



K23P 1377

Reg. No. :

Name :

III Semester M.Sc. Degree (C.B.S.S. – Reg./Supple./Imp.)
Examination, October 2023
(2020 Admission Onwards)
CHEMISTRY
CHE 3C 10 : Physical Chemistry – III

Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer **all** questions in **one** word or **one** sentence. **Each** question carries **one** mark.

1. What is steric factor in collision theory ?
2. What is saddle point in PES ?
3. What is chain length of a reaction ?
4. Explain cage effect.
5. What is critical micelle concentration ?
6. What do you mean by differential heat of adsorption ?
7. Write notes on protective colloids.
8. What is Dorn effect ? How it arises ? (8×1=8)

SECTION – B

Answer **any eight** questions. Answer may be **two** or **three** sentences. **Each** question carries **two** marks.

9. What are the informations obtained from PES ?
10. Explain briefly temperature jump method in relaxation.
11. What are the drawbacks of Lindemann's theory ?

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12. Explain briefly the various steps involved in chain reactions.
13. How solvent influences the rate of a chemical reaction in solution phase ?
14. What is steady state approximation ?
15. What is LEED ? What are its applications ?
16. Write BET equation and explain the terms.
17. Write the steps involved in surface catalysed reactions.
18. What are the factors providing stability to colloidal solutions ?
19. What is electro osmosis ? What are its applications ?
20. What are micelles ? Explain with examples. (8×2=16)

SECTION – C

Answer **any four** questions. Short paragraph questions. **Each** question carries **three** marks.

21. How flash photolysis is used to study fast reactions ?
22. Discuss the steps involved in unimolecular reactions according to Lindemann's theory.
23. How ionic strength influences the rate of chemical reactions in solutions ?
24. Derive Bronsted Bjerrum equation.
25. Discuss briefly the principle of Auger spectroscopy. How it is used in surface analysis ?
26. Differentiate between sedimentation potential and streaming potential. (4×3=12)

SECTION – D

Answer **any four** questions. Essay type questions. **Each** question carries **six** marks.

27. A) What are the postulates of collision theory of reaction rates ? Derive the rate constant of chemical reactions using collision theory.

OR

- B) Discuss in detail transition state theory. Derive Eyring equation.



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28. A) Derive the rate equation for the photochemical reaction between H_2 and Cl_2 reaction.

OR

- B) How solvent dielectric constant influences the rate constant of a chemical reaction in solution ? Explain using mathematical formulations.

29. A) How will you determine the surface area of a solid using Langmuir, BET and Harkin's Jura method ?

OR

- B) What are the postulates of Langmuir adsorption isotherm ? Derive Langmuir adsorption isotherm equation.

30. A) Discuss in detail Donnan membrane equilibrium and its significance.

OR

- B) What is Zeta potential ? How it is generated ? Derive an equation for Zeta potential. (4×6=24)