K22P 1377

Reg. No. : .....

Name : .....

III Semester M.Sc. Degree (CBSS – Reg./Sup./Imp.) Examination, October 2022
(2019 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 **1** mark.

1. Give the Eyring equation of bimolecular reaction and explain the terms.
2. What is potential energy surface ?
3. What is steady state approximation ?
4. What is primary salt effect ?
5. What are micelles ?
6. Give the Gibbs adsorption equation.
7. What is electrical double layer ?
8. What is weight average molecular mass ? (8×1=8)

SECTION – B

Answer **eight** questions. Answer may be in **one** or **two** sentences. **Each** question carries **2** marks.

9. Explain the principle of microscopic reversibility.
10. Distinguish between prototrophic and protolytic mechanism with examples.

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11. Write Taft equation and explain the terms.
12. How does dielectric constant of a medium affect the rate of reactions in solutions ? Give its relationship with rate constant.
13. Give the mechanism of $H_2 - Br_2$ reaction.
14. What is cage effect ?
15. What are surfactants ? How they are classified ?
16. What is the basic principle of photo electron spectroscopy ?
17. What is the surface area of the solid if 118 ml of H_2 formed a monolayer on silica gel at STP ? The cross sectional area of H_2 is 0.192 nm^2.
18. What is Zeta potential ?
19. Give the relation for weight average molecular weight determined by sedimentation equilibrium method.
20. What is Donnan membrane equilibrium ? (8×2=16)

SECTION – C

Answer **four** questions. **Each** question carries **3** marks.

21. Give the thermodynamic treatment of transition state theory.
22. Explain the kinetics of $H_2 - Cl_2$ reaction.
23. Give the Semenov Hinshelwood mechanism of explosive reactions.
24. How Langmuir and BET isotherms are used for the surface area determination ?
25. Briefly explain the working of Auger spectroscopy.
26. Briefly explain the osmotic method for the determination of molecular mass of macromolecules. (4×3=12)

SECTION – D

Answer either **A** or **B** of **each** question. **Each** question carries **6** marks.

27. A) Briefly explain the Lindemann-Hinshelwood mechanism of unimolecular reactions.
    B) Discuss any two methods for studying the kinetics of fast reactions.
28. A) Derive the Michaelis-Menten equation of enzyme catalysis.
    B) Briefly explain the Rice Herzfeld mechanism of branching chain reaction.
29. A) Give the kinetic and statistical approach of Langmuir adsorption isotherm.
    B) Explain the Eleyideal mechanism of flash desorption.
30. A) Derive BET adsorption isotherm.
    B) Write a short note on (a) Electro osmosis (b) Electrophoresis. (4×6=24)