

Electrode potential, E_{cell} , Nernt**equation and ECS**

75. For a cell reaction involving a two-electron change, the standard *emf* of the cell is found to be 0.295 V at 25°C . The equilibrium constant of the reaction at 25°C will be
 (a) 1×10^{-10} (b) 29.5×10^{-2}
 (c) 10 (d) 1×10^{10}
76. For the electrochemical cell,
 $M | M^+ || X^- | X$, $E^\circ(M^+/M) = 0.44 \text{ V}$ and $E^\circ(X/X^-) = 0.33 \text{ V}$. From this data one can deduce that
 (a) $M + X \rightarrow M^+ + X^-$ is the spontaneous reaction
 (b) $M^+ + X^- \rightarrow M + X$ is the spontaneous reaction
 (c) $E_{\text{cell}} = 0.77 \text{ V}$
 (d) $E_{\text{cell}} = -0.77 \text{ V}$
77. The standard potential at 25°C for the following half reactions are given against them $\text{Zn}^{2+} + 2e \rightarrow \text{Zn}$, $E^\circ = -0.762 \text{ V}$ $\text{Mg}^{2+} + 2e \rightarrow \text{Mg}$, $E^\circ = -2.37 \text{ V}$
 When zinc dust is added to the solution of MgCl_2
 (a) ZnCl_2 is formed
 (b) Zinc dissolves in the solution
 (c) No reaction takes place
 (d) Mg is precipitated
78. KMnO_4 acts as an oxidising agent in the neutral medium and gets reduced to MnO_2 . The equivalent weight of KMnO_4 in neutral medium
 (a) *mol. wt*/2 (b) *mol. wt*/3
 (c) *mol. wt*/4 (d) *mol. wt*/7
79. Which of the following condition will increase the voltage of the cell, represented by the equation $\text{Cu}_{(s)} + 2\text{Ag}^+_{(aq)} \rightarrow \text{Cu}^{2+}_{(aq)} + 2\text{Ag}_{(s)}$
 (a) Increase in the concentration of Ag^+ ion
 (b) Increase in the concentration of Cu^+ ion
 (c) Increase in the dimension of silver electrode
 (d) Increase in the dimension of copper electrode
80. Which will increase the voltage of the cell $\text{Sn}_{(s)} + 2\text{Ag}^+_{(aq)} \rightarrow \text{Sn}^{2+}_{(aq)} + 2\text{Ag}_{(s)}$
 (a) Increase in the concentration of Ag^+ ions
 (b) Increase in the concentration of Sn^{2+} ions
 (c) Increase in size of the silver rod
 (d) None of these
81. The mass of the proton is 1840 times that of electron, its potential difference is V. The kinetic energy of proton is



- (a) 1840 KeV (b) 1 KeV (d) $E = -(E_{right} + E_{left})$
- (c) $\frac{1}{1840}$ KeV (d) 920 KeV
82. What will be the *emf* for the given cell
 $Pt|H_2(P_1)|H^+_{(aq)}||H_2(P_2)|Pt$
- (a) $\frac{RT}{f} \log \frac{P_1}{P_2}$
- (b) $\frac{RT}{2f} \log \frac{P_1}{P_2}$
- (c) $\frac{RT}{f} \log \frac{P_2}{P_1}$
- (d) None of these
83. What is the potential of a cell containing two hydrogen electrodes the negative one in contact with $10^{-8}M H^+$ and positive one in contact with $0.025 M H^+$
- (a) 0.18 V (b) 0.28 V
- (c) 0.38 V (d) 0.48 V
84. Will $Fe_{(s)}$ be oxidised to Fe^{2+} by the reaction with 1 M HCl (E^o for $Fe/Fe^{2+} = +0.44$ V)
- (a) Yes (b) No
- (c) May be (d) Can't say
85. *EMF* of a cell in terms of reduction potential of its left and right electrodes is
- (a) $E = E_{left} - E_{right}$
- (b) $E = E_{left} + E_{right}$
- (c) $E = E_{right} - E_{left}$
86. Arrange the following in the order of their decreasing electrode potential
 Mg, K, Ba, Ca
- (a) K, Ba, Ca, Mg (b) Ca, Mg, K, Ba
- (c) Ba, Ca, K, Mg (d) Mg, Ca, Ba, K
87. Which of the following has highest electrode potential
- (a) Li (b) Cu
- (c) Au (d) Al
88. The cell reaction of a cell is
 $Mg_{(s)} + Cu^{2+}_{(aq)} \rightarrow Cu_{(s)} + Mg^{2+}_{(aq)}$
 If the standard reduction potentials of Mg and Cu are -2.37 and $+0.34V$ respectively. The *emf* of the cell is
- (a) 2.03 V (b) -2.03 V
- (c) $+2.71$ V (d) -2.71 V
89. The element which can displace three other halogens from their compound is
- (a) Cl (b) F
- (c) Br (d) I
90. Which of the following has been universally accepted as a reference electrode at all temperatures and has been assigned a value of zero volt
- (a) Graphite electrode
- (b) Copper electrode





- (c) Platinum electrode
(d) Standard hydrogen electrode
91. Aluminium is more reactive than Fe . But Al is less easily corroded than iron because
- (a) Al is noble metal
(b) Iron forms both mono and divalent ions
(c) Oxygen forms a protective oxide layer
(d) Fe undergoes reaction easily with H_2O
92. Zinc displaces copper from the solution of its salt because
- (a) Atomic number of zinc is more than that of copper
(b) Zinc salt is more soluble in water than the copper salt
(c) Gibbs free energy of zinc is less than that of copper
(d) Zinc is placed higher than copper in electro-chemical series
93. An electrochemical cell is set up as follows
 $Pt(H_2, 1atm)/0.1MHCl$
 $|| 0.1 M \text{ acetic acid } / (H_2, 1atm) Pt$
 E.M.F. of this cell will not be zero because
- (a) The pH of $0.1 M HCl$ and $0.1 M$ acetic acid is not the same
- (b) Acids used in two compartments are different
(c) E.M.F. of a cell depends on the molarities of acids used
(d) The temperature is constant
94. Cu^+ ion is not stable in aqueous solution because of disproportionation reaction. E^o value for disproportionation of Cu^+ is
 (Given $E^o_{Cu^{2+}/Cu^+} = 0.15$, $E^o_{Cu^{2+}/Cu} = 0.34V$)
- (a) $-0.49 V$ (b) $0.49 V$
(c) $-0.38 V$ (d) $0.38 V$
95. E^o of a cell $aA + bB \rightarrow cC + dD$ is
- (a) $-\frac{RT}{nF} \log \frac{[C]^c [D]^d}{[A]^a [B]^b}$
(b) $-RT \log \frac{[a]^A [b]^B}{[c]^C [d]^D}$
(c) $-\frac{RT}{nF} \log \frac{[C]^c [d]^D}{[A]^a [B]^b}$
(d) $-\frac{RT}{nF} \log \frac{[C]^c [d]^D}{[a]^A [b]^B}$
96. In the experiment set up for the measurement of EMF of a half cell using a reference electrode and a salt bridge, when the salt bridge is removed, the voltage
- (a) Does not change
(b) Decreases to half the value
(c) Increase to maximum
(d) Drops to zero



97. Electrode potentials of five elements A, B, C, D and E are respectively $-1.36, -0.32, 0, -1.26$ and -0.42 . The reactivity order of these elements are in the order of
- A, D, E, B and C
 - C, B, E, D and A
 - B, D, E, A and C
 - C, A, E, D and B
98. What is wrongly stated about electrochemical series
- It is the representation of element in order of increasing or decreasing standard electrode reductional potential
 - It does not compare the relative reactivity of metals
 - It compares relative strengths of oxidising agents
 - H_2 is centrally placed element
99. Which of the following statements is true for fuel cells
- They are more efficient
 - They are free from pollution
 - They run till reactants are active
 - All of these

