UTKAL GOURAV MADHUSUDAN INSTITUTE OF TECHNOLOGY, RAYAGADA

Academic Lesson Plan for 1st Semester – 2023 (Winter)

Name of the teaching faculty:Smt.Lopamudra Satapathy,
PTGF Lecturer (Chemistry)
Dept.: Department of Mathematics & Science
Semester : 1st
Subject : Theory 2B : Engg. Chemistry
No of Periods per Week: 4, Total Periods: 60,
End semester Exam.: 80 Marks, Class test: 20 Marks,
Total Marks: 100 Marks

Week	Period	Unit / Chapter	Topics to be covered
1st	1st	Unit-1 Atomic Structure	Fundamental particles (electron, proton & neutron Definition, mass and charge). Rutherford's Atomic model (postulates)
	2nd	Unit-1 Atomic Structure	Rutherford's Atomic model (failure) Atomic mass and mass number, Definition, examples and properties of Isotopes, isobars and isotones.
	3rd	Unit-1 Atomic Structure	Bohr's Atomic model (Postulates only), Bohr-Bury scheme, Idea about orbitals(s,p,d,f) and quantum numbers, Aufbau's principle
	4th	Unit-1 Atomic Structure	Electronic configuration (up to atomic no 30) & Hund's rule.
2nd	1st	Unit-2 Chemical Bonding	Electrovalent bond (Definitions, type, examples) NaCl, , $MgCl_2$
	2nd	Unit-2 Chemical Bonding	Covalent bond (Definitions, type, examples) H_2, Cl_2, O_2, N_2, H_2O, CH_4, NH_3
	3rd	Unit-2 Chemical Bonding	Co-ordinate bond (Definitions, type, examples) NH_4^+, SO_2
	4th	Unit-3 Acid-base Theory	Concept of Arrhenius (Postulates and limitations)

3rd	1st	Unit-3 Acid-base Theory	Concept of Lowry Bronsted (Postulates and limitations)
	2nd	Unit-3 Acid-base Theory	Lewis theory for acid and base (Postulates and limitations)
	3rd	Unit-3 Acid-base Theory	Neutralization of acid & base. Definition of Salt, Types of salts (Normal, acidic, basic, double, complex and mixed salts, definitions with examples).
	4th	Unit-4 Solutions	Definitions of atomic weight, molecular weight, Equivalent weight
4th	1st	Unit-4 Solutions	Determination of equivalent weight of Acid, Base and Salt.
	2nd	Unit-4 Solutions	Modes of expression of the concentrations (Molarity, & Normality with Simple Problems
	3rd	Unit-4 Solutions	Modes of expression of the concentrations (Molality with Simple Problems pH of solution (Definitions,
	4th	Unit-4 Solutions	pH of solution (simple numerical) Importance of pH in industry (sugar, textile, paper industries)
5th	1st	Unit-5 Electrochemistry	Definition and types (Strong & weak) of Electrolytes with example , Electrolysis (Principle)
	2nd	Unit-5 Electrochemistry	Electrolysis (process) with example of NaCl (fused and aqueous solution).
	3rd	Unit-5 Electrochemistry	Faraday‘s 1st law(Statement, mathematical expression and Simple numerical)
	4th	Unit-5 Electrochemistry	Faraday‘s 2nd law(Statement, mathematical expression and Simple numerical) Industrial application of Electrolysis- Electroplating (Zinc only).
6th	1st	Unit-6 Corrosion	Definition of Corrosion, Types of Corrosion- Atmospheric Corrosion, Waterline corrosion

	2nd	Unit-6 Corrosion	Mechanism of rusting of Iron only. Protection from Corrosion by (i)Alloying and (ii) Galvanization.
	3rd	Unit-7 Metallurgy	Definition of Mineral, ores, gangue with example. Distinction between Ores and Minerals. Metallurgy
	4th	Unit-7 Metallurgy	General methods of extraction of metals i)Ore Dressing ii)Concentration (Gravity separation)
7th	1st	Unit-7 Metallurgy	Concentration (magnetic separation, Froth floatation & leaching)
	2nd	Unit-7 Metallurgy	iii)Oxidation (Calcinations, Roasting)
	3rd	Unit-7 Metallurgy	iv)Reduction (Smelting, Definition & examples of flux, slag)
	4th	Unit-7 Metallurgy	v)Refining of the metal (Electro refining, & Distillation only)
8th	1st	Unit-8 Alloys	Definition of alloy. Types of alloys (Ferro, Non-Ferro & Amalgam) with example Composition and uses of Brass, Bronze, Alnico, Duralumin
	2nd	Unit-8 Alloys	Composition and uses of Brass, Bronze, Alnico, Duralumin
	3rd	Unit-9 Hydrocarbons	Saturated and Unsaturated Hydrocarbons (Definition with example) , IUPAC system of nomenclature
	4th	Unit-9 Hydrocarbons	IUPAC system of nomenclature of Alkane, Alkene, Alkyne, alkyl halide and alcohol (up to 6 carbons)
			IUPAC Nomenclature (Rules for nomenclature)
9th	1st	Unit-9 Hydrocarbons	IUPAC Nomenclature (Examples)
	2nd	Unit-9 Hydrocarbons	IUPAC Nomenclature (New Questions)
	3rd	Unit-9	IUPAC Nomenclature(Bond-line

		Hydrocarbons	representation)
	4th	Unit-9 Hydrocarbons	IUPAC Nomenclature(Examples o f Bond-line representation)
10th	1st	Unit-9 Hydrocarbons	Aliphatic and Aromatic Hydrocarbons (Huckle's rule only). Difference between Aliphatic and aromatic
	2nd	Unit-9 Hydrocarbons	Uses of some common aromatic compounds (Benzene, Toluene, BHC, Phenol) in daily life
	3rd	Unit-9 Hydrocarbons	Uses of some common aromatic compounds (Naphthalene, Anthracene and Benzoic acid) in daily life.
	4th	Unit-9 Hydrocarbons	Questions on IUPAC Nomenclature
11th	1st	Unit-10 Water Treatment	Sources of water, Soft water, Hard water hardness, types of Hardness (temporary or carbonate and permanent or non-carbonate)
	2nd	Unit-10 Water Treatment	Removal of hardness by lime soda method (cold lime—Principle, process & advantages),
	3rd	Unit-10 Water Treatment	Removal of hardness by lime soda method (hot lime —Principle, process & advantages),
	4th	Unit-10 Water Treatment	Difference between cold and hot lime soda process , Advantages of Hot lime over cold lime process
12th	1st	Unit-10 Water Treatment	Ion- Exchange Process i.e. Organic Ion exchange method (principle & process)
	2nd	Unit-10 Water Treatment	Organic Ion exchange method (regeneration of exhausted resins) Advantage and disadvantage of ion (Exchange process) , Summary of the chapter
	3rd	Unit-11 Lubricants	Definition of lubricant, Types (solid, liquid and semisolid with examples only)
	4th	Unit-11 Lubricants	specific uses of lubricants (Graphite, Oils, Grease), Purpose of lubrication

13th	1st	Unit-12 Fuel	Definition and classification of fuel, Definition of calorific value of fuel, Choice of good fuel
	2nd	Unit-12 Fuel	Composition and uses of some liquid (Diesel, Petrol, and Kerosene) Composition and uses of some gaseous fuel (Producer gas and Water gas)
	3rd	Unit-12 Fuel	Elementary idea about LPG, CNG and coal gas (Composition and uses only).
	4th	Unit-13 Polymers	Definition of Monomer, Polymer, Homo-polymer, Co-polymer
14th	1st	Unit-13 Polymers	Classification of polymer (Chain/Structure) , and based on polymerization , Difference between Thermosetting and Thermoplastic
	2nd	Unit-13 Polymers	Composition and uses of Polythene, & Poly-Vinyl Chloride and Bakelite
	3rd	Unit-13 Polymers	Definition of Elastomer (Rubber). Natural Rubber (its drawbacks)
	4th	Unit-13 Polymers	Vulcanisation of Rubber. Advantages of Vulcanised rubber over raw rubber.
15th	1st	Unit-14 Chemicals in Agriculture	Pesticides , Insecticides, herbicides, fungicides Examples and uses. Bio Fertilizers: Definition, examples and uses
	2nd		Revision Class
	3rd		Revision Class
	4th		Revision Class

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