Unit III

6. (a) Derive the Ilkovič equation. Write its Consequences. **11**

(b) Explain the difference between reversible and irreversible electrode processes in polarography. **5**

7. Write notes on the following : **4,4,4,4**

(i) Diffusion current

(ii) Koutecky's equation

(iii) Half-wave potential

(iv) Cathodic-Anodic waves

Unit IV

8. (a) Explore an approximate treatment of a slow electrode process and a rigorous treatment of a slow electrode process. **11**

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M.Sc. EXAMINATION, 2026

(Fourth Semester)

(2023-24 Onwards)

(Re-appear Only)

CHEMISTRY

Physical Chemistry Special-IV Applications of Electrochemistry

Time : 3 Hours] [*Maximum Marks :* 80

Before answering the question-paper, candidates must ensure that they have been supplied with correct and complete question-paper. No complaint, in this regard will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) Explain the term electrode polarization.

(b) What is corrosion inhibition efficiency ?

(c) What is cathodic protection ?

(d) Discuss prime protective coatings to retard corrosion.

(e) What is meant by the capacity of a battery ?

(f) Give one example of an irreversible electrode reaction.

(g) Why is mercury renewable in DME ?

(h) What is meant by limiting current ?

8×2=16

Unit I

2. Discuss electrochemical behaviour of active passive metal. Explain the factors affecting electrochemical passivity. **16**

3. What are corrosion inhibitors ? Discuss mechanism of corrosion inhibition action and write about different types of inhibitors. **16**

Unit II

4. (a) What is an electrochemical energy converter ? Discuss the factors influencing the electrochemical energy conversion. **8**

(b) What are fuel cells ? Discuss the construction and working of the H_2-O_2 fuel cell. **8**

5. Write notes on the following : **4,4,4,4**

(i) Energy storage density

(ii) Dry cell

(iii) Silver-zinc cell

(iv) Lead Acid battery

(b) Write a brief note on polarographic coulometry. **5**

9. (a) Discuss the polarography of organic substances. **8**

(b) Discuss the determination of the number of electrons by analysis of the decrease in limiting current. **8**

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(b) Write a brief note on polarographic coulometry. **5**

9. (a) Discuss the polarography of organic substances. **8**

(b) Discuss the determination of the number of electrons by analysis of the decrease in limiting current. **8**

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