

Government Polytechnic Hamirpur
Lesson Planning (Theory)

Branch: *Mech Engg*
Subject: Applied Chemistry
Teacher: Shreshtha Devi

Sem : 1st
Session : August-Dec 2024
Class Room

S.No.	No. of Lectures	Week	Chapter/Unit Description	Detail of content	Reference Resources	Remarks
1	8	3rd & 4th week of August	Atomic Structure	1.1 Fundamental particles of atoms : Electron, proton, neutron (Definitions) 1.2 Atomic Structure: Bohr's theory, successes and limitations (expression of energy and radius to be omitted), and Hydrogen spectrum explanation based on Bohr's model of atom, 1.3 Heisenberg uncertainty principle, Quantum numbers – orbital concept, Shapes of s, p orbitals, difference between orbit and orbital 1.4 Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration (Z=1 to 30).	R1, R2 & R3	
2	8	5th week of August & 1st week of Sept	Chemical bonding and Solutions	2.1 Concept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example) 2.2 Lewis concept of covalent bond (H ₂ , F ₂ , HF). Electronegativity, Difference between sigma and pi bond 2.3 Electron sea model of metallic bond. 2.4 Idea of solute, solvent and solution 2.5 Methods to express the concentration of solution- molarity (M = mole per liter), molality, mass percentage (Numerical excluded).	R1, R2 & R3	
3	11	2nd, 3rd & 4th Week of Sept.	Electro Chemistry and Corrosion	3.1 Electronic concept of oxidation, reduction and redox reactions. Definition of terms: electrolytes, non-electrolytes with suitable examples, 3.2 Faradays laws of electrolysis and simple numerical problems. 3.3 Industrial application of Electrolysis – • Electrometallurgy • Electroplating • Electrolytic refining. 3.4 Application of redox reactions in electrochemical cells – • Primary cells – dry cell, • Secondary cell - commercially used lead acid storage battery. 3.5 Introduction to Corrosion of metals – definition, types of corrosion (electrochemical), H ₂ liberation and O ₂ absorption mechanism of electrochemical corrosion, 3.6 Internal corrosion preventive measures – Purification, alloying and heat treatment a	R1, R2 & R3	
4	8	1st & 2nd week of Oct.	Engineering Materials	4.1 Natural occurrence of metals – minerals, ores of iron, aluminium and copper, gangue (matrix), flux, slag, metallurgy – brief account of general principles of metallurgy (a). Crushing and grinding (b) Concentration of ore (Levigation, Froth flotation, Magnetic separation) (c) Extraction (Roasting and calcinations & smelting) (d) Refining (Electro refining, zone refining). 4.2 Extraction of - iron from haematite ore using blast furnace along with reactions. 4.3 Alloys – definition, purposes of alloying, ferrous alloys (Invar steel) and non-ferrous (Simple Brass & Bronze, Nichrome, Duralumin, Magnesium) with suitable examples, properties and applications		

5	9	3rd & 4th Week of Oct.	Water	5.1 Classification of soft and hard water based on soap test, salts causing water hardness, units of hardness (mg/L and ppm) and simple numerical on water hardness. Cause of poor lathering of soap in hard water, 5.2 Problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion.) 5.3 i) water softening techniques- zeolite process ii). Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization. 5.4 Properties of water used for human consumption for drinking and cooking purposes from any water sources and Indian standard specification of drinking water.	R1, R2 & R3
6	8	1st & 2nd Week of Nov.	Fuels	6.1 Definition of fuel and combustion of fuel, classification of fuels 6.2 calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula. Characteristics of good fuel 6.3 Petrol and diesel - fuel rating (octane and cetane numbers) 6.4 Chemical composition, calorific values and applications of LPG, CNG, water gas, producer gas and biogas.	R1, R2 & R3
7	8	3rd & 4th week of Nov.	Lubrication	7.1 Function and characteristic properties of good lubricant, 7.2 classification with examples 7.3 Lubrication mechanism – hydrodynamic and boundary lubrication 7.4 Physical properties (viscosity and viscosity index, oiliness, flash and fire point, cloud and pour point only) and chemical properties (coke number, total acid number, saponification value) of lubricants.	R1, R2 & R3
8	4	5th week of Nov.	Polymers	8.1 Monomer, homo and co polymers, degree of polymerization 8.2 simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using Polythene, PVC, PS, PTFE, nylon-6,6 and Bakelite only) 8.3 Vulcanization of rubber and properties of vulcanised rubber.	R1, R2 & R3

REFERENCE RESOURCES

- R1 Text Book of Chemistry for Class XI & XII (Part-I, Part-II)
R2 Engineering Chemistry by Sunita Rattan
R3 Agnihotri, Rajesh, Chemistry for Engineers

Signature of Teacher

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Government Polytechnic Hamirpur
Lesson Planning (Theory)

Branch: *Civil Engg.*
Subject: Applied Chemistry
Teacher: Shareshtha Devi

Sem 1st
Session: August Dec 2024
Class Room

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