**Post Graduate Govt. College for Girls, Sector-42, Chandigarh**

**Teaching Plan (Even Semester) Session (2019-2020)**

**Class: B.Sc. 5th Sem/ 1st Sem**   **Name of the Teacher: Rajwinder Singh**

**Subject: Physics Period:2nd,6th/3rd ,5th**

**Paper:A/C Room No:129,126,218/126**

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| **S. No** | **Dates** | **Topics to be Covered** |
| Week 1 | 09-01-2020 to 11-01-2020 | Lattice Dynamics, Lattice vibrations and phonons  Current and current density, Equation of continuity, Microscopic form of Ohm’s law |
| Week 2 | 13-01-2020 to 18-01-2020 | Scattering of photons by phonons, Dynamics of a linear chain of similar atoms  Conductivity,Failure of ohm’s law, Invariance of charge, E in different frames of reference. |
| Week 3 | 20-01-2020 to 25-01-2020 | Scattering of photons by phonons, Dynamics of a linear chain of two types of atoms, optical and acoustic modes  Field of a point charge moving with constant velocity,force between parallel currents,  Behaviour of various substances in magnetic field. |
| Week 4 | 27-01-2020 to 01-02-2020 | Density of modes, Einstein theory of specific heats of solids  Definition of M and H and their relation to free and bound currents. |
| Week 5 | 03-02-2020 to 08-02-2020 | Debye theory of specific heats of solids  Permeability and susceptibility and their interrelationship. |
| Week 6 | 10-02-2020 to 15-02-2020 | Magnetic classification of materials (Dia, para,ferro, ferri, antiferro) Langevin theory of dia and paramagnetism  B-H curve and energy loss in hysterisis. |
| Week 7 | 17-02-2020 to 22-02-2020 | Quantum theory, Weiss’s theory of Ferromagnetism  Langevin theory of diamagnetism,Lorentz’s force, Definition of B, Biot savart’s law. |
| Week 8 | 24-02-2020 to 29-02-2020 | temperature dependence, hysteresis of ferromagnetic materials  Application of Biot Savart’s law to long straight wire,circular current loop and solenoid. |
| Week 9 | 02-03-2020 to 05-03-2020 | Dielectric constant & polarizability, electric susceptibility  Ampere’s circuital law and its application |
| Mid Semester Exams (06-03-2020 to 13-03-2020) | | |
| Week 11 | 14-03-2020, 16-03-2020 to 21-03-2020 | Clausius Mosotti equation, frequency dependence  Divergence & curl of B |
| Week 12 | 24-03-2020 to 28-03-2020 | ferroelectrics and Piezoelectrics, Liquid crystals, various types and properties , Applications  Hall effect, expression & coefficient |
| Week 13 | 30-03-2020 to 04-04-2020 | Superconductivity,Meisner effect, London’s equation and penetration depth, critical magnetic field and temperature  Vector potential, Definition and derivation |
| Week 14 | 07-04-2020 to 11-04-2020 | DC and AC Josephson effect, BCS theory(formation of cooper pairs), ground state and energy gap.  Current density-definition,its use in calculation of change in magnetic field at a current sheet |
| Week 15 | 15-04-2020 to 18-04-2020 | Basic ideas of materials at nanoscale: Difference from bulk material properties  Energy stored in magnetic field,  Faraday’s law of EM induction, Displacement current |
| Week 16 | 20-04-2020 to 24-04-2020 | Nanoparticles, introduction to fabrication and characterization  Techniques  Mutual inductance  Reciprocity theorem ,Self inductance for solenoid. |
| Week 17 | 27-04-2020 to 02-05-2020 | Carbon Nanostructures - nanotubes, graphene. Applications  of nanotechnology in various fields.  Numerical and test |
| Week 18 | 04-05-2020 | Numerical and test |