

Lesson Plan

Name: Hemlata Yadav

Branch: Mechanical

Semester: 2nd

Subject and code: Applied Chemistry

Work Load: 3 Lectures and 2 Practical per week

WEEK	Theory		Practical	
	Lecture	Topic (including assignment/test)	Practical	Topic
1	1	Atomic Structure- Bohr Model of atom, Dual character of matter: derivation of de-Broglie's equation, Heisenberg's Principle of uncertainty	1	Introduction to Lab Practices
	2	Modern concept of atomic structure: definition of orbitals, shapes of s, p and d-orbitals	2	To prepare standard solution of oxalic acid
	3	Quantum numbers and their significance.		
2	1	Electronic configuration: Aufbau and Pauli's exclusion principles and Hund's rule	1	To dilute the given KMnO ₄ solution
	2	Electronic configuration of elements up to atomic number 30.	2	To dilute the given KMnO ₄ solution
	3	Modern Periodic law and Periodic table, classification of elements into s, p, d and f-blocks. Metals, non-metals and metalloids (periodicity in properties excluded)		
3	1	Chemical bonding: cause of bonding, ionic bond, covalent bond, and metallic bond (electron sea or gas model).	1	To find out the strength in grams per litre of an unknown solution of sodium hydroxide using a standard (N/10) oxalic acid solution
	2	Physical properties of ionic, covalent and metallic substances.	2	To find out the strength in grams per litre of an unknown solution of sodium hydroxide using a standard (N/10) oxalic acid solution
	3	Test of Unit I		
4	1	Metals: mechanical properties of metals - conductivity, elasticity, hardness, and their uses.	1	Revision of Experiment-1 and viva.
	2	Metals: mechanical properties of metals - ductility, malleability, brittleness, and impact resistance and their uses.	2	Checking of practical note book.
	3	Definition of a mineral, ore, gangue, flux and slag.		
5	1	Metallurgy of iron from haematite using a blast furnace. Commercial varieties of iron.	1	To find out the total alkalinity in (ppm) of a water with the help of a standard sulphuric acid solution
	2	Alloys: definition, necessity of making alloys, composition, properties and uses of Duralumin and steel.	2	To find out the total alkalinity in parts per million (ppm) of a water sample with the help of a standard sulphuric acid solution.
	3	Heat treatment of steel - normalizing, annealing, quenching, tempering		
6	1	Test of Unit II	1	To determine the total hardness of given water sample by EDTA method.
	2	Solutions: definition, expression of the concentration of a solution in percentage	2	To determine the total hardness of given water sample by EDTA method.

		(w/w, w/v and v/v).		
	3	Normality, molarity and molality and ppm. Simple problems on solution preparation.		
7	1	Arrhenius concept of acids and bases, strong and weak acids and bases, pH scale.	1	To determine the amount of total dissolved solids (TDS) in ppm in a given sample of water gravimetrically.
	2	pH value of a solution and its significance. Simple numerical problems on pH of acids and bases.	2	To determine the amount of total dissolved solids (TDS) in ppm in a given sample of water gravimetrically.
	3	Hard and soft water, causes of hardness of water, types of hardness temporary and permanent hardness, expression of hardness of water, ppm unit of hardness.		
8	1	Disadvantages of hard water, Removal of hardness: removal of temporary hardness by boiling and Clark's Method.	1	To determine the pH of different solutions using a digital pH meter.
	2	Removal of permanent hardness of water Boiler problems scale & sludge priming & foaming, caustic embrittlement.	2	To determine the pH of different solutions using a digital pH meter.
	3	Water sterilization by chlorine, UV radiation and RO.		
9	1	Test of Unit III	1	Checking of note book.
	2	Fuels: definition and calorific values, unit of calorific value, characteristics of an ideal fuel.	2	To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter.
	3	Petroleum: composition and refining of petroleum.		
10	1	Gaseous fuels: composition, properties and uses of CNG, PNG, LNG and LPG.	1	To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter.
	2	Relative advantages of liquid and gaseous fuels over solid fuels	2	To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter.
	3	Scope of hydrogen as future fuel.		
11	1	Lubricants- Functions and qualities of a good lubricant.	1	Checking of practical note book
	2	Classification of lubricants with examples, lubrication mechanism	2	Revision of Experiment-4 .
	3	Physical properties of a lubricant: oiliness, viscosity, flash and fire point, , pour point.		
12	1	Test of Unit IV	1	To determine the viscosity of a oil using a Redwood viscometer.
	2	Polymers and Plastics: definition of polymer, addition and condensation polymer	2	To determine the viscosity of a lubricating oil using a Redwood viscometer.
	3	Preparation, properties and uses of polythene, PVC, Nylon-66, Bakelite		
13	1	Definition of plastic, thermoplastics and thermosetting polymers; natural rubber and neoprene, other synthetic rubbers	1	To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab.
	2	Corrosion: definition, dry and wet corrosion, factors affecting rate of corrosion.	2	To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab.
	3	Methods of prevention of corrosion hot dipping, metal cladding, cementation, quenching, cathodic protection methods		
14	1	Introduction and application of nanotechnology: nano-materials and their classification.	1	Checking of practical note book and Revision.
	2	Applications of nanotechnology in various engineering applications.	2	Viva-voce
	3	Test of Unit V		