

Class 12 – Chemistry
Chapter: Electrochemistry

Time: 2 Hours

Maximum Marks: 35

Section A – MCQs and Very Short Answer (1 mark each)

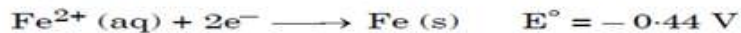
1. The correct cell to represent the following reaction is :



- (a) $2\text{Ag} | \text{Ag}^+ || \text{Zn} | \text{Zn}^{2+}$ (b) $\text{Ag}^+ | \text{Ag} || \text{Zn}^{2+} | \text{Zn}$
(c) $\text{Ag} | \text{Ag}^+ || \text{Zn} | \text{Zn}^{2+}$ (d) $\text{Zn} | \text{Zn}^{2+} || \text{Ag}^+ | \text{Ag}$

2. ΔG and E_{cell} for a spontaneous reaction will be :

- (a) positive, negative (b) negative, negative (c) negative, positive (d) positive, positive



Find the E°_{cell} for :



- (a) 1.6 V (b) - 1.16 V
(c) 2.04 V (d) 1.24 V

4(Qs 4-6) Given below are two statements labelled as Assertion (A) and Reason (R).

Select the most appropriate answer from the options given below :

- (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false. (d) (A) is false, but (R) is true.

4. Assertion (A) : Conductivity decreases with decrease in concentration of electrolyte.

Reason (R) : Number of ions per unit volume that carry the current in a solution decreases on dilution.

5. Assertion (A) : Molar conductivity decreases with increase in concentration.

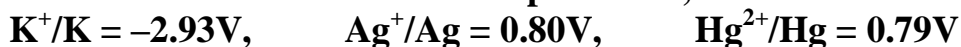
Reason (R) : When concentration approaches zero, the molar conductivity is known as limiting molar conductivity.

6. Draw wheat stone bridge and write formula to calculate unknown resistance.

7. **Explain Molar conductivity.**

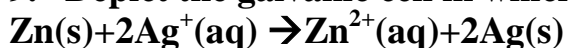
Section B – Short Answer (2 marks each)

8. Given the standard electrode potentials,



Arrange these metals in their increasing order of reducing power.

9. Depict the galvanic cell in which the reaction



takes place. Further show:

(i) Which of the electrode is negatively charged? (ii) The carriers of the current in the cell. (iii) Individual reaction at each electrode.

10. Calculate the standard cell potentials of galvanic cell in which the following reaction take place:

$\text{Fe}^{2+}(\text{aq}) + \text{Ag}^+(\text{aq}) \rightarrow \text{Fe}^{3+}(\text{aq}) + \text{Ag(s)}$ Calculate the $\Delta_r G^\circ$ and equilibrium constant of the reactions.

$$E_{\text{Ag}^+/\text{Ag}}^\circ = +0.80 \text{ V}$$

$$E_{\text{Fe}^{3+}/\text{Fe}^{2+}}^\circ = +0.77 \text{ V}, \text{ Antilog } 0.51 = 3.2$$

11. (N13) Write the chemistry of recharging the lead storage battery, highlighting all the materials that are involved during recharging.

12. (N11). Suggest a list of metals that are extracted electrolytically.

13. (B5) Write the Nernst equation and emf of the following cells at 298 K:

(iv) $\text{Pt(s)}|\text{Br}^-(0.010 \text{ M})|\text{Br}_2(\text{l})||\text{H}^+(0.030 \text{ M})|\text{H}_2(\text{g}) (1 \text{ bar})|\text{Pt(s)}$.

$$E_{\text{Br}_2/\text{Br}^-}^\circ = +1.09 \text{ V}$$

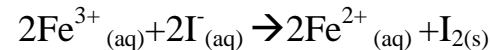
$$E_{\text{H}^+/\text{H}_2}^\circ = 0.00 \text{ V}, \log(1.11 \times 10^7) = 7.045$$

Section C – Short Answer (3 marks each)

14. Suggest a way to determine the Λ_m° value of water.

15. How much electricity is required in coulomb for the oxidation of 1 mol of FeO to Fe₂O₃?

16. The cell in which the following reaction occurs:



has $E_{\text{cell}}^\circ = 0.236 \text{ V}$ at 298 K.

Calculate the standard Gibbs energy and the equilibrium constant of the cell reaction.

Antilog 0.99 = 9.8

17. Draw and explain structure and working of any two the following cells

a. Mercury cell b. Nickel Cadmium Cell c. Fuel Cell

Section D – Long Answer (4 marks)

18. Write formulae and units of the following

a. Resistance b. Resistivity c. Conductance d. Conductivity e. Molar conductivity

References:

Q 8. Help → <https://rksvirtuals.com/eyroots/jpg/b02.html>

Q9. Help → <https://rksvirtuals.com/eyroots/jpg/b03.html>

Q10. Help → <https://rksvirtuals.com/eyroots/jpg/b04.html>

Q11. Help → <https://rksvirtuals.com/eyroots/jpg/n13.html>

Q12. Help → <https://rksvirtuals.com/eyroots/jpg/n11.html>

Q13. Help → <https://rksvirtuals.com/eyroots/jpg/b05.4.html>

Q14. Help → <https://rksvirtuals.com/eyroots/jpg/n08.html>

Q15. Help→ <https://rksvirtuals.com/eyroots/jpg/b14.html>

Q16. Help→ <https://rksvirtuals.com/eyroots/jpg/n06.html>