only at  $25^\circ\text{C}$  the pH of water is 7  
 (4) The value of  $\text{pK}_w$  at  $25^\circ\text{C}$  is 7
61. Which is an acid salt?
- (1)  $\text{Na}_2\text{SO}_4$  (2)  $\text{BiOCl}$   
 (3)  $\text{Pb}(\text{OH})\text{Cl}$  (4)  $\text{Na}_2\text{HPO}_4$
62. The correct relation for hydrolysis constant of  $\text{NH}_4\text{CN}$  is:
- (1)  $\sqrt{\frac{K_w}{K_a}}$  (2)  $\frac{K_w}{K_a \cdot K_b}$   
 (3)  $\frac{\sqrt{K_H}}{c}$  (4)  $\frac{K_a}{K_b}$
63. Phenolphthalein shows .... in acid medium
- (1) red colour (2) yellow colour  
 (3) pink colour (4) no colour
64. Which can act as buffer?
- (1)  $\text{NH}_4\text{Cl} + \text{NH}_4\text{OH}$   
 (2)  $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$   
 (3) 40 mL of 0.1 M NaCN + 20 mL of 0.1 M HCl  
 (4) All of the above
65. A salt of strong acid and a weak base is dissolved in water. Its hydrolysis in solution is:
- (1) no affected by heating  
 (2) increased by adding the strong acid

- (3) suppressed by adding strong acid  
 (4) suppressed by dilution
66. Which metal sulphide has maximum solubility in water?  
 (1)  $\text{CdS}(K_{sp} = 36 \times 10^{-30})$   
 (2)  $\text{FeS}(K_{sp} = 11 \times 10^{-20})$   
 (3)  $\text{HgS}(K_{sp} = 32 \times 10^{-54})$   
 (4)  $\text{CdS}(K_{sp} = 36 \times 10^{-22})$
67. When 0.1 mL of dil. HCl acid is added to 100 mL of a buffer solution of pH 4.0, the pH of the solution:  
 (1) becomes 7 (2) does not change  
 (3) becomes 2 (4) becomes 10
68. The pH of a saturated solution of  $\text{Mg}(\text{OH})_2$  [ $K_{sp}$  of  $\text{Mg}(\text{OH})_2 = 8.9 \times 10^{-12}$ ] is:  
 (1) 10.4168 (2) 9.4168  
 (3) 11.4168 (4) 7.0
69. 0.1 millimole of  $\text{CdSO}_4$  are present in 10 mL acid solution of 0.08 N HCl. Now  $\text{H}_2\text{S}$  is passed to precipitate all the  $\text{Cd}^{2+}$  ions. The pH of the solution after filtering off precipitate, boiling of  $\text{H}_2\text{S}$  and making the solution 100 mL by adding  $\text{H}_2\text{O}$  is:  
 (1) 2 (2) 4  
 (3) 6 (4) 8
70. Hydroxyl ion concentration of N/1000 HCl is  
 (1)  $1 \times 10^{-3}$  N (2)  $1 \times 10^{-7}$  N  
 (3)  $1 \times 10^{-11}$  N (4) Zero
71. The unit of electrochemical equivalent is:  
 (1) gram (2) gram/ampere  
 (3) gram/coulomb (4) coulomb/gram
72. Molten NaCl conduct electricity due to the presence of  
 (1) free electrons (2) free molecules  
 (3) free ions (4) atoms of Na and Cl
73. On electrolysis of a solution of dilute  $\text{H}_2\text{SO}_4$  between platinum electrode, the gas evolved at the anode and cathode are respectively is:  
 (1)  $\text{SO}_2$  and  $\text{O}_2$  (2)  $\text{SO}_3$  and  $\text{H}_2$   
 (3)  $\text{O}_2$  and  $\text{H}_2$  (4)  $\text{H}_2$  and  $\text{O}_2$
74. If 1 faraday of charge is passed through a solution  $\text{CuSO}_4$ , the amount of copper deposited will be equal to its:  
 (1) gram equivalent weight  
 (2) gram molecular weight

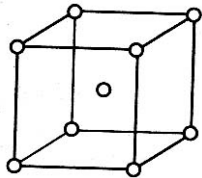
- (3) atomic weight  
 (4) electrochemical equivalent

75.  $\text{Cu}^{2+} + 2e \rightleftharpoons \text{Cu}$   $\log [\text{Cu}^{2+}]$  vs.  $E_{\text{red}}$  graph is of the type is shown in figure where  $OA = 0.34$  V then



electrode potential of the half cell of  $\text{Cu} | \text{Cu}^{2+} (0.1\text{M})$  will be

- (1)  $-0.34 + \frac{0.0591}{2} \text{V}$  (2)  $0.34 + 0.0591 \text{V}$   
 (3) 0.34 V (4) none of these
76. At a given temperature if P is the vapour pressure of a solution and  $P_0$  that of its pure solvent, the relative lowering of vapour pressure of the solution is given by:  
 (1)  $(P_0 - P)/P_0$  (2)  $(P - P_0)/P_0$   
 (3)  $P_0/P$  (4)  $P/P_0$
77.  $E^\circ$  for the half cell reactions are as,  
 $\text{Zn} = \text{Zn}^{2+} + 2e; E^\circ = 0.76$   
 $\text{Fe} = \text{Fe}^{2+} + 2e; E^\circ = +0.41$   
 The  $E^\circ$  for the cell reaction,  
 $\text{Fe}^{2+} + \text{Zn} \rightleftharpoons \text{Zn}^{2+} + \text{Fe}$  is  
 (1)  $-0.35\text{V}$  (2)  $+0.35\text{V}$   
 (3)  $+1.17\text{V}$  (4)  $-0.17\text{V}$
78. The amount of sodium deposited by 5 ampere current for 10 minute from fused NaCl is  
 (1) 0.715 g (2) 71.5 g  
 (3) 5.17 g (4) 0.517 g
79. How many coulomb of electricity are consumed when 100 mA current is passed through a solution of  $\text{AgNO}_3$  for 30 minute during an electrolysis experiment?  
 (1) 108 (2) 18000  
 (3) 180 (4) 3000
80. The formula  $a = \frac{L_v}{L_\infty}$  is valid for  
 (1) weak electrolytes (2) strong electrolytes  
 (3) salts (4) none of these

81. Which relation is not correct?
- (1)  $k = C \cdot \frac{l}{a}$       (2)  $L = k \cdot V_{\text{in mL}}$
- (3)  $L = \frac{k \cdot 1000}{N}$       (4)  $L = k \cdot V_{\text{in L}}$
82. The resistance of 0.01 N solution of an electrolyte was found to be 210 ohm at 298K, using a conductivity cell of cell constant  $0.66 \text{ cm}^{-1}$ . The equivalent conductivity of solution is:
- (1)  $314.28 \text{ mho cm}^2 \text{ eq}^{-1}$   
 (2)  $3.14 \text{ mho cm}^2 \text{ eq}^{-1}$   
 (3)  $314.28 \text{ mho}^{-1} \text{ cm}^2 \text{ eq}^{-1}$   
 (4)  $3.14 \text{ mho}^{-1} \text{ cm}^{-1}$
83. 8 : 8 co-ordination of CsCl is found to change into 6 : 6 co-ordination on:
- (1) applying pressure      (2) increasing temperature  
 (3) both (1) and (2)      (4) none of these
84. In a body centred cubic cell, an atom at the body of centre is shared by:
- (1) 1 unit cell      (2) 4 unit cells  
 (3) 3 unit cells      (4) 2 unit cells
85. The number of  $\text{Na}^+$  ions which surrounds each  $\text{Cl}^-$  ion in the NaCl crystal lattice is:
- (1) 4      (2) 6  
 (3) 12      (4) 8
86. A solid  $\text{A}^+\text{B}^-$  has the  $\text{B}^-$  ions arranged as below. If the  $\text{A}^+$  ions occupy half of the tetrahedral sites in the structure. The formula of solid is:
- (1)  $\text{AB}$   
 (2)  $\text{AB}_2$   
 (3)  $\text{A}_2\text{B}$   
 (4)  $\text{A}_2\text{B}_4$
- 
87. A fcc element (atomic mass =60) has a cell edge of 400 pm. Its density is:
- (1)  $6.23 \text{ g cm}^{-3}$       (2)  $7.43 \text{ g cm}^{-3}$   
 (3)  $8.53 \text{ g cm}^{-3}$       (4)  $9.63 \text{ g cm}^{-3}$
88. A solid XY has NaCl structure. If radius of  $\text{X}^+$  is 100 pm. What is the radius of  $\text{Y}^-$  ion?
- (1) 120 pm      (2) 136.6 to 241.6 pm  
 (3) 136.6 pm      (4) 241.6 pm
89. A catalyst in the finely divided form is most effective because:
- (1) less surface area is available  
 (2) more active centres are formed  
 (3) more energy gets stored in the catalyst  
 (4) none of above
90. Protons accelerate the hydrolysis of esters. This is an example of :
- (1) a heterogeneous catalysis  
 (2) an acid base catalysis  
 (3) a promoter  
 (4) a negative catalyst
91. Which equation represents Freundlich adsorption isotherm (physical adsorption is basis of this theory)?
- (1)  $\frac{x}{m} = K(P)^{1/n}$ ; where x is amount of gas adsorbed on mass 'm' at pressure P  
 (2)  $\log \frac{x}{m} = \log K + \frac{1}{n} \log P$   
 (3)  $\frac{x}{m} = KP$  at low pressure and  $\frac{x}{m} = K$  at high pressure  
 (4) All of the above
92. Overlapping of 2 hybrid orbitals at inter nuclear axis can lead to the formation of:
- (1) Ionic bond      (2) p - bond  
 (3) s - bond      (4) none of these
93. The total number of electrons that take part in forming bonds in  $\text{N}_2$  molecule is:
- (1) 2      (2) 6  
 (3) 4      (4) 8
94. Which one is not tetrahedral?
- (1)  $\text{BF}_4^-$       (2)  $\text{NH}_4^+$   
 (3)  $\text{CO}_3^{2-}$       (4)  $\text{SO}_4^{2-}$
95. The bond order is maximum in:
- (1)  $\text{H}_2$       (2)  $\text{H}_2^+$   
 (3)  $\text{He}_2$       (4)  $\text{He}_2^+$
96. A number of ionic compounds, e.g.,  $\text{AgCl}$ ,  $\text{CaF}_2$ ,  $\text{BaSO}_4$  are insoluble in water. This is because:
- (1) ionic compound do not dissolve in water  
 (2) water has a high dielectric constant  
 (3) water is not a good ionizing solvent

- (4) these molecules have exceptionally high attractive forces in their lattice
97. Which of the following acts sometimes as a metal and sometimes as a non metal?
- (1) Hg                      (2) Cl  
(3) K                        (4) At
98. Which has the largest first ionisation energy?
- (1) Li                        (2) Na  
(3) K                        (4) Rb
99. The orientation of an atomic orbital is governed by:
- (1) magnetic quantum number  
(2) principal quantum number  
(3) azimuthal quantum number  
(4) spin quantum number
100. The energy of an electron in the first Bohr's orbit of H atom is  $-13.6$  eV. The possible energy value (s) of the excited state (s) for electrons in Bohr's orbits of hydrogen is (are):
- (1)  $-3.4$  eV                      (2)  $-4.2$  eV  
(3)  $-6.8$  eV                      (4)  $+6.8$  eV