**Lesson Plan**

**Chemistry**

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| **Week** | **Lecture Day** | **Theory** | **Practical** | |
| **Topic(Including Assignments)** | **Practical Day** | **Topic** |
| 1st | 1st | **Unit1:- Atomic Structure,Periodic Table and Chemical Bonding** Bohr’s model of atom (qualitative treatment only), | 1st | 1.)To prepare standard solution of oxalic acid.(Group-1) |
| 2nd | Dual character of matter: derivation of  de-Broglie’s equation, Heisenberg’s Principle of Uncertainty, |
| 3rd | Modern concept of atomic  structure: definition of orbitals , shapes of s, p and d- orbitals, | 2nd | 1)To prepare standard solution of oxalic acid.(Group-2) |
| 2nd | 4th | Quantum numbers and their  Significance. | 1st | 2)To dilute the given KMnO4 solution(Group-1) |
| 5th | Electronic configuration: Aufbau and Pauli’s exclusion principles |
| 6th | Hund’s rule, electronic configuration of elements up to atomic number 30. | 2nd | 2)To dilute the given KMnO4 solution(Group-2) |
| 3rd | 7th | Modern Periodic law and Periodic table | 1st | 3)To find out the strength in grams per litre of an unknown solution of sodium hydroxide  using a standard (N/10) oxalic acid solution.(Group-1) |
| 8th | Classification of elements into s, p, d and f-blocks,  metals, non-metals and metalloids |
| 9th | Chemical bonding: cause of bonding | 2nd | 3)To find out the strength in grams per litre of an unknown solution of sodium hydroxide  using a standard (N/10) oxalic acid solution.(Group-2) |
| 4th | 10th | Ionic bond, covalent bond, and metallic bond (electron  sea or gas model) | 1st | Revision/viva |
| 11th | Physical properties of ionic, covalent and metallic substances. |
| 12th | **Unit2:- Metals and Alloys** Metals: mechanical properties of metals such as conductivity, elasticity, strength and  stiffness, luster, hardness, toughness, ductility, malleability, brittleness, and impact  resistance and their uses. | 2nd | Revision/viva |
| 5th | 13th | Definition of a mineral, ore, gangue, flux and slag Metallurgy of iron from haematite using  a blast furnace | 1st | 4)To find out the total alkalinity in parts per million (ppm) of a water sample with the help of  a standard sulphuric acid solution(Group-1) |
| 14th | Commercial varieties of iron. Definition,necessity of making alloys |
| 15th | Composition, properties and uses of  duralumin and steel. Heat treatment of steel- normalizing, annealing, quenching, tempering | 2nd | 4)To find out the total alkalinity in parts per million (ppm) of a water sample with the help of  a standard sulphuric acid solution(Group-2) |
| 6th | 16th | First Sessional Test(Tentative) | 1st | First Sessional Test(Tentative) |
| 17th | First Sessional Test(Tentative) | First Sessional Test(Tentative) |
| 18th | First Sessional Test(Tentative | 2nd | First Sessional Test(Tentative) |
| 7th | 19th | **Unit3:- Water ,Solutions,Acids and Bases** Solutions: definition, expression of the concentration of a solution in percentage (w/w, w/v  and v/v), | 1st | 5)To determine the total hardness of given water sample by EDTA method(Group-1) |
| 20th | Normality, molarity and molality and ppm. |
| 21th | Simple problems on solution  preparation. | 2nd | 5)To determine the total hardness of given water sample by EDTA method(Group-2) |
| 8th | 22th | Arrhenius concept of acids and bases, strong and weak acids and bases | 1st | 6)To determine the amount of total dissolved solids(TDS) in ppm in a given sample of water  Gravimetrically(Group-1) |
| 23th | pH value of a  solution and its significance |
| 24th | pH scale. Simple numerical problems on pH of acids and  bases. | 2nd | 6)To determine the amount of total dissolved solids(TDS) in ppm in a given sample of water  Gravimetrically(Group-2) |
| 9th | 25th | Hard and soft water, causes of hardness of water, types of hardness – temporary and  permanent hardness | 1st | Revision/viva(Group-1) |
| 26th | Expression of hardness of water, ppm unit of hardness disadvantages  of hard water; |
| 27th | Removal of hardness: removal of temporary hardness by boiling and Clark’s  method; removal of permanent hardness of water by Ion-Exchange method | 2nd | Revision/viva(Group-2) |
| 10th | 28th | Boiler problems caused by hard water: scale and sludge formation, priming and foaming,  caustic embrittlement | 1st | 7)To determine the pH of different solutions using a digital pH meter.(Group-1) |
|  | 29th | Water sterilization by chlorine, UV radiation and RO |
|  | 30th | **Unit4:- Fuels and Lubricants** Fuels: definition and classification of higher and lower calorific values, units of calorific  value, characteristics of an ideal fuel | 2nd | 7)To determine the pH of different solutions using a digital pH meter.(Group-2) |
| 11th | 31st | Second Sessional Test (Tentative) | 1st | Second Sessional Test (Tentative) |
| 32nd | Second Sessional Test (Tentative) |
| 33rd | Second Sessional Test (Tentative) | 2nd | Second Sessional Test (Tentative) |
| 12th | 34th | Petroleum: composition and refining of petroleum;  gaseous fuels: composition, properties and uses of CNG, PNG, LNG, LPG | 1st | 8)To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter(Group-1) |
| 35th | Relative advantages of liquid and gaseous fuels over solid fuels. Scope of hydrogen as future fuel |
| 36th | Lubricants- Functions and qualities of a good lubricant, | 2nd | 8)To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter(Group-2) |
| 13th | 37th | Classification of lubricants with  examples; lubrication mechanism | 1st | 9)To determine the viscosity of a lubricating oil using a Redwood viscometer(Group-1) |
| 38th | Physical properties (brief idea only) of a  lubricant: oiliness, viscosity, viscosity index, flash and fire point, ignition temperature, pour point |
| 39th | **Unit5:-- Polymers and Electrochemistry** Polymers and Plastics: definition of polymer, classification, addition and condensation  polymerization | 2nd | 9)To determine the viscosity of a lubricating oil using a Redwood viscometer(Group-2) |
| 14th | 40th | Preparation properties and uses of polythene, PVC, Nylon-66, Bakelite;  definition of plastic | 1st | 10)To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab(Group-1) |
| 41th | Thermoplastics and thermosetting polymers; natural rubber and  neoprene, other synthetic rubbers (names only) |
| 42nd | Corrosion: definition, dry and wet corrosion, factors affecting rate of corrosion, methods of  prevention of corrosion | 2nd | 10)To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab(Group-2) |
| 15th | 43th | Third Sessional Test(Tentative) | 1st | Third Sessional Test(Tentative) |
|  | 44th | Third Sessional Test(Tentative) |
|  | 45th | Third Sessional Test(Tentative) | 2nd | Third Sessional Test(Tentative) |
| 16th | 46th | Hot dipping, metal cladding, cementation, quenching, cathodic  protection methods | 1st | Revision/Viva(Group-1) |
| 47th | Introduction and application of nanotechnology: nano-materials and their classification,  applications of nanotechnology in various engineering applications |
| 48th | Revision | 2nd | Revision/Viva(Group-2) |