D 6813　　　　　　　(Pages : 2)　　　　　**Name**

Reg. No...............

THIRD SEMESTER M.Sc. DEGREE EXAMINATION, DECEMBER 2016

(CUCSS)

Chemistry

CH 3C 07—PHYSICAL CHEMISTRY—II

(2010 Admissions)

Time : Three Hours　　　　　　　　　　　　　　　　　Maximum : 36 Weightage

Part A

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

1. What do you mean by most probable distribution ?

2. Distinguish between microstate and macrostate.

3. Define characteristic temperature. Explain its significance.

4. State and explain Dulong Petit's law.

5. Electrons never follow Maxwell Boltzmann statistics. Why ?

6. Explain the term "communal entropy".

7. Explain terms forces and fluxes with reference to irreversible process.

8. State and explain Glansdorf-Pregogine equation.

9. State and explain steady-state approximation.

10. Define relaxation time. Explain its significance.

11. Distinguish between Vant Hoff complex and Arrhenius complex.

12. Enthalpy of adsorption is a function of surface coverage. Why ?

13. Distinguish between diffusion controlled and activation controlled reactions.

14. What is secondary salt effect ?

(14 x 1 = 14 weightage)

Part B

Answer any **seven** *questions.*
Each question carries a weightage of 2.

15. Calculate residual entropy of CO if 50 % molecules are oriented as $\overrightarrow{CO}$ and 50 % molecules are oriented as $O C$.

16. Account for the anamolus heat capacity of H_2.

Turn over

17. What is configurational partition function ? How is it evaluated ?

18. What are the advantages of a linear relationship between force and flux ? Illustrate the conditions for a linear relationship between force and flux.

19. Briefly discuss rice Harzfeld mechanism of organic decomposition reaction.

20. What are the drawbacks of Lindmann's theory of unimolecular reaction ? How are they overcome ? Discuss.

21. 130 ml. of N_2 was required to form a monolayer on one gram of a solid (corrected to 0°C. and 1 atm. pressure). Calculate the surface area of the solid. cross-sectional area of N_2 is 16.2 A^2.

22. Discuss briefly Langmuir-Hinshelwood model of surface catalysed reaction.

23. What is Brusselator model of oscillating chemical reactions ?

24. Calculate the temperature at which 10 % of the molecules would be in the first excited state of this stale is 400 nm above the ground state. The ground state is non-degenerate and excited state is triply degenerate.

(7 x 2 = 14 weightage)

Part C

Answer any two questions.
Each question carries a weightage of 4.

25. Discuss briefly Debye's theory of heat capacity of solids.

26. What are the methods of studying fast reactions ? Discuss any *two* of them.

27. Briefly discuss molecular beam method of studying reaction cross-section.

28. Briefly discuss Bose Einstein condensation.

(2 x 4 = 8 weightage)