QP CODE: 21000545

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Reg No : .....

Name : .....

M Sc DEGREE (CSS) EXAMINATION, MARCH 2021

Third Semester

Faculty of Science

CORE - CH010301 - CHEMICAL KINETICS, SURFACE CHEMISTRY AND CRYSTALLOGRAPHY

M Sc CHEMISTRY

2019 Admission Onwards

A930AC57

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Give the Eyring equation. Explain the terms involved.
2. With an example, explain how pressure affects the velocity of gases.
3. Explain the significance of rate determining step in a multi step reaction.
4. Give the Bronsted Bjerrum equation and explain the terms involved.
5. Distinguish between general and specific H^+ ion catalysis.
6. Write a note about surface films.
7. How ion scatting method is helpful for studying surface of a solid? Write any two applications.
8. Explain Eley-Rideal mechanism.
9. Write a note about viscosity method for molecular weight determination.
10. Explain mesomorphic state of a crystal?

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Explain the Rice Herzfeld mechanism of organic decomposition reactions of acetaldehyde having overall order 1.
12. Discuss on the kinetics of cationic polymerization.
13. Explain how flow and shock methods can be used in studying the kinetics of fast reactions.
14. For an enzyme substrate system obeying Michaelis-Menton mechanism, the rate of product formation when [S] is large has limiting value of 0.04 mol dm^{-3}. At [S] = 200mg dm^{-3}, rate is 1/2 this value. Calculate k_1/k_{-1} assuming $k_1 >> k_{-1}$.
15. Expain different methods used for the verification of Gibbs adsorption.
16. Differentiate Lyophilic and Lyophobic Colloids.
17. Rotating crystal method is a useful technique for characterizing a crystal. Explain.
18. Explain single crystal x-ray diffraction technique for characterizing the crystal structure.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. What are oscillating reactions? Discuss on its significance and explain any three models.
20. Explain Surface Enhanced Raman Scattering.
21. Compare Langmuir and BET adsorption isotherm.Explain the use of this for surface area determination.
22. Explain different technique for characterizing crystal structure.

(2×5=10 weightage)