

LESSON PLAN FOR SESSION-WINTER-2024-25			
FACULTY-JAGANNATH ORAM / CHUDAMANI MEHER			
SUB-APPLIED CHEMISTRY SUB CODE-TH 5(B)			
SEMESTER-1ST SEM BRANCH-CIVIL, MECHANICAL, ELECTRICAL, COMP. ENG & IOT, IT, ETC, MECHATRONICS			
WEEK	DURATION	LECTURE NO.	TOPIC TO BE COVERED
1	1 hr	1	Atomic Structure, Distribution of e, p, n in an atom, Rutherford model of atom (experiment, Observation and conclusion)
	1 hr	2	Bohr's theory (expression of energy and radius to be omitted),
	1 hr.	3	hydrogen spectrum explanation based on Bohr's model of atom
	1 hr	4	Heisenberg uncertainty principle, Quantum numbers – orbital concept. Shapes of s, p and d orbitals
2	1 hr	5	Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration
	1 hr.	6	Concept of chemical bonding – cause of chemical bonding, types of bonds, Ionic bonding NaCl
	1 hr.	7	covalent bond (H ₂ , F ₂ , HF hybridization in BeCl ₂ , BF ₃ , CH ₄ , NH ₃ , H ₂ O),
	1 hr.	8	coordination bond in NH ₄ ⁺ , and anomalous properties of NH ₃ , H ₂ O due to hydrogen bonding, and metallic bonding.
3	1 hr.	9	Solution – idea of solute, solvent and solution, methods to express the concentration of solution molarity ($M = \text{mole per liter}$), ppm, mass percentage, volume percentage and mole fraction.
	1 hr.	10	methods to express the concentration of solution molarity ($M = \text{mole per liter}$), ppm, mass percentage, volume percentage and mole fraction.
	1 hr	11	Graphical presentation of water distribution on Earth (pie or bar diagram). Classification of soft and hard water based on soap test.
	1 hr.	12	salts causing water hardness, unit of hardness and simple numerical on water hardness.
4	1 hr.	13	Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge)
	1 hr.	14	foaming and priming corrosion etc
	1 hr.	15	quantitative measurement of water hardness by EDTA method, total dissolved solids (TDS) alkalinity estimation
	1 hr.	16	Water softening techniques – soda lime process
5	1 hr.	17	zeolite process
	1 hr.	18	ion exchange process
	1 hr.	19	Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization.
	1 hr.	20	Water for human consumption for drinking and cooking purposes from any water sources
6	1 hr.	21	enlist Indian standard specification of drinking water (collect data and understand standards).
	1 hr.	22	Numerical Based Problem solving
	1 hr.	23	Natural occurrence of metals – minerals, ores of iron, aluminium and copper, gangue (matrix), flux, slag,
	1 hr.	24	metallurgy – brief account of general principles of metallurgy.
7	1 hr.	25	metallurgy – brief account of general principles of metallurgy.
	1 hr.	26	Extraction of iron from haematite ore using blast furnace
	1 hr.	27	Extraction of aluminium from bauxite along with reactions
	1 hr.	28	Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples,

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8	1 hr.	29	properties and applications alloys.
	1 hr.	30	General chemical composition, composition based applications of Port land cement and hardening
	1 hr.	31	General chemical composition, composition based applications of Glasses Refractory and Composite materials
	1 hr.	32	Polymers – monomer, homo and co polymers, degree of polymerization
9	1 hr.	33	thermoplastics and thermosetting plastics polymer
	1 hr.	34	simple reactions involved in preparation and their application of PVC, PS, PTFE,
	1 hr.	35	simple reactions involved in preparation and their application of nylon – 6, nylon-6,6 and Bakelite
	1 hr.	36	rubber and vulcanization of rubber.
10	1 hr.	37	Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV),
	1 hr.	38	calculation of HCV and LCV using Dulong's formula.
	1 hr.	39	Proximate analysis of coal solid fuel
	1 hr.	40	petrol and diesel - fuel rating (octane and cetane numbers),
11	1 hr.	41	Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas
	1 hr.	42	Lubrication – function and characteristic properties of good lubricant, classification with examples
	1 hr.	43	lubrication mechanism – hydrodynamic and boundary lubrication
	1 hr.	44	physical proper- ties (viscosity and viscosity index, oiliness)
12	1 hr.	45	physical proper- ties (flash and fire point, could and pour point only)
	1 hr.	46	chemical properties (coke number, total acid number saponification value) of lubricants.
	1 hr.	47	Electronic concept of oxidation, reduction and redox reactions
	1 hr.	48	Definition of terms: electrolytes, non-electrolytes with suitable examples
13	1 hr.	49	Faradays laws of electrolysis and simple numerical problems
	1 hr.	50	Industrial Application of Electrolysis -- Electrometallurgy
	1 hr.	51	Industrial Application of Electrolysis-• Electroplating
	1 hr.	52	Industrial Application of Electrolysis-• Electrolytic refining
14	1 hr.	53	Primary cells – dry cell,
	1 hr.	54	Secondary cell - commercially used lead storage battery,
	1 hr.	55	Secondary cell-fuel and Solar cells
	1 hr.	56	Introduction to Corrosion of metals – definition, types of corrosion (chemical and electrochemical)
15	1 hr.	57	H2 liberation and O2 absorption mechanism of electrochemical corrosion,
	1 hr.	58	Factors affecting rate of corrosion.

WEEK	DURATION	LECTURE NO.	TOPIC TO BE COVERED
	1 hr	59	Internal corrosion preventive measures -- Purification, alloying and heat treatment and
	1 hr.	60	External corrosion preventive measures. a) metal (anodic, cathodic) coatings, b) organic inhibitors.

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