**Name of the Teacher:**  **Dr Joginder** **B. Sc. III Year (Vth Semester)**

**Paper-XV (CH-301) Inorganic Chemistry (Theory & Practical)**

**Lesson Plan**

|  |  |  |  |
| --- | --- | --- | --- |
| **S No** | **Period** | **Topics to be Covered** | **Academic Activity to be Organized** |
|  | **17-31 July 2017** | **Theory:**  **Section – A**  **Metal- Ligand Bonding in Transition Metal complexes**   1. Limitations of valence bond theory, an elementary idea of crystal field theory, 2. Crystal field splitting in octahedral, tetrahedral and square planer complexes, 3. Factors affecting the crystal field parameters   **Practicals:**  **Synthesis of organic compounds:**  (a) To prepare m-nitroaniline from m-dinitrobenzene.  (b) To prepare S-Benzyl-iso-thiouronium chloride from Thiourea. | **Class Tests, Group Discussions & Experiment Presentations** |
|  | **01-31 Aug 2017** | **Theory:**  **Thermodynamics and Kinetic Aspects of metal complexes**   1. A brief outline of thermodynamic stability of metal complexes. 2. Factors affecting the stability, Irving William Series, substitution reactions of square planer complexes. Trans effect.   **Practicals:** (a) To prepare salicylic acid from Aspirin.  (b)To prepare p-bromoaniline from p- bromoacetanilide |
|  | **01-30 Sept 2017** | **Magnetic properties of Transition metal complexes**  Types of magnetic materials, magnetic susceptibility, method of determining  magnetic susceptibility, spin only formula, L-S coupling, correlation of μs and μeff  values, orbital contribution to magnetic moments, application of magnetic moment  data for 3d metal complexes.  **Practicals: Thin Layer Chromatography**  Identification and Rf determination of a mixture of coloured organic compounds using common organic solvents. |
|  | **01-31 Oct 2017** | **Electronic spectra of Transition metal complexes**  Selection rules for d-d transition, spectroscopic ground states, spectrochemical  series  **Practicals:**  To analyse given inorganic mixture( Two acid and two basic radical) |
|  | **01-13 Nov 2017** | Orgel energy level diagram for d1 and d9 states, discussion of electronic  spectrum of [Ti(H2O)6]+3 complex ion.  **Practicals:**  To analyse given inorganic mixture( Two acid and two basic radical) |

**Topics of Assignments/ Class Tests to be given to the Students:**

|  |  |
| --- | --- |
| **Assignment 1** | An elementary idea of crystal field theory and Crystal field splitting in octahedral, tetrahedral and square planar complexes |
| **Assignment 2** | L-S coupling, Term Symbol and Orgel Energy Diagrams of transition metal complexes |
| **Class Test** | **Metal- Ligand Bonding in Transition Metal complexes** |

**Name of the Teacher**: **Dr Joginder** **Class:** **B. Sc- II year (Semester-III)**

**Lesson Plan**

|  |  |  |  |
| --- | --- | --- | --- |
| **S No** | **Period** | **Topics to be Covered** | **Academic Activity to be Organized** |
|  | **17-31 July 2017** | **Theory:**  **Section – A:** Chemistry of d-Block elements Definition of transition elements, position in the periodic table, General characteristic properties of d-Block elements.  **Practicals:**  **Preparations:** Preparation of Cuprous chloride, tetra ammine cupric sulphate | **Class Tests, Group Discussions & Experiment Presentations** |
|  | **01-31 Aug 2017** | **Theory:**  **Section – A:**  Comparison of properties of 3d elements with 4d and 5d elements with reference only to ionic radii, oxidation state, magnetic and spectral properties and stereo chemistry. Stability of various oxidation states and e.m.f (Latimer and Frost diagrams).  **Practicals:**  **Preparations:** Preparation of chrome alum, potassium trioxalatochromate (III) and Nickel Hexammine chloride  **Colorimetry:**  To verify Beer - Lambert law for KMnO4 /K2Cr2O7 and determine the concentration of the given KMnO4 /K2Cr2O7 solution. |
|  | **01-30 Sept 2017** | **Theory:** Structure and properties of some compounds of transition elements- TiO2, VOCl2, FeCl3, CuCl2 and Ni(CO)4.  **Section – B** Coordination Compounds Werner’s theory of coordination compounds, effective atomic number, chelates, nomenclature of coordination compounds.  **Practicals:**  **Gravimetric Analysis:**  Quantitative estimations of, Cu2+ as copper thiocyanate, Ni2+ as Ni-dimethylglyoxime |
|  | **01-31 Oct 2017** | **Theory:** Isomerism in coordination compounds, valence bond theory of transition metal complexes. **Non-aqueous solvents:** Physical properties of solvents.  .  **Practicals:**  1. To determine the CST of phenol-water system.  2. To determine the solubility of benzoic acid at various temperatures and to determine the ΔH of the dissolution process.  3. To determine the enthalpy of neutralisation of a strong base/strong acid and determine the enthalpy of ionisation of the weak acid/weak base.  4. To determine the enthalpy of solution of solid calcium chloride. |
|  | **01-13 Nov 2017** | **Theory:** Types of solvents and their general characteristics, reactions in non aqueous solvents with reference to liquid NH3 and liquid SO2.  **Practicals:**  1. To determine the enthalpy of neutralisation of a weak acid/weak base and determine the enthalpy of ionisation of the weak acid/weak base.  2. To determine the enthalpy of solution of solid calcium chloride. |

**Topics of Assignments/ Class Tests to be given to the Students:**

|  |  |
| --- | --- |
| **Assignment 1** | Chemistry of d-Block elements, Definition of transition elements, position in the periodic table, General characteristic properties of d-Block elements. |
| **Assignment 2** | Comparison of properties of 3d elements with 4d and 5d elements with reference only to ionic radii, oxidation state, magnetic and spectral properties and stereo chemistry. |
| **Class Test** | Definition of transition elements, position in the periodic table, General characteristic properties of d-Block elements. |

**Name of the Teacher:Dr Joginder**   **Class: B. Sc- I year (Semester-I)**

**Lesson Plan**

|  |  |  |  |
| --- | --- | --- | --- |
| **S No** | **Period** | **Topics to be Covered** | **Academic Activity to be Organized** |
|  | **17-31 July 2017** | **Practical:**  **Volumetric Analysis**  1. Preparation of reference solutions.  2. Redox titrations: Determination of Fe2+ , C2O4 2-  (using KMnO4 ) | **Group Discussions, Experiment Presentations** |
|  | **01-31 Aug 2017** | **Practical:**  **Volumetric Analysis**  Redox titrations: Determination of Fe2+ , C2O4 2-  (using K2Cr2O7)  Iodometic titrations: Determination of Cu2+ (using standard hypo solution).  **Complexometric titrations:** Determination of Mg2+, Zn2+ by EDTA. |
|  | **01-30 Sept 2017** | **Practical:**  Preparation and purification through crystallization or distillation and ascertaining their purity through melting point or boiling point   1. Iodoform from ethanol (or acetone) 2. *m*-Dinitrobenzne from nitrobenzene (use 1:2 conc. HNO3-H2SO4 mixture if fuming HNO3 is not available). |
|  | **01-31 Oct 2017** | **Practical:**  Preparation and purification through crystallization or distillation and ascertaining their purity through  melting point or boiling point   1. p-Bromoacetanilide from acetanilide 2. Dibenzalacetone from acetone and benzaldehyde |
|  | **01-13 Nov 2017** | **Practical:**  **Qualitative Analysis:** Inorganic cations and anions by paper chromatography |

**Dr Joginder, Assistant Professor in Chemistry**

**S D College(Lahore) Ambala Cantt-133001**