



TARGET : NEET (UG) 2024

Course : SARANSH (Youtube Live CRASH COURSE)

I-CHEMISTRY

DPP

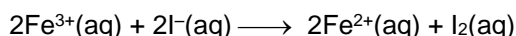
DAILY PRACTICE PROBLEMS

DPP NO. 2

Physical Chemistry : ELECTROCHEMISTRY

DPP No. : 2

1. For the cell reaction :



$E_{\text{cell}}^{\ominus} = 0.24 \text{ V}$ at 298 K. The standard Gibbs energy ($\Delta_r G^{\ominus}$) of the cell reaction is :

[Given that Faraday constant $F = 96400 \text{ C mol}^{-1}$]

- (1) $23.16 \text{ kJ mol}^{-1}$ (2) $-46.32 \text{ kJ mol}^{-1}$
 (3) $-23.16 \text{ kJ mol}^{-1}$ (4) $46.32 \text{ kJ mol}^{-1}$
2. The three cells with their $E_{(\text{cell})}^{\ominus}$ values are given below :

Cells	$E_{(\text{cell})}^{\ominus} / \text{V}$
(1) $\text{Fe} \text{Fe}^{2+} \text{Fe}^{3+} \text{Fe}$	0.404
(2) $\text{Fe} \text{Fe}^{2+} \text{Fe}^{3+}, \text{Fe}^{2+} \text{Pt}$	1.211
(3) $\text{Fe} \text{Fe}^{3+} \text{Fe}^{3+}, \text{Fe}^{2+} \text{Pt}$	0.807

The standard Gibbs free energy change values for three cells are, respectively

(F represents change on 1 mole of electrons)

- (1) $+2.424 F, +2.422 F, +2.421 F$
 (2) $-0.808 F, -2.422 F, -2.421 F,$
 (3) $-2.424 F, -2.422 F, -2.421 F,$
 (4) $-1.212 F, -1.211 F, -0.807 F,$
3. Standard electrode potential for the cell with cell reaction :
 $\text{Zn}(\text{s}) + \text{Cu}^{2+}(\text{aq}) \rightarrow \text{Zn}^{2+}(\text{aq}) + \text{Cu}(\text{s})$ is 1.1 V. calculate the standard gibbs energy change for the cell reaction.
 (Given $F = 96487 \text{ C mol}^{-1}$)
- (1) $-200.27 \text{ kJ mol}^{-1}$ (2) $-212.27 \text{ kJ mol}^{-1}$
 (3) $-212.27 \text{ J mol}^{-1}$ (4) $-200.27 \text{ J mol}^{-1}$



4. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R** :
Assertion A : In equation $\Delta_r G = -nFE_{\text{cell}}$, value of $\Delta_r G$ depends on n .
Reasons R : E_{cell} is an intensive property and $\Delta_r G$ is an extensive property.
 In the light of the above statements, choose the correct explanation of answer from the options given below :
- (1) Both **A** and **R** are true and **R** is **NOT** the correct explanation of **A**.
 (2) **A** is true but **R** is false
 (3) **A** is false but **R** is true.
 (4) Both **A** and **R** are true and **R** is the correct explanation of **A**.
5. A hydrogen gas electrode is made by dipping platinum wire in a solution of HCl of pH = 10 and by passing hydrogen gas around the platinum wire at one atm pressure. The oxidation potential of electrode would be?
 (1) 0.59 V (2) 0.118 V (3) 1.18 V (4) 0.059 V
6. The pressure of H_2 required to make the potential of H_2 -electrode zero in pure water at 298 K is :
 (1) 10^{-4} atm (2) 10^{-14} atm (3) 10^{-12} atm (4) 10^{-10} atm
7. In the electrochemical cell :
 $\text{Zn} | \text{ZnSO}_4 (0.01 \text{ M}) || \text{CuSO}_4 (1.0 \text{ M}) | \text{Cu}$, the emf of this Daniel cell is E_1 . When the concentration of ZnSO_4 is changed to 1.0 M and that of CuSO_4 changed to 0.01 M, the emf changes to E_2 . From the followings which one is the relationship between E_1 and E_2 ? (Given, $\frac{RT}{F} = 0.059$)
 (1) $E_1 = E_2$ (2) $E_1 < E_2$ (3) $E_1 > E_2$ (4) $E_2 = 0 \neq E_1$
8. Find the emf of the cell in which the following reaction takes place at 298 K p
 $\text{Ni(s)} + 2\text{Ag}^+ (0.001 \text{ M}) \rightarrow \text{Ni}^{2+} (0.001 \text{ M}) + 2 \text{Ag(s)}$
 (Given that $E_{\text{cell}}^0 = 1.05 \text{ V}$, $\frac{2.303 RT}{F} = 0.059$ at 298 K)
 (1) 0.9615 V (2) 1.05 V (3) 1.0385 V (4) 1.385 V
9. When 0.1 mol MnO_4^{2-} is oxidised the quantity of electricity required MnO_4^{2-} to MnO_4^- completely to is
 (1) 96500 C (2) $2 \times 96500 \text{ C}$ (3) 9650 C (4) 96.50 C
10. The weight of silver (at.wt. = 108) displaced by a quantity of electricity which displaces 5600 mL of O_2 at STP will be -
 (1) 5.4 g (2) 10.8 g (3) 54.0 g (4) 108.0 g
11. The number of electrons delivered at the cathode during electrolysis by a current of 1 ampere in 60 seconds is (charge on electron = $1.60 \times 10^{-19} \text{ C}$)
 (1) 7.48×10^{23} (2) 6×10^{23} (3) 6×10^{20} (4) 3.75×10^{20}

Answer Key

1. (2) 2. (3) 3. (2) 4. (4) 5. (1) 6. (2) 7. (3)
 8. (1) 9. (3) 10. (4) 11. (4)