Items of (mechanic, sound and electricity)

(A) 1st course

1- Introduction (Physics), subdivision and multiples of SI (metric) units, Latin symbols.
2- Scalar quantities, vector quantities
3- Vectors, resultant, addition and subtraction of vectors, scalar product, vector product.
4- Force, distance, displacement, velocity, acceleration, problems.
5- Newton's laws in motion, friction, coefficients of friction, equilibrium of forces.
6- Torque, work, mechanical power, energy (potential and kinetic) conservation of energy.
7- Machine, mechanical advantages of machine, efficiency, linear momentum, collision.
8- Angular motion (angular displacement, angular velocity, angular acceleration).
9- Fluids (laws of fluids).
10- Hook's law, modulus of material (modulus of elasticity (Young's modulus), bulk modulus, shear modulus), problems.
11- Simple Harmonic Motion (SHM), simple pendulum.
12- Wave motion, wave properties.
13- Sound, intensity of sound, velocity of sound, problems.

(B) 2nd course

1- Coulomb's law, electric fields.
2- Electric charge, conservation of charge, potential difference.
3- Electric current, Direct- Current Circuits (resistors, capacitors, batteries, combination methods).
4- Experimental resistors and capacitors and their applications.
5- Ohm's law, Kirchhoff's rules.
6- Conductors, insulators, semi-conductor materials.
7- Effect of electric fields on insulators, advantages of insulators using in capacitors.
8- Electric polarization.
9- Induced electromotive force, Faraday's law, Lenz's law.
10- Self induction, mutual induction.
11- Time constant of (R-L) circuit, (R-C) circuit.
12-Alternating current circuits, inductive reactance (X_L), capacitive reactance (X_C), phase angle (ϕ), impedance (Z), power factor.
13- Series and parallel (AC) circuits, resonance in (R-L-C) circuits,
resonance frequency (f_o), problems.