Note:-
1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

Section A

Q.1 Select and write the correct answer. (4)

1. Consider the cell Pt | Cl_2 (g)| HCl(aq)|| HBr (aq) | Br_2 (l) Pt. If concentration of HCl is increased, the cell potential will

   A) increase   B) decrease
   C) remain the same   D) become maximum

2. E^0 of an electrode half reaction is related to ΔG^0 by the equation, $E^0 = -\Delta G^0/nF$. If the amount of Ag^+ in the half reaction $Ag^+ + e^- \rightarrow Ag$ is tripled then

   A) n is tripled   B) ΔG^0 reduces to one third

   C) E^0 reduces to one third   D) all the above

3. The number of Faradays required to produce 0.5 mol of free metal from Al^{3+} is

   A) 3   B) 2
   C) 6   D) 1.5

4. During electrolysis, 2A current is passed through an electrolytic solution for 965s. The number of moles of electrons passed will be.

   A) 0.02   B) 0.01
   C) 200   D) 0.037

Q.2 Answer the following. (3)

1. Define Resistivity of conductor.

2. Write an expression to relate the molar conductivity of an electrolyte in terms of degree of dissociation.

3. What is the origin of electrical conductivity of metals?

Section B
Attempt any Four

Q.3   Why mercury battery provides more constant voltage than the Leclanche' dry cell?   **(2)**

Q.4   What does these following terms means?   **(2)**
      (a) Electro-refining
      (b) Electroplating

Q.5   Distinguish between electronic and electrolytic conductors.   **(2)**

Q.6   It is impossible to measure the potential of a single electrode. Comment.   **(2)**

Q.7   What is the use of a battery in an electrolytic cell involved in electrolysis of molten NaCl? **(2)**

Q.8 How many moles of electrons are passed when 0.8 ampere current is passed for 1 hour **(2)**
through molten $CaCl_2$?

Section C
Attempt any Two

Q.9 Write the relationship between conductivity and molar conductivity and hence unit of molar **(3)**
conductivity.

Q.10 How do we calculate cell potential using Nernst equation? **(3)**

Q.11 Calculate the molar conductivity of AgI at zero concentration if the molar conductivities of NaI, **(3)**
$AgNO_3$ and $NaNO_3$ at zero concentration are respectively, 126.9, 133.4 and 121.5 Ω^{-1} cm^2 mol
$^{-1}$.

Section D
Attempt any One

Q.12 Describe the principle and construction of Lead accumulator (Lead storage cell) with a neat **(4)**
labelled diagram.

Q.13 Construct a cell consisting of Ni^{2+} | Ni half cell and H^+ | H_2 (g, 1atm) | Pt half cell. **(4)**

(i) Write the cell reaction.

(ii) Calculate emf of the cell if $[Ni^{2+}]$ = 0.1M, $[H^+]$ = 0.05M and E^0_{Ni} = –0.257