**QP CODE: 25022516**

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**Reg No :** .....

**Name :** .....

# M.Sc DEGREE (CSS) SPECIAL REAPPEARANCE EXAMINATION, APRIL 2025

## Third Semester

M.Sc POLYMER CHEMISTRY

## CORE - CH050301 - CHEMICAL KINETICS AND SURFACE CHEMISTRY

2019 ADMISSION ONWARDS

9AAA094C

Time: 3 Hours Weightage: 30

### Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. What are chain reactions? Explain with one example.
2. Explain secondary kinetic salt effect.
3. Explain Hammett acidity functions.
4. Explain the Lotka –Voltera model for oscillating reactions.
5. What are the main assumptions of Langmuir theory?
6. Mention important applications of Surface Enhanced Raman Scattering.
7. Explain Onsager reciprocal relations.
8. Write Stern-Volmer equation. Represent graphically.
9. Outline the principle involved in coulometric titrations.
10. Write a note on electrical properies of nano materials

(8×1=8 weightage)

### Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. For the first order isomerization of an organic compound at 130 $^0$C, the activation energy is 108.4 kJ/mol and the rate constant is 9.12 X $10^{14}$ $s^{-1}$. Calculate the standard entropy of activation for this reaction.
12. Explain any suitable method for studying rate of fast reactions.
13. Briefly explain the different electro-kinetic phenomena associated with colloidal solutions.

14. Explain the entropy change and free energy change in ATP hydrolysis.

15. Explain briefly chemiluminescence and bioluminescence.

16. Explain briefly the principle and instrumentation of TG.

17. List out various optical and electrical properties ofcarbon nanoparticles.

18. Discuss how nanotechnology plays an important role in drug delivery.

(6×2=12 weightage)

**Part C (Essay Type Questions)**

*Answer any **two** questions.*

*Weight **5** each.*

19. (a) Explain enzyme catalysed reaction mechanism and derive Michael-Menten equation.
    (b) Describe Lineweaver-Burk method of enzyme catalysis.

20. Point out the principle, mechanisms, selection rules and applications of Surface Enhanced Raman spectroscopy.

21. Explain the principle and working of solar cell.

22. Discuss titration procedure, merits and demerits of amperometric titrations.

(2×5=10 weightage)