**LESSON PLAN**

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| **Discipline:**  Civil Engg.& Mechanical Engg | **Semester:**  Second ( 2nd ) | **Name of the Faculty:**  Mr. Rashmi Ranjan Guin  &Mr. Durga Prassana Pattanaik |
| **Subject:**  Engg. Chemistry | **No. of days/week class allotted:**  Six (6) | **Semester from Date:** 29.01.2024 **to Date : 14.05.2024**  **No. of Weeks:** 15 |
| **WEEK** | **CLASS DAY** | **THEORY TOPICS** |
| 1st | 1st | **ATOMIC STRUCTURE**  Introduction on Atomic Structure, Fundamental Particles (Electron, Proton & Neutron, Definition, Mass and Charge) |
| 2nd | Rutherford’s Atomic model (Postulates and Failure)  Atomic Mass & Mass Number. |
| 3rd | Definition, Examples and Properties of Isotopes, Isobars, and Isotones |
| 4th | Bohr’s Atomic model (Postulates only) |
| 5th | Bohr-Bury scheme |
| 6th | Aufbau Principle. Hund’s Rule |
| 2nd | 1st | Electronic configuration  (up to atomic no.30) |
| 2nd | **Review Class/ Possible Short Question Answer discussion & Long Question with hints.** |
| 3rd | **CHEMICAL BONDING**  Definition and Types of Chemical Bond Definition of Electrovalent bond with examples (NaCl , MgCl2) |
| 4th | Definition of Covalent bond with examples ( H2, Cl2, O2, N2, H2O, CH4, NH3) |
| 5th | Definition of Coordinate bond with examples( NH4+ , SO2) |
| 6th | **Review Class** |
| 3rd | 1st | **ACID AND BASE THEORY**  Concept of Arrhenius theory for acid and base with examples **(Postulates and Limitations)** |
| 2nd | Concept Lowry Bronsted theory for acid and base with examples **(Postulates and Limitations)** |
| 3rd | Concept Lewis theory for acid and base with examples  **(Postulates and Limitations)**  Neutralization of Acid and Base. |
| 4th | Definition of Salt, Types of salt (Normal, acidic, basic, double, complex, and mixed salts) |
| 5th | **Review Class** |
| 6th | **Monthly Test-01** |
| 4th | 1st | **SOLUTIONS**  Definition of Atomic Weight, Molecular Weight & Equivalent weight |
| 2nd | Determination of Equivalent Weight of Acid, Base, and Salt |
| 3rd | Modes of expression of Concentration  (Molarity, Normality and Molality) |
| 4th | Simple problems, pH of solution  (Definition with Numericals) |
| 5th | Importance of pH in industry  (Sugar, textile, Paper industries) |
| 6th | **Review Class/ Possible Short Question Answer discussion & Long Question with hints.** |
| 5th | 1st | **ELECTROCHEMISTRY**  Definition and types (Strong & Weak) of Electrolytes with Examples |
| 2nd | Electrolysis (Principle & Process) with Example of NaCl  ( fused and aqueous solution) |
| 3rd | Faraday’s 1st law of Electrolysis.(Statement, Mathematical expression). Simple problems |
| 4th | Faraday’s 2nd law of Electrolysis.(Statement, Mathematical expression). Simple problems |
| 5th | Industrial application of Electrolysis-Electroplating (Zinc Only) |
| 6th | **Review Class/ Possible Short Question Answer discussion & Long Question with hints.** |
| 6th | 1st | **Monthly Test-02** |
| 2nd | **CORROSION**  Definition of Corrosion, Types of Corrosion-  Atmospheric Corrosion, Waterline Corrosion |
| 3rd | Mechanism of Rusting of Iron Only |
| 4th | Protection from Corrosion by  (i) Alloying and (ii) Galvanization |
| 5th | **Review Class/ Possible Short Question Answer discussion & Long Question with hints.** |
| 6th | **METALLURGY**  Definition of Mineral, ore, gangue, example.  Distinction between Ores and Mineral |
| 7th | 1st | General methods of extraction of metal, (i) Ore Dressing  (ii) Concentration. (Gravity Separation, Magnetic Separation) |
| 2nd | Froth floatation , Leaching |
| 3rd | iii) Oxidation (Calcinations, Roasting) |
| 4th | Reduction (Smelting) Definition & examples of flux, slag |
| 5th | Refining of ore (Electro refining & Distillation) |
| 6th | **Review Class/ Possible Short Question Answer discussion & Long Question with hints.** |
| 8th | 1st | **ALLOYS**  Definition of alloy. Types of Alloys (Ferro, Non-Ferro,& Amalgam) with Examples |
| 2nd | Composition and uses of Brass, Bronze, Alnico, Duralumin |
| 3rd | **Review Class.** |
| 4th | **ORGANIC CHEMISTRY**  **Hydrocarbons**: Saturated Hydrocarbons  ( Definition with examples and Bond line notation) |
| 5th | Hydrocarbons: Unsaturated Hydrocarbons  ( Definition with examples and Bond line notation) |
| 6th | Aliphatic and Aromatic Hydrocarbons (Huckel’s Rule only). |
| 9th | 1st | Difference between Aliphatic and Aromatic hydrocarbons |
| 2nd | IUPAC system of Nomenclature**:** Alkane, Alkene, Alkyne, |
| 3rd | IUPAC system of nomenclature of Alkyl halide and Alcohol  ( up to 6 carbons). |
| 4th | Use of some common aromatics compounds (Benzene, toluene, BHC, phenol, Naphthalene , Anthracene & Benzoic acid) in daily life. |
| 5th | **Review Class.** |
| 6th | **Monthly Test-03** |
| 10th | 1st | **WATER TREATMENT**  Sources of water. Soft water, Hard water, Types of Hardness (temporary or carbonate and permanent or non-carbonate) |
| 2nd | **Removal of hardness** by - Lime soda method  ( Hot lime : Principle, process & advantages) |
| 3rd | **Removal of hardness** by - Lime soda method (Cold lime – Principle, process & advantages) |
| 4th | Advantages of Hot lime over Cold lime process |
| 5th | **Removal of hardness** by -Organic Ion exchange method (Principle, process, and regeneration of exhausted resins) |
| 6th | **Review Class/ Possible Short Question Answer discussion & Long Question with hints.** |
| 11th | 1st | **MonthlyTest-04** |
| 2nd | **LUBRICANTS**  Definition of lubricant, Types (Solid, liquid and Semisolid with examples only) |
| 3rd | Specific uses of lubricants (Graphite, Oils, Grease)  Purpose of lubrication |
| 4th | **Review Class.** |
| 5th | **FUEL**  Definition and classification of fuel, Definition of calorific value of fuel, Choice of good fuel. |
| 6th | Liquid: Diesel, Petrol and Kerosene  Composition and uses |
| 1st | Gaseous: Producer gas and Water gas  Composition and uses. |
| 2nd | Elementary idea about **LPG** , **CNG and**  **Coal gas (**Composition and uses only**)** |
| 3rd | **Review Class/ Possible Short Question Answer discussion & Long Question with hints.** |
| 4th | **POLYMER**  Definition of Monomer, Polymer, Homopolymer, Co-polymer and Degree of polymerization |
| 5th | Difference between Thermosetting and Thermoplastic |
| 12th | 6th | **Composition and uses** of Polythene & Poly-Vinyl Chloride and Bakelite |
| 1st | Definition of Elastomer (Rubber),  Natural Rubber ( it’s drawbacks), |
| 2nd | Vulcanization of Rubber.  Advantages of Vulcanized rubber over raw rubber |
| 3rd | **Review Class.** |
| 4th | **CHEMICALS IN AGRICULTURE**  Pesticides, Insecticides, Herbicides, Fungicides**.** Examples and Uses |
| 5th | Bio-fertilizers : Definition , Examples and Uses |
| 13th | 6th | **Review Class/ Possible Short Question Answer discussion & Long Question with hints.** |
| 1st | Revision Class |
| 2nd | Revision Class |
| 3rd | Revision Class |
| 4th | Revision Class |
| 5th | Revision Class |
| 14th | 6th | Revision Class |
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