

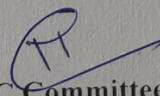
Lesson Plan (2025-26)

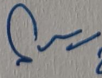
Name : Sonia
Discipline : Civil Engg.
Semester : 1st Sem.
Subject : Applied Chemistry
Code : 220014
Duration : 04/08/25 - 26/11/25
Workload : 3 Lectures and 2 practical per week

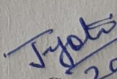
Lecture	Theory	Prac.	Practical
No.	Topic	Day	Topic
1.	Bohr's model of atom (qualitative treatment only), dual character of matter	1	Lab instructions and safety measures.
2.	Derivation of de-Broglie's equation		
3.	Heisenberg's Principle of Uncertainty		
4.	Quantum numbers and their significance. Electronic configuration	2.	Instructions regarding apparatus and instruments.
5.	Modern concept of atomic structure: definition of orbitals, shapes of s, p and d-orbitals		
6.	Aufbau, Pauli's exclusion principles and Hund's rule.		
7.	Electronic configuration of elements upto atomic number 30.	3	To prepare standard solution of oxalic acid
8.	Modern Periodic law and Periodic table,		
9.	Classification of elements into s, p, d and f-blocks		
10.	Metals, non-metals and metalloids (periodicity in properties excluded).	4.	To dilute the given KMnO_4 solution
11.	Ionic bond, covalent bond, and metallic bond (electron sea or gas model),		
12.	Chemical bonding: cause of bonding		
13.	Physical properties of ionic, covalent and metallic substances	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.
14.	Revision and Problem solving		
15.	Definition of a mineral, ore, gangue, flux and slag. Metallurgy of iron from hematite using a blast furnace. Commercial varieties of iron		
16.	Metals: mechanical properties of metals such as conductivity, elasticity, strength and stiffness, luster, hardness, toughness, ductility, malleability, brittleness, and impact resistance and their uses.	6.	To find out the total alkalinity in parts per million (ppm) of a water sample with the help of a standard sulphuric acid solution.
17.	Alloys: definition, necessity of making alloys, composition, properties and uses of duralumin and steel.		
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.	7	To determine the total hardness of given water sample by EDTA method.
20.	Simple problems on solution preparation.		
21.	pH value of a solution and its significance, pH scale. Simple numerical problems on pH of acids and bases.		
22.	Arrhenius concept of acids and bases, strong and weak acids and bases	8.	To determine the amount of total dissolved solids(TDS) in ppm in a given sample of water

	Hard and soft water, causes of hardness of water, types of hardness		gravimetrically
4.	Temporary and permanent hardness, expression of hardness of water, ppm unit of hardness		
25.	Disadvantages of hard water; removal of hardness: removal of temporary hardness by boiling	9.	To determine the pH of different solutions using a digital pH meter, Viva and Checking of Practical file
26.	Clark's method; removal of permanent hardness of water by Ion-Exchange method		
27.	Boiler problems caused by hard water: scale and sludge formation, priming and foaming.		
28.	Caustic empprittlement; water sterilization by chlorine, UV radiation and RO.	10.	To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter.
29.	Fuels: definition and classification of higher and lower calorific values, units of calorific value		
30.	Characteristics of an ideal fuel. Petroleum: Composition and refining of petroleum;		
31.	Gaseous fuels: composition, properties and uses of CNG, PNG, LNG, LPG;	11.	To determine the viscosity of lubricating oil using a Redwood viscometer
32.	Relative advantages of liquid and gaseous fuels over solid fuels. Scope of Hydrogen as future fuel.		
33.	Lubricants- Functions and qualities of a good lubricant, classification of lubricants with examples:		
34.	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.	12.	Viva and Checking of Practical file
35.	Polymers and Plastics: definition of polymer, classification, addition polymerization		
36.	Condensation polymerization; preparation properties and uses Of polythene, PVC, Nylon-66, Bakelite;		
37.	Definition of plastic, thermoplastics and thermo setting polymers; natural rubber and Neoprene, other synthetic rubbers(names only).	13.	13. To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab.
38.	Corrosion: definition, dry and wet corrosion, factor affecting rate of corrosion		
39.	Methods of prevention of corrosion—hot dipping, metal cladding, cementation, quenching,		
40.	Cathodic protection methods Introduction and application of nanotechnology	14.	Viva and practice session
41.	Engineering applications (brief) of Nano-materials		
42.	Nano-materials and their classification		
43.	Applications of Nano technology in various , Revision		

Note: There will be class Tests, Assignments, Sessional Exams and Quizzes etc. will be given as per Academic Calendar.

 29/7/25
PAC Committee
Member - 1
(Sh. Narender Rana)

 29/7/25
PAC Committee
Member - 2
(Smt. Sonia)

 29/7/25
PAC Committee
Member - 3
(Dr. Jyoti Gupta)