# Lesson Plan (2025-26)

Name : Sonia
Discipline: Auto, Mech. & Mech. (T&D) Engg.
Sem. : 2nd Sem.
Subject : Applied Chemistry
Code : 250024
Duration : 15/01/26 - 30/04/26
Load : 3 Lectures and 2 practical per week

| Lecture No. | Theory Topic |
|---|---|
| 1. | Derivation of de-Broglie's equation, Heisenberg's Principle of Uncertainty |
| 2. | Bohr's model of atom (qualitative treatment only),dual character of matter |
| 3. | Modern concept of atomic structure: definition of orbitals, shapes of s, p and d-orbitals |
| 4. | Quantum numbers and their significance. Electronic configuration |
| 5. | Aufbau, Pauli's exclusion principles and Hund's rule, |
| 6. | Electronic configuration of elements upto atomic number 30. |
| 7. | Metals, non-metals and metalloids (periodicity in properties excluded). |
| 8. | Modern Periodic law and Periodic table, Classification of elements into s, p, d and f-blocks |
| 9. | Chemical bonding: cause of bonding, Ionic bond, covalent bond, and metallic bond (electron sea or gas model), |
| 10. | Physical properties of ionic, covalent and metallic substances |
| 11. | Metals: mechanical properties of metals such as conductivity, elasticity, strength and stiffness, luster, hardness, toughness, ductility, malleability, brittleness, and impact resistance and their uses. |
| 12. | Definition of a mineral, ore, gangue, flux and slag. Metallurgy of iron from hematite using a blast furnace. Commercial varieties of iron |
| 13. | Alloys: definition, necessity of making alloys, composition, properties and uses of duralumin and steel. |
| 14. | Heat treatment of steel-normalizing, annealing, quenching, tempering. |
| 15. | Solutions: definition, expression of the concentration of a solution in percentage (w/w/w/v and v/v), normality, molarity and molality and ppm. |
| 16. | Simple problems on solution preparation, Arrhenius concept of acids and bases, strong and weak acids and bases |
| 17. | pH value of a solution and its significance, pH scale. Simple numerical problems on pH of acids and bases. |
| 18. | Temporary and permanent hardness, expression of hardness of water, ppm unit of hardness. |
| 19. | Hard and soft water, causes of hardness of water, types of hardness |
| 20. | Disadvantages of hard water; removal of hardness: removal of temporary hardness by boiling |
| 21. | Clark's method; removal of permanent hardness of water by Ion-Exchange method |
| 22. | Boiler problems caused by hard water: scale and sludge formation, priming and foaming, |
| 23. | Caustic emprittlement; water sterilization by chlorine, UV radiation and RO. |
| 24. | Characteristics of an ideal fuel. Petroleum: Composition and refining of petroleum; Gaseous fuels: composition, properties and uses of CNG, PNG, LNG, LPG; |

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|---|---|
| 25. | Fuels: definition and classification of higher and lower calorific values, units of calorific value |
| 26. | Relative advantages of liquid and gaseous fuels over solid fuels. Scope of Hydrogen as future fuel. |
| 27. | Lubricants- Functions and qualities of a good lubricant, classification of lubricants with examples; |
| 28. | Lubrication mechanism (brief idea only); physical properties (brief idea only)of a lubricant: oiliness, viscosity, viscosity index, flash and fire point, ignition temperature, pour point. |
| 29. | Polymers and Plastics: definition of polymer, classification, addition polymerization |
| 30. | Condensation polymerization; preparation properties and uses Of polythene, PVC, Nylon-66,Bakelite; |
| 31. | Definition of plastic, thermoplastics and thermo setting polymers; natural rubber and Neoprene, other synthetic rubbers (names only). |
| 32. | Corrosion: definition, dry and wet corrosion, factor affecting rate of corrosion |
| 33. | Methods of prevention of corrosion—hot dipping, metal cladding, cementation, quenching, |
| 34. | Cathodic protection methods Introduction and application of nanotechnology |
| 35. | Nano-materials and their classification, |
| 36. | Applications of Nano technology in various Engineering applications (brief) of Nano-materials |

**Note: There will be Class Test, Assignment work and Sessional Exam., Quizzes etc. will be given as per Academic Calendar.**

14/01/26

Smt. Sonia

Lecturer in Chemistry

14/01/26

**PAC Member 1**

**(Sh. Narender Kumar)**

14/01/26

**PAC Member 2**

**(Smt. Sonia)**

Jyoti

**PAC Member 3**

**(Dr. Jyoti Gupta)**

# Practical Lesson Plan (2025-26)

Name : Sonia
Discipline: Auto., Mech(T&D) Engg & Mech. Engg.
Sem. : 2nd Sem.
Subject : Applied Chemistry
Code : 250024
Duration : 15/01/26 - 30/04/26
Load : 3 Lectures and 2 practical per week

| Sr. No. | Practical |
|---|---|
| | Topic |
| 1. | Instructions regarding apparatus and instruments. |
| 2. | Lab instructions and safety measures. Lab instructions and safety measures. |
| 3. | To prepare standard solution of oxalic acid. |
| 4. | To determine the amount of total dissolved solids(TDS) in ppm in a given sample of water gravimetrically. |
| 5. | To find out the strength in grams per litre of an unknown solution of sodium hydroxide using a standard (N/10) oxalic acid solution. |
| 6. | To dilute the given $KMnO_4$ solution |
| 7. | To find out the total alkalinity in parts per million (ppm) of a water sample with the help of a standard sulphuric acid solution. |
| 8. | To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter. |
| 9. | To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab. |
| 10. | To determine the pH of different solutions using a digital pH meter. |
| 11. | To determine the total hardness of given water sample by EDTA method. |
| 12. | To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab. |

Smt. Sonia
Lecturer in App. Chemistry

14/01/26.

PAC Member 1
(Sh. Narender Kumar)

PAC Member 2
(Smt. Sonia)

PAC Member 3
(Dr. Jyoti Gupta)