K25P 2872

Reg. No. : .....

Name : .....

III Semester M.Sc. Degree (C.B.C.S.S. – OBE – Reg./Supple./Imp.) Examination, October 2025
(2023 Admission Onwards)
CHEMISTRY/CHEMISTRY WITH DRUG CHEMISTRY SPECIALIZATION
MSCHD03C14/MSCHE03C14: Physical Chemistry – III

Time : 3 Hours Max. Marks : 60

SECTION – A

(Short answer questions. Answer **any five** questions and **each** carries **three** marks.)

1. What is the significance of the steric factor in collision theory ? Explain.
2. Explain the kinetics of the $H_2 + Cl_2$ reaction.
3. Briefly explain the Hammett equation and its significance.
4. What is meant by heat of adsorption ? Explain.
5. Briefly explain electrical double layer.
6. Define diffusion coefficient. Mention its relevance in macromolecular dynamics. **(5×3=15)**

SECTION – B

(Paragraph questions. Answer **any three** questions and **each** carries **six** marks.)

7. Write notes on reversible, parallel and branching reactions with examples.
8. Derive an expression relating the dielectric constant of the medium to the reaction rate in solutions.
9. Explain the structure and formation of micelles.

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10. Describe the application of low-energy electron diffraction and photoelectron spectroscopy in surface studies.

11. Explain the light scattering method for molecular mass determination of macromolecules. **(3×6=18)**

SECTION – C

(Essay type questions. Answer **any three** questions and **each** carries **nine** marks.)

12. Explain any two methods used for the study of fast reactions.

13. Briefly discuss activated complex theory of reaction rate.

14. Discuss the Branching chain $H_2 - O_2$ reaction.

15. Derive the rate law for a surface catalyzed reaction using the Langmuir adsorption isotherm.

16. Discuss electrokinetic phenomena in detail, covering all four types with examples. **(3×9=27)**

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