INSTRUCTIONS: Ten questions shall be asked. Each question will carry equal marks. First question is compulsory and shall consist of Ten Multiple Choice Questions. The rest questions will be of subjective type which may include long questions and short notes.

GROUP - A: Special Theory of Relativity


GROUP - B: Mechanics and Properties of Matter


Gravitational potential and field due to bodies of regular geometrical shapes, Motion in central field due to bodies of regular geometrical shape, Motion in central field, Kepler's laws, two particles motion in central field.

Elasticity and elastic constants, Relation between elastic constants, Bending of beams and cantilevers, Torsion of cylinder and rigidity modulus by flat spiral spring.

Surface tension and Surface energy, Principle of virtual works and its application to surface tension, Ripple and gravity waves, Surface tension by the method of ripples, Effect of temperature and pressure on surface tension.

GROUP – C: Waves and Vibration

2 questions to be set, one to be answered differential equation of wave, Equation of progressive waves, Stationary Waves, Compression Waves in fluids and in external solids free, damped and forced oscillations in one dimension. Fourier series and its applications to rectangular and saw tooth waves, vibration of string, Intensity and loudness of sound and their measurements, Acoustics of buildings.
INSTRUCTIONS: Ten questions shall be asked. Each question will carry equal marks. First question is compulsory and shall consist of Ten Multiple Choice Questions. The rest questions will be of subjective type which may include long questions and short notes.

Derivation of Maxwell's law of distribution of velocities and its experimental verifications, Equipartition of energy, Mean free path.

Transport phenomenon- viscosity, conductivity and diffusion, Brownian motion, Langevin and Einstein's theories and experimental determination of Avogadro's number.

Rectilinear flow of heat in a metal rod conductivity of periodic flow method. Relation between thermal and electrical conductivities Van der Waal equation of state.

GROUP - B: Thermodynamics


Thermodynamics description of phase transition Chemical potential, Latent heat of transition, Clapeyron equation, Ehrenfest scheme of phase transition.

Joule Thompson effect, Liquefaction of gasses with special reference to hydrogen and helium, Production and measurement of low temperature.

Black body radiation, Kirchoff's law, Stefan's law, Wiens law, Planck's law and its experimental verification.

Einstein and Debye theories of specific heats of solids.
B. Sc. Part - I:- PHYSICS (HONOURS)

PRACTICAL PAPERS

1. 'g' by Kater’s Pendulum
2. Young Modulus by Flexure of beam.
3. Elastic constants by Searle's method
4. Rigidity modulus by (i) Barton's apparatus (ii) Maxwell's model
6. Surface tension by Jagger's method
7. Surface tension by method of Ripples
8. Surface tension of Soap solutions by bubble method.
9. Viscosity of water by capillary flow method
10. Viscosity of air by Rankine's method.
13. Frequency of tuning fork by Melde's experiment.
15. Specific heat of liquid by cooling method.
17. 'J' by Joules calorimeter.
INSTRUCTIONS: Ten questions shall be asked. Each question will carry equal marks. First question is compulsory and shall consist of Ten Multiple Choice Questions. The rest questions will be of subjective type which may include long questions and short notes.

GROUP-A: Relativity, Mechanics, Properties of Matter

Galilean Transformation, Intertial frame of reference, Michelson Morley experiment Lorentz-fitgerald contraction, Einstein postulates, Lorentz transformation and its consequences, Length contraction and time dilation, Addition of velocities, Relativistic Doppler effect for propagation of light waves, variation of mass with velocity, Mass energy Relation.

Inertial and Non-inertial frames of references, Corioli’s and centrifugal forces and their simple application, Motion in central field, Kepler’s laws, Generalised co-ordinates, Constraints (Holonomic and Non-Holonomic), Lagrangian equation of motion and their simple applications.

Elasticity and elastic constraints, Relation between elastic constants, Bending of beams and cantilevers, Torsion of Cylinder and rigidity modulus by flat spiral spring.

Surface tension and surface energy, Ripples and gravity waves, Surface tension by the method of ripples, Effect of temperature and pressure on surface tension.

Perfect fluids, equation of continuity, Euler’s equation for perfect fluid, Bernoulli’s equation.

Viscosity of liquids, critical velocity, Poiseuille’s formulae with correction, Flow of compressible fluid through a narrow tube, Viscosity of gases, Rankine’s method. Effect of temperature and pressure on viscosity.

GROUP-B: Waves and Acoustics

Differential equation of wave, Equation of Progressive waves, Stationary waves, Compression waves in fluids and in extended solids.

Free Damped and forced oscillations Fourier analysis Vibration of strings Intensity and loudness of sound and their measurements, Accounts of buildings, Ultrasonic

GROUP-C: Thermal Physics


Kirchoff’s laws and black-body radiation, Stefan Boltzmann Law-its equation and experimental verification.
The courses shall include the following experiments:

1. Determination of ‘g’ by Bar pendulum.
2. Determination of Youngs modulus by Flexure of beam.
3. Rigidity modulus by (i) statical method (ii) dynamical method.
5. Surface tension by jagger’s method.
7. Viscosity by Stoke’s method.
8. Determination of ‘gamma’ by constant pressure thermometer.
10. Thermal conductivity of copper.
11. Thermal conductivity of ebonite by Lee’s disc method.
12. ‘J’ by Joules calorimeter.
13. Frequency of tuning forks by Melde’s experiment.