



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

26. For a spontaneous reaction the  $\Delta G$ , equilibrium constant ( $K$ ) and  $E_{\text{cell}}^o$  will be respectively  
 (a)  $-ve, > 1, +ve$   
 (b)  $+ve, > 1, -ve$   
 (c)  $-ve, < 1, -ve$   
 (d)  $-ve, > 1, -ve$
27. The reference electrode is made from which of the following  
 (a)  $ZnCl_2$  (b)  $CuSO_4$   
 (c)  $Hg_2Cl_2$  (d)  $HgCl_2$
28. The charge over anode in a galvanic cell is  
 (a) Negative  
 (b) Positive  
 (c) No charge  
 (d) Sometimes negative and sometimes positive
29. The standard electrode potential for the two electrode  $A^+/A$  and  $B^+/B$  are respectively  $0.5\text{ V}$  and  $0.75\text{ V}$ . The  $emf$  of the given cell  $A|A^+(a = 1)||B^+(a = 1)|B$  will be  
 (a)  $1.25\text{ V}$  (b)  $-1.25\text{ V}$   
 (c)  $-0.25\text{ V}$  (d)  $0.25\text{ V}$
30. The standard reduction potential for  $Li^+/Li$ ;  $Zn^{2+}/Zn$ ;  $H^+/H_2$  and  $Ag^+/Ag$  is  $-3.05$ ,  $-0.762$ ,  $0.00$  and  $+0.80\text{ V}$ . Which of the following has highest reducing capacity  
 (a)  $Ag$  (b)  $H_2$   
 (c)  $Zn$  (d)  $Li$
31. If an iron rod is dipped in  $CuSO_4$  solution  
 (a) Blue colour of the solution turns green  
 (b) Brown layer is deposited on iron rod  
 (c) No change occurs in the colour of the solution  
 (d) Blue colour of the solution vanishes  
 (e) None of the above
32.  $E^o$  values of  $Mg^{2+}/Mg$  is  $-2.37\text{ V}$ , of  $Zn^{2+}/Zn$  is  $-0.76\text{ V}$  and  $Fe^{2+}/Fe$  is  $-0.44\text{ V}$ . Which of the following statements is correct  
 (a)  $Zn$  will reduce  $Fe^{2+}$   
 (b)  $Zn$  will reduce  $Mg^{2+}$   
 (c)  $Mg$  oxidises  $Fe$   
 (d)  $Zn$  oxidises  $Fe$
33. The standard reduction potential for  $Fe^{2+}/Fe$  and  $Sn^{2+}/Sn$  electrodes are  $-0.44$  and  $-0.14\text{ V}$  respectively. For the given cell reaction  $Fe^{2+} + Sn \rightarrow Fe + Sn^{2+}$ , the standard EMF is  
 (a)  $+0.30\text{ V}$  (b)  $-0.58\text{ V}$



(c) + 0.58 V (d) - 0.30 V

34. Electrode potential of  $Zn^{2+}/Zn$  is  $-0.76V$  and that of  $Cu^{2+}/Cu$  is  $+0.34V$ . The *EMF* of the cell constructed between these two electrodes is

(a) 1.10 V (b) 0.42 V  
(c) - 1.1 V (d) - 0.42 V

35. *EMF* of a cell whose half cells are given below is



(a) - 2.03 V (b) 1.36 V  
(c) 2.7 V (d) 2.03 V

36. A cell constructed by coupling a standard copper electrode and a standard magnesium electrode has *emf* of 2.7 volts. If the standard reduction potential of copper electrode is + 0.34 volt that of magnesium electrode is

(a) + 3.04 volts (b) - 3.04 volts  
(c) + 2.36 volts (d) - 2.36 volts

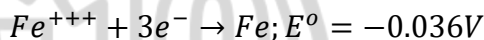
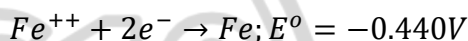
37. When  $E_{Ag^+/Ag}^o = 0.8$  volt and  $E_{Zn^{2+}/Zn}^o = -0.76$  volt, which of the following is correct

(a)  $Ag^+$  can be reduced by  $H_2$   
(b)  $Ag$  can oxidise  $H_2$  into  $H^+$   
(c)  $Zn^{2+}$  can be reduced by  $H_2$   
(d)  $Ag$  can reduce  $Zn^{2+}$  ion

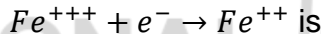
38. Adding powdered lead and iron to a solution that is 1.0 M in both  $Pb^{2+}$  and  $Fe^{2+}$  ions, would result a reaction, in which

(a) More iron and  $Pb^{2+}$  ions are formed  
(b) More lead and  $Fe^{2+}$  ions are formed  
(c) Concentration of both  $Pb^{2+}$  and  $Fe^{2+}$  ions increases  
(d) There is no net change

39. Given standard electrode potentials



The standard electrode potential ( $E^o$ ) for



(a) - 0.476 V (b) - 0.404 V  
(c) + 0.404 V (d) + 0.771 V

40. Reduction potential of four elements P, Q, R, S is -2.90, +0.34, +1.20 and -0.76. Reactivity decreases in the order

(a)  $P > Q > R > S$   
(b)  $Q > P > R > S$   
(c)  $R > Q > S > P$   
(d)  $P > S > Q > R$

41. Which of the following metal can deposit copper from copper sulphate solution

(a) Mercury (b) Iron



- (c) Gold (d) Platinum
42. Standard electrode potential of  $Ag^+/Ag$  and  $Cu^+/Cu$  is  $+0.80V$  and  $+0.34V$  respectively. these electrodes are joint together by salt bridge if
- (a) Copper electrode is work like cathode, then  $E_{cell}^o$  is  $+0.45V$   
 (b) Silver electrode is work like anode then  $E_{cell}^o$  is  $-0.34V$   
 (c) Copper electrode is work like anode then  $E_{cell}^o$  is  $+0.46V$   
 (d) Silver electrode is work like cathode then  $E_{cell}^o$  is  $-0.34V$   
 (e) Silver electrode is work like anode then  $E_{cell}^o$  will be  $+1.14V$
43. The reaction is spontaneous if the cell potential is
- (a) Positive (b) Negative  
 (c) Zero (d) Infinite
44. Which substance eliminates bromine from  $KBr$  solution
- (a)  $I_2$  (b)  $Cl_2$   
 (c)  $HI$  (d)  $SO_2$
45. A standard hydrogen electrode has zero electrode potential because
- (a) Hydrogen is easiest to oxidise  
 (b) The electrode potential is assumed to be zero
- (c) Hydrogen atom has only one electron  
 (d) Hydrogen is the lightest element
46. In the electrochemical cell  
 $H_2(g)1atm|H^+(1M)||Cu^{2+}(1M)|Cu(s)$   
 Which one of the following statements is true
- (a)  $H_2$  is cathode;  $Cu$  is anode  
 (b) Oxidation occurs at  $Cu$  electrode  
 (c) Reduction occurs at  $H_2$  electrode  
 (d)  $H_2$  is anode;  $Cu$  is cathode
47. Expression representing the cell potential ( $E_{cell}$ )
- (a)  $E_{cathode} + E_{anode}$   
 (b)  $E_{anode} - E_{cathode}$   
 (c)  $E_{cathode} - E_{anode}$   
 (d)  $E_{left} - E_{right}$
48. Iron displaces copper from its salt solution, because
- (a) Atomic number of iron is less than that of copper  
 (b) The standard reduction potential of iron is less than that of copper  
 (c) The standard reduction potential of iron is more than that of copper  
 (d) The iron salt is more soluble in water than the copper salt



49. (i) Copper metal dissolves in 1 *M* silver nitrate solution and crystals of silver metal get deposited.
- (ii) Silver metal does not react with 1 *M* zinc nitrate solution
- (iii) Zinc metal dissolves in 1 *M* copper sulphate solution and copper metal gets deposited

Hence the order of decreasing strength of the three metals as reducing agents will be

(a)  $Cu > Ag > Zn$

(b)  $Ag > Cu > Zn$

(c)  $Zn > Cu > Ag$

(d)  $Cu > Zn > Ag$

- (d) Since (i) is more than (ii), zinc becomes the cathode and iron the anode

50. Standard electrode potentials of *Zn* and *Fe* are known to be (i)  $-0.76V$  and (ii)  $-0.44V$  respectively. How does it explain that galvanization prevents rusting of iron while zinc slowly dissolves away

(a) Since (i) is less than (ii), zinc becomes the cathode and iron the anode

(b) Since (i) is less than (ii), zinc becomes the anode and iron the cathode

(c) Since (i) is more than (ii), zinc becomes the anode and iron the cathode

