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 ?

P.T.O.

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.

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)**
