

21P213

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Name: .....

Reg.No: .....

**FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2021**

(CBCSS - PG)

(Regular/Supplementary/Improvement)

**CC19P CHE1 C04 - THERMODYNAMICS, KINETICS AND CATALYSIS**

(Chemistry)

(2019 Admission onwards)

Time : 3 Hours

Maximum : 30 Weightage

**Section A**

Answer any *eight* questions. Each question carries 1 weightage.

1. What is meant by activity coefficient ?
2. State Raoult's law for vapour pressure lowering.
3. Give one application to the theory of diffusion
4. What is meant by steady state approximation? Explain in the case of a reaction that proceeds through chain mechanism.
5. What is the effect of temperature and pressure in the reaction of  $H_2$  and  $O_2$ ?
6. Explain the shock-tube method to study the kinetics of fast reactions.
7. What is Marcus's contribution to kinetic study of unimolecular reactions?
8. Draw the Lineweaver-Burk plot. What is its significance?
9. Suggest the form of the rate law for the decomposition of phosphine ( $PH_3$ ) on tungsten is first-order at low pressures and zeroth-order at high pressures.
10. What is nanocatalysis?

**(8 × 1 = 8 Weightage)**

**Section B**

Answer any *six* questions. Each question carries 2 weightage.

11. Discuss the term residual entropy.
12. Explain entropy production due to heat flow.
13. Explain Glansdorf-Pregogine equation.

14. What is primary salt effect?
15. Explain the concepts of attractive and repulsive potential energy surfaces.
16. Give three methods used to determine the surface area of adsorbents.
17. Write a note on catalysis. What is the role of catalyst in a reaction?
18. Write a note on the preparation of zeolites and silica supports.

**(6 × 2 = 12 Weightage)**

### **Section C**

Answer any *two* questions. Each question carries 5 weightage.

19. Explain how fugacity is measured experimentally.
20. Apply collision theory for the study of reaction rates. What are its drawbacks?
21. Suggest a method for the determination of surface acidity.
22. Explain the mechanisms of oscillating reactions.

**(2 × 5 = 10 Weightage)**

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