

Elective Paper III (Group C)

Chemical Dynamics:

60 hrs.

I. Theories of reaction rates:

15 hrs.

The theory of absolute reaction rates, Transmission coefficient. The review of theories of rates of unimolecular reactions. Hinshelwood Kassel Rice Ramsperger, RRKM and with special reference to Slater's theory. Thermodynamics of reaction rates.

II. Fast reaction Kinetics:

15 hrs.

Relaxation phenomenon, techniques for rate measurement. T Jump, P Jump and Shock wave. The stopped flow technique. The radical detectionary mass spectrometry and laser induced magnetic resonance.

III. Molecular reaction dynamics:

15 hrs.

The scope of reaction dynamics in terms of reactive encounter, energy requirement; steric requirement, diffusion controlled reactions. Material balance equation and its solution collision of structureless particles, kinetic isotope effect. The experimental observation of activated complex. Activation parameters. Reaction between ions. Dynamics of molecular collisions, Potential energy surfaces, dynamic calculation & transition state theory. Adiabatic theory of reactions.

IV. Experimental reaction dynamics:

15 hrs.

The bulb method. The molecular beam method from the stand point of reagent specification and product distribution. The laser induced fluorescence.

Books Suggested

1. Chemical kinetics, Keith J. Laidler, Tata Macgraw Hill Kepmit (1995).
2. Kinetics and Mechanism, Frost and Peorson, John Wiley (1963).
3. Physical Chemistry, IRAN Levine, Tata Macgraw Hill (1995).
4. Physical Chemistry, ALKMs, Oxford University Press, (1998).
5. Chemical Kinetics, Michael. J. Pilling, Paul.W. Seakins, Science Publications (1995).