Electrochemistry 539

Electrochemistry

- 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*
- 2. The current in a given wire is 1.8 *A*. The number of coulombs that flow in 1.36 minutes will be [AIIMS 2001]
 - (a) 100 *C* (b) 147 *C*
 - (c) 247 *C* (d) 347 *C*
- 3. 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 [AFMC 2001]

(a) 55.97 <i>gm</i>	(b) 65.97 gm
(c) 75.97 gm	(d) 85.97 gm

- 4. The resistance of 0.01*N* NaCl solution at 25 ° C is 200 Ω . Cell constant of conductivity cell is 1 cm⁻¹. The equivalent conductance is
 - (a) $5 \times 10^{2} \Omega^{-1} cm^{2} eq^{-1}$ (b) $6 \times 10^{3} \Omega^{-1} cm^{2} eq^{-1}$ (c) $7 \times 10^{4} \Omega^{-1} cm^{2} eq^{-1}$ (d) $8 \times 10^{5} \Omega^{-1} cm^{2} eq^{-1}$
- 5. Which of the following reaction is possible at anode

[AIEEE 2002]

(a) $2Cr^{3+} + 7H_2O \rightarrow Cr_2O_7^{2-} + 14H^+$ (b) $F_2 \rightarrow 2F^-$ (c) $\frac{1}{2}O_2 + 2H^+ \rightarrow H_2O$

(d) None of these

6. What is the standard cell potential for the cell

$$Zn / Zn^{2+} (1M) \| Cu^{2+} (1M) / Cu$$

 E^{o} for $Zn/Zn^{2+}(1M) = -0.76 V \& Cu^{2+}/Cu = +0.34 V$

[AIIMS 1980]

(a) -0.76 + (-0.34) = -0.42 V

(b) -0.34 + 0.76 = +0.42 V

(c) 0.34 - (-0.76) = 1.10 V

- (d) -0.76 (+0.34) = -1.10 V
- [AIIMS 2001]
 7. Normal aluminium electrode coupled with normal hydrogen electrode gives an *emf* of 1.66 *volts*. So the standard electrode potential of aluminium is[KCET 198]

(a)
$$- 1.66 V$$
 (b) $+ 1.66 V$
(c) $- 0.83 V$ (d) $+ 0.83 V$

ET Self Evaluation Test -12

8. Which one among the following is the strongest reducing agent

 $Fe^{2+} + 2e^{-} \rightarrow Fe(-0.44 V)$ $Ni^{2+} + 2e^{-} \rightarrow Ni(-0.25 V)$ $Sn^{2+} + 2e^{-} \rightarrow Sn(-0.14 V)$ $Fe^{3+} + e^{-} \rightarrow Fe^{2+}(-0.77 V)$ [BHU 1998]
(a) Fe
(b) Fe^{2+}
(c) Niccesse pure 10001
(d) Sn

- (c) *N*_[CBSE PMT 1999] (d) *Sn* The cell reaction of the g
- **9.** The cell reaction of the galvanic cell $Cu_{(s)} \mid Cu^{2+}_{(aq)} \parallel Hg^{2+}_{(aq)} \mid Hg_{(l)}$ is **[EAMCET 2003]**
 - (a) $Hg + Cu^{2+} \rightarrow Hg^{2+} + Cu$
 - (b) $Hg + Cu^{2+} \rightarrow Cu^+ + Hg^+$
 - (c) $Cu + Hg \rightarrow CuHg$
 - (d) $Cu + Hg^{2+} \rightarrow Cu^{2+} + Hg$
- **10.** The specific conductivity of $N/10 \ KCl$ solution at $20^{\circ}C$ is $0.0212 \ ohm^{-1} \ cm^{-1}$ and the resistance of cell containing this solution at $20^{\circ}C$ is 55 ohm. The cell constant is

[AIIMS 1999]

- (a) 1.166 cm^{-1} (b) 2.173 cm^{-1} (c) 3.324 cm^{-1} (d) 4.616 cm^{-1}
- **11.** The oxide which is not reduced by hydrogen is



=
$$5 \times 965 = 4825C$$
. Since 96500 *coulombs* will
deposit $\frac{63.5}{2}g$ of copper therefore 4825 **8.** (a)

coulombs will deposit

$$= \frac{63.5 \times 4825}{96500 \times 2} = 1.5875 \ g$$

- (b) $Q = I \times t$; $1.8 \times 1.36 \times 60 = 147 C$. 2.
- (a) Time (t) = 150 min = 9000 sec 3. Current (I) = 0.15 AWeight of metal (w) = 0.783 g. We know $Q = I \times t = 0.15 \times 9000 = 1350 C$. Since 1350 *C* of electricity will deposited 0.783 *g* of metal, so, 96500 C of electricity will deposited $\frac{0.783 \times 96500}{1350} = 55.97 \ g$. (a) $\lambda = k \times V = \frac{1}{R} \times \frac{l}{a} \times V = \frac{1}{200} \times 1 \times 10,000$ 4.

$$= 5 \times 10^{2} \Omega^{-1} cm^{2} eq.^{-1}$$

(a) Oxidation always occurs at anode. 5٠

(a)
$$E_{\text{cell}}^{o} = 1.66 = E_{H^+/H_2}^{o} - E_{Al^{3+}/Al}^{o}$$

= $O - E_{Al^{3+}/Al}^{o}$ or $E_{Al^{3+}/Al}^{o} = -1.66 V$

- (a) The reduction potential of Fe is very high, so 8. it is a strongest reducing agent.
- (b) $Cu_{(s)} | Cu_{(Ag)}^{2+} || Hg_{(Ag)}^{2+} | Hg_{(l)}$ anode oxidation cathode reduction 9.

$$Cu + Hg^{2+} \rightarrow Cu^{2+} + Hg$$
.
Oxidation

10. (a) $K = \frac{1}{R} \times \text{cell constant}$

 $= K \times R = 0.0212 \times 55 = 1.166 \ cm^{-1}$.

(b) On the basis of electrochemical series K_2O is 11. not reduced by hydrogen.
