Lesson Plan

Name : Ankita

Discipline : Mechanical and Automobile Engg.

Semester : 2nd

Subject : Applied Chemistry

Code : 220024

Session : 2023 –2024

Work Load : 3 Lectures, and 2 practical per week

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| **Day** | **Lecture** | **Practical** |
| **Sr. No.** | **Topic** | **Topic** |
| 1. | Bohr’smodelofatom(qualitativetreatmentonly),dualcharacterofmatter | 1. To prepare standard solution of oxalic acid |
| 2. | Derivation of de-Broglis equation |
| 3. | Heisenberg’s Principle of Uncertainty |
| 4. | Modern concept of atomic structure: definition of orbitals, shapes of s,p and d-orbitals | Revision and Checking of Practical file |
| 5. | Quantum numbers and their significance.  Electronic configuration | 2. To dilute the given KMnO4solution |
| 6. | Aufbau and Pauli’s exclusion principles and Hund’s rule, | Revision and Checking of Practical file |
| 7. | Electronicconfigurationofelementsuptoatomicnumber30. | 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. |
| 8. | Modern Periodic law and Periodic table, | Revision and Checking of Practical file |
| 9. | Classification of elements in to s,p, d and f-  blocks | 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. |
| 10. | Metals, non-metals and metalloids (periodicity in properties excluded). | Revision and Checking of Practical file |
| 11. | Chemical bonding: cause of bonding | 5. To determine the total hardness of given water sample by EDTA method |
| 12. | Ionic bond, covalent bond, and metallic bond(electron sea or gas model), | Revision and Checking of Practical file |
| 13. | Physical properties of ionic, covalent and metallic substances | 6. To determine the amount of total dissolved solids(TDS) in ppm in a given sample of water gravimetrically |
| 14. | Revisionofunit1/Problem solving |  |
| 15. | Metals: mechanical properties of metals such as conductivity, elasticity, strength and stiffness, luster, hardness, toughness, ductility, malleability, brittleness, and impact resistance and their uses. | 7. To determine the pH of different solutions using a digital pH meter |
| 16. | Definitionofamineral,ore,gangue,fluxandslag.Metallurgyofironfromhaematite using a blast  furnace. Commercial varieties of iron | Revision and Checking of Practical file |
| 17. | Alloys: definition, necessity of making alloys, composition, properties and uses of duralumin and steel. | 8. To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter. |
| 18. | Heat treatment of steel-normalizing,  annealing, quenching, tempering. |  |
| 19. | Solutions: definition, expression of the concentration of a solution in percentage(w/w/w/v and v/v), normality, molarity and molality and ppm. | 9. To determine the viscosity of lubricating oil using a Redwood viscometer |
| 20. | Simple problems on solution preparation. | Revision and Checking of Practical file |
| 21. | Arrhenius concept of acids and bases, strong and weak acids and bases, | 10. To prepare a sample of Phenol-formaldehyde resin(Bakelite)/Nylon-66inthelab. |
| 22 | PH value of a solution and its significance, | Revision and Checking of Practical file |
| 23. | PH scale. Simple numerical problems on pH of acids and bases. | Revision and Checking of Practical file |
| 24. | Hard and soft water, causes of hardness of water, types of hardness | Revision and Checking of Practical file |
| 25. | Temporary and permanent hardness, expression of hardness of  water, ppm unit of hardness | Revision and Checking of Practical file |
| 26. | Disadvantages of hard water; removal of hardness: removal of temporary hardness by boiling | Revision and Checking of Practical file |
| 27. | Clark’s method; removal of permanent hardness of water by Ion-Exchange  method | Revision and Checking of Practical file |
| 28. | Boiler problems caused by hard water: scale and sludge formation, priming and foaming, | Revision and Checking of Practical file |
| 29. | Caustic embrittlement; water sterilization by chlorine, UV radiation and RO. | Revision and Checking of Practical file |
| 30. | Fuels: definition and classification of higher and lower calorific values, units of calorific value | Revision and Checking of Practical file |
| 31. | Characteristics of an ideal fuel. Petroleum:  Composition and refining of petroleum; | Revision and Checking of Practical file |
| 32. | Gaseous fuels: composition, properties and uses of CNG, PNG, LNG, LPG; | Revision and Checking of Practical file |
| 33. | Relative advantages of liquid and gaseous fuels over solid fuels. Scope of  Hydrogen as future fuel. | Revision and Checking of Practical file |
| 34. | Lubricants- Functions and qualities of a good lubricant, classification of lubricants with examples; | Revision and Checking of Practical file |
| 35. | 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. | Revision and Checking of Practical file |
| 36. | Polymers and Plastics: definition of polymer, classification, addition polymerization | Revision and Checking of Practical file |
| 37. | Condensation polymerization; preparation properties and uses  Of polythene, PVC, Nylon-66,Bakelite; | Revision and Checking of Practical file |
| 38. | Definition of plastic, thermoplastics and thermo setting polymers; natural rubber and  Neoprene, other synthetic rubbers(names only). | Revision and Checking of Practical file |
| 39. | Corrosion: definition, dry and wet corrosion, factor affecting rate of corrosion | Revision and Checking of Practical file |
| 40. | Methods of prevention of corrosion—hot dipping, metal cladding, cementation, quenching, | Revision and Checking of Practical file |
| 41. | Cathodic protection  methods | Revision and Checking of Practical file |
| 42. | Introduction and application of nanotechnology: | Revision and Checking of Practical file |
| 43. | Nano-materials and their classification, applications of Nano technology in various | Revision and Checking of Practical file |
| 44. | Engineering applications(brief) of Nano-materials |  |
| 45. | **Revision of Unit -1** |  |
| 46. | **Revision of Unit -2** |  |
| 47. | **Revision of Unit -3** |  |
| 48. | **Revision of Unit -4** |  |
| 49. | **Revision of Unit -5** |  |
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