**L**esson Plan (2021-22)

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Class and Section: B.sc 6th Sem.

Subject: chemistry

Paper: inorganic and organic, physical

 chemistry

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| Week1 | Dates | Topics to be covered |
|  | March 21-March 26 | Briefing the Syllabus |
|  | Definition, nomenclature and classification of organometallic compounds |
|  | Preparation, properties, and bonding of alkyls of Li, Al, Hg, and Sn a brief account of metal-ethylenic complexes, |
|  | mononuclear carbonyls  |
|  |  nature of bonding in metal carbonyls. |
|  | Assignment and announcement of test |
| Week 2 | March 28-April 2 | Arrhenius, Bronsted – Lowry, the Lux – Flood,  |
|  | Solvent system and Lewis concepts of acids & bases, |
|  | relative strength of acids & bases, |
|  | Concept of Hard and Soft Acids & Bases. |
|  | Symbiosis, electronegativity and hardness and softness |
|  | Assignment and announcement of test |
| Week3 | April 4-April 9 | Essential and trace elements in biological processes,  |
|  | metalloporphyrins with special reference to myoglobin. |
|  | Biological role of alkali and alkaline earth metal ions |
|  | with special reference to Ca2+. Nitrogen fixation. |
|  | metalloporphyrins with special reference to myoglobin. |
|  | Assignment and announcement of test |
| Week 4 | April 11-April 16 | Silicones and phosphazenes |
|  | their preparation |
|  | properties |
|  | structure and uses |
|  | Assignment and announcement of test |
|  | test |
| Week 5 | April 18-April 23 | **PHYSICAL chemistry Electronic Spectrum**Concept of potential energy curves for bonding and antibonding molecular orbitals,.  |
|  | qualitative description of selection rules |
|  | Franck- Condon principle |
|  | Qualitative description of sigma and pie and n molecular orbital (MO) |
|  |  energy level and respective transitions. |
|  | Assignment and announcement of test |
| Week 6 | April 25-April 30 | **Photochemistry**Interaction of radiation with matter, non-radiative processes (internal conversion, intersystem crossing)  |
|  | difference between thermal and photochemical processes. |
|  | Laws of photochemistry: Grotthus-Drapper law, , qualitative description of fluorescence, phosphorescence |
|  | Stark- Einstein law (law of photochemical equivalence) Jablonski diagram depiciting various processes occurring in the excited state  |
|  | quantum yield |
|  | photosensitized reactions-energy transfer processes (simple examples). |
| Week 7 | May2-May 7 | **Solutions:****Dilute Solutions and Colligative Properties**Ideal and non-ideal solutions, methods of expressing concentrations of solutions, |
|  | activity and activity coefficient. |
|  | Dilute solution,Colligative properties |
|  | Raolut’s law,  |
|  | molelcular weight determination |
|  | relative lowering of vapour pressure |
| Week 8 | May 9-May 14 | Osmosis law of osmotic pressure and its measurement |
|  | determination of molecular weight from osmotic pressure. |
|  | . Elevation of boiling point and depression of freezing point |
|  | Thermodynamic derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. |
|  | Experimental methods for determining various colligative properties. |
|  | Abnormal molar mass, degree of dissociation and association of solutes. Assignment and announcement of test |
| Week 9 | May 16-May 21 | **ORGANIC CHEMISTRY Heterocyclic Compounds-I**Introduction: Molecular orbital p icture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. |
|  | Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. |
|  | Mechanism of nucleophilic substitution reactions in pyridine derivatives |
|  | Comparison of basicity of pyridine, piperidine and pyrrole |
|  | Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline |
|  | Assignment and announcement of test |
| Week 10 | May 23-May 28 | 1. **Heterocyclic Compounds-II**

Introduction to condensed five and six- membered heterocycles. |
|  | Prepration and reactions of indole |
|  | quinoline and isoquinoline with special reference to Fisher indole synthesis |
|  | Skraup synthesis and Bischler-Napieralski synthesis. |
|  | Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline |
|  | TEST OF EARLIER UNIT |
| Week 11 | May 30-June 4 | Organosulphur CompoundsNomenclature, structural features |
|  | Methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, |
|  | Methods of formation and chemical reactions of sulphonamides and sulphaguanidine.  |
|  | Synthetic detergents alkyl and aryl sulphonates. |
|  | TEST OF EARLIER UNIT |
|  | Assignment and announcement of test |
| Week 12 | June 6-June 11 | 1. **Organic Synthesis *via* Enolates**

Acidity of -hydrogens,.  |
|  | alkylation of diethyl malonate and ethyl acetoacetate. |
|  | Synthesis of ethyl acetoacetate: the Claisen condensation |
|  | Keto-enol tautomerism of ethyl acetoacetate. |
|  | TEST OF EARLIER UNIT |
|  | Assignment and announcement of test |
| Week13 | June 13-June 18 | Synthetic PolymersAddition or chain-growth polymerization, and  |
|  |  Free radical vinyl polymerization |
|  | ionic vinyl polymerization |
|  | Ziegler-Natta polymerization |
|  | vinyl polymers.Condensat ion or step growth polymerization. |
|  | Polyeste rs ,polyamides |
| Week 14 | June 20-June 25 | phenol formaldehyde resins |
|  | urea formaldehyde resins |
|  | epoxy re sins and polyurethanes |
|  | Natural and synthetic rubbers. |
|  | TEST OF EARLIER UNIT |
|  | Assignment and announcement of test |
| Week 15 | June 27-July2 | Amino Acids, Peptides& ProteinsClassification, of amino acids. , , selective hydrolysis of peptides. Classical peptide synthesis, solid– phase peptide synthesis |
|  | Acid-base behavior, isoelectric point and electrophoresis.  |
|  | Preparation of  -amino acids.Structure and nomenclature of peptides and proteins. |
|  | Classification of proteins. Peptide structure determination |
|  | end group analysis, . Structures of peptides and proteins: Primary & Secondary structure. |