

LESSON PLAN

GOVT. POLYTECHNIC, SONEPUR

Name of the Faculty:
Sulagna Das, Sr. Lect.(Chemistry)

Academic Year: 2025-26
Dt. 09.01.2026

Course No.: TH.5

Course Name: APPLIED CHEMISTRY

Program: Diploma

Department: Math and Science

Year/Sem: 2ND Semetser(2nd Year)

Branch- Civil, Mechanical, Electrical, Metallurgy

Session: SUMMER

Section: A, B, C, D

WEEK	PERIOD	TOPIC TO BE COVERED
1.	1.	UNIT-1: ATOMIC STRUCTURE: Rutherford model of atom
	2.	Bohr's theory (expression of energy and radius to be omitted)
	3.	Hydrogen spectrum explanation based on Bohr's model of atom, Heisenberg uncertainty principle
	4.	Quantum numbers – orbital concept. Shapes of s, p and d orbitals, Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule,
2.	5.	Electronic configuration. (Z=1 to 30)
	6.	CHEMICAL BONDING: Concept of chemical bonding – cause of chemical bonding,
	7.	Types of bonds: ionic bonding (NaCl example), covalent bond (H ₂ , F ₂ , HF hybridization in BeCl ₂ , BF ₃ , CH ₄ , NH ₃ , H ₂ O)
	8.	Coordination bond in NH ₄ ⁺ , and anomalous properties of NH ₃ , H ₂ O due to hydrogen bonding.
3.	9.	Metallic bonding
	10.	SOLUTION: idea of solute, solvent and solution, methods to express the concentration of solution
	11.	Molarity (M = mole per liter), ppm, mass percentage- Problem solving
	12.	Volume percentage and mole fraction.-Problem solving
4.	13.	SESSIONAL
	14.	UNIT-2: Water: Graphical presentation of water distribution on Earth (pie or bar diagram). Classification of soft and hard water based on soap test, salts causing water hardness, unit of hardness and simple numericals on water hardness.
	15.	Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge)
	16.	Problems caused by the use of hard water in boiler (foaming and

		priming, corrosion etc),
5.	17.	Quantitative measurement of water hardness by ETDA method
	18.	Total dissolved solids (TDS) alkalinity estimation.
	19.	Water softening techniques – soda lime process
	20.	Zeolite process and ion exchange process.
6.	21.	Municipal water treatment (in brief only) – sedimentation, coagulation
	22.	Municipal water treatment (in brief only) – Filtration, sterilization
	23.	Water for human consumption for drinking and cooking purposes from any water sources and enlist Indian standard specification of drinking water (collect data and understand standards).
	24.	SESSIONAL
7.	25.	Unit 3: Engineering Materials Natural occurrence of metals – minerals, ores of Fe, Al and Cu, gangue (matrix), flux, slag
	26.	Metallurgy – brief account of general principles of metallurgy.
	27.	Extraction of Fe from Haematite ore using blast furnace along with reactions.
	28.	Extraction of Al from Bauxite along with reactions.
8.	29.	Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications.
	30.	General chemical composition, composition based applications (elementary idea only details omitted): Port land cement and hardening
	31.	Glasses Refractory and Composite materials.
	32.	Polymers – Monomer, homo and co polymers, degree of polymerization
9.	33.	Simple reactions involved in preparation and application of thermoplastics and thermosetting plastics (using PVC, PS, PTFE, nylon – 6, nylon-6,6 and Bakelite),
	34.	Rubber and vulcanization of rubber.
	35.	SESSIONAL
	36.	Unit 4: Chemistry of Fuels and Lubricants Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV)
10.	37.	calculation of HCV and LCV using Dulong's formula.
	38.	Proximate analysis of coal solid fuel
	39.	petrol and diesel - fuel rating (octane and cetane numbers),
	40.	Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.

11.	41.	Lubrication – function and characteristic properties of good lubricant, classification with examples,
	42.	Lubrication mechanism – hydrodynamic and boundary lubrication,
	43.	Physical properties (viscosity and viscosity index, oiliness)
	44.	Physical properties (flash and fire point, cloud and pour point only)
12.	45.	Chemical properties (coke number, total acid number saponification value) of lubricants.
	46.	SESSIONAL
	47.	Unit 5: Electro Chemistry Electronic concept of oxidation, reduction and redox reactions
	48.	Definition of terms: electrolytes, non-electrolytes with suitable examples,
13.	49.	Faradays laws of electrolysis and simple numerical problems.
	50.	Industrial Application of Electrolysis –Electrometallurgy, Electroplating
	51.	Electrolytic refining
	52.	Primary cells – dry cell, Application of redox reactions in electrochemical cells –
14.	53.	Secondary cell - commercially used lead storage battery,
	54.	Fuel and solar cells
	55.	Introduction to Corrosion of metals – Definition, types of corrosion (chemical and electrochemical),
	56.	H ₂ liberation and O ₂ absorption mechanism of electrochemical corrosion, factors affecting rate of corrosion.
15.	57.	Internal corrosion preventive measures -Purification, alloying and heat treatment
	58.	External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors.
	59.	External corrosion preventive measures: b) organic inhibitors.
	60.	SESSIONAL

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09/01/26
Signature of Faculty

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Counter Signature of HOD

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