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

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

**Class: B.Sc**. 4th Semester **Name of the Teacher: Kamlesh Kumari**

**Subject: Physics Period: 4th**

**Paper: A and B Room No: 31 ,129**

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| **S. No** | **Dates** | **Topics to be Covered** |
| Week 1 | 09-01-2020 to 11-01-2020 | Interaction of light with matter :Absorption ,spontaneous emission, stimulated emission. |
| Week 2 | 13-01-2020 to 18-01-2020 | Wave mechanical explanation, Properties of spectral lines, Temporal and spatial coherence. |
| Week 3 | 20-01-2020 to 25-01-2020 | Characteristics of stimulated emission, Einstein coefficients and their relations. Light amplification and threshold condition. |
| Week 4 | 27-01-2020 to 01-02-2020 | Population inversion, Kinetics of optical absorption (qualitative account only ). Qualitative account of Collision broadening. |
| Week 5 | 03-02-2020 to 08-02-2020 | Statistical definition of entropy, change of entropy of a system, additive nature of entropy, law of increase  of entropy, reversible and irreversible processes with examples. Work done in a reversible process. |
| Week 6 | 10-02-2020 to 15-02-2020 | Examples of increase of entropy in natural processes. Entropy and disorder. Class Test. |
| Week 7 | 17-02-2020 to 22-02-2020 | Doppler broadening & natural broadening, Mechanism of Luminescence. Lasing action, components of laser. |
| Week 8 | 24-02-2020 to 29-02-2020 | Brief review of the terms and  Laws of Thermodynamics, Carnot’s Cycle. Entropy changes in Carnot’s Cycle. Applications of  thermodynamics to thermoelectric effect, change of entropy along a reversible path in a P.V. diagram |
| Week 9 | 02-03-2020 to 05-03-2020 | Elementary theory of optical cavity, Longitudinal and transverses modes, Principal pumping schemes. Three level and four level laser schemes. Discussion of short answer type questions. |
| Mid Semester Exams (06-03-2020 to 13-03-2020) | | |
| Week 11 | 14-03-2020, 16-03-2020 to 21-03-2020 | Laser systems : Types of lasers , Ruby and Nd : YAG lasers ,He-Ne Laser . |
| Week 12 | 24-03-2020 to 28-03-2020 | Entropy of a perfect gas. Equation of state of ideal gas from simple statistical consideration. Heat death of  the universe. Discussion of short answer type questions. |
| Week 13 | 30-03-2020 to 04-04-2020 | Dye and CO2 lasers -construction, mode of creating population inversion and output characteristics.  Applications of lasers - a general outline, Holography. Principle, recording of hologram and reconstruction of image. |
| Week 14 | 07-04-2020 to 11-04-2020 | Derivation of Maxwell’s thermodynamical relations and applications , cooling produced by adiabatic stretching, adiabatic compression, change of internal energy with volume. |
| Week 15 | 15-04-2020 to 18-04-2020 | Fibre optics: Photonics, optical fibre, Construction, Numerical aperture, acceptance angle, skip distance,  Step index fibre - single mode and multimode, Graded index Fibre. |
| Week 16 | 20-04-2020 to 24-04-2020 | losses in optical fibre, Material losses and Rayleigh scattering, bending losses, Intermodal and intramodal dispersion. Splicing techniques, Optical fibre based communication system, Medical applications. |
| Week 17 | 27-04-2020 to 02-05-2020 | Expression for (Cp- Cv), change of state and Clayperon Equation. Thermodynamical treatment of Joule- Thomson effect. Use of Joule- Thomson effect for liquefaction of helium. |
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| Week 18 | 04-05-2020 | Production of very low temperature by adiabatic demagnetization. Numerical problems and class test. |