Electrode potential, E_{Cell}, Nernt equation and ECS

26. For a spontaneous reaction the ΔG, equilibrium constant (K) and E^o_{Cell} 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 V and 0.75 V. The emf of the given cell $A|A^+(a = 1)||B^+(a = 1)|B$ will be
(a) 1.25 V (b) – 1.25 V
(c) – 0.25 V (d) 0.25 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 $+0.80V$. 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 $-2.37V$, of Zn^{2+}/Zn is $-0.76V$ and Fe^{2+}/Fe is $-0.44V$. 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 volt respectively. For the given cell reaction $Fe^{2+} + Sn \rightarrow Fe + Sn^{2+}$, the standard EMF is
(a) + 0.30 V (b) – 0.58 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
$Mg^{2+} + 2e^- \rightarrow Mg(s); E = -2.37V$
$Cu^{2+} + 2e^- \rightarrow Cu(s); E = +0.33V$
(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 $E^o_{Ag^+/Ag} = 0.8$ *volt* and $E^o_{Zn^{2+}/Zn} = -0.76$ *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
$Fe^{++} + 2e^- \rightarrow Fe; E^o = -0.440V$
$Fe^{+++} + 3e^- \rightarrow Fe; E^o = -0.036V$
The standard electrode potential (E^o) for
$Fe^{+++} + e^- \rightarrow Fe^{++}$ is
(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^o_{cell} is $+0.45V$
(b) Silver electrode is work like anode then E^o_{cell} is $-0.34V$
(c) Copper electrode is work like anode then E^o_{cell} is $+0.46V$
(d) Silver electrode is work like cathode then E^o_{cell} is $-0.34V$
(e) Silver electrode is work like anode then E^o_{cell} 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 $(Ecell)$
(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) $Cu > Zn > Ag$

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

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