ASSIGNMENT CHEMISTRY

☑ 3 Marks Questions

24. (i) The cell in which the following reaction occurs :

$$2Fe^{3+}(aq) + 2I^-(aq) \longrightarrow$$
$$2Fe^{2+}(aq) + I_2(s)$$

has $E_{cell}^\circ = 0.236$ V at 298 K. Calculate the standard Gibbs energy of the cell reaction.
(Given, 1 F = 96500 C mol^{-1})

(ii) How many electrons flow through a metallic wire if a current of 0.5 A is passed for 2 h?
(given, 1 F = 96500 C mol^{-1})

All India 2017

25. (i) Calculate the mass of Ag deposited at cathode when a current of 2A was passed through a solution of AgNO$_3$ for 15 min.

(Given : Molar mass of Ag = 108 g mol^{-1} 1F = 96500 C mol^{-1}).

(ii) Define fuel cell. *Delhi 2017*

26. (i) Calculate ΔG° for the reaction,
$$Mg(s) + Cu^{2+}(aq) \longrightarrow Mg^{2+}(aq) + Cu(s)$$

(Given,
$E_{cell}^\circ = +2.71$ V, 1 F = 96500 C mol^{-1})

(ii) Name the type of cell which was used in Apollo space programme for providing electrical power. *Delhi 2014*

27. (i) Write two advantages of H$_2$—O$_2$ fuel cell over ordinary cell.

(ii) Equilibrium constant (K_C) for the given cell reaction is 10. Calculate E_{cell}°.

$$A(s) + B^{2+}(aq) \rightleftharpoons A^{2+}(aq) + B(s)$$
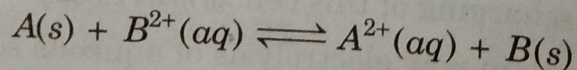
Foreign 2014

28. What type of battery is lead storage battery? Write the anode and cathode reactions, and the overall cell reaction occurring in the operation of a lead storage battery.

Delhi 2012, 2011, 2009; Foreign 2012; All India 2009

29. An aqueous solution of copper sulphate was electrolysed between CuSO$_4$ platinum electrodes using a current of 0.1287 A for 50 min.
[Given, atomic mass of Cu = 63.5 g mol^{-1}]

(i) Write the cathodic reaction.

(ii) Calculate
  (a) Electric charge passed during electrolysis.
  (b) Mass of copper deposited at the cathode.
  [Given, 1 F = 96500 C mol^{-1}]

All India 2011C

30. Calculate the strength of the current required to deposit 1.2 g of magnesium from molten MgCl$_2$ in 1 h.
[1 F = 96500 C mol^{-1}, atomic mass of Mg = 24.0] *Delhi 2009C*

☑ 5 Marks Questions

31. (i) Define the following terms:
  (a) Molar conductivity (Λ_m)
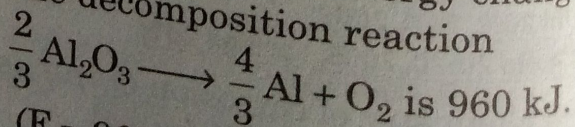 (b) Secondary batteries
  (c) Fuel cell

(ii) State the following laws:
  (a) Faraday's first law of electrolysis
  (b) Kohlrausch's law of independent migration of ions *Delhi 2015C*

32. (i) Predict the products of electrolysis in each of the following :
  (a) An aqueous solution of AgNO$_3$ with platinum electrodes.
  (b) An aqueous solution of H$_2$SO$_4$ with platinum electrodes.

(ii) Estimate the minimum potential difference needed to reduce Al$_2$O$_3$ at 500°C. The Gibbs energy change for the decomposition reaction
$$\frac{2}{3}Al_2O_3 \longrightarrow \frac{4}{3}Al + O_2 \text{ is } 960 \text{ kJ.}$$
(F = 96500 C mol^{-1}) *Delhi 2014C*