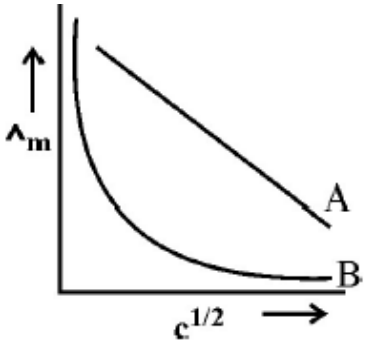
Electrochemistry

Question bank

S. No.	Question	Year
	Note: The PINK coloured questions are from the **reduced portion** of syllabus as per CBSE guidelines.	
1.	Out of zinc and tin, whose coating is better to protect iron objects ?	2020
2.	(a) Calculate ΔG° for the reaction $Zn(s) + Cu^{2+}(aq) \longrightarrow Zn^{2+}(aq) + Cu(s)$ Given : E° for $Zn^{2+}/Zn = -0{\cdot}76$ V and E° for $Cu^{2+}/Cu = +0{\cdot}34$ V $R = 8{\cdot}314$ JK–1 mol^{-1}, $F = 96500$ C mol^{-1}. (b) Give two advantages of fuel cells. **OR** (a) Out of the following pairs, predict with reason which pair will allow greater conduction of electricity : (i) Silver wire at 30°C or silver wire at 60°C. (ii) 0·1 M CH_3COOH solution or 1 M CH_3COOH solution. (iii) KCl solution at 20°C or KCl solution at 50°C. (b) Give two points of differences between electrochemical and electrolytic cells.	2020
3.	For an electrochemical cell $Mg(s) + Ag^+(aq) \longrightarrow Ag(s) + Mg^{2+}(aq)$, give the cell representation. Also write the Nernst equation for the above cell at 25°C.	2020
4.	Conductivity of 2×10^{-3} M methanoic acid is 8×10^{-5} S cm^{-1}. Calculate its molar conductivity and degree of dissociation if for methanoic acid is 404 S cm^2 mol^{-1}.	2020
5.	For an electrochemical cell $Cu^{2+}(aq) + Ni(s) \longrightarrow Ni2+(aq) + Cu(s)$, give the cell representation. Also write the Nernst equation for the above cell at 25°C.	2020
6.	State Kohlrausch's law. Calculate the molar conductance of $Sr(NO_3)_2$. The molar ionic conductance of Sr^{2+} and NO^{3-} ions are 119 S cm^2 mol^{-1} and 72 S cm^2 mol^{-1} respectively.	2020
7.	For an electrochemical cell $F_2(g) + 2I^-(aq) \longrightarrow 2F^-(aq) + I_2(s)$, give the cell representation. Also write the Nernst equation for the above cell at 25°C.	2020
8.	State Kohlrausch's law. Calculate the molar conductance of $Ba(OH)_2$. The molar ionic conductance of Ba^{2+} and OH^- ions are 127 and 199 S cm^2 mol^{-1} respectively.	2020
9.	Name the cell which was used in the Apollo Space Programme.	2020
10.	How many coulombs are required for the oxidation of 1 mol of H_2O to O_2 ?	2020
11.	Calculate the maximum work and log Kc for the given reaction at 298 K : $Ni(s) + 2\,Ag^+(aq) \longrightarrow Ni^{2+}(aq) + 2\,Ag(s)$ Given : $E^\circ Ni^{2+}/Ni = -0{\cdot}25$ V, $E^\circ\ Ag^+/Ag = +0{\cdot}80$ V, 1 F = 96500 C mol^{-1}	2020
12.	Write the product obtained at cathode on electrolysis of aqueous solution of NaCl.	2020
13.	(a) The electrical resistance of a column of 0.05 M KOH solution of length 50 cm and area of cross-section 0.625 cm^2 is 5×10^3 ohm. Calculate its resistivity, conductivity and molar conductivity. (b) Predict the products of electrolysis of an aqueous solution of $CuCl_2$ with platinum electrodes. (Given : $E^\circ_{Cu^{2+}/Cu} = +0.34$ V, $E^\circ_{(\frac{1}{2}\,Cl_2/Cl^-)} = +1.36$ V $E^\circ_{H^+/H_2(g),Pt} = 0.00$ V, $E^\circ_{(\frac{1}{2}\,O_2/H_2O)} = +1.23$ V) OR	2020

	(a) Calculate e.m.f. of the following cell : $Zn(s)/Zn^{2+}$ (0.1 M) || (0.01 M) $Ag^{+}/Ag(s)$ Given : $E°Zn^{2+}/Zn = -0.76$ V, $E°Ag^{+}/Ag = +0.80$ V [Given : log 10 = 1] (b) X and Y are two electrolytes. On dilution molar conductivity of 'X' increases 2.5 times while that Y increases 25 times. Which of the two is a weak electrolyte and why?	
14.	Name the cell used in hearing aids and watches.	2020
15.	How much charge in terms of Faraday is required to reduce one mol of MnO_4^- to Mn^{2+} ?	2020
16.	When a steady current of 2A was passed through two electrolytic cells A and B containing electrolytes $ZnSO_4$ and $CuSO_4$ connected in series, 2 g of Cu were deposited at the cathode of cell B. How long did the current flow? What mass of Zn was deposited at cathode of cell A? [Atomic mass : Cu = 63.5 g mol–1, Zn = 65 g mol–1; 1F = 96500 C mol–1] 3	2020
17.	E°cell for the given redox reaction is 2.71 V $Mg(s) + Cu^{2+}(0.01\ M) \longrightarrow Mg^{2+}(0.001\ M) + Cu(s)$ Calculate E_{cell} for the reaction. Write the direction of flow of current when an external opposite potential applied is (i) less than 2.71 V and (ii) greater than 2.71 V OR (a) A steady current of 2 amperes was passed through two electrolytic cells X and Y connected in series containing electrolytes FeSO4 and ZnSO4 until 2.8 g of Fe deposited at the cathode of cell X. How long did the current flow? Calculate the mass of Zn deposited at the cathode of cell Y. (Molar mass : Fe = 56 g mol^{-1} Zn = 65.3 g mol^{-1}, 1F = 96500 C mol^{-1}) (b) In the plot of molar conductivity (Λm) vs square root of concentration ($c^{1/2}$), following curves are obtained for two electrolytes A and B :  Answer the following : (i) Predict the nature of electrolytes A and B. (ii) What happens on extrapolation of Λ_m to concentration approaching zero for electrolytes A and B?	2019
18.	(a) The conductivity of 0·001 mol L^{-1} acetic acid is 4·95 x 10^{-5} S cm^{-1}. Calculate the dissociation constant if Λ° m for acetic acid is 390·5 S cm^2 mol^{-1}. (b) Write Nernst equation for the reaction at 25°C : $2Al(s) + 3Cu^{2+}(aq) \longrightarrow 2Al^{3+}(aq) + 3Cu(s)$ (c) What are secondary batteries? Give an example. OR (a) Represent the cell in which the following reaction takes place : $2\ Al(s) + 3\ Ni^{2+}(0·1\ M) \longrightarrow 2\ Al^{3+}(0·01\ M) + 3\ Ni(s)$ Calculate its emf if E°cell = 1·41 V. (b) How does molar conductivity vary with increase in concentration for strong electrolyte and	2019

	weak electrolyte? How can you obtain limiting molar conductivity ($\Lambda°m$) for weak electrolyte?	
19.	Write anode and cathode reactions that occur in dry cell. How does a dry cell differ from a mercury cell?	2019
20.	(a) Following reaction takes place in the cell: $Zn\,(s) + Ag_2O\,(s) + H_2O\,(l) \longrightarrow Zn^{2+}\,(aq) + 2Ag\,(s) + 2OH^-\,(aq)$ Calculate $\Delta_r G^o$ of the reaction. [Given : $E^o_{(Zn^{2+}/Zn)} = -0{\cdot}76$ V, $E^o_{(Ag^+/Ag)} = 0{\cdot}80$ V, 1 F = 96,500 C mol^{-1}] (b) How can you determine limiting molar conductivity, ($\Lambda°m$) for strong electrolyte and weak electrolyte?	2019
21.	(a) Write the reaction that occurs at anode on electrolysis of concentrated H_2SO_4 using platinum electrodes. (b) What is the effect of temperature on ionic conductance?	2019
22.	Write the name of two fuels other than hydrogen used in fuel cell. Write two advantages of fuel cell over an ordinary cell.	2019
23.	Explain with a graph, the variation of molar conductivity of a strong electrolyte with dilution.	2019
24.	Calculate $\Delta rG°$ and log Kc for the following reaction : $Cd^{+2}(aq) + Zn(s) \longrightarrow Zn^{2+}(aq) + Cd(s)$ Given : $E^o_{Cd^{2+}/Cd} = -0{\cdot}403$ V $E^o_{Zn^{2+}/Zn} = -0{\cdot}763$ V **OR** Chromium metal is electroplated using an acidic solution containing CrO_3 according to the following equation : $CrO_3(aq) + 6H^+ + 6e^- \longrightarrow Cr(s) + 3H_2O$ Calculate how many grams of chromium will be electroplated by 24,000 coulombs. How long will it take to electroplate 1·5 g chromium using 12·5 A current? [Atomic mass of Cr = 52 g mol^{-1}, 1 F = 96500 C mol^{-1}]	2019
25.	Define electrochemical cell. What happens when applied external potential becomes greater than E°cell of electrochemical cell?	2019
26.	Following reactions may occur at cathode and anode during electrolysis of aqueous sodium chloride. What products will be held at anode and cathode? Use given E° values to justify your answer. Cathode : $Na^+(aq) + e^- \rightarrow Na(s)$ $E^\circ = -2{\cdot}71$ V $H^+(aq) + e^- \rightarrow \frac{1}{2}H_2(g)$ $E^\circ = 0{\cdot}00$ V Anode : $Cl^-(aq) \rightarrow \frac{1}{2}Cl_2(g) + e^-$ $E^\circ = +1{\cdot}36$ V $2H_2O(aq) \rightarrow O_2(g) + 4H^+ + 4e^-$ $E^\circ = +1{\cdot}23$ V	2019
27.	Calculate the emf of the following cell at 25°C :	2019

	$Al\ (s)\ |Al^{3+}\ (0{\cdot}001\ M)\ ||\ (0{\cdot}1)\ Ni^{2+}\ |Ni\ (s)$ Given : $E^{o}_{(Ni^{2+}/Ni)} = -0{\cdot}25\ V$ $E^{o}_{(Al^{3+}/Al)} = -1{\cdot}66\ V$ [log 2 = 0·3010, log 3 = 0·4771]	
28.	(a) Write the cell reaction and calculate the e.m.f. of the following cell at 298 K : Sn (s) | Sn^{2+} (0·004 M) || H^+ (0·020 M) | H_2 (g) (1 bar) | Pt (s), (Given : $E°(Sn^{2+}/Sn) = -0{\cdot}14$ V) (b) Give reasons : (i) On the basis of E° values, O_2 gas should be liberated at anode but it is Cl_2 gas which is liberated in the electrolysis of aqueous NaCl. (ii) Conductivity of CH_3COOH decreases on dilution.	2018
29.	(a) For the reaction $2AgCl\ (s) + H_2\ (g)\ (1\ atm) \longrightarrow 2Ag\ (s) + 2H^+\ (0{\cdot}1\ M) + 2Cl^-\ (0{\cdot}1\ M)$, Calculate the e.m.f. of the cell. Given $\Delta G° = -43600$ J at 25°C. [log $10^{-n} = -n$] (b) Define fuel cell and write its two advantages.	2018
30.	Write the name of the cell which is generally used in hearing aids. Write the reactions taking place at the anode and the cathode of this cell.	2017(OD)
31.	(a) The cell in which the following reaction occurs : $2\ Fe^{3+}\ (aq) + 2\ I^-\ (aq) \longrightarrow 2\ Fe^{2+}\ (aq) + I_2\ (s)$ has $E°_{cell} = 0{\cdot}236$ V at 298 K. Calculate the standard Gibbs energy of the cell reaction. (b) How many electrons flow through a metallic wire if a current of 0·5 A is passed for 2 hours? (Given : 1 F = 96,500 C mol^{-1})	2017(OD)
32.	Write the name of the cell which is generally used in inverters. Write the reactions taking place at the anode and the cathode of this cell.	2017(OD)
33.	Write the name of the cell which is generally used in transistors. Write the reactions taking place at the anode and the cathode of this cell.	2017(OD)
34.	Calculate the degree of dissociation (α) of acetic acid if its molar conductivity (Λ_m) is 39.05 Scm^2mol^{-1}. Given $\lambda°_{(H+)} = 349.6\ S\ cm^2\ mol^{-1}$ and $\lambda°_{(CH3COO^-)} = 40.9\ S\ cm^2mol^{-1}$	2017(D) 2016(OD)
35.	(a) Calculate the mass of Ag deposited at cathode when a current of 2 amperes was passed through a solution of $AgNO_3$ for 15 minutes. (Given : Molar mass of Ag = 108 g mol^{-1} 1F = 96500 C mol^{-1}) (b) Define fuel cell.	2017(D)
36.	In a galvanic cell, the following cell reaction occurs : $Zn\ (s) + 2\ Ag^+(aq) \longrightarrow Zn^{2+}\ (aq) + 2\ Ag\ (s)$ $E°_{cell} = +1{\cdot}56$ V (a) Is the direction of flow of electrons from zinc to silver or silver to zinc? (b) How will concentration of Zn^{2+} ions and Ag^+ ions be affected when the cell functions?	2017(F)
37.	The electrical resistance of a column of 0·05 M KOH solution of diameter 1 cm and length 45.5 cm is 4.55×10^3 ohm. Calculate its molar conductivity.	2017(F)
38.	Calculate $E°_{cell}$ for the following reaction at 298 K: $2Al(s) + 3Cu^{2+}(0.01M) \longrightarrow 2\ Al^{3+}(0.01M) + 3Cu(s)$; Given: $E_{cell} = 1.98$ V	2016(OD)
39.	Using the E° values of A and B, predict which is better for coating the surface of iron [$E°(Fe^{2+}/Fe) = -0.44V$] to prevent corrosion and why? Given: $E°(A^{2+}/A) = -2.37V$, $E°(B^{2+}/B) = -0.14V$	2016(OD)
40.	Define electrochemical cell. What happens if external potential applied becomes greater than $E°_{cell}$ of electrochemical cell?	2016(OD)
41.	From the given cells:	2016(D)

	Lead storage cell, mercury cell, fuel cell and Dry cell. Answer the following: (i) Which cell is used in hearing aids? (ii) Which cell was used in Apollo space programme? (iii) Which cell is used in automobiles and inverters? (iv) Which cell does not have long life?	
42.	Calculate e.m.f of the following cell at 298K: $\boldsymbol{2Cr(s) + 3Fe^{2+}(0.1M) \longrightarrow 2Cr^{3+}(0.01M) + 3Fe(s)}$ Given: $\boldsymbol{E^0(Cr^{3+}\|Cr) = -0.74V \quad E^0(Fe^{2+}\|Fe) = -0.44V}$	2016(D)
43.	Following reaction occurs at cathode during the electrolysis of aqueous silver chloride solution: $Ag^+(aq) + e^- \longrightarrow Ag(s) \qquad E^o = +0.80\ V$ $H^+(aq) + e^- \longrightarrow \frac{1}{2} H_2(g) \qquad E^o = 0.00\ V$ On the basis of their standard electrode potential (E^o) values, which reaction is feasible and why?	2015(D)
44.	Define limiting molar conductivity. Why conductivity of an electrolyte solution increases with the decrease in concentration?	2015(D)
45.	Calculate emf of the following cell at 25 ^oC: $Fe\|Fe^{2+}(0.001M) \parallel H^+(0.01M)\| H_2(g)\ (1bar)\|Pt(s)$ $E^o(Fe^{2+}/Fe) = -0.44\ V,\ E^o(H^+/H_2) = 0.00V$	2015(D) 2013(D)
46.	Calculate the time to deposit 1.27g of copper at cathode when a current of 2A was passed through the solution of $CuSO_4$. (molar mass of Cu=63.5g mol^{-1}, 1 F= 96500 C)	2015(O)
47.	Conductivity of 2.5×10^{-4} M Methanoic acid is 5.25×10^{-5} S cm^{-1}. Calculate its molar conductivity and degree of dissociation. Given: $\lambda°(H^+) = 349.5$ S cm^2 mol^{-1} and $\lambda°(HCOO^-) = 50.5$ S cm^2 mol^{-1}	2015(O)
48.	Define the following terms: (i) Molar conductivity (Λ_m) (ii) Secondary batteries (iii) Fuel cell	2015(D,C) 2014(O)
49.	For the cell reaction $Ni(s)\|Ni^{2+}(aq) \parallel Ag^+(aq)\| Ag(s)$ Calculate the equilibrium constant at 25 ^oC. How much maximum work can be obtained by operation of this cell? $E^o(Ni^{2+}\|Ni) = 0.25\ V,\ E^o(Ag^+\|Ag) = 0.80V$	2015(D,C)
50.	Calculate $\Delta_rG°$ and emf that can be obtained from the following under the standard conditions at 25 ^oC: $Zn(s)\|Zn^{2+}(aq) \parallel Sn^{2+}(aq)\| Sn(s)$ Given: $E^o(Zn^{2+}/Zn) = -0.76\ V,\ E^o(Sn^{2+}/Sn) = -0.14V$ and F = 96500 C mol^{-1}	2015(O,C)
51.	Define conductivity and molar conductivity for the solution of an electrolyte. Discuss their variation with concentration.	2015(O) 2014(D,O)
52.	Calculate the standard cell potential of galvanic cell in which the following reaction takes place: $Fe^{2+}(aq) + Ag^+(aq) \longrightarrow Fe^{3+}(aq) + Ag(s)$ Calculate $\Delta_rG°$ and equilibrium constant of the reaction also. ($E^o(Ag^+/Ag) = 0.80V$; $E^o(Fe^{3+}/Fe^{2+}) = 0.77V$	2015(O,C)
53.	Define the following terms: (i) Limiting molar conductivity (ii) Fuel cell	2014(D) 2014(O)
54.	Resistance of a conductivity cell filled with 0.1 mol L^{-1}KCl solution is100 Ω. If the resistance of the same cell when filled with 0.02 mol L^{-1}KCl solution is 520 Ω, calculate the conductivity and molar conductivity of 0.02 mol L^{-1}KCl solution. The conductivity of 0.1 mol L^{-1}KCl solution is $1.29 \times 10^{-2}\ \Omega^{-1}cm^{-1}$.	2014(D)
55.	State faraday's first law of electrolysis. How much charge in terms of Faraday is required for	2014(D)

	reduction of 1 mole of Cu^{2+} to Cu.	
56.	Calculate emf of the following cell at 298 K $Mg(s)\|\ Mg^{2+}(0.1M)\ \|\ Cu^{2+}(0.01M)\|Cu(s)$ Given E^{o}_{cell} = +2.71 V, 1F = 96500 C mol^{-1}	2014(D)
57.	State Kohlrausch's law of independent migration of ions. Why does the conductivity of a solution decreases with dilution?	2014(O)
58.	Calculate $\Delta_r G°$ fot the reaction $Mg(s) + Cu^{2+}(aq) \longrightarrow Mg^{2+}(aq)+Cu(s)$ Given E^{o}_{cell} = +2.71 V, 1F = 96500 C mol^{-1}	2014(O)
59.	The conductivity of 0.20 M solution of KCl at 298 K is 0.025 S cm^{-1}. Calculate its molar conductivity.	2013(D)
60.	The standard electrode potential (E°) of Daniel cell is 1.1 V. Calculate the ΔG° for the reaction $Zn(s) + Cu^{2+}(aq) \longrightarrow Zn^{2+}(aq)+Cu(s)$ Given:1F = 96500 C mol^{-1}	2013(O) 2013(D,C)
61.	Calculate emf of the following cell at 298 K $Ag(s)\|\ Ag^{+}(0.001M)\ \|\ Cu^{2+}(0.1M)\|Cu(s)$ Given E^{o}_{cell} = +0.46 V, 1F = 96500 C mol^{-1}	2013(O) 2009(D)
62.	What are fuel cells? Write the electrode reactions and overall reaction of H_2-O_2 fuel cell.	2013(O,C) 2011(O,C)
63.	What type of battery is the lead storage battery? Write the anode and cathode reactions and overall reaction occurring in a lead storage battery when current is drawn from it. What happens on charging the battery?	2012(D) 2011(D),(O) 2010(D)
64.	In the button cell, widely used in watches, the following reaction takes place $Zn(s) + Ag_2O(s) + H_2O(l) \longrightarrow Zn^{2+}(aq) + 2\ Ag(s) + 2OH^{-}(aq)$ Determine E° andΔG° for the reaction. (Given: $E°(Ag^{+}/Ag)$ = +0.80 V, $E°(Zn^{2+}/Zn)$ = -0.76 V)	2012(D)
65.	Define molar conductivity of a solution and how molar conductivity changes with change in concentration of solution for a weak and strong electrolyte. How is such change explained?	2012(D) 2009(D)
66.	The resistance of conductivity cell containing 0.001 M KCl solution at 298 K is 1500 Ω. What is the cell constant if the conductivity of 0.001 M KCl solution at 298 K is 0.146×10^{-3} S cm^{-1}.	2012(D) 2009(D,C)
67.	Express the relation among the cell constant, resistance of the solution in the cell and conductivity of the solution. How is molar conductivity of a solution related to its conductivity?	2012(O)
68.	The molar conductivity of a 1.5 M solution of an electrolyte is found to be 138.9 S cm^{-2} mol^{-1}. Calculate the conductivity of this solution.	2012(O) 2010(O,C)
69.	The electrical resistance of a column of 0.05 M NaOH solution of diameter 1 cm and length 50 cm is 5.55×10^{3} ohm. Calculate resistivity, conductivity and molar conductivity.	2012(O)
70.	A voltaic cell is set up at 25°C with the following half cells: $Al/Al^{3+}(0.001M)$ and Ni/Ni^{2+} (0.50M). Write an equation for the reaction that occurs when the cell generates an electrical current and determine the cell potential. $E°(Ni^{2+}/Ni)$ = -0.25 V and $E°(Al^{3+}/Al)$ = -1.66 V	2012(O) 2011(O) 2009(D)(O)
71.	What is corrosion? Explain the electrochemical theory of rusting of iron and write reaction involved in the rusting of iron.	2012(D,C) 2009(D)
72.	Determine the value of equilibrium constant(Kc) and ΔG° for the following reaction: $Ni(s) + 2Ag^{+}(aq) \longrightarrow Ni^{2+}(aq) + 2Ag(s)$; Given E°= 1.05 V, 1F = 96500 C mol^{-1}.	2011(D)
73.	The half reactions of an electrochemical cell are given below: $MnO_4^{-}(aq) + 8H^{+} + 5e^{-} \longrightarrow Mn^{2+}(aq) + 4H_2O$ (l) , E°= +1.51 V $Sn^{2+}(aq) \longrightarrow Sn^{4+}(aq) + 2e^{-}$, E°= +0.15 V Construct the redox equation from the standard potential of the cell and predict if the reaction is reactant favoured or product favoured?	2011(D) 2010(O) 2009(O)
74.	Calculate the potential of the half-cell containing 0.10 M $K_2Cr_2O_7(aq)$, 0.20 M Cr^{3+} (aq) and 1.0×10^{-4} M $H^{+}(aq)$. The half-cell reaction is $Cr_2O_7^{2-}(aq) + 14H^{+} + 6e^{-} \longrightarrow 2Cr^{3+}(aq) + 7H_2O$ (l) , E°= +1.33 V	2011(O)
75.	How many moles of mercury will be produced by electrolyzing 1.0 M $Hg(NO_3)_2$ solution with	2011(O)

	a current of 2.00 A for 3hours? [$Hg(NO_3)_2$= 200.6 g mol^{-1}]	
76.	Calculate the equilibrium constant, Kc for the reaction $3Sn^{4+}(aq) + 2\ Cr(s) \longrightarrow 3Sn^{2+}(aq) + 2\ Cr^{3+}(aq)$ Given: E°= 0.885 V	2011(O)
77.	Calculate the degree of dissociation of acetic acid at 298 K, given that: $\Lambda_m(CH_3COOH) = 11.7$ S cm^2 mol^{-1} $\Lambda°_m(CH_3COO^-) = 49.9$ S cm^2 mol^{-1} $\Lambda°_m(H^+) = 349.1$ S cm^2 mol^{-1}	2011(D,C)
78.	Calculate the equilibrium constant, Kc for the reaction at 298 K $Zn(s) + Cu^{2+}(aq) \longrightarrow Zn^{2+}(aq) + Cu(s)$ [Given: $E°(Cu^{2+}/Cu) = +0.34$ V, $E°(Zn^{2+}/Zn) = -0.76$ V]	2011(O,C)
79.	Write the Nernst equation and compute the emf of the following cell at 298 K: $Sn(s)\|Sn^{2+}(0.05M) \| H^+(0.02M)\| H_2(g)$ 1 atm/Pt ; (Given: $E°(Sn^{2+}/Sn) = -0.136$ V)	2011(O,C)
80.	State Kohlrausch's law of independent migration of ions. Write an expression for the molar conductivity of acetic acid at infinite dilution according to Kohlrausch law.	2010(D)
81.	Calculate $\Lambda°_m$ for acetic acid; given that $\Lambda°_m(HCl)$=426 S cm^2 $mol^{-1}$$\Lambda°_m(NaCl)$= 126 S cm^2 mol^{-1}, $\Lambda°_m(CH_3COONa)$= 91 S cm^2 mol^{-1}	2010(D)
82.	A copper silver cell is set up. The copper ion concentrations is 0.1 M. The concentration of silver ion is not known. The cell potential when measured was 0.422 V. Determine the concentration of silver ions in the cell. (Given $E°(Ag^+/Ag) = +0.80$ V, $E°(Cu^{2+}/Cu) = +0.34$ V)	2010(D) 2009(O)
83.	Given that the standard electrode potentials (E°) of metals are: $K^+/K = -2.93$V, $Ag^+/Ag = 0.80$V, $Hg^{2+}/Hg = 0.79$V, $Mg^{2+}/Mg = -2.37$ V, $Cr^{3+}/Cr = -0.74$V, $Fe^{2+}/Fe = -0.44$V. Arrange these metals in order of their reducing power.	2010(O)
84.	Define the term molar conductivity. How is it related to conductivity of the related solution?	2009(D)
85.	One half-cell in a voltaic cell is constructed from silver wire dipped in silver nitrate solution of unknown concentration. Its other half-cell consists of a zinc electrode dipping in a 1.0 M solution of $Zn(NO_3)_2$. A voltage 1.48 V is measured for this cell. Use this information to calculate the concentration of silver nitrate solution used.(Given: $E°(Ag^+/Ag) = +0.80$ V, $E°(Zn^{2+}/Zn) = -0.76$ V)	2009(D)
86.	Calculate the equilibrium constant for the equilibrium reaction at 298 K $Fe(s) + Cd^{2+}(aq) \longrightarrow Fe^{2+}(aq) + Cd(s)$ [Given: $E°_{(Cd2+/Cd)} = -0.40$ V, $E°_{(Fe2+/Fe)} = -0.44$ V]	2009(D)