**Govt. P.G. COLLEGE FOR WOMEN, SECTOR-14, PANCHKULA**

**LESSON-PLAN (Session 2020-21) ODD SEMESTER**

**Name of Professor**: Dr.Shubha

**Designation: Assistant professor**

**Subject: Chemistry**

**Class:B.Sc 3rd  ( 5th sem) Medical & Nonmedical**

**Subject/Paper: Physical Chemistry**

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| **Sr. No.** | **Months** | **Topics to be covered** | **Remarks if any,** |
| **1** | **October** | **Quantum Mechanics-I** Black body radiation , photoelectric effect**,** Average value of square of Hermitian as a positive quantity, Role of operators in quantum mechanics |  |
| **2** | **November** | To show quantum mechanically that position and momentum cannot be predicated simultaneously, Determination of wave function & energy of a particle in one dimensional box. **Raman Spectrum** Concept of polarizibility, pure rotational and pure vibrational Raman spectra ofdiatomic molecules, selection rules, Quantum theory of Raman spectra **Vibrational spectrum**  Selection rules, Energy levels of simple harmonic oscillator | Assignment and Test |
| **3** | **December** | pure vibrational spectrum of diatomic molecules, determination of force constant and qualitative relation of force constant and bond energy, idea of vibrational frequencies ofdifferent functional groups **Rotational Spectrum** Selection rules, Energy levels of rigid rotator (semi-classical principles), rotational spectra of diatomic molecules , spectral intensity distribution using population distribution (Maxwell-Boltzmann distribution), determination of bond length and isotopic effect | **Assignment and Test** |
| **4** | **January** | **Physical Proper ties and Molecular Structure**  Optical activity, polarization – (Clausius – Mossotti equation derivation excluded). Orientation of dipoles in an electric field, dipole moment, induced dipole moment Measurement of dipole moment -temperature method and refractivity method, dipole moment and structure of molecules, Magnetic permeability, magnetic susceptibility and its de termination Assignment Applicat ion of magnetic susceptibility, magnetic properties – paramagnetism, diamagnetism and ferromagnetism | **Unit- Test** |

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| **Sr. No.** | **Months** | **Topics to be covered** | **Remarks if any,** |
| **1** | **October** | **Kinetics:** Rate of reaction, rate equation and its types, factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst. Order of a reaction, integrated rate expression for zero order, first order ,second and third order reactions. Half life period of a reaction |  |
| **2** | **November** | **Kinetics:** Effect of temperature on the rate of reaction – Arrhenius equation. Theories of reaction rate Simple collision theory for unimolecular collision. Transition state theory of bimolecular reactions. | Assignment and Test |
| **3** | **December** | **Electrochemistry:** Electrolytic conduction, factors affecting electrolytic conduction, specific conductance, molar conductance ,equivalent conductance and relation among them, their variation with concentration. Arrhenius theory of ionization, Ostwald’s Dilution Law. Debye-Huckel – Onsager’s equation for strong electrolytes (elementary treatment only), Applica tion of Kohlrausch’s Law in calculation of conductance of weak electrolytes at infinite dilution. Applications of conductivity measurements: determinat ion of degree ofdissociation | **Assignment and Test** |
| **4** | **January** | **Electrochemistry:** Determination of Ka of acids determination of solubility product of sparingly soluble salts, conductometric titrations. Concepts of pH and pKa , Buffer solution, Buffer action, Henderson – Hazel equation, Buffer mechanism of buffer action.  **REVISION AND TESTS** | **Revision** |