

# GOVERNMENT COLLEGE BIROHAR (JHAJJAR)

Summary of Lesson Plans of College Faculty for Academic Session 2024-25

Name of Assistant/Associate Professor: Dr. SHIVANI

Class: B.Sc. 5<sup>th</sup> Semester. Subject: Chemistry (Inorganic, organic & Physical Chemistry)

Semester: 5<sup>th</sup> Semester

Months	Topics/Chapters to be Covered
July 2024	<p>Metal-ligand bonding in transition metal complexes -</p> <ul style="list-style-type: none"> <li>• Limitations of VBT, an elementary idea of CFT, CFSE in octahedral, tetrahedral and square planar complexes, factors affecting the crystal field parameters.</li> </ul> <p>Thermodynamic and kinetic aspects of metal complexes - A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, Irving-Williams series, substitution reactions of square planar complexes of Pt(II), Trans effect.</p> <p style="text-align: center;"><b>Assignment - I</b></p>
August 2024	<p>Magnetic properties of transition metal complexes. Types of magnetic materials, magnetic susceptibility, methods of determining magnetic susceptibility, spin only formula, L-S coupling, correlation of <math>\mu_e</math> and <math>\mu_{eff}</math> values, orbital contribution to magnetic moments. Applications of magnetic moment data for 3d-metal complexes. Electronic state of Transition metal complex. Selection rule for d-d transitions, spectroscopic ground states &amp; spectrochemical series. Orgel energy level diagram for <math>d^1</math> and <math>d^9</math> states. Discussion of the electronic spectrum of <math>[Ti(H_2O)_6]^{3+}</math> complex ion.</p>
September 2024	<p>Principle of NMR, IR spectrum, number of signals, peak area, equivalent and non-equivalent protons, positions of signals and chemical shift, shielding and deshielding of protons, proton counting, splitting of signals and coupling constants, magnetic equivalence of protons.</p> <p>NMR spectroscopy - II: Discussion of IR spectra of the molecules: ethyl bromide, n-propyl bromide, isopropyl bromide, 1,1-dibromoethane, 1,2-dibromoethane, ethanol, acetaldehyde, ethyl acetate, toluene, benzaldehyde, and acetophenone. Simple molecules on IR spectroscopy for structure determination of organic compounds.</p>

October  
2024

Classification, Nomenclature, Tetrasaccharides, mechanism of action, interconversion glucose polymer, chain lengthening & chain shortening of aldehydes. Erythron, threo, ribose, deoxyribic, maltose, sucrose, lactose, raffinose, mesium, ergonine, erginoldivium. Quantum Mechanics - I, Black body radiation, photoelectric effect, heat capacity of solids, Compton effect, wave function and its significance of Postulates of Quantum mechanics, optical activity, polarization. Orientation of dipoles in an electric field. Dipole moment, induced dipole moment. measurement of dipole moment - temperature method and refractivity method, dipole moment. Structure of molecules. Electromagnetic radiation Degree of freedom. Unit Test.

November  
2024

Rotational spectrum. Diatomic molecules, Energy levels of rigid rotor rotator, selection rules, spectral intensity distribution using population distribution. Vibrational Infrared spectrum. Simple harmonic oscillator, selection rules. pure vibrational spectrum. intensity, force constant, bond energies, isotopic effect - Vibrational frequencies. Raman spectrum pure rotational & vibrational of diatomic molecules. Selection rules. Quantum theory of Raman spectra. Revision. UT. II

Signature of Asst/Asso. Professor 22/08/24

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Summary of Lesson Plans of College Faculty for Academic Session 2024-25

Name of Assistant/Associate Professor: Dr. SHIVANI

Class: B.Sc. 5<sup>th</sup> Semester Subject: Practical Chemistry (Inorganic & Organic)

Semester: 5<sup>th</sup> Semester

Months	Topics/Chapters to be Covered
July 2024	<p>Laboratory Preparations, arrangements, glasswares cleaning.</p> <p>Basic rules and regulations to conduct the practical examinations.</p>
August 2024	<p>Inorganic: Semimicro qualitative analysis of mixture containing not more than four radicals (including interfering, insoluble)</p> <p>Pb<sup>2+</sup>, Hg<sup>2+</sup>, Hg<sub>2</sub><sup>2+</sup>, Ag<sup>+</sup>, Bi<sup>3+</sup>, Cu<sup>2+</sup>, Cd<sup>2+</sup>, As<sup>3+</sup>, Sb<sup>3+</sup>, Sn<sup>2+</sup>, Fe<sup>3+</sup>, Cr<sup>3+</sup>, Al<sup>3+</sup>, Co<sup>2+</sup>, Ni<sup>2+</sup>, Mn<sup>2+</sup>, Zn<sup>2+</sup>, Ba<sup>2+</sup>, Sr<sup>2+</sup>, Ca<sup>2+</sup>, Mg<sup>2+</sup>, NH<sub>4</sub><sup>+</sup>, CO<sub>3</sub><sup>2-</sup>, S<sup>2-</sup>, SO<sub>3</sub><sup>2-</sup>, S<sub>2</sub>O<sub>3</sub><sup>2-</sup>, NO<sub>2</sub><sup>-</sup>, CH<sub>3</sub>CO<sup>-</sup>, Cl<sup>-</sup>, I<sup>-</sup>, NO<sub>3</sub><sup>-</sup>, SO<sub>4</sub><sup>2-</sup>, CrO<sub>4</sub><sup>2-</sup>, PO<sub>4</sub><sup>3-</sup>, PO<sub>3</sub><sup>3-</sup></p>
September 2024	<p>1.) Laboratory Techniques.</p> <p>2.) Steam distillation (non-evaluative) Naphthalene from its suspension in water.</p> <p>3.) Separation of o and p-nitrophenols.</p> <p>b.) Column Chromatography (non-evaluative) Separation of fluorescein and methylene blue separation of leaf pigments</p>

October  
2024

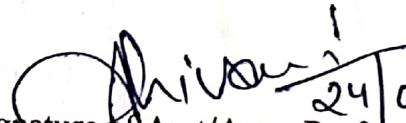
2.) Thin Layer Chromatography.

Determination of  $R_f$  values and identification of organic compounds.

3.) Separation of green leaf pigments

4.) Separation of a mixture of colored organic compounds using common organic solvents.

November  
2024

  
24/08/24  
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