18P113 (Pages: 2) Name: …………………….

Reg. No…………………...

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2018
(Regular/Supplementary/Improvement)
(CUCSS-PG)
CC15P CH1 C04 – THERMODYNAMICS, KINETICS AND CATALYSIS
(Chemistry)
(2015 Admission onwards)

Time: Three Hours   Maximum: 36 Weightage

Section A
Answer *all* questions. Each question has 1 weightage.

1. Write Onsagar reciprocal relations and explain the terms.

2. How does activation energy differ from threshold energy?

3. Distinguish between regular solution and ideal solution.

4. Write Glansdorff-Priggogine equation and explain the terms.

5. What is steady state approximation?

6. What is residual entropy? Give example.

7. Distinguish between specific and general acid catalysis.

8. What is a reaction coordinate? Explain.

9. Write London equation for attractive surfaces.

10. Partial molar properties are intensive properties. Justify the statement.

11. Define fugacity. How does it differ from activity?

12. How do you distinguish XPS from Auger peaks?

(12 x 1 = 12 Weightage)

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

13. Explain the effect of pressure and temperature on chemical potential.

14. Distinguish between Arrhenius complex and Vant Hoff complex.

15. Derive an equation for relaxation time for a first order reversible reaction.

16. What is electrokinetic effect ? Explain.

17. Write the principle of crossed molecular beams.

18. Explain oscillating chemical reactions.

19. Explain primary salt effect.

20. Explain decomposition of ethane using Rice Herzfeld mechanism.

21. Using third law of thermodynamics, show that absolute zero of temperature is unattainable.

22. Define phenomenological coefficients. Show that direct coefficients always dominate indirect coefficients.

23. What is the principle of SEM?

24. Explain autocatalysis with example.

(8 x 2 = 16 Weightage)

Section C

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

25. How would you understand thermal osmosis and thermal diffusion from irreversible thermodynamics? Discuss.

26. How will you study the kinetics of fast reactions?

27. Write a brief account of experimental method for studying fast reactions.

28. Explain transition state theory of reaction rates.

(2 x 4 = 8 Weightage)

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