

Electrochemistry Assignment

- The platinum electrodes were immersed in a solution of cupric sulphate and electric current passed through the solution. After some time it was found that colour of copper sulphate disappeared with evolution of gas at the electrode. The colourless solution contains
 - Platinum sulphate
 - Copper hydroxide
 - Copper sulphate
 - Sulphuric acid
- Which of the following aqueous solutions remains acidic after electrolysis
 - $K_2Cr_2O_7$
 - $KMnO_4$
 - CH_3COONa
 - $CuCl_2$
- Which of the following aqueous solutions remains neutral after electrolysis
 - $CuSO_4$
 - $AgNO_3$
 - K_2SO_4
 - $NaCl$
- When electric current is passed through a cell having an electrolyte, the positive ions move towards the cathode and the negative ions towards the anode. If the cathode is pulled out of the solution
 - The positive and negative ions will move towards the anode
 - The positive ions will start moving towards the anode, the negative ions will stop moving
 - The negative ions will continue to move towards the anode and the positive ions will stop moving
 - The positive and negative ions will start moving randomly
- Assertion (A):** Sodium ions are discharged in preference to hydrogen ions at a mercury cathode
Reason (R): The nature of the cathode can affect the order of discharge of ions
 - Both A and R are true and R is a correct explanation of A
 - Both A and R are true but R is not a correct explanation of A
 - A is true but R is false
 - Both A and R are false
 - A is false but R is true
- The density of copper is 8.94 g mL^{-1} . Find the charge needed to plate an area of $10 \times 10 \text{ cm}^2$ to thickness of 10^{-2} cm using a $CuSO_4$ solution as electrolyte (atomic weight of $Cu = 63.6$)
 - $2.7 \times 10^4 \text{ C}$
 - $8.8 \times 10^4 \text{ C}$
 - $18.3 \times 10^4 \text{ C}$
 - $1.7 \times 10^4 \text{ C}$
- During the purification of copper by electrolysis
 - The anode used are made of copper ore
 - Pure copper is deposited on the cathode, with the evolution of hydrogen at the cathode
 - The impurities such as Ag , Au , Zn and Fe go into solution
 - The voltage is carefully controlled to prevent the deposition of Zn and Fe at the cathode
- Oxygen and hydrogen gas are produced at the anode and cathode during the electrolysis of dilute aqueous solutions of
 - Na_2SO_4
 - $AgNO_3$
 - H_2SO_4
 - $NaOH$
- Which of the following statements are correct
 - The electrolysis of concentrated H_2SO_4 at $0-5^\circ\text{C}$ using a Pt electrode produces $H_2S_2O_8$.
 - The electrolysis of a brine solution produces $NaClO_3$ and $NaClO$.
 - The electrolysis of $CuSO_4$ solution using Pt electrodes causes the liberation of O_2 at the anode and the deposition of copper at the cathode.
 - All electrolytic reactions are redox reactions.
- For electrosynthesis of a substance
 - $\Delta G = +ve$ and $E_{\text{cell}} = -ve$
 - $\Delta G = -ve$ and $E_{\text{cell}} = +ve$
 - $\Delta G = -ve$ and $E_{\text{cell}} = -ve$
 - $\Delta G = +ve$ and $E_{\text{cell}} = +ve$
- The atomic weight of Fe is 56. The weight of Fe deposited from $FeCl_3$ solution by passing 0.6 Faraday of electricity is
 - 5.6 g
 - 11.2 g
 - 22.4 g
 - 33.6 g
- Same quantity of current is passed through molten $NaCl$ and molten cryolite containing Al_2O_3 . If 4.6 g of sodium were liberated in one cell, the mass of aluminium liberated in other cell was
 - 0.9 g
 - 2.7 g
 - 1.8 g
 - 3.6 g
- Silver is removed electrically from 200 ml of a 0.1 N solution of $AgNO_3$ by a current of 0.1 Ampere. How long will it take to remove half of the silver from the solution
 - 16 sec
 - 96.5 sec
 - 100 sec
 - 10 sec
- When an electric current is passed through acidified water. 112 ml of hydrogen gas at NTP is collected at the cathode in 965 seconds. The current passed in Amperes, is

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- (a) 1.0 (b) 0.5 (c) 0.1 (d) 2.0
15. How many atoms of calcium will be deposited from a solution of CaCl_2 by a current of 25 milliamperes flowing for 60 seconds
 (a) 4.68×10^{18} (b) 4.68×10^{15} (c) 4.68×10^{12} (d) 4.68×10^9
16. What is the amount of chlorine evolved when 2 Amperes of current is passed for 30 minutes in an aqueous solution of NaCl
 (a) 66 g (b) 1.32 g (c) 33 g (d) 99 g
17. A solution of a salt of a metal was electrolysed for 150 minutes with a current of 0.15 Amperes. The weight of metal deposited was 0.783 gm. The equivalent weight of the metal is
 (a) 55.97 gm (b) 65.97 gm (c) 75.97 gm (d) 85.97 gm
18. If 0.5 Amp current is passed through acidified silver nitrate solution for 10 minutes. The mass of silver deposited on cathode, is (eq. wt. of silver nitrate = 108)
 (a) 0.235 g (b) 0.336 g (c) 0.536 g (d) 0.636 g
19. If a steady current of 15.0 A is passed through an aqueous solution of CuSO_4 , how many minute will it take to deposit 0.250 mol of Cu at the cathode, assuming 100% efficiency
 (a) 3.217×10^3 (b) 1.613×10^3 (c) 53.62 (d) 0.893
20. On passing a current through KCl solution, 19.5 g of potassium is deposited. If the same quantity of electricity is passed through a solution of aluminium chloride, the amount of aluminium deposited is
 (a) 4.5 g (b) 9.0 g (c) 13.5 g (d) 27 g
21. In order to separate oxygen from one mole of H_2O the required quantity of coulomb would be
 (a) 1.93×10^5 (b) 9.6×10^4 (c) 1.8 (d) 3.2
22. During electrolysis of fused aluminium chloride 0.9 gm of aluminium was deposited on the cathode. The volume of chlorine liberated at the anode will be
 (a) 2.24 litres (b) 11.2 litres (c) 1.12 litres (d) 5.6 litres
23. On passing 3 Ampere of electricity for 50 minutes, 1.8 gram metal deposits. The equivalent mass of metal is
 (a) 20.5 (b) 25.8 (c) 19.3 (d) 30.7
24. The mass of copper deposited from a solution of CuSO_4 by passage of 5 A current for 965 second is (Mol. wt. of Copper = 63.5)
 (a) 15.875 g (b) 1.5875 g (c) 4825 g (d) 96500 g
25. 5 Amperes is passed through a solution of zinc sulphate for 40 minutes. Find the amount of zinc deposited at the cathode
 (a) 40.65 gm (b) 4.065 gm (c) 0.4065 gm (d) 65.04 gm
26. In an electroplating experiment m g of silver is deposited, when 4 Amperes of current flows for 2 minutes. The amount (in gms) of silver deposited by 6 Amperes of current flowing for 40 seconds will be
 (a) 4 m (b) m/2 (c) m/4 (d) 2m
27. On passing electric current through molten aluminium chloride, 11.2 litre of Cl_2 is liberated at NTP at anode. The quantity of aluminium deposited at cathode is (at. wt. of Al = 27)
 (a) 9 g (b) 18 g (c) 27 g (d) 36 g
28. A conducting wire carries a current of 0.965 Ampere. Rate of flow of electrons per second at a given point is
 (a) $1 \times 10^{-5} N_0$ (b) N_0 (c) $0.965 N_0$ (d) $\frac{N_0}{0.965}$
29. An electrolytic cell contains a solution of Ag_2SO_4 and have platinum electrodes. A current is passed until 1.6 gm of O_2 has been liberated at anode. The amount of silver deposited at cathode would be
 (a) 107.88 gm (b) 1.6 gm (c) 0.8 gm (d) 21.60 gm
30. A certain quantity of electricity is passed through an aqueous solution of AgNO_3 and cupric salt solution connected in series. The amount of Ag deposited is 1.08 gm, the amount of copper deposited is (atomic weight of Cu = 63.5; Ag = 108)
 (a) 0.6454 g (b) 6.354 g (c) 0.3177 g (d) 3.177 g
31. An electric current is passed through silver voltameter connected to a water voltameter. The cathode of the silver voltameter weighed 0.108 g more at the end of the electrolysis. The volume of oxygen evolved at STP is
 (a) 56 cm^3 (b) 550 cm^3 (c) 5.6 cm^3 (d) 11.2 cm^3
32. A current being passed for two hour through a solution of an acid liberating 11.2 litre of oxygen at NTP at anode. What will be the amount of copper deposited at the cathode by the same current when passed through a solution of copper sulphate for the same time
 (a) 16 g (b) 63 g (c) 31.5 g (d) 8 g
33. The number of electrons involved in redox reactions when a Faraday of electricity is passed through an electrolyte in solution is
 (a) 6×10^{23} (b) 6×10^{-23} (c) 96500 (d) 8×10^{19}

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34. The electrolytic cells, one containing acidified ferrous chloride and another acidified ferric chloride are connected in series. The ratio of iron deposited at cathodes in the two cells when electricity is passed through the cells will be
(a) 3 : 1 (b) 2 : 1 (c) 1 : 1 (d) 3 : 2
35. The number of electrons passing per second through a cross-section of copper wire carrying 10^{-6} Amperes of current per second is found to be
(a) 1.6×10^{-19} (b) 6×10^{-35} (c) 6×10^{-16} (d) 6×10^{12}
36. Three Faradays electricity was passed through an aqueous solution of iron (II) bromide. The weight of iron metal (at. wt. = 56) deposited at the cathode (in gm) is
(a) 56 (b) 84 (c) 112 (d) 168
37. The number of Faradays needed to reduce 4 gram equivalents of Cu^{++} to Cu metal will be
(a) 1 (b) 2 (c) 1/2 (d) 4
38. A silver cup is plated with silver by passing 965 Coulombs of electricity, the amount of silver deposited is
(a) 9.89 g (b) 107.87 g (c) 1.0787 g (d) 1.002 g
39. One Faraday of electricity when passed through a solution of copper sulphate deposits
(a) 1 mole of Cu (b) 1 gm atom of Cu (c) 1 molecule of Cu (d) 1 gm equivalent of Cu
40. During electrolysis of aqueous $NaOH$, 4 g of O_2 gas is liberated at NTP at anode, H_2 gas liberated at cathode is
(a) 2.8 litres (b) 5.6 litres (c) 11.2 litres (d) 22.4 litres
41. To deposit 0.6354 gm of copper by electrolysis of aqueous cupric sulphate solution, the amount of electricity required (in Coulombs) is
(a) 9650 (b) 4825 (c) 3860 (d) 1930
42. During electrolysis of a solution of $AgNO_3$, 9650 Coulombs of charge pass through the electroplating bath, the mass of silver deposited in the cathode will be
(a) 1.08 g (b) 10.8 g (c) 21.6 g (d) 108 g
43. On passing 0.1 Faraday of electricity through aluminium chloride, the amount of aluminium metal deposited on cathode is ($A = 27$)
(a) 0.9 gm (b) 0.3 gm (c) 0.27 gm (d) 2.7 gm
44. On litre of 1 M $CuSO_4$ solution is electrolysed. After passing 2F of electricity, molarity of $CuSO_4$ solution will be
(a) $\frac{M}{2}$ (b) $\frac{M}{4}$ (c) M (d) 0
45. For $M^{2+} + 2e^- \rightarrow M$, 0.275 g of metal M is deposited at the cathode due to passage of 1 A of current for 965 s. Hence atomic weight of the metal M is
(a) 27.5 (b) 55.0 (c) 110.0 (d) 13.75
46. A certain current liberated 0.504 gm of hydrogen in 2 hours. How many grams of copper can be liberated by the same current flowing for the same time in a copper sulphate solution
(a) 12.7 gm (b) 15.9 gm (c) 31.8 gm (d) 63.5 gm
47. What weight of copper will be deposited by passing 2 Faradays of electricity through a cupric salt (Atomic weight of $Cu = 63.5$)
(a) 2.0 gm (b) 3.175 gm (c) 63.5 gm (d) 127.0 gm
48. The quantity of electricity required to liberate 112 cm^3 of hydrogen at STP from acidified water is
(a) 0.1 Faraday (b) 1 Faraday (c) 965 Coulomb (d) 96500 Coulomb
49. How much charge is required to produce hydrogen gas at the rate of 1 mL s^{-1} by the electrolysis of molten $NaCl$
(a) 8.6 C (b) 18.4 C (c) 4.3 C (d) 1.4 C
50. In the electrolysis of aqueous $NaCl$ for how long would you have to pass a current of 1.0 A through the cell to convert 1.0 L of a 1 M $NaCl$ solution into 1 M of $NaOH$
(a) 35.5 hours (b) 23.8 hours (c) 15.6 hours (d) 26.8 hours