DPP – 09
CLASS –12th
TOPIC – PRACTICE QUESTIONS

Q.1 Salts of A (atomic mass 7), B (atomic mass 27) and C (atomic mass 48) were electrolyzed using the same amount of charge. It was found that when 2.1 g of A was deposited, the mass of B and C deposited were 2.7g and 7.2g. The valencies of A, B and C respectively.

(A) 2, 3 and 2

(B) 1, 3 and 2

(C) 2, 6 and 3

(D) 3, 1 and 2

Q.2 A current of 3 A was passed for 2 h through a solution of CuSO4, 3 g of Cu2+ ions were discharged at cathode. The current efficiency is

(A) 21.5%

(B) 42.2%

(C) 10%

(D) 40.01%

Q.3 How many faradays are required to reduce one mol of $MnO4^-$ to Mn2+:-

(A) 1

(B) 2

(C) 3

(D) 5

Q.4 Three faradays of electricity was passed through an aqueous solution of iron (II) bromide. The mass of iron metal (at. mass 56) deposited at the cathode is -

(A) 56 g

(B) 84 g

(C) 112 g

(D) 168 g

SOLUTION

(CHEMISTRY) ELECTROCHEMISTRY

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Sol.1 $An_1^+ + n_1e^- \rightarrow A$

$Bn_2^+ + n_2e^- \rightarrow B$

$Cn_3^+ + n_3e^- \rightarrow C$

Since charged is same

$\therefore$ Eq wt is same

$$\therefore \frac{2.1}{\frac{7}{n_1}} = \frac{2.7}{\frac{2.7}{n_2}} = \frac{7.2}{\frac{48}{n_3}}$$

$$\therefore \frac{3\times n_1}{10} = \frac{1\times n_2}{10} = \frac{3\times n_3}{2\times 10}$$

$$\therefore n_1\frac{n_2}{3} = \frac{n_3}{2}$$

$\therefore n_1 = 1$

$\therefore n_2 = 3$

$\therefore n_3 = 2$

Option B is correct.

Sol.2 According to law of electrolysis, Mass deposited = Zit

Or $i = \frac{m\times 96500}{t\times Eq.wt}$;

$Z = \frac{Eq.wt}{96500}$;

$Eq.wt = \frac{At.wt}{oxidation\,number}$;

$\therefore i = \frac{3\times 96500\times 2}{63.5\times 7200}$;

1.266 A

Efficiency of current is given by,

$$= \frac{\text{Current used}}{\text{Total Current passed}} \times 100$$

$$= \frac{1.255}{3} \times 100 = 42.22\%$$

Hence, option B is correct

Sol.3 Correct option

$$MnO_4^- + 8H^+ 5e^- \rightarrow Mn^{2+} + 5H_2O$$

1 mole of MnO_4^- requires 5 mole of electrons = 5 faradays.

Sol.4 correct option is B

3 Faradays of electricity was passed through an aqueous solution of iron (II) bromide.

3 F of electricity = 3 moles of electrons

$$Fe^{2+} + 2e^- \rightarrow Fe$$

2 moles of electrons gives 1 mole of Fe

3 moles of electrons gives = $\frac{3}{2}$ moles of Fe

$$= \frac{3}{2} \times 56 = 84g$$

Hence, 84 g of iron metal is deposited at the cathode.