17P115 (Pages:2) Name: ……..

Reg. No……..

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, DECEMBER 2017

(Regular/Supplementary/Improvement)

(CUCSS-PG)

CC15P CH1 C04 – THERMODYNAMICS, KINETICS AND CATALYSIS

(Chemistry)

(2015 Admission onwards)

Time: Three Hours Maximum:36 Weightage

PART A

Answer ***all*** questions. Each question carries 1 weightage.

1. Explain briefly what is meant by cage effect.
2. Explain briefly what is meant by steady state approximation.
3. What is the relation between nature of the terminating radicals and the order of the reaction?
4. What is chain retardation? Give an example.
5. Mention two applications of ESCA.
6. Spontaneous adsorption is always exothermic. Justify the statement.
7. Give a note on determination of surface area from BET method.
8. Explain autocatalysis.
9. Define the terms fugacity and activity.
10. Explain residual entropy with suitable examples.
11. Define forces and fluxes with reference to irreversible process.
12. Write down the Glansdorf-Pregogine equation.

(12 x 1 =12 weightage)

PART B

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

13. Derive Michaelis-Menten equation.
14. Explain specific and general acid catalysis.
15. Give a note on oscillating reactions.
16. Briefly explain TEM for studying surfaces.
17. Illustrate the oxidation of CO using Langmuir-Hinshelwood and Eley-Rideal mechanism.
18. What is primary salt effect? Explain.
19. Derive the Eyring equation.

20. Discuss the relaxation method in the study of fast reactions. What is meant by relaxation time?
21. Derive Duhem-Margules equation.
22. Define phenomenological coefficients. Show that direct coefficients always dominate indirect coefficients.
23. Explain briefly the electrokinetic effect.
24. Define Chemical potential. Discuss the variation of chemical potential with temperature and pressure.

(8 x 2 =16 weightage)

PART C

Answer any ***two*** questions. Each question carries 4 weightage

25. Discuss the mechanism of $H_2 - O_2$ reaction and derive the rate law. Explain the various explosion limits.
26. Discuss the various theories of unimolecular reactions.
27. Derive the rate equation for bimolecular surface reactions.
28. Discuss the determination of absolute entropies of solids, liquids and gases with respect to 3rd law of thermodynamics.

(4 x 2 =8 weightage)

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