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M.Sc. Chemistry
Semester II Examination 2025
Paper Code: MCHCC--201
Paper Title: Physical Chemistry-II

Time $2\frac{1}{2}$ hours

Maximum Marks 60

Abbreviations Used

CLO- Course Outcome, PLO- Program Outcome, BTL- Bloom Taxonomy Level: BT level 1-Remember; BT level 2-Understand; BT level 3-Apply; BT level 4-Analyse; BT level 5-Evaluate, BT level 6-Create

Section A

Very Short Type Questions

(10x1.5=15 Marks)

Q. No	Question	BTL	CLO	PLO
1.	Are surfactants biodegradable?	1	1	1
2.	What is the difference between chemical Kinetics & Chemical Dynamics?	2	2	1
3.	What is the difference between statistical Thermodynamics & Statistical Mechanics?	2	3	1
4.	What is rate Law equation for first order reaction?	2	4	1
5.	What is degeneracy?	1	4	1
6.	Define thermodynamic probability. How is it related to entropy?	2	4	1
7.	What is microstate?	2	2	1
8.	What is colloidal solution?	2	3	1
9.	Name four methods to determine CMC?	2	3	1
10.	What is the unit of Rotational Partition function?	2	4	1

Section B

Long Type question (Attempt any two out four)

(10x2=20 Marks)

Q. No	Question	BTL	CLO	PLO
1.	Explain Integrated law methods to determine order of reaction.	6	1	3
2.	Explain Activated Reaction Rate Theory	5	2	3
3.	Show how thermodynamic quantities like internal energy, free energy, and entropy can be derived from the partition function.	5	2	3
4.	What role do surfactants play in pharmaceuticals or cosmetics?	6	3	3

Section C

Short Type questions. (Attempt all questions)

(5x5=25 Marks)

Q.NO	Questions	BTL	CLO	PLO
1.	Explain Primary & Secondary salt effects? OR Explain the Kinetics of Enzyme Reaction.	3	1	2
2.	Explain Collision Theory? OR Explain Arrhenius Theory?	4	2	2
3.	Define ensemble averaging. How is it different from time averaging?? OR Define partition function. Why is it called a "sum over states"?	3	3	1
4.	Differentiate between unimolecular & Pseudo-unimolecular reactions. OR Explain the factors affecting the rate of reaction.	4	2	1
5.	How do surfactants help in oil recovery? OR How do ionic and nonionic surfactants differ in structure and function?	3	4	2