

QUICK DRILL · CBSE CLASS 12

Electrochemistry

Chemistry · Chapter 2 · 15 MCQs · 20 minutes · PYQ-tagged with time budgets

DATE	TOTAL MARKS	DURATION	MARKING	TARGET
_____	15	20 min	+1/0	≥ 12/15

OBJECTIVES

Reinforce the four core topics of Electrochemistry via 15 PYQ-derived MCQs. Identify weak sub-topics via concept-node IDs (see answer key). Build per-question time budget habit.

INSTRUCTIONS

 Attempt all 15. Time budget shown per Q (use it as pacing guide). Mark answers (A/B/C/D) in the margin. Answer key + explanations on the last page. **Don't peek — score yourself honestly.**
SECTION · QUICK DRILL

Q 1-15 · 20 MIN

Q1. In a galvanic cell, the anode is:

- (A) Positive terminal
(C) Neutral

PYQ 2018 · Delhi · 1m · 30s

- (B) Negative terminal — site of oxidation
(D) Site of reduction

Q2. Standard hydrogen electrode (SHE) has $E^\circ =$

- (A) +1.00 V
(C) -1.00 V

PYQ 2019 · All India · 1m · 30s

- (B) 0.00 V (by convention)
(D) Cannot be defined

Q3. Nernst equation at 298K for half-cell:

- (A) $E = E^\circ + (0.0591/n) \log Q$
(C) $E = E^\circ \times n \log Q$

PYQ 2020 · Delhi · 1m · 30s

- (B) $E = E^\circ - (0.0591/n) \log Q$
(D) $E = E^\circ / \log Q$

Q4. Faraday constant $F =$

- (A) 96500 C/mol
(C) 9.65×10^{19} C/mol

PYQ 2018 · Outside Delhi · 1m · 30s

- (B) 9650 C/mol
(D) 0.0965 C/mol

Q5. Cell EMF formula:

- (A) $E^\circ_{\text{cell}} = E^\circ_{\text{anode}} + E^\circ_{\text{cathode}}$
(C) $E^\circ_{\text{cell}} = E^\circ_{\text{anode}} - E^\circ_{\text{cathode}}$

PYQ 2020 · All India · 1m · 30s

- (B) $E^\circ_{\text{cell}} = E^\circ_{\text{cathode}} - E^\circ_{\text{anode}}$ (both as reduction potentials)
(D) $E^\circ_{\text{cell}} =$ average of E° values

Q6. ΔG° relates to E°_{cell} by:

- (A) $\Delta G^\circ = nFE^\circ$
(C) $\Delta G^\circ = E^\circ/nF$

PYQ 2021 · Standard · 1m · 30s

- (B) $\Delta G^\circ = -nFE^\circ$
(D) $\Delta G^\circ = F/E^\circ$

Q7. Faraday's first law: $m = ?$

- (A) $Z + I \times t$
(C) $Z \times I / t$

PYQ 2017 · Delhi · 1m · 30s

- (B) $Z \times I \times t$
(D) $Z / (I \times t)$

Q8. Faraday's second law states: $m_1/m_2 =$

(A) Q_1/Q_2

(C) I_1/I_2

PYQ 2019 · All India · 1m · ⌚ 30s

(B) E_1/E_2 (equivalent weights, same Q)

(D) t_1/t_2

Q9. Molar conductivity Λ_m with increasing concentration:

(A) Increases

(C) Constant

PYQ 2022 · Delhi · 1m · ⌚ 45s

(B) Decreases

(D) Becomes negative

Q10. Kohlrausch's law: $\Lambda^\circ_m =$

(A) $\Lambda^\circ_m(\text{cation}) - \Lambda^\circ_m(\text{anion})$

(C) $\Lambda^\circ_m \times c$

PYQ 2020 · Outside Delhi · 1m · ⌚ 30s

(B) $v_+ \lambda^\circ_+ + v_- \lambda^\circ_-$

(D) 0

Q11. For Zn^{2+}/Zn , $E^\circ = -0.76\text{V}$. For Cu^{2+}/Cu , $E^\circ = +0.34\text{V}$. Galvanic cell EMF:

(A) +0.42 V

(C) -0.42 V

PYQ 2018 · Delhi · 2m · ⌚ 60s

(B) +1.10 V

(D) -1.10 V

Q12. How many coulombs needed to deposit 1 mole of Cu from Cu^{2+} ?

(A) 96500 C

(C) $1F \times 2$

PYQ 2019 · Delhi · 2m · ⌚ 60s

(B) 193000 C

(D) 9650 C

Q13. A primary cell:

(A) Is rechargeable

(C) Is the same as fuel cell

PYQ 2021 · Standard · 1m · ⌚ 30s

(B) Is NOT rechargeable

(D) Has no electrolyte

Q14. For iron to rust, you need:

(A) Oxygen only

(C) Oxygen + Water + Electrolyte

PYQ 2023 · Standard · 1m · ⌚ 45s

(B) Water only

(D) Heat only

Q15. Cell notation convention:

(A) Cathode | cathode-ion || anode-ion | Anode

(C) Anode + Cathode mixed

PYQ 2020 · Delhi · 1m · ⌚ 30s

(B) Anode | anode-ion || cathode-ion | Cathode

(D) No standard convention

ANSWER KEY & EXPLANATIONS

Q 1-15 · MARK YOUR SCORE

Q1. Answer: B

Anode = oxidation. In galvanic cell, electrons flow OUT of anode → it is the NEGATIVE terminal.

Q2. Answer: B

SHE is the international reference. $E^\circ = 0.00\text{V}$ is a CONVENTION, not absolute. All other E° measured relative to SHE.

Q3. Answer: B

Nernst at 298K: $E = E^\circ - (0.0591/n) \log Q$. The MINUS sign matters; (0.0591/n) is the room-temp shortcut from $(RT/F) \cdot \ln 10$.

Q4. Answer: A

$F = 96500 \text{ C/mol}$ (precise: 96485). Charge carried by one mole of electrons.

Q5. Answer: B

$E^\circ_{\text{cell}} = E^\circ_{\text{cathode}} - E^\circ_{\text{anode}}$ (both as REDUCTION potentials). Higher E° half-cell becomes cathode.

Q6. Answer: B

$\Delta G^\circ = -nFE^\circ$. Negative ΔG° (spontaneous) means positive E° (galvanic).

Q7. Answer: B

$m = Z \times I \times t$ where $Z = \text{equivalent weight} / 96500$ (electrochemical equivalent).

Q8. Answer: B

When same Q passes through different electrolytes, masses deposited are proportional to equivalent weights.

Q9. Answer: B

Counter-intuitive but true: Λ_m DECREASES with increasing concentration. Reason: ion-ion interactions slow ion mobility. At infinite dilution, Λ_m reaches max value Λ_m° .

Q10. Answer: B

$\Lambda_m^\circ = \nu_+ \lambda_+^\circ + \nu_- \lambda_-^\circ$. At infinite dilution, ions contribute independently — additivity.

Q11. Answer: B

Cu is cathode (higher E°), Zn is anode. $E^\circ_{\text{cell}} = 0.34 - (-0.76) = 1.10\text{V}$. Positive value = spontaneous (galvanic).

Q12. Answer: B

$\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$. Need 2 moles of electrons = $2 \times 96500 = 193,000$ C.

Q13. Answer: B

Primary cell: reaction non-reversible — must be discarded when reactants exhausted. Examples: dry cell, mercury cell. Secondary cells are rechargeable.

Q14. Answer: C

Rusting is electrochemical. Requires all three: O_2 (gets reduced at cathode), H_2O (medium for ions), and electrolyte (CO_2 dissolved \rightarrow carbonic acid suffices).

Q15. Answer: B

Convention: ANODE on left, CATHODE on right. Single | separates phases; double || is salt bridge. Example: $\text{Zn} | \text{Zn}^{2+} || \text{Cu}^{2+} | \text{Cu}$.