GUJCET CRASH COURSE

SEM- 3 - Ch- 3 electrochemistry

(1) What is the cell reaction for: $^{\ominus}Zn\,|\,Zn^{2+}{}_{(0.1M)}\,||\,Cd^{+2}{}_{(0.1M)}\,|\,Cd^{\oplus}$

(a) $Cd \rightarrow Cd^{2+} + 2e^{-}$

(b) $Zn^{+2} \rightarrow Zn + 2e^{-}$

(c) $Cd + Zn^{2+} \rightarrow Cd^{2+} + Zn$

(d) $Cd^{2+}{}_{(aq)} + Zn_{(s)} \rightarrow Cd_{(s)} + Zn^{2+}$

(2) If the cell reaction is $Zn + 2Ag^{+} \rightarrow Zn^{+2} + 2Ag$, what will be the correct presentation of cell?

(a) $^{\ominus}Ag\,|\,Ag^{+}\,||\,Zn\,|\,Zn^{2+\oplus}$

(b) $^{\ominus}Zn\,|\,Zn^{+}\,||\,2Ag^{+}\,|\,Ag^{\oplus}$

(c) $^{\ominus}2Ag\,|\,Ag^{+}\,||\,Zn^{+}\,|\,Zn^{2+\oplus}$

(d) $^{\ominus}Zn\,|\,Zn^{+2}\,||\,2Ag^{+}\,|\,Ag^{\oplus}$

(3) KCl solution cannot be filled in the salt bridge in the following cell $^{\ominus}Cu_{(s)}\,|\,CuSO_{4(aq)}\,||\,AgNO_{3(aq)}\,|\,Ag^{\oplus}_{(s)}$ why?

(a) $CuCl_2$ is precipitated

(b) Cl_2 gas produce

(c) AgCl is precipitated

(d) Nothing happened

(4) Which reaction is possible in Galvanic cell?

(a) $Zn_{(s)} \rightarrow Zn^{2+}{}_{(aq)} + 2e^{-}$

(b) $Cu^{2+} + 2e^{-} \rightarrow Cu_{(s)}$

(c) $Zn_{(s)} + Cu^{2+}{}_{(aq)} \ddagger\hat{}\dagger\ Zn^{2+}{}_{(aq)} + Cu_{(s)}$

(d) All of these

(5) The combination of Zn metal strip $ZnSO_4$ solution is called-

(a) Cell (b) Concentration cell

(c) Half cell (d) None of

these

(6) Which apparatus is used to measure exact potential?

(a) Ammeter (b) Galvanometer

(c) Voltmeter (d) Potentiometer

(7) The difference of intensity to lose electrons of electrode is called -

(a) Oxidation potential

(b) Reduction potential

(c) Cell potential

(d) All of these

(8) The potential of the standard hydrogen electrode is ……

(a) 1.1 volt (b) 0.0 volt

(c) 0.5 volt (d) 1.5 volt

(9) The potential of the half cell cannot be measured alone because-

(a) Redox reaction cannot be completed

(b) Salt bridge is not there

(c) Cell cannot be completed

(d) All are correct

(10) $E^{o}_{red} = ...$

(a) E^{o}_{oxi} (b) $-E^{o}_{red}$

(c) $-E^{o}_{oxi}$ (d) E^{o}_{Redox}

(11) The tendency to lose electron of an unknown electrode is more than the standard hydrogen electrode, so the unknown electrode work as

(a) Anode (b) Cathode

(c) Neutral (d) None of these

(12) In the cell, which electrode is acting as an anode?

(a) The electrode whose oxidation potential is less

(b) The electrode whose oxidation potential is more

(c) The electrode whose reduction potential is less

(d) The electrode whose reduction potential is more

(13) The cell in which both electrodes are of same metal and the cone, of solution is different is called....

(a) Standard H electrode

(b) Electrolytic cell

(c) Concentration cell

(d) Dry cell

(14) Which is the correct formula to get oxidation potential non standard half cell $Co\,|\,Co^{2+}$

(a) $E_{(Co^{2+}|Co)} = E^{o}_{(Co^{2+}|Co)} - \frac{0.059}{2}\log[Co^{2+}]$

(b) $E_{(Co^{2+}|Co)} = E^{o}_{(Co^{2+}|Co)} - \frac{0.059}{2}\log\left[\frac{1}{Co^{2+}}\right]$

(c) $E_{(Co^{2+}|Co)} = E^{o}_{(Co^{2+}|Co)} - \frac{0.059}{n}\log\left[Co^{2+}\right]$

(d) $E_{(Co^{2+}|Co)} = E^{o}_{(Co^{2+}|Co)} + \frac{0.059}{n}\log\left[Co^{2+}\right]$

(15) What is the value of cell potential at equilibrium state?

(a) Positive (b) Negative

(c) Zero (d) Infinite

(16) Which reaction takes place by combination of the following two half cell?

$E^{o}_{Fe^{2+}|Fe} = 0.44V;\ E^{o}_{Pb^{2+}|Pb} = 0.20V$

(a) $Fe^{2+}_{(aq)} + Pb_{(s)} \hat{\ddagger}\hat{\uparrow} Pb^{2+}_{(aq)} + Fe_{(s)}$

(b) $Fe_{(s)} + Pb^{2+}_{(aq)} \rightleftharpoons Fe^{2+}_{(aq)} + Pb_{(s)}$

(c) $Fe_{(s)} + Pb_{(s)} \rightleftharpoons Fe^{2+}_{(aq)} + Pb^{2+}_{(aq)}$

(d) $Pb^{2+}_{(aq)} + Fe^{2+}_{(aq)} \rightleftharpoons Pb_{(s)} + Fe_{(s)}$

(17) KNO_3 solution is used in the sale bridge because-

(a) KNO_3 is soluble in water

(b) KNO_3 is good conductor

(c) The speed of the ions K^+ and NO_3^- are same

(d) None of these

(18) The value of E°_{red} for the metal A, B, and C are +0.5 volt, –3.0 volt and –1.2 volt respectively then what will be the correct order of decrease in the reducing property?

(a) B > C > A (b) A > B > C

(c) C > B > A (d) A > C > B

(19) The potential of the cell is actually

(a) potential applied to electrodes

(b) ionization potential

(c) a relative difference of intensity to accept or lose electrons.

(d) the potential energy of electrons.

(20) The half cell potential Zn and Mg are as $\frac{Zn^{+2}}{Zn} = +0.76\ V$ and $\frac{Mg^{+2}}{Mg} = +2.37\ V$ What happeded when powder of 'Zn' is added to $MgCl_2$ solution?

(a) No reaction (b) $ZnCl_2$ will form

(c) Mg will precipitated (d) None

(21) $CuSO_{4(aq)}$ solution cannot be stored in Aluminium container why?

(a) 'Cu' undergo oxidation

(b) Cu undergo reduction

(c) 'Al' undergo Reduction

(d) $CuSO_4$ will be decompose

(22) On which factor the value of cell potential does not depend?

(a) Temperature

(b) Colour of solution

(c) Nature of electrode

(d) Conc.

(23) In Nernst's equation 0.059 is value of which constant at 298 K?

(a) $\frac{RT}{F}$ (b) $\frac{RT}{nF}$

(c) $2.303\frac{RT}{nF}$ (d) $2.303\frac{RT}{F}$

(24) What will be 'n' for $Mg\,|\,Mg^{2+}_{(0.5M)}\,||\,Al^{3+}_{(0.25\,M)}\,|\,Al$ cell?

(a) 2 (b) 3 (c) 6 (d) 4

(25) Which is produced in the solution of $CuSO_4$ when it is electrolysed with graphite electrodes?

(a) $Cu(OH)_2$ (b) H_2O

(c) Na_2SO_4 (d) H_2SO_4

(26) What can be measured with help of wheatstone bridge?

(a) Electric current (b) Conductivity

(c) Resistance (d) All of these

(27) The relative tendency of electrode to release (lose) e^- is commonly known as-

(a) E_{red} (b) E^{o}_{red} (c) E^{o}_{oxi} (d) E_{cell}

(28) The potential of $E^{o}_{Mg+2|Mg} = -2.36$ volt, then what will be potential of $E^{o}_{Mg/Mg^{+2}}$?

(a) +2.36 volt (b) +0.236 volt

(c) –1.10 v (d) –2.36 volt

(29) Which is the correct formula to get coulomb?

(a) $Q = \frac{1}{t}$ (b) $Q = 1 \times t$

(c) $Q = I^2 \times t$ (d) $Q = \frac{I}{t^2}$

(30) Pick the correct formula for the efficiency of cell in %?

(a) $\frac{\text{Exp. value of product}}{\text{Theoritical value of product}} \times 100$

(b) $\frac{\text{Theoritical value of product}}{\text{Exp. value of product}} \times 100$

(c) $\frac{\text{Theoritical value of product}}{\text{Practical value of product}} \times 100$

(d) None of these

(31) The cell potential of the cell with $\frac{1}{2}Cu_{(s)} + \frac{1}{2}Cl_{2(g)} \rightarrow \frac{1}{2}Cu^{2+} + Cl^-$ reaction at 298 K temperature is 1.02 volt. What will be the free energy?

(a) 98430 J (b) –98430 J

(c) 96500 J (d) –49215 J

(32) Which of the following equation gives the correct for potential?

(a) $E = E^o - \frac{RT}{nF} \ln\left[\frac{\text{Product}}{\text{Reactant}}\right]$

(b) $E = E^o - \frac{RT}{nF} \ln\left[\frac{\text{Reactant}}{\text{Product}}\right]$

(c) $E = E^o + \frac{RT}{nF} \ln\left[\frac{\text{Product}}{\text{Reactant}}\right]$

(d) $E = -\frac{RT}{nF} \log\left[\frac{\text{Product}}{\text{Reactant}}\right]$

(33) E^o_{red} value of A, B, C are +0.5V, –3.0 V and –1.2 V respectively, then intensity of reducing power in decreasing order will be

(a) B > C > A (b) A > B > C

(c) C > B > A (d) A > C > B

(34) $Zn^{2+} + 2e^- \rightarrow Zn_{(s)} \quad E^o = -0.762\ V$

$Fe^{2+} + 2e^- \rightarrow Fe_{(s)} \quad E^o = -0.440\ V$

$Cu^{2+} + 2e^- \rightarrow Cu_{(s)} \quad E^o = +0.345V$

$Ag^+ + e^- \rightarrow Ag_{(s)} \quad E^o = +0.800V$

From the above information say that which metal will oxidised easily?

(a) Zn (b) Cu (c) Fe (d) Ag

(35) Calculate the equilibrium constant for the following reaction:

$Cu_{(s)} + 2Ag^+_{(aq)} \rightleftharpoons Cu^{2+}_{(aq)} + 2Ag_{(s)}$

$E^o_{cell} = 0.46$ volt

(a) 1.941×10^{15} (b) 3.92×10^{15}

(c) 0.392×10^{15} (d) 39.20×10^{10}

(36) The values of limiting molar conductivity of NaCl, HCl and CH_3COONa are 126.4, 425.9 and 91.05 S cm^2mol^{-1} what is the molar conductivity of CH_3COOH solution?

(a) 271.6 S cm^2mol^{-1}

(b) 266.0 S cm^2mol^{-1}

(c) 590.6 S cm^2mol^{-1}

(d) 390.5 S cm^2mol^{-1}

(37) 1.08 gm 'Ag' deposited by passing 7.5 amp current for 200 sec. through $AgNO_3$ solution. What is the efficiency of cell?

(a) 90% (b) 100%(c) 95%(d) 64.51%

(38) What is the free energy of the cell formed be the combination of $E^o_{Cu^{2+}|Cu} = 0.34\ V$ and $E^o_{Fe^{2+}|Fe} = -0.45V$?

(a) –154 J (b) 152470 J (c) 96500 J

(d) –96487 J

(39) Pick up the correct cell presentation formed by the, $E^o_{Ni^{2+}|Ni} = -0.23V; E^o_{Ag^+|Ag} = 0.80V$ Volt?

(a) $^{\ominus}Ni \mid Ni^{2+}_{(1M)} \parallel Ag^+_{(1M)} \mid Ag^{\oplus}$

(b) $^{\ominus}Ag \mid Ag^{2+}_{(1M)} \parallel Ni^{2+}_{(1M)} \mid Ni$

(c) $^{\ominus}Ni^{2+} \mid Ni \parallel Ag \mid Ag^{+\oplus}$

(d) $^{\ominus}Ag^+_{(1M)} \mid Ag \parallel Ni \mid Ni^{2+}_{(1M)}$

(40) How much Calcium will be obtained on cathode by passing 1 Faraday electric current? (At wt. of Ca = 40 gm/mole)

(a) 40 gram (b) 80 gram

(c) 20 gram (d) 50 gram)