Govt. College for Women, Sampla (Rohtak)

Lesson plan of ODD Semester (session 2024-2025)

Name of the Faculty : Ms. Monika

Course/Class : B.SC- I

Semester : Semester-I

Subject : Physical Chemistry

Week/Month	Name of Topics
4th week of July	**Chemical Bonding and Molecular Structure** Ionic bond, lattice energy, Born-Haber cycle and its applications, Fajan's rules, hydration energy, bond moment, dipole moment and percentage ionic character
1st week of August	Resonance and resonance energy: study of some inorganic and organic compounds. Molecular Orbital Approach: LCAO method, bonding and antibonding MOs and their characteristics for s-s, s-p and p-p combination of atomic orbitals
2nd week of August	non- bonding combination of orbitals, MO treatment of homonuclear diatomic molecules of 1st and 2nd periods (including idea of s-p mixing) and heteronuclear diatomic molecules such as O_2^-, O_2^{2-}, N_2^-, CO, NO^+, CN^-. Comparison of VB and MO approaches.
3rd week of August	**p-Block Elements** Oxides – structures of oxides of N, P. Oxyacids – structure and relative acid strengths of oxyacids of nitrogen and phosphorus. Structure of white, yellow and red phosphorus.
4th week of August	Oxyacids of sulphur – structures and acidic strength, H_2O_2– structure, properties and uses. Basic properties of halogen, interhalogen compounds-types and properties, halogen-acids and oxyacids of chlorine – structure and comparison of acidic strength.
1st week of September	**Acids and Bases:** Brönsted–Lowry concept, conjugate acids and bases, relative strengths of acids and bases, effects of substituent and solvent
2nd week of September	11,12,13 Sessional I
3rd week of September	Differentiating and levelling solvents. Lewis acid-base concept, classification of Lewis acids and bases, Lux-Flood concept.
4th week of September	**Gaseous States** Maxwell's distribution of velocities and energies (derivation excluded), calculation of root mean square velocity, average

	velocity and most probable velocity. Collision diameter, collision number, collision frequency and mean free path, deviation of real gases from ideal behaviour,
1st week of October	derivation of Van der Waals Equation of state and its applications in the calculation of Boyle's temperature (compression factor), explanation of behavior of real gases using Van der Waals equation.
2nd week of October	**Critical Phenomenon:** Critical temperature, critical pressure, critical volume and their determination. PV isotherms of real gases, continuity of states
3rd week of October	isotherms of Van der Waals equation, relationship between critical constants and Van der Waals constants, compressibility factor. Law of corresponding states.
4th week of October	DIWALI BREAK
1st week of November	**Basics of Organic Chemistry and Stereochemistry** Electronic displacements and its applications, reaction intermediates and concept of aromaticity. Concept of isomerism, types of isomerism, optical isomerism, optical activity, elements of symmetry
2nd week of November	12,13,14 Sessional II
3rd week of November	molecular chirality, enantiomers, stereogenic centre, properties of enantiomers, chiral and achiral molecules with two stereogenic centres, diastereomers, threo and erythro diastereomers
4th week of November	meso compounds, resolution of enantiomers, inversion, retention and racemization, relative and absolute configuration, sequence rules, R & S system of nomenclature.

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Lesson plan of Even Semester (session 2024-2025)

Name of the Faculty : Ms. Monika

Course/Class : B.SC- II

Semester : Semester-III

Subject : Physical Chemistry

Week/Month	Name of Topics
4th week of July	SECTION – A Thermodynamics-I Definition of thermodynamic terms: system,surrounding etc. Types of systems, intensive and extensive properties. State and path functions and their differentials.
1st week of August	Thermodynamic process. Concept of heat and work. Zeroth Law of thermodynamics, First law of thermodynamics: statement, definition of internal energy and enthalpy.
2nd week of August	Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law – Joule – Thomson coefficient for ideal gases and real gas: and inversion temperature.
3rd week of August	SECTION – B Thermodynamics-II Calculation of w.q. dU & dH for the expansion of ideal gases under isothermal conditions for reversible process
4th week of August	Calculation of w.q. dU & dH for the expansion of ideal gases under adiabatic conditions for reversible process Temperature dependence of enthalpy, Kirchoffs equation.
1st week of September	Bond energies and applications of bond energies.
2nd week of September	11,12,13 Sessional I
3rd week of September	SECTION – C Chemical Equilibrium, Equilibrium constant and free energy, concept of chemical potential
4th week of September	Thermodynamic derivation of law of chemical equilibrium. Temperature dependence of equilibrium constant; Van't Hoff reaction isochore
1st week of October	Van't Hoff reaction isotherm. Le-Chatetier's principle and its applica tions
2nd week of October	Clapeyron equation and Clausius – Clapeyron equation its applications.
3rd week of October	Section-D Dis tributioln Law Nernst distribution law – its thermodynamic derivation, Modification of distribution law when solute undergoes dissociation, association and chemical combination.

4th week of October	DIWALI BREAK
1st week of November	Applications of distribution law: (i) Determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride.
2nd week of November	12,13,14 Sessional II
3rd week of November	(ii) Determination of equilibrium constant of potassium tri-iodide complex and process of extraction.
4th week of November	Revision Exam Starts

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Lesson plan of Even Semester (session 2024-2025)

Name of the Faculty : Ms. Monika

Course/Class : B.SC- III

Semester : Semester-V

Subject : Physical Chemistry

Week/Month	Name of Topics
4th week of July	Section-A Quantum Mechanic s-I, Black-body radiation, Plank's radiation law, photoelectric effect, heat capacity of solids.

1st week of August	Compton effect, wave function and its significance of Postulates of quantum mechanics, quantum mechanical operator, commutation relations
2nd week of August	Hamiltonial operator, Hermitian operator, average value of square of Hermitian as a positive quantity, Role of operators in quantum mechanics
3rd week of August	To show quantum mechanically that position and momentum cannot be predicated simultaneously, Determination of wave function & energy of a particle in one dimensional box, Pictorial representation and its significance.
4th week of August	Section-B Physical Properties and Molecular Structure, Optical activity, polarization – (clausius – Mossotti equation).
1st week of September	Orientation of dipoles in an electric field, dipole moment, included dipole moment, measurement of dipole moment-temperature method and refractivity method
2nd week of September	11,12,13 Sessional I
3rd week of September	Dipole moment and structure of molecules, Magnetic permeability, magnetic susceptibility and its determination.
4th week of September	Application of magnetic susceptibility, magnetic properties-paramagnetism, diamagnetism and ferromagnetics.
1st week of October	Section-C Spectroscopy-I Introduction: Electromagnetic radiation, regions of spectrum, basic features of Spectroscopy
2nd week of October	Statement of Born-oppenheimer approximation, Degrees of freedom. Rotational Spectrum Diatomic

	molecules. Energy levels of rigid rotator (semi-classical principles),
3rd week of October	Selection rules, spectral intensity distribution using population distribution (Maxwell-Boltzmann distribution), determination of bond length, qualitative description of non-rigid rotor, isotope effect.
4th week of October	DIWALI BREAK
1st week of November	Section-D Spectroscopy-II Vibrational spectrum Infrared spectrum: Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum
2nd week of November	12,13,14 Sessional II
3rd week of November	Intensity, determination of force constant and qualitative relation of force constant and bond energies, effects of anharmonic motion
4th week of November	Isotopic effect on the spectra., idea of vibrational frequencies of different functional groups Raman Spectrum: Concept of polarizibility, pure rotational and pure vibrational, Raman spectra of diatomic molecules, selectin rules, Quantum theory of Raman spectra.

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