Department of Applied Chemistry

Course completion unit plan

CH-10516 Chemistry

Academic Year 2022-23

Lecture duration = 1 hour

Lecture No.	Date	Topic to be taught	Reference/ Remark
Unit 1: Basics of Chemistry			
1		Organic Chemistry : Isomers – configuration (including R|S and E/Z nomenclature) with examples	**S. Chand**
2		Conformation (Newman and Sawhorse Projection Formulae with nomenclature), Energy diagram for Newman structures with examples & Conversion	**P.S. Kalsi**
3		Concepts of Hybridization- (Including Structure, geometry & angles) with an example of each	-
4.		Physical Chemistry: Introduction to chemical kinetics, Rate Law, molecularity	
5.		Order of Reaction, 1^{st} order Kinetics, Expression & Numerical	-
6.		Inorganic Chemistry: Theories of Chemical Bonding (Valence Bond Theory), Postulates Of VBT, and Drawbacks of VBT	-
7.		Molecular Orbital Theory, Postulates, MO Diagram for Diatomic Molecules e.g. O_2, N_2 , CO & Bond Order of each	
8		Green Chemistry: Introduction, Principles and Examples	
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		Unit 2: Water	
9		Water: Source, Types of impurities and their effects	**Dr.Shashi chawla**

10		Hardness-meaning, definition, types, units of hardness and Hardness Determination and Expression	-
11		Boiler troubles-Sludge & scale formation, causes, effects and control measures.	-
12		Softening methods:-(1)External methods (a) Lime-Soda method, principal, types (b) Ion-Exchange method, principal, types, procedure	**Jain &Jain**
13		Analysis and treatment of water for industrial and Domestic purposes, Municipal Water treatment methods of disinfection and breakpoint chlorination.	
14		Alkalinity and its determination by complexometric titration and neutralization titration	
15		Numerical-based problems of each method and IS specification for water	-
16		Analysis of BOD, COD & DO, numerical.	
Unit 3: Lubricants (a)			
17		Lubricants-definition, characteristics, functions.	**A.K. Narula**
18		Types of lubricants, mechanism of lubrication-thick film lubrication. Boundary and extreme pressure lubrication	
19		Properties of lubricants-V.I, Flash &fire point, cloud & pour point etc.	
20		Refractories-classification, acidic, basic, and natural and their sub-types.	
21		Grease, Graphite, Cooling liquids, and cutting fluids and their applications and Ethics code and Ethics management	-
.		**(b) Corrosion**	-
22		Introduction, Principle of Corrosion and Types of Corrosion	
23		Factors affecting and methods of protection	
24		Use of inhibitors, use of pure metal and alloys and Ethics for corrosion prevention	
Unit 4: Materials Chemistry			
25		**(a)Polymers and Polymerization** : Introduction, Classification, types	

26		Mechanism , method of polymerization- Addition and Condensation polymerization	
27		General applications of the polymer materials of industrial importance (Nylon 6 6, Kevlar, PVC, Teflon, and Polystyrene)	
28		Biodegradable polymers, Environmental regulations for polymer-based packaging materials, Structure-Property Relationships	
29		Structure-Property Relationships, Compounding	
		(b) Nanomaterials	
30		Synthesis- Bottom-up and top-down techniques, PVD and CVD	
31		Nano-structured materials and their applications.	
32		Introduction to Smart materials and their applications.	
Unit 5: Spectroscopic Techniques and Applications			
33		Introduction to Spectroscopy, Principle	**B.K. Sharma**
34		Instrumentation, Principle, and Application of Atomic Absorption Spectroscopy (AAS)	
35		Instrumentation, Principles, and Applications of UV-Visible Spectroscopy	-
36		IR Instrumentation, applications, stretching Frequency	-
37		Hooks law and Modes of vibration and Related numerical	-
38		Introduction to Chromatographic Techniques, Classification	-
49		Principle, working, and application of paper chromatography	-
40		Principle, Working, and Application (GLC and Column) chromatography	