**MUFFAKHAM JAH COLLEGE OF ENGINEERING AND TECHNOLOGY**

**Teaching Schedule for Chemistry**

**B.E I-SEM (2024-2025)**

**Subject Code: BS204CH No. Of Classes Planned:48 Branch:**

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| **No of Class** | **Unit I: ELECTROCHEMISTRY AND BATTERY CHEMISTRY** | | **DATE** |
| **1,2** | Introduction To Electro Chemistry – Electrolytic conductance, Specific and equivalent conductance, factors effecting conductance. | |  |
| **2** | Types of cells -Electrolytic and Galvanic cells. Galvanic cells -Cell notation, cell reaction and cell potentials | |  |
| **3** | Concept of Electrode Potential and EMF – Definition of Single & Standard Electrode potential, determination of single Electrode potential. Calculation of e.m.f. of Galvanic cell (Ecathode –Eanode) | |  |
| **4,5** | Nernst Equation for cell emf and electrode potential– Derivation – Its applications- Calculation of electrode potential, emf of cell ,PH ,Keq , Numerical Problems | |  |
| **6,7** | Types of Electrodes- (i) standard Hydrogen Electrode, (ii) Calomel Electrode, (iii) Quinhydrone Electrode and (iv)glass Electrode- (diagram, Description, Electrode Reactions & Potential of Electrodes) | |  |
| **8** | **Batteries**-Introduction- Primary and secondary battery. Primary battery: Zn – carbon battery – construction and applications | |  |
| **9,10** | Secondary batteries: Lead-acid storage battery, Li ion batteries – Construction ,Charging and discharging reactions, advantages and applications. | |  |
| **10** | Fuel cells: concept of fuel cells and advantages. Methanol-Oxygen fuel cell – construction and applications. | |  |
| **Unit II: WATER CHEMISTRY AND CORROSION** | | | |
| **1** | | **Corrosion** - Introduction - Definition - Causes & Effects of Corrosion - Types of Corrosion - (i) Dry / Chemical Corrosion (ii) Wet or Electrochemical corrosion. |  |
| **2** | | Electrochemical Corrosion, Mechanism of Electrochemical Corrosion - (i) Evolution of Hydrogen type. (ii) Absorption of Oxygen.( Ex. Rusting of Iron in Acidic, Neutral & Alkaline Medium). |  |
| **3** | | Types of electrochemical corrosion-galvanic and Differential aeration corrosion- Waterline |  |
| **4** | | Factors influencing rate of Corrosion – (a) Nature of metal- Position of Metal In Galvanic Series, Relative areas of Anode & Cathode, Nature of surface oxide film. (b) Nature of environment-Effect of Temperature, Humidity and pH. |  |
| **5** | | **Corrosion control methods**: Cathodic Protection – Principle, Sacrificial Anode and Impressed Current cathodic protection methods. |  |
| **6** | | Surface coatings- Hot-dipping- Galvanizing |  |
| **1** | | **Water chemistry**-Introduction - Sources of Water - Hardness, Definition, Types of Hardness - Temporary & Permanent hardness. Units of hardness- ppm, mg/l, °Cl, °Fr. Calcium carbonate equivalents. |  |
| **2,3** | | Estimation of temporary and permanent Hardness by EDTA Method - Numerical problems on Hardness by EDTA (based on concentration of EDTA –Normality or Molarity). |  |
| **4** | | Water Softening Methods – Ion-Exchange Method , Advantages. |  |
| **5** | | Reverse Osmosis - Method, Advantages. Alkalanity in water and its sources. |  |
| **6,7** | | Specifications of potable water, Sterilization of water by Chlorination, Break point chlorination. |  |
| **Unit III : ENGINEERING MATERIALS** | | | |
| **1,2** | | **POLYMERS:** Introduction to **polymers,** definition of the terms –monomer, functionality , polymers and degree of polymerization. Classification – natural and synthetic polymers, thermoplastics and thermosetting (differences with one example each) |  |
| **3** | | Types of Polymerization: Addition , condensation and copolymerization. With one example each |  |
| **4** | | **Applications of Plastics, Fibres and elastomers- -examples- Plastics**: PVC and Bakelite.  **Fibers**: Nylon- 6,6 .**Elastomers**: Buna-S and Buna- N |  |
| **5** | | **Conducting Polymers -**  Introduction , classification- Intrinsic and extrinsic conducting polymers,Properties, Applications of conducting polymers |  |
| **6 , 7** | | **BioMaterials** : Introduction .definition of biomaterials , Preparation, properties and applications of Polylactic acid(PLA) |  |
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| **Unit IV: CHEMICAL FUELS** | | | |
| **1,2** | | **Definition** of a chemical fuel, Origin of fuels, Classification– primary and secondary fuels - Solid, liquid & Gaseous fuels. Requirements of good fuel with respect to calorific value, ignition temperature, safety, control of combustion, efficiency. |  |
| **2** | | Calorific value-HCV, LCV. Theoretical calculation of calorific value by Dulong’s formula- Numerical problems. |  |
| **3,4** | | **Solid fuels** :coal and its ranking, proximate analysis of coal – moisture, volatile matter, ash. Ultimate analysis- carbon, hydrogen, nitrogen, sulphur, oxygen and its significance. |  |
| **5** | | **Liquid fuels**: Source, important fractions: composition and uses of gasoline, Diesel and kerosene. |  |
| **6** | | Knocking – Introduction, Fuel rating – Octane number and cetane number-concept and significance. . |  |
| **7** | | **Gaseous fuels**: LPG, CNG composition and uses |  |
| **8,9** | | **Biodiesel**: Sources, Transesterification reaction. Advantages and properties of Biodiesel. Carbon Neutrality-concept and significance. Ethanol-biodiesel, sourses and uses. |  |
| **Unit V: SPECTROSCOPY and GREEN CHEMISTRY** | | | |
| **1,2** | | **Spectroscopy**- Description of Electromagnetic spectrum.  Principles of UV-Visible Spectroscopy: Statement of Beer-Lambert Law. Absorption and intensity shifts: Bathochromic, Hypsochromic, Hyperchromic and Hypochromic shifts with one example each. |  |
| **3** | | Principle and applications of UV - visible spectroscopy |  |
| **4,5** | | **IR Spectroscopy**: Principle of IR Spectroscopy. Principle and applications of IR . |  |
| **6,7** | | **NMR Spectroscopy**: Principle of H 1 -NMR Spectroscopy. Multiplicity, Chemical Shift. |  |
| **8** | | Principle and Applications of MRI |  |
| **9,10** | | **Green Chemistry**: Concept, Mention- Principles of Green chemistry. Diels Alder reaction. |  |

Total No of Classes :

**Signature**