

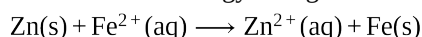
NEET ELECTROCHEMISTRY — CONCEPT OF ΔG AND MAXIMUM WORK DONE BY A GALVANIC CELL — PYQS

Max. Marks: 48

Questions: 12

Section A (MCQ) — 12 questions

- Q.1** The standard cell potential of the following cell $\text{Zn} | \text{Zn}^{2+}(\text{aq}) || \text{Fe}^{2+}(\text{aq}) | \text{Fe}$ is 0.32 V. Calculate the standard Gibbs energy change for the reaction:



(Given : 1 F = 96487 C) [RE-NEET (UG) 2024]

- (1) $-61.75 \text{ kJ mol}^{-1}$ (2) $+5.006 \text{ kJ mol}^{-1}$
(3) $-5.006 \text{ kJ mol}^{-1}$ (4) $+61.75 \text{ kJ mol}^{-1}$

Scan or tap for the full solution



- Q.2** 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.

Reason (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 answer from the options given below:

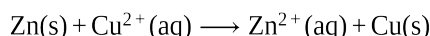
[NEET (UG) 2023]

- (1) Both A and R are true but 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.

Scan or tap for the full solution



- Q.3** Standard electrode potential for the cell with cell reaction



is 1.1 V. Calculate the standard Gibbs energy change for the cell reaction. (Given

F = 96487 C mol⁻¹) [NEET (UG) 2022 (Phase 2)]

- (1) $-200.27 \text{ J mol}^{-1}$ (2) $-200.27 \text{ kJ mol}^{-1}$
(3) $-212.27 \text{ kJ mol}^{-1}$ (4) $-212.27 \text{ J mol}^{-1}$

Scan or tap for the full solution



- Q.4** For the cell reaction
 $2\text{Fe}^{3+}(\text{aq}) + 2\text{I}^{-}(\text{aq}) \longrightarrow 2\text{Fe}^{2+}(\text{aq}) + \text{I}_2(\text{aq})$
 $E_{\text{cell}}^{\ominus} = 0.24 \text{ V}$ at 298 K. The standard Gibbs energy ($\Delta_r G^{\ominus}$) of the cell reaction is :

[Given that Faraday constant F = 96500 C mol⁻¹]

[NEET (UG) 2019]

- (1) $46.32 \text{ kJ mol}^{-1}$ (2) $23.16 \text{ kJ mol}^{-1}$
(3) $-46.32 \text{ kJ mol}^{-1}$ (4) $-23.16 \text{ kJ mol}^{-1}$

Scan or tap for the full solution



- Q.5** If the $E_{\text{cell}}^{\ominus}$ for a given reaction has a negative value, which of the following gives the correct relationships for the values of $\Delta G^{\ominus}$ and K_{eq} ?

[NEET 2016 (Phase 2)]

- (1) $\Delta G^{\ominus} > 0$; $K_{\text{eq}} < 1$ (2) $\Delta G^{\ominus} > 0$; $K_{\text{eq}} > 1$
(3) $\Delta G^{\ominus} < 0$; $K_{\text{eq}} > 1$ (4) $\Delta G^{\ominus} < 0$; $K_{\text{eq}} < 1$

Scan or tap for the full solution



- Q.6** The electrode potentials for $\text{Cu}^{2+}_{(\text{aq})} + \text{e}^{-} \longrightarrow \text{Cu}^{+}_{(\text{aq})}$ and $\text{Cu}^{+}_{(\text{aq})} + \text{e}^{-} \longrightarrow \text{Cu}_{(\text{s})}$ are +0.15 V and +0.50 V respectively. The value of $E^{\ominus}_{\text{Cu}^{2+}/\text{Cu}}$ will be

[AIPMT 2011 (Prelims)]

- (1) 0.500 V (2) 0.325 V (3) 0.650 V (4) 0.150 V

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- Q.7** For the reduction of silver ions with copper metal, the standard cell potential was found to be +0.46 V at 25 °C. The value of standard Gibbs energy, $\Delta G^{\ominus}$ will be

(F = 96500 C mol⁻¹)

[AIPMT 2010 (Prelims)]

- (1) -89.0 kJ (2) -89.0 J (3) -44.5 kJ (4) -98.0 kJ

Scan or tap for the full solution



- Q.8** Given :
(i) $\text{Cu}^{2+} + 2\text{e}^{-} \longrightarrow \text{Cu}$, $E^{\ominus} = 0.337 \text{ V}$
(ii) $\text{Cu}^{2+} + \text{e}^{-} \longrightarrow \text{Cu}^{+}$, $E^{\ominus} = 0.153 \text{ V}$

Electrode potential, $E^{\ominus}$ for the reaction,
 $\text{Cu}^{+} + \text{e}^{-} \longrightarrow \text{Cu}$, will be

[AIPMT 2009]

- (1) 0.90 V (2) 0.30 V (3) 0.38 V (4) 0.52 V

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Q.9 Standard free energies of formation (in kJ/mol) at 298 K are -237.2 , -394.4 and -8.2 for $\text{H}_2\text{O}(\text{l})$, $\text{CO}_2(\text{g})$ and pentane (g) respectively. The value of E°_{cell} for the pentane-oxygen fuel cell is

[AIPMT 2008]

- (1) 1.0968 V (2) 0.0968 V
(3) 1.968 V (4) 2.0968 V

Scan or tap for the
full solution



Q.10 The efficiency of a fuel cell is given by

[AIPMT 2007]

- (1) $\Delta G/\Delta S$ (2) $\Delta G/\Delta H$ (3) $\Delta S/\Delta G$ (4) $\Delta H/\Delta G$

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full solution



Q.11 On the basis of the information available from the reaction,
 $4/3 \text{Al} + \text{O}_2 \longrightarrow 2/3 \text{Al}_2\text{O}_3$, $\Delta G = -827 \text{ kJ mol}^{-1}$ of O_2 ,

the minimum e.m.f. required to carry out an electrolysis of Al_2O_3 is

($F = 96500 \text{ C mol}^{-1}$)

[AIPMT 2003]

- (1) 2.14 V (2) 4.28 V (3) 6.42 V (4) 8.56 V

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full solution



Q.12 Cell reaction is spontaneous when

[AIPMT 2000]

- (1) ΔG° is negative (2) ΔG° is positive
(3) $\Delta E^\circ_{\text{red}}$ is positive (4) $\Delta E^\circ_{\text{red}}$ is negative

Scan or tap for the
full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	1	4	3	3	1	2	1	4	1	2	1
Ques.	12										
Ans.	1										