

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

<b>BRANCH : CIVIL,CSE,ETC</b> <b>DISCIPLINE : SEMESTER: 2ND</b> <b>SUBJECT: APPLIED CHEMISTRY (TH 5 b)</b> <b>NO.OF DAYS/WEEK CLASS ALLOTED: 06</b>			<b>NAME OF THE TEACHING FACULTY: Mrs. Itishree Jena</b>
<b>SEMESTER FROM DATE: 09 /01/2026 TO DATE: 08 /05 /2025</b> <b>NO OF WEEKS: 14</b>			
<b>WEEK</b>	<b>UNIT</b>	<b>CLASS DAY</b>	<b>THEORY TOPICS</b>
1st	UNIT - 1: Atomic Structure, Chemical Bonding and Solutions	1	Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted)
		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.
		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,
		11	mass percentage, volume percentage and mole fraction
2nd	UNIT - 2: Water	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.
		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.
		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).
3rd	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 along examples, properties and applications.
		28	details omitted):
		29	Port land cement and hardening, Glasses Refractory
		30	

7th	UNIT - 3: Eng	31	Composite materials.	
		32	Polymers – monomer, homo and co polymers, degree of polymerization	
		33	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.	
		39	Proximate analysis of coal solid fuel	
		40	petrol and diesel - fuel rating (octane and cetane numbers)	
9th		41	Chemical composition, calorific values and applications of LPG, CNG	
		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	
10th		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.	
UNIT - 5: Electro Chemistry	49	Electronic concept of oxidation, reduction and redox reactions.		
	50	Definition of terms: electrolytes, non-electrolytes with suitable examples,		
	11th		51	Faradays laws of electrolysis and simple numerical problems.
			52	Industrial Application of Electrolysis – Electrometallurgy
			53	Electroplating
			54	Electrolytic refining
			55	Application of redox reactions in electrochemical cells – Primary cells – dry cell
	12th		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	affecting rate of corrosion
			60	External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic

Signature of the HOD