

**D 72935**

(Pages : 2)

Name.....

Reg. No.....

**FIRST SEMESTER M.A./M.Sc./M.Com. DEGREE EXAMINATION  
DECEMBER 2019**

(CBCSS)

Chemistry

**CHE 1C 04—THERMODYNAMICS, KINETICS AND CATALYSIS**

(2019 Admissions)

Time : Three Hours

Maximum : 30 Weightage

**Section A**

*Answer eight questions.*

*Each question carries a weightage of 1.*

1. What is residual entropy ? Write an example.
2. What do you mean by regular solution ?
3. State and explain Onsager reciprocal relation.
4. What is active transport ?
5. State and explain steady-state approximation.
6. Distinguish between diffusion controlled and activation controlled reactions.
7. Define isosteric heat of adsorption.
8. What is Michaelis-Menten constant ?
9. Write one example for a polymer supported catalyst. Explain.
10. Distinguish between collision cross section and reaction cross section.

(8 × 1 = 8 weightage)

**Section B**

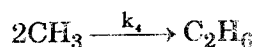
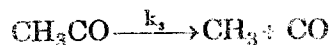
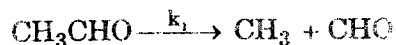
*Answer six questions.*

*Each question carries a weightage of 2.*

11. Use third law of thermodynamics to show that absolute zero of temperature is unattainable.
12. Show that solvent obeys Raoult's law in the limit of solute obeying Henry's law.
13. Define phenomenological coefficient. Show that direct coefficient always dominates indirect coefficients.

**Turn over**

14. Decomposition of acetyldehyde obeys the following mechanism. Derive the rate law :



15. Briefly illustrate a crossed molecular beam experiment.  
 16. With the help of potential energy surfaces explain reaction coordinate.  
 17. Discuss principle and applications of mercury porosimetry.  
 18. Briefly explain Lotka-Volterra model of oscillatory chemical reactions.

(6 × 2 = 12 weightage)

### Section C

*Answer two questions*

*Each question carries a weightage of 5.*

19. Apply concept of irreversible thermodynamics to rationalise (a) thermal osmosis ; (b) thermal diffusion.  
 20. Discuss Somenoff Hinshelwood theory of branching chain reactions.  
 21. Briefly discuss Activated Complex Theory of reaction rates.  
 22. Write a brief account of the methods for determination of surface area of solids.

(2 × 5 = 10 weightage)