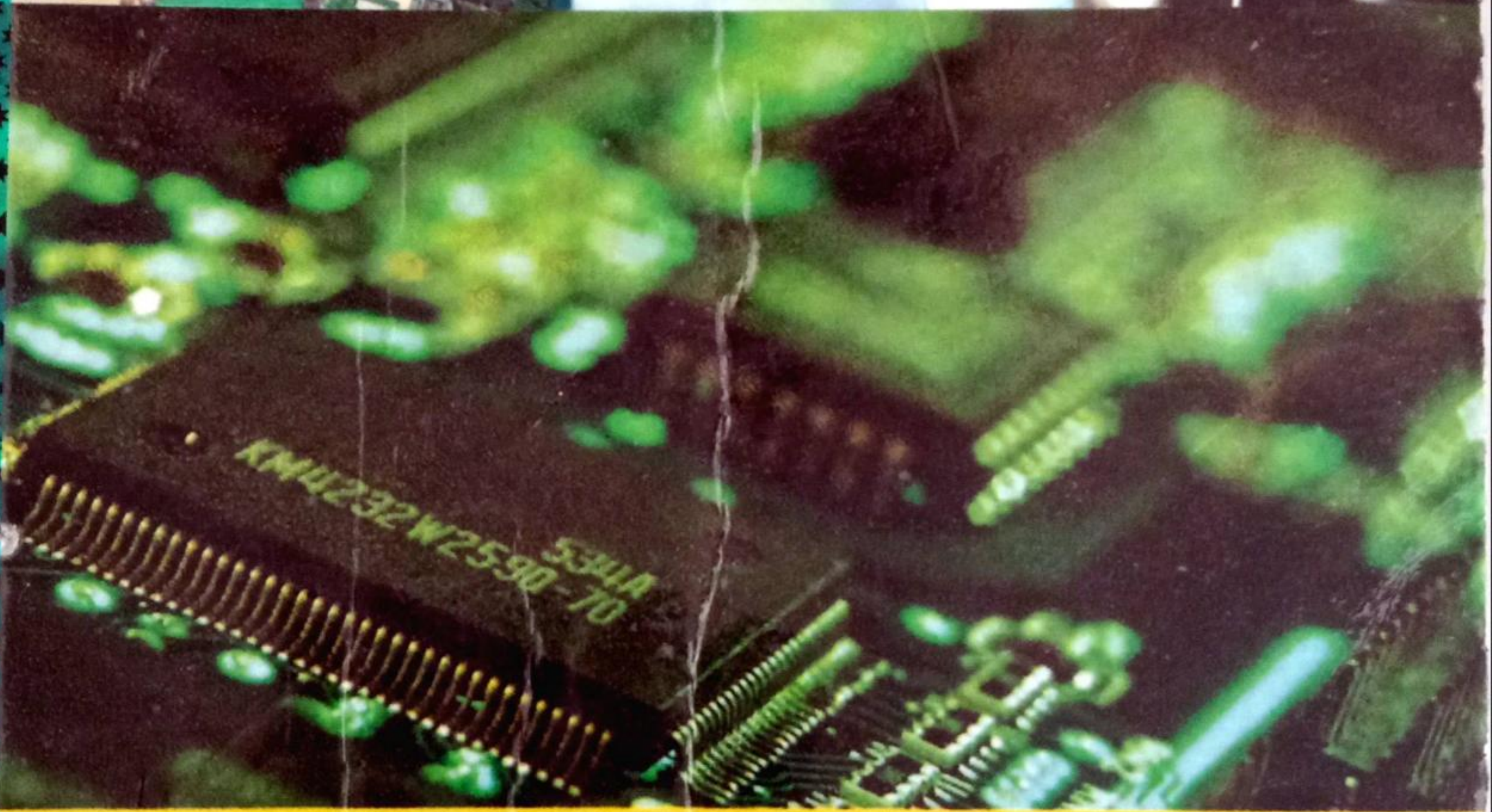


R Chand's

MECHANICS AND ELECTRONIC DEVICES



R CHAND & CO., NEW DELHI

SYLLABUS

Physics-PH-201

Semester-II

Paper-III: Properties of Matter and Kinetic Theory of Gases
Max. Marks: 45
Internal Assessment: 45
Time: 3 Hours

Note:

1. Nine questions will be set in total.
2. Question No. 1 will be compulsory and will be based on the conceptual aspects of the entire syllabus. This question may have 5 parts and the answer should be in brief but not in Yes/No.
3. Four more questions are to be attempted, selecting one question out of two questions set from each unit. Each question may contain two or more parts. All questions will carry equal marks.

UNIT-I

Moment of inertia: Rotation of rigid body, Moment of inertia, Torque, Angular momentum, Kinetic energy of rotation. Theorem of perpendicular and parallel axes (with proof), Moment of inertia of solid sphere, hollow sphere, spherical shell, solid cylinder, hollow cylinder and solid bar of rectangular cross-section, Fly wheel, Moment of inertia of an irregular body, Acceleration of a body rolling down on an inclined plane.

UNIT-II

Elasticity: Elasticity, Stress and Strain. Hook's law, Elastic constant and their relations, Poisson's ratio, Torsion of cylinder and twisting couple, Determination of coefficient of modulus of rigidity for the material of wire by Maxwell's needle, Bending of beam (Bending moment and its magnitude), Cantilever and centrally loaded beam. Determination of Young's modulus for the material of the beam and Elastic constants for the material of the wire by Searle's method.

UNIT-III

Kinetic theory of gases-I: Assumption of Kinetic theory of gases, Pressure of an ideal gas (no derivation), Kinetic interpretation of Temperature, Ideal Gas equation, Degree of freedom. Law of equipartition of energy and its application for specific heat of gases, Real gases, Vander Waal's equation, Brownian motion (Qualitative).

UNIT-IV

Kinetic theory of gases-II: Maxwell's distribution of speed and velocities (derivation required), Experimental verification of Maxwell's law of speed distribution: Most probable speed, average and r.m.s. speed, Mean free path, Transport of energy and momentum, Diffusion of gases.

SYLLABUS

Physics-PH-202

Semester-II

Paper-IV: Semiconductor Devices

Max. Marks: 45

Internal Assessment: 5

Time: 3 Hours

Note:

1. Nine questions will be set in total.
2. Question No. 1 will be compulsory and will be based on the conceptual aspects of the entire syllabus. This question may have 5 parts and the answer should be in brief but not in Yes/No.
3. Four more questions are to be attempted, selecting one question out of two questions set from each unit. Each question may contain two or more parts. All questions will carry equal marks.

UNIT-I

Semiconductors: Energy bands in solids, Intrinsic and extrinsic semiconductors, carrier mobility and electrical resistivity of semiconductors, Hall effect p-n junction diode and their characteristics, Zener and Avalanche breakdown, Zener diode, Light emitting diodes (LED), Photoconduction in semiconductors, Photodiode, Solar Cell. p-n junction as a rectifier, half wave and full wave rectifiers (with derivation), filters (series inductor, shunt capacitance, L-section or choke, π and R.C. filter circuits).

UNIT-II

Transistors: Junction transistors, Working of NPN and PNP transistors, Three configurations of transistor (C-B, C-E, C-C modes), Common base, common emitter and common collector characteristics of transistor, Constants of a transistor and their relation, Advantages and disadvantages of C-E configuration. D.C. load line. Transistor biasing, various methods of transistor biasing and stabilization.

UNIT-III

Transistor amplifiers: Amplifiers, Classification of amplifiers, Common base and common emitter amplifiers, Coupling in amplifiers and methods of Coupling Resistance-Capacitance (RC) coupled amplifier (two stage, concept of band width, no derivation), Feedback in amplifiers, Advantages of negative feedback, Emitter follower, distortion in amplifiers.

UNIT-IV

Oscillators: Oscillators, Principle of oscillation, classification of oscillators, Condition for self sustained oscillation: Barkhausen criterion for oscillation, Tuned collector common emitter oscillator, Hartley oscillator, C.R.O. (Principle and Working).

PAPER - I
PROPERTIES OF MATTERS, KINETIC THEORY
AND RELATIVITY

Chapter 1. Dynamics of Rigid Bodies

Chapter 2. Elasticity

Chapter 3. Kinetic Theory of Gases-I

Chapter 4. Kinetic Theory of Gases-II

3-60

67-124

125-164

165-206

PAPER - II
ELECTRONIC DEVICES

Chapter 5. Semi Conductor Diodes

Chapter 6. Transistors

Chapter 7. Transistor Amplifiers

Chapter 8. Oscillators

Paper

207-274

275-318

319-348

349-378

379-384