

LESSON PLAN

Name of the Faculty: Dr. Ritu Yadav

Discipline: Mechanical Engg.

Semester: 2nd

Subject: Applied Chemistry

Week	Theory		Practical	
	Lect- ure Day	Topic (Including assignment/Test)	Pract- ical Day	Topic
1 st	1 st	Unit – 1 Atomic Structure, Periodic Table & Chemical Bonding - Introduction	1 st	To prepare standard solution of oxalic acid – introduction (G-1).
	2 nd	Bohr’s Model of an Atom	2 nd	To prepare standard solution of oxalic acid – introduction (G-2).
	3 rd	Dual character of matter – derivation of de-Broglie’s equation		
2 nd	4 th	Heisenberg’s Principle of Uncertainty	3 rd	Perform the experiment & prepare a std. solution of oxalic acid (G-1).
	5 th	Modern concept of atomic structure: Definition & shape of orbitals (s, p & d orbitals)	4 th	Perform the experiment & prepare a std. solution of oxalic acid (G-2).
	6 th	Quantum numbers & their significance		
3 rd	7 th	Electronic configuration: Aufbau, Pauli Exclusion Principles & Hund’s rule.	5 th	To dilute the given KMnO₄ solution – introduction (G-1).
	8 th	Electronic configuration of elements up to Z = 30.	6 th	To dilute the given KMnO₄ solution – introduction (G-2).
	9 th	Modern Periodic Law & Table, Classification of elements s, p, d, & f-blocks		
4 th	10 th	Metals, Non-metals & Metaloids	7 th	Perform the experiment & dilute the given solution (G-1).
	11 th	Chemical Bonding: cause & types of bonding	8 th	Perform the experiment & dilute the given solution (G-2).
	12 th	Physical properties of ionic, covalent & metallic substances.		
5 th	13 th	- Test - Unit - 2 Metals & Alloys - introduction	9 th	To find out the strength in g/l of an unknown solution of NaOH using a std. (N/10) oxalic acid solution – introduction (G-1)
	14 th	Metals: Mechanical properties, Impact resistance & their uses	10 th	To find out the strength in g/l of

	15 th	Def. of mineral, ore, gangue, flux & slag		an unknown solution of NaOH using a std. (N/10) oxalic acid solution – introduction (G-2).
6 th	16 th	Metallurgy of Fe from Hematite using Blast furnace, Commercial varieties of Fe	11 th	Perform the experiment and find out the strength of given NaOH Solution (G-1).
	17 th	Alloy: Def., necessity, composition, properties & uses of Duralumin & steel	12 th	Perform the experiment and find out the strength of given NaOH Solution (G-2).
	18 th	- Heat treatment of steel - normalizing, annealing, quenching, tempering Assignment		
7 th	19 th	Unit – 3 Water, Solutions, Acids & Bases - introduction	13 th	To find out the total alkalinity in ppm of a water sample with the help of a std. sulphuric acid solution – introduction (G-1).
	20 th	Solutions: Def., expression of the conc. of a solution in % (w/w, w/v, v/v), normality, molarity, molality & ppm	14 th	To find out the total alkalinity in ppm of a water sample with the help of a std. sulphuric acid solution – introduction (G-2).
	21 th	Simple problems on solution preparation		
8 th	22 th	- Arrhenius concept of Acids & Bases - Strong and weak acids & bases	15 th	Perform the experiment and find out the total alkalinity (G- 1).
	23 th	- Ph value & its significance - Ph scale - Numerical problems on ph	16 th	Perform the experiment and find out the total alkalinity (G- 2).
	24 th	- Types of water & causes of hardness of water - Types of hardness		
9 th	25 th	- Expression of hardness of water – ppm unit of hardness - Disadvantages of hard water	17 th	To determine the total hardness of given water sample by EDTA method (G-1).
	26 th	Removal of Temporary hardness – boiling & Clark’s method	18 th	To determine the total hardness of given water sample by EDTA method (G-2).
	27 th	Removal of Permanent hardness – Ion-exchange method		
10 th	28 th	- Boiler problems caused by hard water – scale & sludge formation - Priming & foaming	19 th	To determine the TDS in ppm in a given sample of water gravimetrically (G-1).
	29 th	- Caustic embrittlement - Water sterilization by Cl, UV radiation and RO	20 th	To determine the TDS in ppm in a given sample of water gravimetrically (G-2).
	30 th	- Test Unit – 4 Fuels & Lubricants - introduction		
11 th	31 th	- Fuels: def., - Calorific value – def., types & units - Characteristics of an ideal fuel	21 th	To determine the pH of different solutions using a digital pH meter (G-1).
	32 th	- Petroleum: composition & refining - Gaseous fuels: Composition,	22 th	To determine the pH of different solutions using a

		properties & uses of CNG, PNG, LNG, LPG		digital pH meter (G-2).
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	33 th	- Relative advantages of liquid & gaseous fuels over solid fuels - Scope of Hydrogen as future fuel Assignment		
12 th	34 th	Lubricants: classification, functions & Qualities of lubricants	23 th	To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter (G-1).
	35 th	- Mechanism of Lubrication - Physical properties of Lubricant	24 th	To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter (G-2).
	36 th	- Test Unit – 5 Polymer & Electrochemistry - introduction		
13 th	37 th	Polymers: Def., classification	25 th	To determine the viscosity of lubricating oil using a Redwood viscometer – introduction (G-1).
	38 th	Preparation properties & uses of polythene, PVC, Nylon-66, Bakelite	26 th	To determine the viscosity of lubricating oil using a Redwood viscometer – introduction (G-2).
	39 th	- Plastic: Def. & types - Natural rubber, neoprene & other synthetic rubber		
14 th	40 th	Corrosion: Def., types & factors affecting rate of corrosion	27 th	Perform the experiment and find out the viscosity of given lubricant oil (G-1).
	41 th	Methods of prevention of corrosion – Hot dipping, metal cladding, cementation	28 th	Perform the experiment and find out the viscosity of given lubricant oil (G-2).
	42 th	Quenching & cathodic protection		
15 th	43 th	- Nanotechnology: intro & applications Assignment	29 th	To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab (G-1).
	44 th	Nano-materials & their classification	30 th	To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab (G-2).
	45 th	Applications of nanotechnology in various engineering applications.		
16 th	46 th	Taking Problems & solve them	31 th	Revision
	47 th	Test	32 th	Revision
	48 th	Revision		