Govt. College for Girls, Rania (Sirsa)

Lesson Plan (Session 2020-21)

Name - Bharti Sharma.
Class- B.Sc. 2nd Year.

Semester- Fourth
Subject- Statistical Physics

Month	Week	Topic
March	2	Unit 1- Introduction, Microscopic and Macroscopic systems, events-mutually exclusive, dependent and independent. Probability, statistical probability
		A- priori Probability and relation between them, probability theorems, some probability considerations, combinations possessing maximum probability
		combination possessing minimum probability, Tossing of 2,3 and any number of Coins,
	3	Permutations and combinations, distributions of N (for N= 2,3,4) distinguishable and indistinguishable particles in two boxes of equal size,
		Micro and Macro states, Thermodynamical probability, Constraints and Accessible states,
		Statistical fluctuations,
	4	general distribution of distinguishable particles in compartments of different sizes
		Condition of equilibrium between two systems in thermal contact-- β parameter, Entropy and Probability (Boltzman's relation).
		Revision and Numerical Problems
April	1	Unit 2- Postulates of statistical physics, Phase space, Division of Phase space into cells.
		three kinds of statistics, basic approach in three statistics.
		M. B. statistics applied to an ideal gas in equilibrium- energy distribution law (including evaluation of α and β), Assignment.
	2	speed distribution law & velocity distribution law.
		Expression for average speed, r.m.s. speed, average velocity,
		r. m. s. velocity, most probable energy & mean energy for Maxwellian distribution.
	3	Revision and Numericals

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Semester- Fourth
Subject- Statistical Physics

Month	Week	Topic
		Unit 3-Need for Quantum Statistics: Bose-Einstein energy distribution law.
		Application of B.E. statistics to Planck's radiation law B.E. gas,
	4	Degeneracy and B.E. Condensation,
		Fermi- Dirac energy distribution law, F.D. gas and Degeneracy
		Fermi energy and Fermi temperature, Fermi Dirac energy distribution law,
	5	Fermi Dirac gas and degeneracy, Fermi energy and Fermi temperature,
		Fermi Dirac energy distribution law for electron gas in metals,
		Zero point energy, Zero point pressure and average speed (at 0 K) of electron gas.
May	1	Specific heat anomaly of metals and its solution. M.B. distribution as a limiting case of B.E. and F.D. distributions. Test.
		Comparison of three statistics. Revision and Numericals.
		Unit 4- Dulong and Petit law,
	2	Derivation of Dulong and Petit law from classical physics.
		Specific heat at low temperature, Einstein theory of specific heat
		Criticism of Einstein theory, Debye model of specific heat of solids,
	3	success and shortcomings of Debye theory, comparison of Einstein and Debye theories.
	4	Revision and Numericals.
		Revision of Unit 1,2,3.

Barsi

Govt. College for Girls, Rania (Sirsa)

Lesson Plan (Session 2020-21)

Name - Bharti Sharma.
Class- B.Sc. 2nd Year.

Semester- Fourth
Subject- Optics II

Month	Week	Topic
March	2	Unit 1-Polarization: Polarisation by reflection, refraction and scattering
		Malus Law, Phenomenon of double refraction,
		Huygen's wave theory of double refraction (Normal and oblique incidence),
	3	Analysis of polarized Light. Nicol prism,
		Quarter wave plate and half wave plate,
		production and detection of (i) Plane polarized light (ii) Circularly polarized light and (iii) Elliptically polarized light.
	4	Optical activity, Fresnel's theory of optical rotation, Specific rotation,
		Polarimeters (half shade and Biquartz).
April	1	Unit 2- Fourier theorem and Fourier series, Test
		evaluation of Fourier coefficient, importance and limitations of Fourier theorem, even and odd functions
		Fourier series of functions f(x) between (i) 0 to 2pi, (ii) –pi to pi, (iii) 0 to pi, (iv) –L to L,
	2	complex form of Fourier series, Application of Fourier theorem for analysis of complex waves:
		solution of triangular and rectangular waves , half and full wave rectifier outputs,
		Parseval identity for Fourier Series, Fourier integrals.
	3	Revision and Numericals
		Fourier transforms and its properties,
		Application of Fourier transform (i) for evaluation of integrals,
	4	Solution of ordinary differential equations, (iii) to the following function, Revision and Numericals.

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Bharti

Govt. College for Girls, Rania (Sirsa)

Lesson Plan (Session 2020-21)

Name - Bharti Sharma.
Class- B.Sc. 2nd Year.

Semester- Fourth
Subject- Optics II

Month	Week	Topic
		Unit 3-Matrix methods in paraxial optics,
	5	effects of translation and refraction,
May	1	derivation of thin lens. Assignment.
		thick lens formulae, unit plane
		nodal planes, system of thin lens
		Revision and Numericals
	2	Unit 4-Chromatic, spherical, coma, astigmatism
		distortion aberrations and their remedies
		Optical fiber, Critical angle of propagation,
	3	Mode of Propagation, Acceptance angle, Fractional refractive index change,
		Numerical aperture, Types of optics fiber, Normalized frequency
		Pulse dispersion, Attenuation,
	4	Applications, Fiber optic Communication, Advantages.
		Revision and. Numerical Problems
		Revision Unit 1,2,3

Barsi

Lesson Plan

Govt. College, Rania

Name of the Assistant Professor:-Dr. Manoj Kumar

Class and Section:-B.Sc. II (NM)/IV Semester Session-2020-21

Subject:- Chemistry

Week	Topics
1	**Physical Chemistry** **Chapter-Thermodynamics** ○ Limitation of first law of thermodynamics ○ Carnot Cycle
	○ Carnot Cycle, Carnot Theorem and Numerical problems
	○ Entropy change during reversible and irreversible process and clausius inequality
	○ Entropy Change for an ideal gas with change in P.V& T
	○ Entropy change during phase transition and numerical problems, Entropy change during mixing of ideal gases
	○ Work function and Gibbs free energy,Change in work function and Gibbs free energy with T & P
2	○ Criteria for spontaneity of a process
	○ Gibbs Helmholtz equation and numerical problems ,Nernst heat theorem and third law of thermodynamics
	○ Application of third law of thermodynamics-absolute entropy calculation. Residual entropy
	Chapter-Electrochemistry ○ Galvanic cells –introduction , Electrolytic cell
	○ Electrode potential and e.m.f .measurements. Standard cells
	○ Reversible cells and irreversible cells
3	○ Reversible cells Types
	○ Calculation of thermodynamic quantities of cell reactions, Standard hydrogen electrode and its uses
	○ Electrochemical Series and its applications
	○ Nernst equation for e.m.f .cell and numerical problems related to Nernst equation
	○ Calculation of equilibrium constant of cell reaction Concentration cells-introduction
	○ e.m.f. of electrode conc. Without transference
4	○ e.m.f . of cells With transference, **Liquid junction potential**
	○ Applications of e.mf. measurements
	○ Applications of e.mf. measurements
	○ Potentiometric titrations-principle and examples
	○ **Inorganic Chemistry** **Chapter-Chemistry of f-Block elements** ○ Lanthanides: Electronic structure, oxidation states
	○ magnetic properties, complex formation, colour of lanthanides

Week	Topics
5	○ Atomic & ionic radii and lanthanide contraction and it consequences
	○ occurrence, separation tech. of lanthanides,
	○ Lanthanide compounds, Actinides: General characteristics of actinides
	○ chemistry of separation of Np, Pu and Am from uranium
	○ Comparison of properties of Lanthanides and actinides with transition elements.
	Chapter- Theory of Qualitative and Quantitative Analysis ○ Basic of analysis- common ion effect, solubility product etc.
6	○ chemistry of identification of acid radicals
	○ chemistry of identification of acid radicals
	○ chemistry of identification of acid radicals in typical combination
	○ chemistry of identification of acid radicals in typical combination
	○ chemistry of identification of Basic radicals
	○ chemistry of identification of Basic radicals
7	○ chemistry of identification of Basic radicals,
	○ Theory of precipitation, co-precipitation, post ○ precipitation
	○ **Organic Chemistry** **Chapter –IR spectroscopy** ○ Basics of Infrared (IR) absorption spectroscopy, different types of Molecular vibrations
	○ Hooke 's law, selection rules, intensity and position of IR bands,
	○ Measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds.
	○ Measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds.
8	○ Applications of IR spectroscopy in structure elucidation of simple Organic compounds.
	Chapter- Amines ○ Structure and nomenclature of amines, physical properties.
	○ Separation of a mixture of primary, secondary and tertiary amines
	○ Basicity of amines, Structural features affecting basicity of amines.
	○ Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive lamination of aldehyde and kenotic compounds
	○ Gabriel -phthalimide reaction, Hofmann bromamide reaction.

Week	Topics
9	○ Chemical Properties of Amines, Electrophilic aromatic substitution in aromatic amines
	○ Electrophilic aromatic substitution in aromatic amines
	○ Reaction of amines with nitrous acid.
	○ **Diazonium Salts**-Mechanism of diazotisation, structure of benzene diazonium chloride,
	○ Replacement of diazo group by H, OH, F, Cl, Br, I, NO_2 and CN groups, reduction of diazonium sa lts to hyra zines
	○ Coupling reaction and its synthetic application.
10	○ **Carboxylic Acids & Acid Derivatives** –Nomenclature of Carboxylic acids, structure and bonding, physical properties,
	○ Acidity of carboxylic acids, effects of substituents on acid strength.
	○ Preparation of carboxylic acids.
	○ Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction
	○ Mechanism of decarboxylation reactions
	○ Relative stability of acyl derivatives. Physical properties, Inter-conversion of acid derivatives by nucleophilic acyl ○ substitution.