

### Lesson Plan (2023-24)-Odd Semester

**Name of the Assistant Professor: Dr. Shri Bhagwan**

**Class and Section: B.Sc. III<sup>rd</sup> year (5<sup>th</sup> semester)**

**Subject: Chemistry (Inorganic & Physical Chemistry)**

WEEK	DATE	TOPICS
1	17.08.2023	Valence bond theory
	18.08.2023	Crystal field splitting in octahedral complexes
	19.08.2023	Criteria for a complex to be high spin or low spin
2	21.08.2023	Crystal field splitting in tetrahedral complexes
	22.08.2023	Calculation of CFSE in octahedral complexes
	23.08.2023	Calculation of CFSE in tetrahedral complexes
	24.08.2023	Crystal field splitting in square Planar complexes
	25.08.2023	Factors affecting the crystal-field parameters
	26.08.2023	Nature of Ligands affecting Crystal field splitting
3	28.08.2023	Nature of Metal ion affecting Crystal field splitting
	29.08.2023	<b>Test-1 (Unit-I Metal-ligand Bonding in Transition Metal Complexes)</b>
	30.08.2023	<b>Raksha Bandan</b>
	31.08.2023	Thermodynamic & Kinetic stability of metal complexes
	01.09.2023	Relationship between Stepwise & overall stability constant
	02.09.2023	Factors affecting the thermodynamic stability of metal complexes
4	04.09.2023	Substitution reactions of square planar complexes of Pt(II)
	05.09.2023	Trans effect and its theories
	06.09.2023	<b>Janmashtami</b>
	07.09.2023	<b>Test-2 (Unit-II Thermodynamic and Kinetic Aspects of Metal Complexes)</b>
	08.09.2023	Magnetic Properties of Transition Metal Complexes
	09.09.2023	Types of magnetic behaviour
5	11.09.2023	Methods of determining magnetic susceptibility
	12.09.2023	Calculation of magnetic moment
	13.09.2023	Quenching of Orbital contribution to magnetic moments
	14.09.2023	Application of magnetic moment data for 3d metal Complexes
	15.09.2023	<b>Test-3 (Unit-III Magnetic Properties of Transition Metal Complexes)</b>
	16.09.2023	Electron Spectra of Transition Metal Complexes
6	18.09.2023	Types of electronic transitions

	19.09.2023	Color in Transition Metal Complexes
	20.09.2023	Selection rules for d-d transitions
	21.09.2023	Spectroscopic ground states
	22.09.2023	Term Symbol & Microstate
	23.09.2023	<b>Shaheedi Diwas</b>
<b>7</b>	25.09.2023	Spectrochemical series
	26.09.2023	Orgel-energy level diagram for $d^1$ and $d^9$ octahedral complexes
	27.09.2023	Orgel-energy level diagram for $d^1$ and $d^9$ tetrahedral complexes
	28.09.2023	Electronic spectrum of $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ complex ion
	29.09.2023	<b>Test-4 (Unit-IV Electron Spectra of Transition Metal Complexes)</b>
	30.09.2023	<b>Thermodynamics-I Introduction- Unit-I (Physical Chemistry)</b>
<b>8</b>	02.10.2023	<b>Mahatma Gandhi Jayanti</b>
	03.10.2023	Basics of thermodynamics
	04.10.2023	Zeroth Law of thermodynamics
	05.10.2023	First law of thermodynamics: statement
	06.10.2023	Relationship between heat capacities at constant volume & pressure
	07.10.2023	Joule – Thomson coefficient for ideal gases
<b>9</b>	09.10.2023	Joule – Thomson coefficient for real gases
	10.10.2023	Inversion temperature
	11.10.2023	<b>Test-5 (Unit-I Thermodynamics-I)</b>
	12.10.2023	<b>Thermodynamics-II- Introduction- Unit-II</b>
	13.10.2023	Calculation of $w$ for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process
	14.10.2023	Calculation of $q$ for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process
<b>10</b>	16.10.2023	Kirchoffs equation
	17.10.2023	Bond energies
	18.10.2023	<b>Test-6 (Unit-II Thermodynamics-II)</b>
	19.10.2023	<b>Chemical Equilibrium- Introduction- Unit III</b>
	20.10.2023	Concept of chemical potential
	21.10.2023	Thermodynamic derivation of law of chemical equilibrium
<b>11</b>	23.10.2023	Van't Hoff reaction isochore & isotherm
	24.10.2023	<b>Dussehra</b>

	25.10.2023	Le-Chatetier's principle and its applications
	26.10.2023	Clapeyron equation and Clausius – Clapeyron equation
	27.10.2023	<b>Test-7 (Unit-III Chemical Equilibrium)</b>
	28.10.2023	<b>Maharshi Valmiki Jayanti</b>
<b>12</b>	30.10.2023	<b>Distribution Law - Introduction- Unit IV</b>
	31.10.2023	Nernst distribution law
	01.11.2023	<b>Haryana Day</b>
	02.11.2023	Modification of distribution law when solute undergoes dissociation
	03.11.2023	Modification of distribution law when solute undergoes association
	04.11.2023	Modification of distribution law when solute undergoes combination
<b>13</b>	06.11.2023	Applications of distribution law: (i) Determination of degree of hydrolysis
	07.11.2023	Hydrolysis constant for aniline hydrochloride
	08.11.2023	Determination of equilibrium constant of potassium tri-iodide complex
	09.11.2023	Process of extraction
	10.11.2023	<b>Diwali vacation</b>
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<b>14</b>	13.11.2023	<b>Diwali vacation</b>
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	16.11.2023	<b>Diwali vacation</b>
	17.11.2023	<b>Test-8 (Unit-IV Distribution Law)</b>
	18.11.2023	Revision
<b>15</b>	20.11.2023	Revision
	21.11.2023	Revision
	22.11.2023	Revision
	23.11.2023	Revision
	24.11.2023	Revision
	25.11.2023	Revision
<b>16</b>	27.11.2023	<b>Guru Nanak Dev Jayanti</b>
	28.11.2023	Solved question papers
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### Lesson Plan (2023-24)-Odd Semester

**Name of the Assistant Professor: Dr. Shri Bhagwan**

**Class and Section: M.Sc. Chemistry (I<sup>st</sup> semester)**

**Subject: Chemistry (Inorganic Chemistry)**

WEEK	DATE	TOPICS
1	17.08.2023	<b>Unit-I Transition Metal Chemistry: Introduction</b>
	18.08.2023	Description of ligand, coordination, geometry,
	19.08.2023	Structural Isomerism
2	21.08.2023	Optical Isomerism
	22.08.2023	Thermodynamic stability and trends in stepwise constants
	23.08.2023	Successive and overall stability constants and their interactions
	24.08.2023	Factors affecting stability of metal complexes with reference to the nature of metal ion
	25.08.2023	Factors affecting stability of metal complexes with reference to the nature of ligand
	26.08.2023	Thermodynamic origin of chelate effect
3	28.08.2023	Theories of Bonding- Crystal field theory and its limitation
	29.08.2023	d-orbital splitting in octahedral complexes
	30.08.2023	<b>Raksha Bandan</b>
	31.08.2023	d-orbital splitting in tetrahedral complexes
	01.09.2023	d-orbital splitting in square planar complexes
	02.09.2023	d-orbital splitting in square pyramidal and trigonal bipyramidal complexes
4	04.09.2023	John-Teller distortion
	05.09.2023	Molecular orbital theory of octahedral complexes
	06.09.2023	<b>Janmashtami</b>
	07.09.2023	Molecular orbital theory of tetrahedral and square planar complexes
	08.09.2023	<b>Test-1 (Unit 1: Transition Metal Chemistry)</b>
	09.09.2023	<b>Unit-II Electronic spectra and magnetic properties: Introduction</b>
5	11.09.2023	Calculation of the number of microstates
	12.09.2023	Spectroscopic term symbols and splitting of terms in free atoms
	13.09.2023	Spin-orbit coupling
	14.09.2023	Orgel diagram for transition metal complexes ( $d^1 - d^9$ states)
	15.09.2023	Orgel diagram for transition metal complexes ( $d^1 - d^9$ states)
	16.09.2023	Tanabe-Sugano diagram for transition metal complexes ( $d^1 - d^9$ states)

<b>6</b>	18.09.2023	Tanabe-Sugano diagram for transition metal complexes ( $d^1 - d^9$ states)
	19.09.2023	Spectrochemical and nephelauxetic series
	20.09.2023	Calculation of $Dq$ , $B$ , $\beta$ parameters
	21.09.2023	Charge transfer spectra
	22.09.2023	Magnetic properties
	23.09.2023	<b>Shaheedi Diwas</b>
<b>7</b>	25.09.2023	Magnetic exchange coupling and spin crossover
	26.09.2023	<b>Test-2 (Unit II: Electronic spectra and magnetic properties)</b>
	27.09.2023	<b>Unit-III Reaction Mechanisms-I: Introduction</b>
	28.09.2023	Inert and labile complexes
	29.09.2023	Application of valence bond and crystal field theories
	30.09.2023	Substitution reactions in octahedral complexes- acid hydrolysis
<b>8</b>	02.10.2023	<b>Mahatma Gandhi Jayanti</b>
	03.10.2023	Factors affecting acid hydrolysis
	04.10.2023	Base hydrolysis
	05.10.2023	Base hydrolysis
	06.10.2023	Conjugate base mechanism
	07.10.2023	Direct and indirect evidences in favor of conjugate mechanism
<b>9</b>	09.10.2023	Water exchange reactions
	10.10.2023	Anation reactions
	11.10.2023	Reactions without metal ligand bond cleavage
	12.10.2023	Racemization of tris-chelate complexes
	13.10.2023	Racemization of tris-chelate complexes
	14.10.2023	Electrophilic attack on ligands
<b>10</b>	16.10.2023	<b>Test-3 (Unit III: Reaction Mechanisms-I)</b>
	17.10.2023	<b>Unit-IV Reaction Mechanisms-II: Introduction</b>
	18.10.2023	Substitution reactions in square planar complexes
	19.10.2023	Substitution reactions in square planar complexes
	20.10.2023	Trans effect
	21.10.2023	Theories of trans effect
<b>11</b>	23.10.2023	Redox reactions
	24.10.2023	<b>Dussehra</b>

	25.10.2023	Inner sphere electron transfer reactions
	26.10.2023	Inner sphere electron transfer reactions
	27.10.2023	Outer sphere electron transfer reactions
	28.10.2023	<b>Maharshi Valmiki Jayanti</b>
<b>12</b>	30.10.2023	Outer sphere electron transfer reactions
	31.10.2023	Cross reactions
	01.11.2023	<b>Haryana Day</b>
	02.11.2023	Marcus-Hush theory
	03.11.2023	Electron exchange reactions
	04.11.2023	Mixed valence complexes and their electron transfer
<b>13</b>	06.11.2023	Mixed valence complexes and their electron transfer
	07.11.2023	<b>Test-4 (Unit 1V: Reaction Mechanisms-II)</b>
	08.11.2023	Revision
	09.11.2023	Revision
	10.11.2023	<b>Diwali vacation</b>
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