**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 KeroseneComposition and uses |
| 1st  | Gaseous: Producer gas and Water gasComposition 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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| 2nd  | Revision Class |
| 3rd  | Revision Class |
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|  15th | 6th | Revision Class |
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| 6th  | Revision Class |