I. MECHANICS

KINAMETICS

1. Material point. Trajectory. Path travelled by body. Displacement. Reference body. Reference frame.
2. Rectilinear uniform motion. Velocity. Temporal dependences of Velocity and Displacement.
3. Rectilinear uniformly accelerated motion. Acceleration. Temporal dependences of Acceleration, Velocity and Displacement.
4. Non uniform motion. Average velocity.
5. Curvilinear motion. Circular uniform motion. Centripetal acceleration, Linear and Angular velocities, Period, Frequency.
6. Motion due to gravity. Free falling acceleration.

DYNAMICS

1. Inertia. Inertness. Mass as measure of inertness. Density.
2. Force. Resultant force. Newton's first, second and third laws.
3. Deformations, elasticity force. Hook's law.
4. Friction and reactive force.
5. Gravity force. Gravitational force. Universal gravity law.
6. Weight. Weightlessness. Overloading.
7. Mechanical work. Power.
8. Kinetic energy. Potential energy.
9. Total mechanical energy. Law of conservation of energy.
10. Momentum of body. Impulse. Conservation law of momentum.

HYDROSTATICS

1. Pressure. Pressure in liquids and gases. Pascal's law.
2. Archimedes law. Conditions of floating of bodies.

II. MOLECULAR PHYSICS AND HEAT EFFECTS

MOLECULAR PHYSICS

1. Substance quantity, molar mass, Avogadro's number. Bases principles of molecular kinetic theory.
2. State equation of molecular kinetic theory.
3. Gas laws. State equation of ideal gas. Isotherm, isobaric and isochoric processes. Graphical representations of these processes.

HEAT EFFECTS

1. Internal energy. Work in thermodynamics.
2. Heat quantity. Heat balance equation.
3. Vaporization, boiling, melting, crystallization and condensation. Latent heat of vaporization and melting.
4. First law of thermodynamics.
5. Applications of law of thermodynamics to isotherm, isobaric and isochoric processes.

III. ELECTRODYNAMICS

ELECTROSTATICS

1. Coulomb's law. Electrical field strength.
2. Work of electrical field.
3. Potential, potential difference.
4. Capacitance of capacitor. Series and parallel connections of capacitors. Energy of charged capacitor.

DIRECT ELECTRICAL CURRENT

1. Current strength. Ohm's law for the part of circuit. Resistance.
2. Dependence of resistance on geometrical dimensions of resistor and temperature.
3. Series and parallel connections of resistors.
4. Work and Power of current.
5. Extraneous forces.
6. Electromotive force. Ohm's law for the total circuit.
7. Heat, magnetic and chemical effects of current. Joule's effect.

MAGNETIC FIELD

1. Magnetic field. Magnetic field induction. Ampere's force.
2. Lorenz's force. Motion of charged particle in magnetic field.
3. Magnetic flux. Magnetic inductivity. Lenz's law. Energy of magnetic field.

IV. OPTICS

1. Light as an electromagnetic wave. Laws of straight linear propagation of light.
2. Reflection of light. Plane mirror. Law of reflection.
3. Law of light refraction.
4. Lenses. Diverging and Converging lenses. Formula of thin lens. Optical power.
5. Construction of image of object in thin lens.