



QP CODE: 26019322



26019322

Reg No :

Name :

M.Sc DEGREE (CSS) EXAMINATION, MARCH 2026

Fourth Semester

M Sc CHEMISTRY

ELECTIVE - CH800403 - ADVANCED PHYSICAL CHEMISTRY

2019 Admission Onwards

23A506DE

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

Weight 1 each.

1. Explain the principle and advantages of solar cells.
2. Give the relation for the ratio of quantum yield in absence and presence of quencher. Graphically show how this ratio depend on concentration of quencher.
3. Sketch the flow diagram of a fluorescent spectrometer showing the different parts of the instrument.
4. Explain the principle of FES.
5. Discuss the validity of DHO in aqueous solvents.
6. What are concentration cells. How are they classified.
7. Represent Butler –Volmer equation and explain the terms.
8. Explain about a typical cyclic voltammogram.
9. Write a short note on diffusion current.
10. Briefly explain the terms in Onsager Reciprocal Relations.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

Weight 2 each.

11. Give a brief description on radiolysis of water.
12. Write a note on the different types of fluorophores.





13. Discuss in detail about the structure and working of HCL.
14. Briefly describe the structure and functioning of solid oxide fuel cells.
15. Explain dry corrosion and electrochemical corrosion.
16. Explain about the general principle and instrumentation of amperometric titration?
17. Discuss about the neutralization titrations, complex formation titrations, redox titrations using coulometry? Also explain the advantages of coulometry?
18. In a photochemical decomposition of ethylene iodide with a radiation of 450 nm, the iodine formed after 25 minutes required 50.14 dm³ of 0.0030 moldm⁻³ of hypo (one mole of iodine molecule reacts with 2 mole of hypo) . The intensity of light source was $9.58 \times 10^{-4} \text{ JS}^{-1}$. Calculate the quantum yield assuming absorption light energy is 90%.

(6×2=12 weightage)

Part C (Essay Type Questions)

Answer any **two** questions.

Weight 5 each.

19. Elaborate on the photochemistry of the environment and green house effect.
20. Give an account of the principle and instrumentation of AES. What are its applications, advantages and disadvantages?
21. What are fuel cells? Briefly describe the functioning of methanol fuel cells and solid oxide fuel cells.
22. a) What is DME? Explain its working, advantages and disadvantages.
b) Explain pilot ion procedure, standard addition method and determination of half wave potential of an ion using a polarogram.

(2×5=10 weightage)

