Reg. No. : ....

Name : ....

III Semester M.Sc. Degree (C.B.S.S. – Supple./Imp.) Examination, October 2024
(2021 and 2022 Admissions)
CHEMISTRY
CHE 3C10 : 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. Explain the terms involved.

2. What is cage effect ?

3. What are micelles ?

4. What is zeta potential ?

5. Give the Hammet and Taft equation.

6. What is flash desorption ?

7. What do you mean by parallel reactions ?

8. What are surfactants ?

(8×1=8)

SECTION – B

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

9. Give Gibbs adsorption isotherm. Explain the terms used in the equation.

10. Write a note on surface films.

11. Explain steady state approximation.

P.T.O.

12. What do you mean by branching chain reaction ?

13. Give the Bronsted-Bjerrum equation.

14. What is electrophoresis ?

15. Spontaneous adsorption is exothermic. Why ?

16. Explain with one example anionic and cationic surfactants.

17. Define isosteric heat of adsorption.

18. What do you mean by specific acid catalysis ? Give an example.

19. Account for the high quantum yield of photochemical reaction between H_2 and Cl_2.

20. Define number average molecular mass. **(8×2=16)**

SECTION – C

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

21. Briefly describe the flash photolysis method for studying fast reactions.

22. Explain primary and secondary salt effects on reaction rates.

23. Explain the principle of Auger electron spectroscopy in the study of surfaces.

24. Distinguish between prototropic and protolytic mechanism with examples.

25. At 25°C and 1 atm pressure, a volume of 250 mL of H_2 was required to form a monolayer on an adsorbent. Calculate the surface area of the solid given that the area occupied by one molecule of H_2 is 0.11 nm^2.

26. Explain Donnan Membrane equilibrium. **(4×3=12)**

SECTION – D

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

27. A) Discuss briefly on transition state theory and derive an expression for bimolecular rate constant.

   OR

   B) Discuss briefly on the Lindmann and RRK theories of unimolecular reactions.

28. A) Derive Michaelis – Menten equation.

   OR

   B) Write mechanism for photochemical reaction between H_2 and Br_2. Derive the rate law.

29. A) Derive Langmuir adsorption isotherm.

   OR

   B) Briefly explain Eley-Rideal mechanism for surface catalyzed reactions.

30. A) Explain in detail sedimentation potential and streaming potential.

   OR

   B) Describe any two methods for the determination of weight average molar mass. **(4×6=24)**

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