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

**Teaching Plan (OddSemester) Session (2019-2020)**

**Class: B.Sc 5th /B.Sc(hons.)/B.Sc BTH Name of the Teacher:Rajwinder Singh**

**Subject: Physics Period:2,3,4,6**

**Paper: A/A/A Room No:126,129,218,114,111**

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| **S. No** | **Dates** | **Topics to be Covered** |
| Week 1 | 23-07-2019 to 27-07-2019 | **B.Sc 5th:-**Crystal structure: Symmetry operations for a two dimensional crystal.  **B.Sc (Hons.):-**Crystal Properties and Growth of Semiconductors:  Semiconductor materials, Crystal lattices, Ge and Si crystal structure  **B.Sc BTH:-**Science, Physics and Life Sciences- An introduction to apparent differences and the underlying  overlap (atomic nature of matter). |
| Week 2 | 29-07-2019 to 03-08-2019 | **B.Sc 5th:-**Two dimensional Bravais lattices , Three dimensional Bravais lattices, Basic primitive cells  **B.Sc (Hons.):-**production of electronic grade Si, Bulk crystal growth, Epitaxial growth. Bonding forces and energy bands in solids  **B.Sc BTH:-**Units of measurement and ranges (from the smallest to the largest known) for different physical quantities viz. mass, length, time, current, temperature,  luminosity, etc. with suitable examples from bio/physical sciences. |
| Week 3 | 05-08-2019 to 10-08-2019 | **B.Sc 5th:-**Crystal planes and Miller indices, Diamond and Na  Cl structure.  **B.Sc (Hons.):-**Metals, semiconductors and insulators, Direct and Indirect semiconductors,  **B.Sc BTH:-**Units of measurement and ranges (from the smallest to the  largest known) for different physical quantities viz. mass, length, time, current, temperature,  luminosity, etc. with suitable examples from bio/physical sciences contd. |
| Week 4 | 13-08-2019 to 17-08-2019 | **B.Sc 5th:-**Crystal diffraction : Bragg’s Law, Determination of crystal structure  **B.Sc (Hons.):-**intrinsic and extrinsic semiconductors, compensation, Electrons and holes, effective mass  **B.Sc BTH:-**Coulomb’s law for point charges; electric field due to point charge and electric dipole (on axial  line and equator line), |
| Week 5 | 19-08-2019 to 24-08-2019 | **B.Sc 5th:-**Laue equations, Reciprocal lattices of SC, BCC and FCC  **B.Sc (Hons.):-**Fermi level, Conductivity and mobility, temperature dependence of Carrier concentration, effect of  temperature, doping and field on mobility  **B.Sc BTH:-**electric flux; Gauss’s theorem and its applications (line of charge and sheet of charge). |
| Week 6 | 26-08-2019 to 31-08-2019 | **B.Sc 5th:-**Bragg’s law in reciprocal lattice, Brillouin zones and its derivation in two dimensions,  **B.Sc (Hons.):-**Fermi level, Conductivity and mobility, temperature dependence of Carrier concentration, effect of  temperature, doping and field on mobility contd.  **B.Sc BTH:-**Electric potential due to point charge, group of charges and dipole (on axial line and equatorial line) |
| Week 7 | 02-09-2019 to 07-09-2019 | **B.Sc 5th:-**Structure factor and atomic form factor.  **B.Sc (Hons.):-**Hall effect, Invariance of Fermi level at equilibrium.  **B.Sc BTH:-**potential difference as line integral of electric field, capacitance; series and parallel arrangements |
| Week 8 | 09-09-2019 to 14-09-2019 | **B.Sc 5th:-**Band Theory of solids, periodic potential and Bloch theorem  **B.Sc (Hons.):-**Excess carriers in semiconductors: Optical absorption, Photoluminescence, Electroluminescence  **B.Sc BTH:-**energy stored in the electric field of capacitor,  current, current density, equation of continuity, Ohm’s law in vector form |
| Week 9 | 16-09-2019 to 21-09-2019 | **B.Sc 5th:-**Kronig-Penney model  **B.Sc (Hons.):-**Carrier lifetime and photoconductivity, photoconductive devices. Diffusion and drift of carriers in semiconductors  **B.Sc BTH:-**Interference of waves, phase and path differences, theory of interference fringes, Young’s experiment |
| Week 10 | 23-09-2019 to 28-09-2019  (Youth Festival 24-09-2019 to 27-09-2019) | **B.Sc 5th:-**band gaps in semiconductors  **B.Sc BTH:-**coherent sources, Llyod’s mirror, Fresnel Biprism, intensities of maxima and minima. |
| Week 11 | 30-09-2019 to 05-10-2019 | **B.Sc 5th:-**band structures in conductors  **B.Sc (Hons.):-**Einstein relation,built-in fields in semiconductors with different doping profiles  **B.Sc BTH:-**Diffraction of light, rectilinear propagation |
| Mid Semester Exams | | |
| Week 12 | 16-10-2019 to 19-10-2019 | **B.Sc 5th:-**direct and indirect semiconductors and insulators.  **B.Sc (Hons.):-**energy band diagrams. Steady state carrier injection  **B.Sc BTH:-**Fresnel and Fraunhofer diffraction, Fraunhofer  diffraction at single slit |
| Week 13 | 21-10-2019 to 26-10-2019 | **B.Sc 5th:-**Free electron theory of metals  **B.Sc (Hons.):-**diffusion length, Haynes-Shockley experiment (qualitative discussion).  **B.Sc BTH:-**Rayleigh criterion for resolving power, Resolving power of telescope and microscope |
| Week 14 | 29-10-2019 to 02-11-2019 | **B.Sc 5th:-**effective mass, drift current, mobility and conductivity  **B.Sc (Hons.):-**pn junction energy band diagrams, forward and reverse-biased junction,  **B.Sc BTH:-**Compound Microscope ( Principle, construction, ray diagram, formula for  magnifying power), fluorescent microscope(concept only) |
| Week 15 | 04-11-2019 to 09-11-2019 | **B.Sc 5th:-**carrier concentration and mobility of carriers and their variation with temperature in semi-conductors  **B.Sc (Hons.):-**calculation of contact potential and depletion width in abrupt junction  **B.Sc BTH:-**Polarization, introduction. |
| Week 16 | 11-11-2019 to 16-11-2019 | **B.Sc 5th:-**carrier concentration and mobility of carriers and their variation with temperature in semi-conductors cont.  **B.Sc (Hons.):-**diffusion and drift currents, Reverse-bias breakdown, Zener and  Avalanche diode.  **B.Sc BTH:-**Quantum theory of light, X-rays diffraction, Compton effect, Bragg’s law, de Broglie wave  equation, phase velocity and group velocity |
| Week 17 | 18-11-2019 to 23-11-2019 | **B.Sc 5th:-**Fermi level positions in intrinsic and extrinsic semiconductors  **B.Sc (Hons.):-**Diffusion and depletion capacitance of pn junction, varactors.  **B.Sc BTH:-**electron microscope, Uncertainty Principle  (statement only), applications of Uncertainty Principle ( particle in a box, existence of electron in  Nucleus and atom ). |
| Week 18 | 25-11-2019 to 30-11-2019 | **B.Sc 5th:-**Wiedemann-Franz law, Hall effect in metals and semiconductors.  **B.Sc (Hons.):-**Metal-semiconductor contacts, energy band diagrams  of ohmic and rectifying contacts, Schottky diodes.  **B.Sc BTH:-**Radioactivity and its laws ; half-life and mean life, uses of radioactivity. |