LESSON PLAN

**Name of the Faculty**: Smt. Pooja Rani **Discipline**: Mechanical Engg.

**Semester**: 2nd

**Subject:** Applied Chemistry

**Lesson Plan Duration:** 16 weeks (From 15/02/2024 to 14/06/2024)

**Work Load (Lecture/Practical) Per Week (In Hours):** Lectures – 03, Practicals – 04

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|  |  | **Theory** | | **Practical** | |
| **Week** | **Date** | **Lect-**  **ure Day** | **Topic**  **(Including assignment/Test)** | **Pract-**  **ical Day** | **Topic** |
| 1st |  | 1st | **Unit – 1 Atomic Structure, Periodic Table & Chemical Bonding -** Introduction | 1st | **To prepare standard solution of oxalic acid** – introduction (G-1). |
|  | 2nd | Bohr’s Model of an Atom | 2nd | To prepare standard solution of oxalic acid – introduction (G-2). |
|  | 3rd | Dual character of matter – derivation of de- Broglie’s equation |
| 2nd |  | 4th | Heisenberg’s Principle of Uncertainty | 3rd | Perform the experiment & prepare a std. solution of oxalic acid (G-1). |
|  | 5th | Modern concept of atomic structure: Definition & shape of orbitals (s, p & d) | 4th | Perform the experiment & prepare a std. solution of oxalic acid (G-2). |
|  | 6th | Quantum numbers & their significance |
| 3rd |  | 7th | Electronic configuration: Aufbau, Pauli Exclusion Principles & Hund’s rule. | 5th | **To dilute the given KMnO4 solution** – introduction (G-1). |
|  | 8th | Electronic configuration of elements up to Z = 30. | 6th | To dilute the given KMnO4 solution – introduction (G-2). |
|  | 9th | Modern Periodic Law & Table, Classification of elements s, p, d, & f-blocks  Class Test |
| 4th |  | 10th | Metals, Non-metals & Metalloids | 7th | Perform the experiment & dilute the given solution (G-1). |
|  | 11th | Chemical Bonding: cause & types of bonding | 8th | Perform the experiment & dilute the given solution (G-2). |
|  | 12th | Physical properties of ionic, covalent & metallic substances. |
| 5th |  | 13th | **Assignment**  Solution of problems | 9th | **To find out the strength in g/l of an unknown solution of NaOH using a std. (N/10) oxalic acid solution** – introduction (G-1) |
|  | 14th | **1st Sessional Test** | 10th | To find out the strength in g/l of an unknown solution of NaOH using a std. (N/10) oxalic acid solution – introduction (G-2). |
|  | 15th | Analysis of Sessional test  **Unit - 2 Metals & Alloys -** introduction  Metals: Mechanical properties, Impact resistance & their uses |
| 6th |  | 16th | PTM  Def. of mineral, ore, gangue, flux & slag Commercial varieties of Fe | 11th | Perform the experiment and find out the strength of given NaOH Solution (G-1). |
|  | 17th | Metallurgy of Fe from Hematite using Blast furnance, | 12th | Perform the experiment and find out the strength of given NaOH Solution (G-2). |
|  | 18th | Alloy: Def., necessity, composition, properties & uses of Duralumin & steel |
| 7th |  | 19th | Heat treatment of steel -normalizing, annualizing, quenching, tempering | 13th | **To find out the total alkalinity in ppm of a water sample with the help of a std.**  **sulphuric acid solution** – introduction (G- 1). |
|  | 20th | **Unit – 3 Water, Solutions, Acids & Bases** - introduction  Solutions: Def., expression of the conc. of a  solution in % (w/w, w/v, v/v), normality, molarity, molality & ppm | 14th | To find out the total alkalinity in ppm of a water sample with the help of a std. sulphuric acid solution – introduction (G- 2). |
|  | 21th | Arrhenius concept of Acids & Bases, Strong and weak acids & bases |
| 8th |  | 22th | pH value & its significance | 15th | Perform the experiment and find out the |

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|  | Date | 23th | pH scale  Numerical problems on pH |  | total alkalinity (G-1). |
|  | 24th | Class Test  Types of water & causes of hardness of water, Types of hardness  Disadvantages of hard water | 16th | Perform the experiment and find out the total alkalinity (G-2). |
|  | 25th | Expression of hardness of water – ppm unit of hardness,  Removal of Temporary hardness – boiling & Clark’s method |
| 9th |  | 26th | Removal of Permanent hardness – Ion- exchange method | 17th | **To determine the total hardness of given water sample by EDTA method** (G-1). |
|  | 27th | Boiler problems caused by hard water – scale & sludge formation,  Priming & foaming | 18th | To determine the total hardness of given water sample by EDTA method (G-2). |
|  | 28th | Caustic embrittlement,  Water sterilization by Cl, UV radiation and RO |
| 10th |  | 29th | **Assignment**  Solution of problems | 19th | **To determine the TDS in ppm in a given sample of water gravimetrically** (G-1). |
|  | 30th | **2nd Sessional Test** | 20th | To determine the TDS in ppm in a given  sample of water gravimetrically (G-2). |
|  | 31th | Analysis of Sessional test |
| 11th |  | 32th | PTM  **Unit – 4 Fuels & Lubricants** - introduction Fuels: def., Calorific value – def., types & units  Characteristics of an ideal fuel | 21th | **To determine the pH of different solutions using a digital pH meter** (G-1). |
|  | 33th | Petroleum: composition & refining  Gaseous fuels: Composition, properties & uses of CNG, PNG, LNG, LPG | 22th | To determine the pH of different solutions using a digital pH meter (G-2). |
|  | 34th | Relative advantages of liquid & gaseous fuels over solid fuels  Scope of Hydrogen as future fuel |
| 12th |  | 35th | Lubricants: classification, functions & Qualities of lubricants | 23th | **To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter** (G-1). |
|  | 36th | Mechanism of Lubrication Physical properties of Lubricant | 24th | To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter (G-2). |
|  | 37th | Class Test  **Unit – 5 Polymer & Electrochemistry** - introduction |
| 13th |  | 38th | Polymers: Def., classification | 25th | **To determine the viscosity of lubricating oil using a Redwood viscometer** – introduction (G-1). |
|  | 39th | Preparation properties & uses of polythene, PVC, Nylon-66, Bakelite | 26th | To determine the viscosity of lubricating oil using a Redwood viscometer – introduction (G-2). |
|  | 40th | Plastic: Def. & types  Natural rubber, neoprene & other synthetic rubber |
| 14th |  | 41th | Corrosion: Def., types & factors affecting rate of corrosion | 27th | Perform the experiment and find out the viscosity of given lubricant oil (G-1). |
|  | 42th | Methods of prevention of corrosion – Hot dipping, metal cladding, cementation | 28th | Perform the experiment and find out the viscosity of given lubricant oil (G-2). |
|  | 43th | Quenching & cathodic protection  Nanotechnology: intro & applications Nano-materials & their classification |
| 15th |  | 44th | Applications of nanotechnology in various engineering applications.  **Assignment**  Solution of problems | 29th | **To prepare a sample of Phenol- formaldehyde resin (Bakelite)/Nylon-66 in the lab** (G-1). |
|  | 45th | **3rd Sessional Test** | 30th | To prepare a sample of Phenol- formaldehyde resin (Bakelite)/Nylon-66 in the lab (G-2). |
|  | 46th | Analysis of Sessional test |
| 16th |  | 47th | Taking Problems & solve them PTM | 31th | Revision |
|  | 48th | Practice of sample papers | 32th | Revision |
|  |  | Revision |