

PNS SCHOOL OF ENGINEERING & TECHNOLOGY, MARSHAGHAI  
DEPARTMENT OF SCIENCE AND HUMANITIES  
LESSON PLAN OF APPLIED CHEMISTRY (TH 5 b)

BRANCH : CIVIL,CSE,ETC, ELECT, MECH DISCIPLINE : SEMESTER: 2ND SUBJECT: APPLIED CHEMISTRY (TH 5 b) NO.OF DAYS/WEEK CLASS ALLOTTED: 06		NAME OF THE TEACHING FACULTY: MR KSHITISH KUMAR SINGH	
		SEMESTER FROM DATE: 04/02/2025 TO DATE: 17/05 /2025 NO OF WEEKS: 14	
WEEK	UNIT	CLASS DAY	THEORY TOPICS
1st	UNIT - 1: Atomic Structure, Chemical Bonding and Solutions	1	Rutherford model of atom, Bohr's theory (expression of energy and radius to be
		2	hydrogen spectrum explanation based on Bohr's model of atom,
		3	Heisenberg uncertainty principle, Quantum numbers – orbital concept.
		4	Shapes of s,p and d orbitals, Pauli's exclusion principle,
		5	Hund's rule of maximum multiplicity Aufbau rule, electronic configuration.
2nd		6	Concept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example),
		7	covalent bond (H <sub>2</sub> , F <sub>2</sub> , HF hybridization in BeCl <sub>2</sub> , BF <sub>3</sub> ,
		8	CH <sub>4</sub> , NH <sub>3</sub> , H <sub>2</sub> O), coordination bond in NH <sub>4</sub> +
		9	anomalous properties of NH <sub>3</sub> , H <sub>2</sub> O due to hydrogen bonding, and metallic bonding.
		10	Solution – idea of solute, solvent and solution, methods to express the concentration of solution molarity (M = mole per liter), ppm,
3rd	UNIT - 2: Water	11	mass percentage, volume percentage and mole fraction
		12	Graphical presentation of water distribution on Earth (pie or bar diagram).
		13	Classification of soft and hard water based on soap test
		14	salts causing water hardness, unit of hardness
		15	simple numerical on water hardness.
4th		16	Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion etc
		17	quantitative measurement of water hardness by ETDA method
		18	total dissolved solids (TDS) alkalinity estimation.
		19	I) Water softening techniques – soda lime process, zeolite process
		20	ion exchange process.
5th	21	II) Municipal water treatment (in brief only) – sedimentation, coagulation,	
	22	filtration, sterilization.	
	23	Water for human consumption for drinking and cooking purposes from any water sources	
	24	enlist Indian standard specification of drinking water (collect data and understand standards).	
6th	Engineering Materials	25	Natural occurrence of metals – minerals, ores of iron, aluminium and copper, gangue (matrix)-
		26	flux, slag, metallurgy – brief account of general principles of metallurgy.
		27	Extraction of - iron from haematite ore using blast furnace, aluminium from bauxite
		28	Alloys – definition, purposes of alloying, ferrous alloys and non- ferrous with suitable examples, properties and applications.
		29	General chemical composition, compositionbased applications (elementaryidea only details omitted):
		30	Port land cement and hardening, Glasses Refractory

7th	UNIT - 3: Enj	31	Composite materials.	
		32	Polymers – monomer, homo and co polymers, degree of polymerization	
		33	simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics	
		34	using PVC, PS, PTFE, nylon – 6, nylon-6,6 and Bakelite),	
		35	rubber and vulcanization of rubber.	
8th	UNIT - 4: Chemistry of Fuels and Lubricants	36	Definition of fuel and combustion of fuel, classification of fuels	
		37	calorific values (HCV and LCV)	
		38	calculation of HCV and LCV using Dulong's formula.	
9th		39	Proximate analysis of coal solid fuel	
		40	petrol and diesel - fuel rating (octane and cetane numbers)	
		41	Chemical composition, calorific values and applications of LPG, CNG	
10th		42	water gas, coal gas, producer gas and biogas.	
		43	Lubrication – function and characteristic properties of good lubricant	
		44	classification with examples, lubrication mechanism	
		45	hydrodynamic and boundary lubrication	
		46	physical proper- ties viscosity and viscosity index	
		47	oiliness, flash and fire point could and pour point only	
		48	chemical properties (coke number, total acid number saponification value) of lubricants.	
11th		UNIT - 5: Electro Chemistry	49	Electronic concept of oxidation, reduction and redox reactions.
			50	Definition of terms: electrolytes, non-electrolytes with suitable examples,
	51		Faradays laws of electrolysis and simple numerical problems.	
12th	52		Industrial Application of Electrolysis – Electrometallurgy	
	53		Electroplating	
	54		Electrolytic refining	
55	Application of redox reactions in electrochemical cells – Primary cells – dry cell			
56	Secondary cell - commercially used lead storage battery, fuel			
57	Solar cells. Introduction to Corrosion of metals			
58	definition, types of corrosion (chemical and electrochemical)			
59	H2 liberation and O2 absorption mechanism of electrochemical corrosion factors affecting rate of corrosion			
60	Internal corrosion preventive measures – Purification, alloying and heat treatment and External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors.			

Sunakar Singh.

Signature of the HOD

Gitishree Jena

Signature of Lecturer