Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor : Dr. Kuldeep Mahiya

Class: B.Sc. I (1st Semester) **Section: A & B**

Subject: Inorganic Chemistry-I **Paper: CCL-104**

UNIT –I

Week 1, 04/10/2021 – 09/10/2021

- 1 Introduction
- 1.1 Atomic structure: historical perspective
- 1.2 Review of: Bohr's theory and its limitations

Week 2, 11/10/2021 – 16/10/2021

- 2 Brief revision of previous week topics
- 2.1 Dual behavior of matter and radiation: de Broglie's relation
- 2.2 Application and significance of de Broglie's relation

Week 3, 18/10/2021 – 23/10/2021

- 3 Brief revision of previous week topics
- 3.1 Heisenberg Uncertainty principle
- 3.2 Application and significance of Heisenberg Uncertainty principle in daily life

Week 4, 25/10/2021 – 30/10/2021

- 4 Brief revision of previous week topics
- 4.1 Hydrogen atom spectra.
- 4.2 Quantum mechanical approach to atomic structure

Week 5, 01/11/2021 - 06/11/2021

- 5 Brief revision of previous week topics
- 5.1 Time independent Schrodinger equation for hydrogen atom
- 5.2 Radial and angular wave functions and their variations for 1s, 2s, 2p, 3s, 3p and 3d orbitals (Only graphical representation).

Week 5 (01/11/2021 – 07/11/2021 : Diwali Break)

UNIT –II

Week 6, 08/11/2021 – 13/11/2021

- 1 Introduction
- 1.1 Radial and angular nodes and their significance
- 1.2 Radial distribution functions with special reference to 1s and 2s atomic orbitals

Week 7, 15/11/2021 - 20/11/2021

- 2 Brief revision of previous week topics
- 2.1 Quantum numbers and their significance.

- 2.2 Shape of atomic orbitals on the basis of quantum numbers

Week 8, 22/11/2021 – 27/11/2021

- 3 Brief revision of previous week topics
- 3.1 Shapes of s, p and d atomic orbitals
- 3.2 Stability of half-filled and completely filled orbitals

Week 9, 29/11/2021 – 04/12/2021

- 4 Brief revision of previous week topics
- 4.1 Concept of symmetry and exchange energy
- 4.2 Relative energies of atomic orbitals: Aufbau principle

Week 10, 06/12/2021 – 11/12/2021

- 5 Brief revision of previous week topics
- 5.1 Pauli exclusion principle and Hund's rule of maximum multiplicity
- 5.2 Anomalous electronic configurations

UNIT –III

Week 11, 13/12/2021 – 18/12/2021

- 1 Introduction
- 1.1 Ionic Bonding: General characteristics of ionic bonding
- 1.2 Energy considerations in ionic bonding: lattice energy, solvation energy and their importance
- Minor test

Week 12, 20/12/2021 – 25/12/2021

- 2 Brief revision of previous week topics
- 2.1 Born-Landé equation for calculation of lattice energy
- 2.2 Born-Haber cycle and its applications

Week 13, 27/12/2021 – 01/01/2022

- 3 Brief revision of previous week topics
- 3.1 Calculation of lattice energy of some common salts using Born Haber cycle
- 3.2 Fajan's rules: polarizing power and polarizability

Week 14, 03/01/2022 – 08/01/2022

- 4 Brief revision of previous week topics
- 4.1 Ionic character in covalent compounds
- 4.2 Bond moment and dipole moment

Week 15, 10/01/2022 – 15/01/2022

- 5 Brief revision of previous week topics
- 5.1 Covalent bonding: VB Approach
- 5.2 Shapes of some inorganic molecules and ions on the basis of VSEPR and hybridization

Week 16, 17/01/2022 – 22/01/2022

- 6 Brief revision of previous week topics
- 6.1 Concept of resonance and resonating structures in inorganic and organic compounds.
- 6.2 Limitation of VBT and VSEPR theory

UNIT –IV

Week 17, 24/01/2022 – 29/01/2022

- 1 Introduction
- 1.1 MO Approach: Rules for the LCAO method
- 1.2 Bonding and antibonding MOs and their characteristics for s-s, s-p and p-p combinations of atomic orbitals

Week 18, 31/01/2022 – 05/02/2022

- 2 Brief revision of previous week topics
- 2.1 MO treatment of homonuclear diatomic molecules of 1st and 2nd periods (including idea of s-p mixing)
- 2.2 MO diagram of heteronuclear diatomic molecules such as CO, NO and NO^+
- 2.3 Comparison of VBT and MOT approaches

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor : Dr. Kuldeep Mahiya

Class: B.Sc. II (3rd Semester) **Section: A & B**

Subject: Organic Chemistry-III **Paper: CCL-305**

UNIT–I

Week 1, 04/10/2021 – 09/10/2021

- 1 Introduction
- 1.1 Functional group approach for carboxylic acid and derivatives
- 1.2 Preparation of carboxylic acids (aliphatic and aromatic)

Week 2, 11/10/2021 – 16/10/2021

- 2 Brief revision of previous week topics
- 2.1 Reactions of carboxylic acids (aliphatic and aromatic)
- 2.2 Acidic and Alkaline hydrolysis of esters and Hell-Vohlard-Zelinsky Reaction

Week 3, 18/10/2021 – 23/10/2021

- 3 Brief revision of previous week topics
- 3.1 Preparation of acid chloride
- 3.2 Reactions of acid chloride

Week 4, 25/10/2021 – 30/10/2021

- 4 Brief revision of previous week topics
- 4.1 Preparation of acid anhydride
- 4.2 Reactions of acid anhydride

Week 5, 01/11/2021 - 06/11/2021

- 5 Brief revision of previous week topics
- 5.1 Preparation of esters and acid amide
- 5.2 Reactions of esters and acid amide

Week 5 (01/11/2021 – 07/11/2021 : Diwali Break)

UNIT–II

Week 6, 08/11/2021 – 13/11/2021

- 1 Introduction
- 1.1 Amines (Aliphatic and Aromatic)
- 1.2 Structure and bonding in amines

Week 7, 15/11/2021 - 20/11/2021

- 2 Brief revision of previous week topics
- 2.1 Preparation of amines from alkyl halides, Gabriel's Phthalimide synthesis, Hofmann Bromamide reaction.

- 2.2 Mecanism of Gabriel's Phthalimide synthesis, Hofmann Bromamide reaction.

Week 8, 22/11/2021 – 27/11/2021

- 3 Brief revision of previous week topics
- 3.1 Hofmann vs. Saytzeff elimination
- 3.2 Carbylamine test, Hinsberg test, Reaction with HNO_2, Schotten-Baumann Reaction

Week 9, 29/11/2021 – 04/12/2021

- 4 Brief revision of previous week topics
- 4.1 Mechanism of electrophilic substitution in amines
- 4.2 Reactions: Nitration, bromination and sulphonation

Week 10, 06/12/2021 – 11/12/2021

- 5 Brief revision of previous week topics
- 5.1 Diazonium salts: Preparation: from aromatic amines
- 5.2 Reactions: conversion to benzene, phenol, dyes

UNIT –III

Week 11, 13/12/2021 – 18/12/2021

- 1 Introduction
- 1.1 Preparation of Amino Acids: Strecker synthesis using Gabriel's phthalimide synthesis
- 1.2 Zwitterion, Isoelectric point and Electrophoresis
- Minor test

Week 12, 20/12/2021 – 25/12/2021

- 2 Brief revision of previous week topics
- 2.1 Reactions of Amino acids: esterification of –COOH group and acetylation of $–NH_2$ group.
- 2.2 complexation with Cu^{2+} ions, ninhydrin test.

Week 13, 27/12/2021 – 01/01/2022

- 3 Brief revision of previous week topics
- 3.1 Overview of Primary and Secondary Structure of proteins.
- 3.2 Overview of Tertiary and Quaternary Structure of proteins.

Week 14, 03/01/2022 – 08/01/2022

- 4 Brief revision of previous week topics
- 4.1 Determination of Primary structure of Peptides by degradation
- 4.2 Edmann degradation (N-terminal) and C–terminal (thiohydantoin and with carboxypeptidase enzyme)

Week 15, 10/01/2022 – 15/01/2022

- 5 Brief revision of previous week topics
- 5.1 Synthesis of simple peptides (upto dipeptides) by N-protection (t-butyloxycarbonyl and phthaloyl) & C-activating groups
- 5.2 Merrifield solid-phase synthesis

UNIT –IV

Week 16, 17/01/2022 – 22/01/2022

- 1 Introduction
- 1.1 Classification and General Properties
- 1.2 Glucose and Fructose (open chain and cyclic structure)

Week 17, 24/01/2022 – 29/01/2022

- 2 Brief revision of previous week topics
- 2.1 Determination of configuration of monosaccharides
- 2.2 Absolute configuration of Glucose and Fructose, mutarotation

Week 18, 31/01/2022 – 05/02/2022

- 3 Brief revision of previous week topics
- 3.1 Ascending and descending carbon chain in monosaccharides
- 3.2 Structure of disacharrides (sucrose, cellobiose, maltose, lactose) and polysacharrides (starch and cellulose) excluding their structure elucidation

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor : Dr. Kuldeep Mahiya

Class: B.Sc. II (3rd Semester) **Group: C-1 & C-3**

Subject: Chemistry practicals **Paper: CCP-309**

Section A : Physical Chemistry

Week 1, 04/10/2021 – 09/10/2021

- Introduction
- Do's and don't in laboratory
- Handling of chemical and glassware
- Maintaining of lab note book and lab record

Week 2, 11/10/2021 – 16/10/2021

- Determination of molecular weight by Rast method (Experiment -1)
- Viva-voce

Week 3, 18/10/2021 – 23/10/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Strong acid *vs*. strong base (Experiment -2)
- Viva-voce

Week 4, 25/10/2021 – 30/10/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Weak acid *vs*. strong base (Experiment -3)
- Determination of equivalent conductance of weak acid (Experiment -4)
- Viva-voce

Week 5, 01/11/2021 - 06/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Determination of CST of Phenol water system (Experiment -5)
- Viva-voce

Week 5 (01/11/2021 – 07/11/2021 : Diwali Break)

Week 6, 08/11/2021 – 13/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Effect of impurity of NaCl on CST of Phenol water system (Experiment -6)
- Viva-voce

Week 7, 15/11/2021 - 20/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Phase diagram of a binary system by cooling curve (Experiment -7)
- Viva-voce

Section B : Organic Chemistry

Week 8, 22/11/2021 – 27/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Separation of amino acids by paper chromatography (Experiment -8)
- Viva-voce

Week 9, 29/11/2021 – 04/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Determination of conc. of glycine by formylation method (Experiment -9)
- Viva-voce

Week 10, 06/12/2021 – 11/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Titration curve of glycine (Experiment -10)
- Viva-voce

Week 11, 13/12/2021 – 18/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Action of salivary amylase on starch and effect of temperature (Experiment -11 & 12)
- Viva-voce

Week 12, 20/12/2021 – 25/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Differentiation between reducing and non reducing sugars (Experiment -13)
- Viva-voce.

Week 13, 27/12/2021 – 01/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-I (Experiment -14)
- Viva-voce

Week 14, 03/01/2022 – 08/01/2022

- Discussion on previous week experiment
- Introduction to next experiment

- Systematic qualitative organic analysis-II (Experiment -15)
- Viva-voce

Week 15, 10/01/2022 – 15/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-III (Experiment -16)
- Viva-voce
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Week 16, 17/01/2022 – 22/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-IV (Experiment -17)
- Viva-voce

Week 17, 24/01/2022 – 29/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-V (Experiment -18)
- Viva-voce

Week 18, 31/01/2022 – 05/02/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-VI (Experiment -19)
- Viva-voce

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2020 TO MARCH 2021)

Name of the Assistant/Associate Professor : Mr. Jitender Kumar

Class: B.Sc. III (5th Semester) **Section: A & B**

Subject: Chemistry of Main Group Elements, Theories of Acids and Bases

Paper: CCL-503(ii)

UNIT –I Acids and Bases
Week 1, 04/10/2021 – 09/10/2021 Introduction Bronsted–Lowry concept, conjugate acids and bases
Week 2, 11/10/2021 – 16/10/2021 Brief revision of previous week topics Relative strengths of acids and bases, effects of substituent and solvent, differentiating and levelling solvents
Week 3, 18/10/2021 – 23/10/2021 Brief revision of previous week topics Lewis acid-base concept, classification of Lewis acids and bases, Lux-Flood concept and solvent system concept.
Week 4, 25/10/2021 – 30/10/2021 Brief revision of previous week topics Hard and soft acids and bases (HSAB concept), applications of HSAB process.
Unit-II General Principles of Metallurgy:
Week 5, 01/11/2021 - 06/11/2021 Brief revision of previous week topics Chief modes of occurrence of metals based on standard electrode potentials
Week 6, 08/11/2021 – 13/11/2021 Brief revision of previous week topics Ellingham diagrams for reduction of metal oxides using carbon and carbon monoxide as reducing agents.
Week 7, 15/11/2021 - 20/11/2021 Hydrometallurgy with reference to cyanide process for gold and silver Methods of purification of metals (Al, Pb, Ti)
Week 8, 22/11/2021 – 27/11/2021 Brief revision of previous week topics

Methods of purification of metals (Fe, Cu, Ni, Zn, Au): electrolytic refining, zone refining, van Arkel-de Boer process
Week 9, 29/11/2021 – 04/12/2021 Parting Process, Mond's process and Kroll Process. Revision Of Unit -I and II
UNIT –III s- and p-Block Elements
Week 10, 06/12/2021 – 11/12/2021 Introduction Periodicity in *s*- and *p*-block elements with respect to electronic configuration, atomic and ionic size, ionization enthalpy, electron gain enthalpy, electronegativiy (Pauling scale).
Week 11, 13/12/2021 – 18/12/2021 General characteristics of *s*-block metals like density, melting and boiling points, flame colour and reducing nature. Minor test
Week 12, 20/12/2021 – 25/12/2021 Brief revision of previous week topics Oxidation states of *s*- and *p*-block elements, inert-pair effect, diagonal relationships and anomalous behaviour of first member of each group.
Week 13, 27/12/2021 – 01/01/2022 Allotropy in C, P and S.
UNIT –IV
Week 14, 03/01/2022 – 08/01/2022 Complex forming tendency of *s* block elements and a preliminary idea of crown ethers and cryptates .
Week 15, 10/01/2022 – 15/01/2022 Structures of basic beryllium acetate, salicylaldehyde/ acetylacetonato complexes of Group 1 metals. Solutions of alkali metals in liquid ammonia and their properties.
Week 16, 17/01/2022 – 22/01/2022 Common features, such as ease of formation, solubility and stability of oxides, peroxides, superoxides.
Week 17, 24/01/2022 – 29/01/2022 Common features, such as ease of formation, solubility and stability of sulphates and carbonates of *s*-block metals.
Week 18, 31/01/2022 – 05/02/2022 Revision Of Unit I, II, III, and IV and Problem solving

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor: Mr. Jitender Kumar

Class: B.Sc. I (1st Semester) **Group: C-1 & C-3**
Subject: Chemistry practicals **Paper: CCP-109**

Section A: Inorganic Chemistry - Volumetric Analysis
Week 1, 04/10/2021 – 09/10/2021 • Introduction • Do's and don't in laboratory • Handling of chemical and glassware • Maintaining of lab note book and lab record
Week 2, 11/10/2021 – 16/10/2021 Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture. • Viva-voce
Week 3, 18/10/2021 – 23/10/2021 • Discussion on previous week experiment • Introduction to next experiment • Estimation of oxalic acid by titrating it with KMnO4 • Viva-voce
Week 4, 25/10/2021 – 30/10/2021 • Discussion on previous week experiment • Estimation of Fe (II) ions by titrating it with $K_2Cr_2O_7$ using internal indicator. • Viva-voce
Week 5, 01/11/2021 - 06/11/2021 • Discussion on previous week experiment • Introduction to next experiment • Viva-voce **Week 5 (01/11/2021 – 07/11/2021 : Diwali Break)**
Week 6, 08/11/2021 – 13/11/2021 • Discussion on previous week experiment • Introduction to next experiment • Estimation of Cu (II) ions iodometrically using Na2S2O3.
Week 7, 15/11/2021 - 20/11/2021 • Discussion on previous week experiment

- Viva-voce

Section B : Organic Chemistry

Week 8, 22/11/2021 – 27/11/2021

- Introduction to next experiment
- Detection of extra elements (N, S, Cl, Br, I) in organic compounds (containing upto two extra elements)

Week 9, 29/11/2021 – 04/12/2021

- Detection of extra elements (N, S, Cl, Br, I) in organic compounds (containing upto two extra elements)
- Viva-voce

Week 10, 06/12/2021 – 11/12/2021

- Detection of extra elements (N, S, Cl, Br, I) in organic compounds (containing upto two extra elements)
- Viva-voce

Week 11, 13/12/2021 – 18/12/2021

- Detection of extra elements (N, S, Cl, Br, I) in organic compounds (containing upto two extra elements)
- Viva-voce

Week 12, 20/12/2021 – 25/12/2021

Separation of mixtures by Chromatography: Measure the Rf value in each case

(combination of two compounds to be given)

- Viva-voce.

Week 13, 27/12/2021 – 01/01/2022

Separation of mixtures by Chromatography: Measure the Rf value in each case

(combination of two compounds to be given)

Viva-voce

Week 14, 03/01/2022 – 08/01/2022

- Identify and separate the components of a given mixture of two amino acids (glycine, aspartic acid, glutamic acid, tyrosine or any other amino acid) by paper chromatography

Week 15, 10/01/2022 – 15/01/2022

- Discussion on previous week experiment

- Identify and separate the components of a given mixture of two amino acids glycine by paper chromatography
- Viva-voce

Week 16, 17/01/2022 – 22/01/2022

- Discussion on previous week experiment
- Identify and separate the components of a given mixture of two amino aspartic acids by paper chromatography
- Viva-voce

Week 17, 24/01/2022 – 29/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Identify and separate the sugars present in the given mixture by paper chromatography.
- Viva-voce

Week 18, 31/01/2022 – 05/02/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Identify and separate the sugars present in the given mixture by paper chromatography.
- Viva-voce

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor : Mr. Jitender Kumar

Class: B.Sc. III (5th Semester) **Group: C-3**
Subject: Chemistry practicals **Paper: CCP-509(ii)**

Week 1, 04/10/2021 – 09/10/2021

- Introduction
- Do's and don't in laboratory
- Handling of chemical and glassware
- Maintaining of lab note book and lab record

Week 2, 11/10/2021 – 16/10/2021

- Iodometric estimation of potassium dichromate (Experiment -1)
- Viva-voce

Week 3,18/10/2021 – 23/10/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Iodometric estimation of copper sulphate (Experiment -2)
- Viva-voce

Week 4, 25/10/2021 – 30/10/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Gravimetric estimation of sulphate as barium sulphate. (Experiment -3)
- Viva-voce

Week 5, 01/11/2021 - 06/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Gravimetric estimation of aluminium as oximato complex (Experiment -4)
- Viva-voce

Week 5 (01/11/2021 – 07/11/2021 :Diwali Break)

Week 6, 08/11/2021 – 13/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Preparation of potash alum (Experiment -5)
- Viva-voce

Week 7, 15/11/2021 - 20/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Preparation of Chrom alum (Experiment -6)

- Viva-voce

Week 8, 22/11/2021 – 27/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Separation of amino acids by paper chromatography (Experiment -7)
- Viva-voce

Week 9, 29/11/2021 – 04/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Preparation of tetraamminecopper(II) sulphate monohydrate (Experiment -8)
- Viva-voce

Week 10, 06/12/2021 – 11/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Preparation of potassium trioxalatoferrate(III) (Experiment -9)
- Viva-voce

Week 11, 13/12/2021 – 18/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Estimation of amount of available chlorine in bleaching powder and household bleaches (Experiment -10)
- Viva-voce

Week 12, 20/12/2021 – 25/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Revision of Iodometric estimation of potassium dichromate and copper sulphate. (Experiment -11&12)
- Viva-voce.

Week 13, 27/12/2021 – 01/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Revision of Gravimetric estimation of sulphate as barium sulphate. (Experiment -13)
- Viva-voce

Week 14, 03/01/2022 – 08/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Revision of Gravimetric estimation of aluminium as oximato complexes (Experiment -14)
- Viva-voce

Week 15, 10/01/2022 – 15/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Revision of preparation of potash alum and Chrom alum (Experiment -15&16)
- Viva-voce

Week 16, 17/01/2022 – 22/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Revision of preparation of tetraamminecopper(II) sulphate monohydrate, potassium trioxalatoferrate(III) (Experiment -17 &18)
- Viva-voce

Week 17, 24/01/2022 – 29/01/2022

- Discussion on previous week experiment
- Revision of Estimation of amount of available chlorine in bleaching powder and household bleaches and estimation of amino acid by paper chromatography (Experiment -19&20)
- Viva-voce

Week 18, 31/01/2022 – 05/02/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Revision of estimation of dissolved oxygen in water samples (Experiment -21)
- Viva-voce

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor : Mr. Shyam Lal

Class: B.Sc. I (1st Semester) **Section: A**
Subject: Organic Chemistry-I **Paper: CCL-105**

UNIT –I Basic Concepts of Organic Chemistry

Week 1, 04/10/2021 – 09/10/2021

- 1 Introduction
- 1.1 Scheme And syllabus
- 1.2 Pattern of examination

Week 2, 11/10/2021 – 16/10/2021

- 2 Physical Effects, Electronic Displacements: Inductive Effect, Electromeric Effect,
- 2.1 Resonance

Week 3, 18/10/2021 – 23/10/2021

- 3 Hyperconjugation ,Cleavage of Bonds: Homolysis and Heterolysis
- 3.1 Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles

Week 4, 25/10/2021 – 30/10/2021

- 4 Reactive Intermediates: Carbocations, Carbanions
- 4.1free radicals. Strength of organic acids and bases: Comparative study with emphasis on factors affecting pK values

Week 5, 01/11/2021 - 06/11/2021

- 5 Aromaticity: Benzenoids and Hückel's rule
- Problems realated to Unit

Week 5 (01/11/2021 – 07/11/2021 : Diwali Break)

UNIT-II Stereochemistry

Week 6, 08/11/2021 – 13/11/2021

- 1 Introduction
- 1.1 Conformations with respect to ethane ,butane and cyclohexane

Week 7, 15/11/2021 - 20/11/2021

- 2Interconversion of Wedge Formula, Newmann, Sawhorse and Fischer representations

- 2.1Concept of chirality (upto two carbon atoms)..;

Week 8, 22/11/2021 – 27/11/2021

- 3 Configuration: Geometrical and Optical isomerism;
- 3.1 Enantiomerism, Diastereomerism and Meso compounds

Week 9, 29/11/2021 – 04/12/2021

- 4 Preparation: Catalytic hydrogenation, Wurtz reaction, Kolbe's synthesis, from Grignard reagent
- 4.1 CIP Rules: R/ S (for upto 2 chiral carbon atoms) and E / Z Nomenclature (for upto two C=C systems)

Week 10, 06/12/2021 – 11/12/2021

- 5 Threo and erythro; D and L; cis - trans nomenclature
- 5.1 Problems of the Unit

Week 11, 13/12/2021 – 18/12/2021

- Minor test
- Solution of test

UNIT –III Aliphatic Hydrocarbons-I

Week 12, 20/12/2021 – 25/12/2021

- 1 Reactions: Free radical Substitution: Halogenation.
- 1.2 Alkenes: (Upto 5 Carbons) Preparation: Elimination reactions: Dehydration of alcohols Preparation: Acetylene from CaC2 and conversion into higher alkynes

Week 13, 27/12/2021 – 01/01/2022

- 2 Dehydrohalogenation of alkyl halides (Saytzeff's rule)
- 2.1 Cis alkenes (Partial catalytic hydrogenation) and trans alkenes (Birch reduction)

Week 14, 03/01/2022 – 08/01/2022

- 3 Reactions: cisaddition (alk. KMnO4) and trans-addition (bromine), Addition of HX
- 3.1 (Markownikoff's and anti-Markownikoff's addition)

Week 15, 10/01/2022 – 15/01/2022

- 4 Hydration, Ozonolysis, oxymecuration-demercuration,
- 4.1 Hydroboration-oxidation

UNIT-IV Aliphatic Hydrocarbons-II Alkynes

Week 16, 17/01/2022 – 22/01/2022

- 1 Acetylene from CaC2 and conversion into higher alkynes
- 1.1 Dehalogenation of tetra halides and dehydrohalogenation of vicinal-dihalides

Week 17, 24/01/2022 – 29/01/2022

- 2 Reactions: formation of metal acetylides, addition of bromine and alkaline KMnO4
- 2.1 ozonolysis and oxidation with hot alk. KMnO4.

Week 18, 31/01/2022 – 05/02/2022

- Revision
- Problems of the unit

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor : Mr. Shyam Lal

Class: B.Sc. II (3rd Semester) **Group: C-2**

Subject: Chemistry Practicals **s** **Paper: CCP-309**

Section A : Physical Chemistry

Week 1, 04/10/2021 – 09/10/2021

- Introduction
- Do's and don't in laboratory
- Handling of chemical and glassware
- Maintaining of lab note book and lab record

Week 2, 11/10/2021 – 16/10/2021

- Determination of molecular weight by Rast method (Experiment -1)
- Viva-voce

Week 3, 18/10/2021 – 23/10/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Strong acid *vs*. strong base (Experiment -2)
- Viva-voce

Week 4, 25/10/2021 – 30/10/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Weak acid *vs*. strong base (Experiment -3)
- Determination of equivalent conductance of weak acid (Experiment -4)
- Viva-voce

Week 5, 01/11/2021 - 06/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Determination of CST of Phenol water system (Experiment -5)
- Viva-voce

Week 5 (01/11/2021 – 07/11/2021 : Diwali Break)

Week 6, 08/11/2021 – 13/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Effect of impurity of NaCl on CST of Phenol water system (Experiment -6)
- Viva-voce

Week 7, 15/11/2021 - 20/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Phase diagram of a binary system by cooling curve (Experiment -7)
- Viva-voce

Section B : Organic Chemistry

Week 8, 22/11/2021 – 27/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Separation of amino acids by paper chromatography (Experiment -8)
- Viva-voce

Week 9, 29/11/2021 – 04/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Determination of conc. of glycine by formylation method (Experiment -9)
- Viva-voce

Week 10, 06/12/2021 – 11/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Titration curve of glycine (Experiment -10)
- Viva-voce

Week 11, 13/12/2021 – 18/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Action of salivary amylase on starch and effect of temperature (Experiment -11 & 12)
- Viva-voce

Week 12, 20/12/2021 – 25/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Differentiation between reducing and non reducing sugars (Experiment -13)
- Viva-voce.

Week 13, 27/12/2021 – 01/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-I (Experiment -14)
- Viva-voce

Week 14, 03/01/2022 – 08/01/2022

- Discussion on previous week experiment
- Introduction to next experiment

- Systematic qualitative organic analysis-II (Experiment -15)
- Viva-voce

Week 15, 10/01/2022 – 15/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-III (Experiment -16)
- Viva-voce
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Week 16, 17/01/2022 – 22/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-IV (Experiment -17)
- Viva-voce

Week 17, 24/01/2022 – 29/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-V (Experiment -18)
- Viva-voce

Week 18, 31/01/2022 – 05/02/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-VI (Experiment -19)
- Viva-voce

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor : Mrs.Sonia Saroya

Class: B.Sc. III(5th Semester) **Section: A &B**

Subject: Chemistry of Main Group Elements-II **Paper: CCL-504(ii)**

UNIT –I

Week1, 04/10/2021 – 09/10/2021

- 1Introduction
- 1.1Structure and bonding of group 13 hydrides (EH_3)
- 1.2 Structure and bonding in diborane: concept of multicentre bonding
- 1.3 Acidic/basic and oxidizing/ reducing nature of Diborane and group 13 hydrides (EH_3)

Week 2, 11/10/2021 – 16/10/2021

- 2 Brief revision of previous week topics
- 2.1Applications of Diborane and group 13 hydrides (EH_3)
- 2.2 Structure and bonding of group 14 hydrides (EH_4)
- 2.3 Acidic/basic and oxidizing/ reducing nature of group 14 hydrides (EH_4)

Week 3, 18/10/2021 – 23/10/2021

- 3 Brief revision of previous week topics
- 3.1 Structure and bonding of group 15 hydrides
- 3.2 Acidic/basic and oxidizing/ reducing nature of group 15 hydrides
- 3.3 Application of group 14 hydrides and 15 hydrides

Week 4, 25/10/2021 – 30/10/2021

- 4 Brief revision of previous week topics
- 4.1 Structure and bonding of group 16 hydrides
- 4.2 Acidic/basic and oxidizing/ reducing nature of group 16 hydrides
- 4.3 Applications of group 16 hydrides

Week 5, 01/11/2021 - 06/11/2021

- 5 Brief revision of previous week topics
- 5.1 Structure and bonding of group 17 hydrides
- 5.2 Acidic/basic and oxidizing/ reducing nature of group 17 hydrides
- 5.3 Application of group 17 hydrides

Week 5 (01/11/2021 – 07/11/2021 :Diwali Break)

UNIT –II

Week 6, 08/11/2021 – 13/11/2021

- 1Introduction
- 1.1 Halides of Phosphorus
- 1.2 Oxohalides of Phosphorus

Week 7, 15/11/2021 - 20/11/2021

- 2 Brief revision of previous week topics
- 2.1 Halides of Sulphur
- 2.2 Oxohalides of Sulphur
- Minor test

Week 8, 22/11/2021 – 27/11/2021

- 3Brief revision of previous week topics
- 3.1 Interhalogen compounds: Structure and bonding-I
- 3.2 Interhalogen compounds: Structure and bonding-II

Week 9, 29/11/2021 – 04/12/2021

- 4 Brief revision of previous week topics
- 4.1A brief idea of pseudohalides
- 4.2 Structure and bonding in pseudohalides
- Assignment

UNIT –III

Week 10, 06/12/2021 – 11/12/2021

- 1Introduction
- 1.1Noble gases: Brief history of discovery
- 1.2 Occurrence of noble gases in environment

Week 11, 13/12/2021 – 18/12/2021

- 2 Brief revision of previous week topics
- 2.1Preparation and properties of XeF_2
- 2.2 Preparation and properties of XeF_4 and XeF_6

Week 12, 20/12/2021 – 25/12/2021

- 3 Brief revision of previous week topics
- 3.1 Brief introduction to VBT
- 3.2 Brief introduction to VSEPR Theory

Week 13, 27/12/2021 – 01/01/2022

- 4 Brief revision of previous week topics
- 4.1Structure and bonding in XeF_2using VBT andVSEPR Theory
- 4.2 Structure and bonding in XeF_4 and XeF_6using VBT andVSEPR Theory

Week 14, 03/01/2022 – 08/01/2022

- 5Brief revision of previous week topics
- 5.1clathrates compounds of noble gases
- 5.2 Question practice

UNIT –IV

Week 15, 10/01/2022 – 15/01/2022

- 1Introduction
- 1.1Inorganic Polymers and their types
- 1.2 Structure of inorganic polymers
- 1.3 Comparison with organic polymers

Week 16, 17/01/2022 – 22/01/2022

- 2 Brief revision of previous week topics
- 2.1 Silicates and their classification
- 2.2 Structure and importance of silicates
- 2.3 Synthesis of silicones

Week 17, 24/01/2022 – 29/01/2022

- 3 Brief revision of previous week topics
- 3.1 Structural features of silicones
- 3.2 Application of silicones
- 3.3 Borazines and cyclophosphazenes- Structure, bonding, preparation, properties and reaction

Week 18, 31/01/2022 – 05/02/2022

- 4 Brief revision of previous week topics
- 4.1 Structure and bonding in $(NPCl_2)_3$.
- 4.2 Problem Solving

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor : Mrs. Sonia Saroya

Class: B.Sc. II (3rd Semester) **Section: A & B**

Subject: Physical Chemistry-II **Paper: CCL-305**

UNIT–II

Week 1, 04/10/2021 – 09/10/2021

- 1 Introduction
- 1.1 Phases, components and degrees of freedom of a system
- 1.2 Criteria of phase equilibrium

Week 2, 11/10/2021 – 16/10/2021

- 2 Brief revision of previous week topics
- 2.1 Gibbs Phase Rule and its thermodynamic derivation
- 2.2 Derivation of Clausius – Clapeyron equation

Week 3, 18/10/2021 – 23/10/2021

- 3 Brief revision of previous week topics
- 3.1 Importance of Clausius – Clapeyron equation and in phase equilibria
- 3.2 Numerical solving

Week 4, 25/10/2021 – 30/10/2021

- 4 Brief revision of previous week topics
- 4.1 Phase diagrams of one-component systems (water and sulphur)
- 4.2 Phase diagrams of two component systems involving eutectics

Week 5, 01/11/2021 - 06/11/2021

- 5 Brief revision of previous week topics
- 5.1 Congruent melting points
- 5.2 Incongruent melting points (lead-silver, and Na-K only)

Week 5 (01/11/2021 – 07/11/2021 :Diwali Break)

UNIT–III

Week 6, 08/11/2021 – 13/11/2021

- 1 Introduction
- 1.1 Conductivity
- 1.2 Equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes

Week 7, 15/11/2021 - 20/11/2021

- 2 Brief revision of previous week topics
- 2.1 Kohlrausch law of independent migration of ions

- 2.2 Transference number, ionic mobility.
- Assignment

Week 8, 22/11/2021 – 27/11/2021

- 3 Brief revision of previous week topics
- 3.1 Determination of degree of ionization of weak electrolyte
- 3.2 Solubility and solubility products of sparingly soluble salts, ionic product of water

Week 9, 29/11/2021 – 04/12/2021

- 4 Brief revision of previous week topics
- 4.1 Hydrolysis constant of a salt
- 4.2 Conductometric titrations

Week 10, 06/12/2021 – 11/12/2021

- 5 Brief revision of previous week topics
- 5.1 Concept of pH and pKa
- 5.2 Buffer solution, buffer action, Handerson Hazel Blac equation

Minor Test

UNIT –IV

Week 11, 13/12/2021 – 18/12/2021

- 1Introduction
- 1.1 Reversible and irreversible cells
- 1.2 Concept of EMF of a cell

Week 12, 20/12/2021 – 25/12/2021

- 2 Brief revision of previous week topics
- 2.1 Nernst equation and its importance
- 2.2 Types of electrodes

Week 13, 27/12/2021 – 01/01/2022

- 3 Brief revision of previous week topics
- 3.1 Standard electrode potential.
- 3.2 Electrochemical series.

Week 15, 10/01/2022 – 15/01/2022

- 4 Brief revision of previous week topics
- 4.1 Thermodynamics of a reversible cell
- 4.2 Calculation of thermodynamic properties: ΔG, ΔH and ΔS from EMF data.

Week 16, 17/01/2022 – 22/01/2022

- 5 Brief revision of previous week topics
- 5.1 Concentration cells with transference
- 5.2 Concentration cells without transference

Week 17, 24/01/2022 – 29/01/2022

- 6Brief revision of previous week topics

- 6.1 Liquid junction potential and Salt bridge
- 6.2 .pH determination using hydrogen electrode and quinhydrone electrode

Week 18, 31/01/2022 – 05/02/2022

- 7 Brief revision of previous week topics
- 7.1 Potentiometric titrations -qualitative treatment (acid-base and oxidation-reduction)
- 7.2 Numerical practice

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor : Mrs. Sonia Saroya

Class: B.Sc. III (5th Semester) **Group: C-1 & C-2**
Subject: Chemistry practicals **Paper: CCP-509(ii)**

Week 1, 04/10/2021 – 09/10/2021

- Introduction
- Do's and don't in laboratory
- Handling of chemical and glassware
- Maintaining of lab note book and lab record

Week 2, 11/10/2021 – 16/10/2021

- Iodometric estimation of potassium dichromate (Experiment -1)
- Viva-voce

Week 3,18/10/2021 – 23/10/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Iodometric estimation of copper sulphate (Experiment -2)
- Viva-voce

Week 4, 25/10/2021 – 30/10/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Gravimetric estimation of sulphate as barium sulphate. (Experiment -3)
- Viva-voce

Week 5, 01/11/2021 - 06/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Gravimetric estimation of aluminium as oximato complex (Experiment -4)
- Viva-voce

Week 5 (01/11/2021 – 07/11/2021 :Diwali Break)

Week 6, 08/11/2021 – 13/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Preparation of potash alum (Experiment -5)
- Viva-voce

Week 7, 15/11/2021 - 20/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Preparation of Chrom alum (Experiment -6)
- Viva-voce

Week 8, 22/11/2021 – 27/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Separation of amino acids by paper chromatography (Experiment -7)
- Viva-voce

Week 9, 29/11/2021 – 04/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Preparation of tetraamminecopper(II) sulphate monohydrate (Experiment -8)
- Viva-voce

Week 10, 06/12/2021 – 11/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Preparation of potassium trioxalatoferrate(III) (Experiment -9)
- Viva-voce

Week 11, 13/12/2021 – 18/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Estimation of amount of available chlorine in bleaching powder and household bleaches (Experiment -10)
- Viva-voce

Week 12, 20/12/2021 – 25/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Revision of Iodometric estimation of potassium dichromate and copper sulphate. (Experiment -11&12)
- Viva-voce.

Week 13, 27/12/2021 – 01/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Revision of Gravimetric estimation of sulphate as barium sulphate. (Experiment -13)
- Viva-voce

Week 14, 03/01/2022 – 08/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Revision of Gravimetric estimation of aluminium as oximato complexes (Experiment -

14)

- Viva-voce

Week 15, 10/01/2022 – 15/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Revision of preparation of potash alum and Chrom alum (Experiment -15&16)
- Viva-voce

Week 16, 17/01/2022 – 22/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Revision of preparation of tetraamminecopper(II) sulphate monohydrate, potassium trioxalatoferrate(III) (Experiment -17 &18)
- Viva-voce

Week 17, 24/01/2022 – 29/01/2022

- Discussion on previous week experiment
- Revision of Estimation of amount of available chlorine in bleaching powder and household bleaches and estimation of amino acid by paper chromatography (Experiment -19&20)
- Viva-voce

Week 18, 31/01/2022 – 05/02/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Revision of estimation of dissolved oxygen in water samples (Experiment -21)
- Viva-voce

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor : Dr. Prince Kumar

Class: B.Sc. II (3rd Semester) **Paper: CCL-304**

Subject: Physical chemistry

UNIT –I
Week 1, 04/10/2021 – 09/10/2021 • Postulates of Kinetic Theory of Gases and derivation of the kinetic gas equation
Week 2, 11/10/2021 – 16/10/2021 • Deviation of real gases from ideal behaviour, compressibility factor, causes of deviation. van der Waals equation of state for real gases
Week 3, 18/10/2021 – 23/10/2021 • Boyle temperature (derivation not required). Critical phenomena, critical constants and their calculation from van der Waals equation.Andrews isotherms of CO2
Week 4, 25/10/2021 – 30/10/2021 • Maxwell Boltzmann distribution laws of molecular velocities and molecular energies (graphic representation – derivation not required) and their importance. • Temperature dependence of these distributions.
Week 5, 01/11/2021 - 06/11/2021 • Brief revision of previous week topics • Most probable, average and root mean square velocities (no derivation). Collision cross section, collision number, collision frequency, collision diameter and mean free path of molecules **Week 5 (01/11/2021 – 07/11/2021 : Diwali Break)**
UNIT –II
Week 6, 08/11/2021 – 13/11/2021 • Surface tension and its determination using stalagmometer
Week 7, 15/11/2021 - 20/11/2021 • Viscosity of a liquid and determination of coefficient of viscosity using Ostwald viscometer
Week 8, 22/11/2021 – 27/11/2021 • Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only)
Week 9, 29/11/2021 – 04/12/2021 • Brief revision of previous week topics • TEST

Week 10, 06/12/2021 – 11/12/2021 • Brief revision of previous week topics
UNIT –III
Week 11, 13/12/2021 – 18/12/2021 • Forms of solids. Symmetry elements
Week 12, 20/12/2021 – 25/12/2021 • unit cells, crystal systems, Bravais lattice types and identification of lattice planes
Week 13, 27/12/2021 – 01/01/2022 • Laws of Crystallography - Law of constancy of interfacial angles, Law of rational indices. Miller indices
Week 14, 03/01/2022 – 08/01/2022 • Brief revision of previous week topics • X–Ray diffraction by crystals, Bragg's law.Structures of NaCl, KCl and CsCl (qualitative treatment only).Defects in crystals.
Week 15, 10/01/2022 – 15/01/2022 • Brief revision of previous week topics
Week 16, 17/01/2022 – 22/01/2022 Brief revision of previous week topics
UNIT –IV
Week 17, 24/01/2022 – 29/01/2022 • The concept of reaction rates. Effect of temperature, pressure, catalyst and other factors on reaction rates
Week 18, 31/01/2022 – 05/02/2022 • Order and molecularity of a reaction.Derivation of integrated rate equations for zero, first and second order reactions. Half–life of a reaction.General methods for determination of order of a reaction.Concept of activation energy and its calculation from Arrhenius equation. Theories of Reaction Rates: Collision theory and Activated Complex theory of bimolecular reactions. Comparison of the two theories

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor : Dr. Prince Kumar

Class : B.SC(6TH SEM.) **CCS-505(ii)**

Subject: FUEL CHEMISTRY

UNIT-1
Week 1, 04/10/2021 – 09/10/2021 • Review of energy sources (renewable and non-renewable). Classification of fuels and their calorific value.
Week 2, 11/10/2021 – 16/10/2021 • Uses of coal (fuel and nonfuel) in various industries, its composition, carbonization of coal. Coal gas, producer gas and water ga
Week 3, 18/10/2021 – 23/10/2021 • Fractionation of coal tar, uses of coal tar bases chemicals, requisites of a good metallurgical coke, Coal gasification (Hydro gasification and Catalytic gasification)
Week 4, 25/10/2021 – 30/10/2021 • Fractionation of coal tar, uses of coal tar bases chemicals, requisites of a good metallurgical coke, Coal gasification (Hydro gasification and Catalytic gasification)
Week 5, 01/11/2021 - 06/11/2021 • Brief revision of previous week topics .**Week 5 (01/11/2021 – 07/11/2021 : Diwali Break)**
Week 6, 08/11/2021 – 13/11/2021 • Composition of crude petroleum
Week 7, 15/11/2021 - 20/11/2021 • Refining and different types of petroleum products and their applications.
Week 8, 22/11/2021 – 27/11/2021 • Refining and different types of petroleum products and their applications.
Week 9, 29/11/2021 – 04/12/2021 • Brief revision of previous week topics • TEST
Week 10, 06/12/2021 – 11/12/2021 • Brief revision of previous week topics
UNIT –II
Week 11, 13/12/2021 – 18/12/2021

• Fractional Distillation (Principle and process), Cracking (Thermal and catalytic cracking)
Week 12, 20/12/2021 – 25/12/2021 • Reforming Petroleum and non-petroleum fuels (LPG, CNG, LNG, bio-gas, fuels derived from biomass)
Week 13, 27/12/2021 – 01/01/2022 • fuel from waste, synthetic fuels (gaseous and liquids), clean fuels. Petrochemicals: Vinyl acetate
Week 14, 03/01/2022 – 08/01/2022 • Brief revision of previous week topics • Propylene oxide, Isoprene, Butadiene, Toluene and its derivatives Xylene
Week 15, 10/01/2022 – 15/01/2022 • Brief revision of previous week topics
Week 16, 17/01/2022 – 22/01/2022 Brief revision of previous week topics
Week 17, 24/01/2022 – 29/01/2022 • Propylene oxide, Isoprene, Butadiene, Toluene and its derivatives Xylene
Week 18, 31/01/2022 – 05/02/2022 • Classification of lubricants, lubricating oils Properties of lubricants (viscosity index, cloud point, pore point) and their determination.

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor : Dr. Prince Kumar

Class: B.Sc. II (3rd Semester) **Group: C-4& C-5**

Subject: Chemistry Practicals **Paper: CCP-309**

Section A : Physical Chemistry

Week 1, 04/10/2021 – 09/10/2021

- Introduction
- Do's and don't in laboratory
- Handling of chemical and glassware
- Maintaining of lab note book and lab record

Week 2, 11/10/2021 – 16/10/2021

- Determination of molecular weight by Rast method (Experiment -1)
- Viva-voce

Week 3, 18/10/2021 – 23/10/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Strong acid *vs*. strong base (Experiment -2)
- Viva-voce

Week 4, 25/10/2021 – 30/10/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Weak acid *vs*. strong base (Experiment -3)
- Determination of equivalent conductance of weak acid (Experiment -4)
- Viva-voce

Week 5, 01/11/2021 - 06/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Determination of CST of Phenol water system (Experiment -5)
- Viva-voce

Week 5 (01/11/2021 – 07/11/2021 : Diwali Break)

Week 6, 08/11/2021 – 13/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Effect of impurity of NaCl on CST of Phenol water system (Experiment -6)
- Viva-voce

Week 7, 15/11/2021 - 20/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Phase diagram of a binary system by cooling curve (Experiment -7)
- Viva-voce

Section B : Organic Chemistry

Week 8, 22/11/2021 – 27/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Separation of amino acids by paper chromatography (Experiment -8)
- Viva-voce

Week 9, 29/11/2021 – 04/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Determination of conc. of glycine by formylation method (Experiment -9)
- Viva-voce

Week 10, 06/12/2021 – 11/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Titration curve of glycine (Experiment -10)
- Viva-voce

Week 11, 13/12/2021 – 18/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Action of salivary amylase on starch and effect of temperature (Experiment -11 & 12)
- Viva-voce

Week 12, 20/12/2021 – 25/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Differentiation between reducing and non reducing sugars (Experiment -13)
- Viva-voce.

Week 13, 27/12/2021 – 01/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-I (Experiment -14)
- Viva-voce

Week 14, 03/01/2022 – 08/01/2022

- Discussion on previous week experiment
- Introduction to next experiment

- Systematic qualitative organic analysis-II (Experiment -15)
- Viva-voce

Week 15, 10/01/2022 – 15/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-III (Experiment -16)
- Viva-voce
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Week 16, 17/01/2022 – 22/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-IV (Experiment -17)
- Viva-voce

Week 17, 24/01/2022 – 29/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-V (Experiment -18)
- Viva-voce

Week 18, 31/01/2022 – 05/02/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-VI (Experiment -19)
- Viva-voce

Session 2021-22 (Even semester)

LESSON PLAN (FROM APRIL 2022 TO MAY 2022)

Name of the Assistant/Associate Professor : Dr. Kuldeep Mahiya

Class: B.Sc. II (4th Semester) **Section: A & B**

Subject: INORGANIC CHEMISTRY-II **Paper: CCL-404**

UNIT–I

Week 1, 01/04/2022 – 02/04/2022

- 1 Introduction
- 1.1 General group trends
- 1.2 Electronic configuration
- 1.3 Variable valency and oxidation states

Week 2, 04/04/2020 – 09/04/2022

- 2 Brief revision of previous week topics
- 2.1 Coordination number and geometry
- 2.2 Octahedral and tetrahedral geometry
- 2.3 Colour in transition metal ion complexes

Week 3, 11/04/2020 – 16/04/2022

- 3 Brief revision of previous week topics
- 3.1 Magnetic properties
- 3.2 Catalytic properties
- 3.3 Complex formation ability of transition metal ion complexes
- 3.4 Latimer diagrams for Mn, Fe and Cu.

UNIT-II

Week 4, 18/04/2022 – 23/04/2022

- 1 Introduction
- 1.1 Electronic configurations
- 1.2 oxidation states
- 1.3 Stability of different oxidation states

Week 5, 25/04/2022 - 30/04/2022

- 2 Brief revision of previous week topics
- 2.1 Colour and magnetic properties
- 2.2 lanthanide contraction and its consequences
- 2.3 Separation of lanthanides
- Minor test

UNIT-III

Week 6, 02/05/2022 – 07/05/2022

- 1 Introduction
- 1.1 Valence Bond Theory (VBT)

- 1.2 Inner and outer orbital complexes of Cr and Fe (coordination numbers 4 and 6)
- 1.3 Inner and outer orbital complexes of Co, Ni and Cu (coordination numbers 4 and 6)

Week 7, 09/05/2022 - 14/05/2022

- 3 Brief revision of previous week topics
- 3.1 Isomerism in coordination compounds
- 3.2 Structural and stereoisomerism in complexes with coordination numbers 4 & 6

Week 8, 16/05/2022 – 21/05/2022

- Brief revision of previous week topics
- 5.2 IUPAC system of nomenclature
- 5.3 Drawbacks of VBT

UNIT-IV

Week 9, 23/05/2022 – 28/05/2022

- 1 Introduction
- 1.1 Crystal field effect: Tetrahedral and octahedral symmetry
- 1.2 Crystal field effects for weak and strong fields
- 1.3 Factors affecting the magnitude of d-orbital splittings, Spectrochemical series

Week 10, 30/05/2022 – 31/05/2022

- 2 Brief revision of previous week topics
- 2.1 Comparison of CFSE for Oh and Td complexes
- 2.2 Tetragonal distortion of octahedral geometry: Jahn-Teller distortion
- 2.3 Square planar coordination

Session 2021-22 (Even semester)

LESSON PLAN (FROM APRIL 2022 TO MAY 2022)

Name of the Assistant/Associate Professor : Dr. Kuldeep Mahiya

Class: B.Sc. III (6th Semester) **Section: A & B**

Subject: Organometallics and bioinorganic chemistry **Paper: CCL-603(i)**

UNIT–I

Week 1, 01/04/2022 – 02/04/2022

- 1 Introduction
- 1.1 Chemistry of 3d metals
- 1.2 Oxidation states displayed by Cr, Fe, Co, Ni and Co
- 1.3 Preparation and important properties of peroxo compounds of Cr and Mn

Week 2, 04/04/2020 – 09/04/2022

- 2 Brief revision of previous week topics
- 2.1 Preparation and important properties of compounds of Co
- 2.2 Preparation and important properties of compounds of Fe
- 2.3 Structures of some important compounds of Cr, Mn, Fe, Ni, Cu and Co

UNIT-II

Week 3, 11/04/2020 – 16/04/2022

- 1 Introduction
- 1.1 Organometallic Compounds: Definition and Classification
- 1.2 Nature of metal-carbon bond: Ionic, covalent and multicentre bonds
- 1.3 Structures of alkyl lithium

Week 4, 18/04/2022 – 23/04/2022

- 2 Brief revision of previous week topics
- 2.1 Structure of zeiss salt and ferrocene
- 2.2 EAN rule
- 2.3 Preparation of mononuclear and polynuclear carbonyls of 3d metals

UNIT-III

Week 5, 25/04/2022 - 30/04/2022

- 1 Introduction
- 1.1 Structure of mononuclear and polynuclear carbonyls of 3d metals
- 1.2 Bonding in mononuclear and polynuclear carbonyls of 3d metals
- Minor test

Week 6, 02/05/2022 – 07/05/2022

- 2 Brief revision of previous week topics
- 2.1 MO diagram of CO: pi-acceptor behaviour of carbon monoxide
- 2.2 Synergic bonding effects

Week 7, 09/05/2022 - 14/05/2022

- 3 Brief revision of previous week topics
- 3.1 IR stretching frequencies in metal carbonyls
- 3.2 Chemical properties of mononuclear and polynuclear carbonyls of 3d metals

UNIT-IV

Week 8, 16/05/2022 – 21/05/2022

- 1 Introduction
- 1.1 Role of metal ions present in biological systems
- 1.2 Na/K pump
- 1.3 Role of Mg^{2+} ions in energy production and chlorophyll

Week 9, 23/05/2022 – 28/05/2022

- 2 Brief revision of previous week topics
- 2.1 Role of Ca^{2+} in blood clotting
- 2.2 Structure of proteins
- 2.3 Stabilization of protein structures and structural role of Ca^{2+} (bones)

Week 10, 30/05/2022 – 31/05/2022

- 3 Brief revision of previous week topics
- 3.1 Structure and role of important proteins in biological system

Session 2021-22 (Even semester)

LESSON PLAN (FROM APRIL 2022 TO MAY 2022)

Name of the Assistant/Associate Professor : Dr. Kuldeep Mahiya

Class: B.Sc. II (4th Semester) **Group: C-1, C-3 & C-4**

Subject: Chemistry Practicals **Paper: CCL-409**

Section A : Inorganic Chemistry
Week 1, 01/04/2022 – 02/04/2022 • Introduction • Do's and don't in laboratory • Handling of chemical and glassware • Maintaining of lab note book and lab record
Week 2, 04/04/2020 – 09/04/2022 • Estimate the amount of nickel present in a given solution as bis(dimethylglyoximato)nickel (II) in a given solution gravimetrically. (Experiment -1) • Viva-voce
Week 3, 11/04/2020 – 16/04/2022 • Discussion on previous week experiment • Introduction to next experiment • Estimation of (i) Mg^{2+} or (ii) Zn^{2+} by complexometric titrations using EDTA (Experiment -2) • Viva-voce
Week 4, 18/04/2022 – 23/04/2022 • Discussion on previous week experiment • Introduction to next experiment • Estimation of total hardness of a given sample of water by complexometric titration. (Experiment -3) • Viva-voce
Section B : Physical Chemistry
Week 5, 25/04/2022 - 30/04/2022 • Discussion on previous week experiment • Introduction to next experiment • Surface tension measurement using stalgamometer (use of organic solvents excluded) (Experiment -4) • Viva-voce
Week 6, 02/05/2022 – 07/05/2022 • Discussion on previous week experiment

- Introduction to next experiment
- Study of the variation of surface tension of a detergent solution with concentration (Experiment -5)
- Viva-voce

Week 7, 09/05/2022 - 14/05/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Determination of the viscosity of a liquid or dilute solution using an Ostwald's viscometer (Experiment -6)
- Viva-voce

Week 8, 16/05/2022 – 21/05/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Study of the variation of viscosity of an aqueous solution with concentration of solute (Experiment -7)
- Viva-voce

Week 9, 23/05/2022 – 28/05/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Acid hydrolysis of methyl acetate with hydrochloric acid (Experiment -8)
- Viva-voce

Week 10, 30/05/2022 – 31/05/2022

- Discussion on previous week experiment
- Lab record
- Viva-voce

Session 2021-22 (Even semester)

LESSON PLAN (FROM APRIL 2022 TO MAY 2022)

Name of the Assistant/Associate Professor: Mr. Jitender Kumar

Class: B.Sc. II (4th Semester) **Section: A & B**

Subject: PHYSICAL CHEMISTRY-III **Paper: CCL-405**

UNIT–I Kinetic Theory of Gases
Week 1, 01/04/2022 – 02/04/2022 Introduction Postulates of Kinetic Theory of Gases and derivation of the kinetic gas equation.
Week 2, 04/04/2020 – 09/04/2022 Deviation of real gases from ideal behaviour, compressibility factor, causes of deviation. van der Waals equation of state for real gases. Boyle temperature (derivation not required).
Week 3, 11/04/2020 – 16/04/2022 Critical phenomena, critical constants and th eir calculation from van der Waals equation. Andrew's isotherms of CO2.
Week 4, 18/04/2022 – 23/04/2022 Maxwell Boltzmann distribution laws of molecular velocities and molecular energies (Graphic representation – derivation not required) and their importance.
Week 5, 25/04/2022 - 30/04/2022 Temperature dependence of these distributions.Most probable, average and root mean square velocities (no derivation). Collision cross section, collision number, collision frequency, collision diameter and mean free path of molecules. Minor test
UNIT-II Liquids
Week 6, 02/05/2022 – 07/05/2022 Introduction Surface tension and its determination using stalagmometer. Viscosity of a liquid and determination of coefficient of viscosity using Ostwald viscometer. Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only).
UNIT-III Solids
Week 7, 09/05/2022 - 14/05/2022 Forms of solids. Symmetry elements, unit cells, crystal systems, Bravais lattice types and identification of lattice planes. Laws of Crystallography - Law of constancy of interfacial angles, Law of rational indices.

UNIT-IV Chemical Kinetics:

Week 8, 16/05/2022 – 21/05/2022

Miller indices. X–Ray diffraction by crystals, Bragg's law.Structures of NaCl, KCl and CsCl (qualitative treatment only). Defects in crystals. The concept of reaction rates. Effect of temperature, pressure, catalyst, and other factors on reaction rates.

Week 9, 23/05/2022 – 28/05/2022

Order and molecularity of a reaction. Derivation of integrated rate equations for zero, firs t and second order reactions (both for equal and unequal concentrations of reactants). Half–life of a reaction.General methods for determination of order of a reaction.

Week 10, 30/05/2022 – 31/05/2022

Concept of activation energy and its calculation from Arrhenius equation. Theories of Reaction Rates: Collision theory and Activated Complex theory of bimolecular reactions. Comparison of the two theories (qualitative treatment only)

Session 2021-22 (Even semester)

LESSON PLAN (FROM APRIL 2022 TO MAY 2022)

Name of the Assistant/Associate Professor : Mr. Jitender Kumar

Class: B.Sc. II (4th Semester) **Group: C-2**

Subject: Chemistry Practicals **Paper: CCL-409**

Section A : Inorganic Chemistry
Week 1, 01/04/2022 – 02/04/2022 • Introduction • Do's and don't in laboratory • Handling of chemical and glassware • Maintaining of lab note book and lab record
Week 2, 04/04/2020 – 09/04/2022 • Estimate the amount of nickel present in a given solution as bis(dimethylglyoximato)nickel (II) in a given solution gravimetrically. (Experiment -1) • Viva-voce
Week 3, 11/04/2020 – 16/04/2022 • Discussion on previous week experiment • Introduction to next experiment • Estimation of (i) Mg^{2+} or (ii) Zn^{2+} by complexometric titrations using EDTA (Experiment -2) • Viva-voce
Week 4, 18/04/2022 – 23/04/2022 • Discussion on previous week experiment • Introduction to next experiment • Estimation of total hardness of a given sample of water by complexometric titration. (Experiment -3) • Viva-voce
Section B : Physical Chemistry
Week 5, 25/04/2022 - 30/04/2022 • Discussion on previous week experiment • Introduction to next experiment • Surface tension measurement using stalgamometer (use of organic solvents excluded) (Experiment -4) • Viva-voce
Week 6, 02/05/2022 – 07/05/2022 • Discussion on previous week experiment • Introduction to next experiment

- Study of the variation of surface tension of a detergent solution with concentration (Experiment -5)
- Viva-voce

Week 7, 09/05/2022 - 14/05/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Determination of the viscosity of a liquid or dilute solution using an Ostwald's viscometer (Experiment -6)
- Viva-voce

Week 8, 16/05/2022 – 21/05/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Study of the variation of viscosity of an aqueous solution with concentration of solute (Experiment -7)
- Viva-voce

Week 9, 23/05/2022 – 28/05/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Acid hydrolysis of methyl acetate with hydrochloric acid (Experiment -8)
- Viva-voce

Week 10, 30/05/2022 – 31/05/2022

- Discussion on previous week experiment
- Lab record
- Viva-voce

Session 2021-22 (Even semester)

LESSON PLAN (FROM APRIL 2022 TO MAY 2022)

Name of the Assistant/Associate Professor : Mr. Jitender Kumar

Class: B.Sc. II (4th Semester) **Group: C-2**

Subject: Chemistry Practicals **Paper: CCP-609 (i)**

Section A : Inorganic Chemistry
Week 1, 01/04/2022 – 02/04/2022 Separation of mixtures by chromatography: Measure the *Rf* value in each case. (Combination of two ions to be given)
Week 2, 04/04/2020 – 09/04/2022 Paper chromatographic separation of Fe3+, A13+ and Cr3+ or
Week 3, 11/04/2020 – 16/04/2022 Paper chromatographic separation of Ni2+, Co2+, Mn2+ and Zn2+
Week 4, 18/04/2022 – 23/04/2022 Preparation of following complexes and measurement of their conductivity: tetraamminecopper (II) sulphate
Week 5, 25/04/2022 - 30/04/2022 Preparation of the following complexes and measurement of their conductivity: tetraamminecarbonatocobalt (III) nitrate
Week 6, 02/05/2022 – 07/05/2022 Preparation of the following complexes and measurement of their conductivity: potassium trioxalatoferrate (III) trihydrate Compare the conductance of the complexes with that of M/1000 solution of NaCl, MgCl2 and LiCl3.
Section A : Organic Chemistry
Week 7, 09/05/2022 - 14/05/2022 Systematic Qualitative Organic Analysis of Organic Compounds possessing monofunctional groups (-COOH, phenolic, aldehydic, ketonic, amide, nitro, amines) and preparation of one derivative. Viva-voce
Week 8, 16/05/2022 – 21/05/2022 Systematic Qualitative Organic Analysis of Organic Compounds possessing monofunctional groups (-aldehydic, ketonic, amide, nitro, amines) and preparation of one derivative.
Week 9, 23/05/2022 – 28/05/2022

Systematic Qualitative Organic Analysis of Organic Compounds possessing monofunctional groups (amide, nitro, amines) and preparation of one derivative.
Week 10, 30/05/2022 – 31/05/2022 Discussion on previous week experiment Lab record Viva-voce

Session 2021-22 (Even semester)

LESSON PLAN (FROM APRIL 2022 TO MAY 2022)

Name of the Assistant/Associate Professor : Mr. Shyam Lal

Class: B.Sc. II (4th Semester) **Section: A & B**

Subject: INORGANIC CHEMISTRY-II **Paper: CCL-404**

UNIT–I Aromatic hydrocarbons

Week 1, 01/04/2022 – 02/04/2022

- 1.Introduction
- 1.1 Preparation (Case benzene): from phenol, by decarboxylation, from acetylene, from benzene sulphonic acid.

Week 2, 04/04/2020 – 09/04/2022

- 2 Reactions: (Case benzene): Electrophilic substitution: nitration, halogenation
- 2.1 Sulphonation. Friedel-Craft's reaction (alkylation and acylation)

Week 3, 11/04/2020 – 16/04/2022

- 3 Side chain oxidation of alkyl benzenes
- 3.1 Problem solving

UNIT-II Alkyl and Aryl Halides

Week 4, 18/04/2022 – 23/04/2022

- 1 Alkyl Halides (Upto 5 Carbons) Types of Nucleophilic Substitution (SN1, SN2 and SNi) reactions
- 1.1 Preparation: from alkenes and alcohols. Reactions: hydrolysis, nitrite & nitro formation, nitrile & isonitrile formation. Williamson's ether synthesis:
- 1.2Elimination vs substitution. bromo and iodo-benzene case): from phenol, Sandmeyer & Gattermann reactions. Reactions (Chlorobenzene)

Week 5, 25/04/2022 - 30/04/2022

- 2 Aromatic nucleophilic substitution (replacement by – OH group) and effect of nitro substituent.
- 2.1 Benzyne Mechanism: KNH2/NH3 (or NaNH2/NH3). Reactivity and Relative strength of C-Halogen bond in alkyl, allyl, benzyl, vinyl and aryl halides
- 2Minor test

UNIT-III Alcohols, Phenols and Ethers

Week 6, 02/05/2022 – 07/05/2022

- 1 Introduction
- 1.1Preparation: Preparation of 1º , 2º and 3º alcohols: using Grignard reagent, Ester hydrolysis, Reduction of aldehydes, ketones, carboxylic acid and esters. Reactions: With sodium, HX (Lucas test),.

Week 7, 09/05/2022 - 14/05/2022

- 3 Brief revision of previous week topics
- 3.1 Esterification, oxidation (with PCC, alk. KMnO4, acidic dichromate, conc. HNO3). Oppeneauer oxidation Diols: (Upto 6 Carbons) oxidation of diols. Pinacol-Pinacolone rearrangement

Week 8, 16/05/2022 – 21/05/2022

- 3 Brief revision of previous week topics
- 3.1 Phenols: (Phenol case) Preparation: Cumene hydroperoxide method, from diazonium salts. Reactions: Electrophilic substitution: Nitration, halogenation and sulphonation. Reimer-Tiemann Reaction, Gattermann-Koch Reaction, Houben– Hoesch Condensation, Schotten – Baumann Reaction. Ethers (aliphatic and aromatic): Cleavage of ethers with HI

UNIT-IV Aldehydes and ketones (aliphatic and aromatic)

Week 9, 23/05/2022 – 28/05/2022

- 1 Introduction
- 1.1 Preparation: from acid chlorides and from nitriles. Reactions – Reaction with HCN, ROH, NaHSO3, NH2-G derivatives.

Week 10, 30/05/2022 – 31/05/2022

- 2 Brief revision of previous week topics
- 2.1 Iodoform test. Aldol Condensation, Cannizzaro's reaction, Wittig reaction, Benzoin condensation. Clemensen reduction and Wolff Kishner reduction. MeerweinPondorff Verley reduction

Session 2021-22 (Even semester)

LESSON PLAN (FROM APRIL 2022 TO MAY 2022)

Name of the Assistant/Associate Professor : Mr. Shyam Lal

Class: B.Sc. II (4th Semester) **Group: C-5**

Subject: Chemistry Practicals **Paper: CCL-409**

Section A : Inorganic Chemistry
Week 1, 01/04/2022 – 02/04/2022 • Introduction • Do's and don't in laboratory • Handling of chemical and glassware • Maintaining of lab note book and lab record
Week 2, 04/04/2020 – 09/04/2022 • Estimate the amount of nickel present in a given solution as bis(dimethylglyoximato)nickel (II) in a given solution gravimetrically. (Experiment -1) • Viva-voce
Week 3, 11/04/2020 – 16/04/2022 • Discussion on previous week experiment • Introduction to next experiment • Estimation of (i) Mg^{2+} or (ii) Zn^{2+} by complexometric titrations using EDTA (Experiment -2) • Viva-voce
Week 4, 18/04/2022 – 23/04/2022 • Discussion on previous week experiment • Introduction to next experiment • Estimation of total hardness of a given sample of water by complexometric titration. (Experiment -3) • Viva-voce
Section B : Physical Chemistry
Week 5, 25/04/2022 - 30/04/2022 • Discussion on previous week experiment • Introduction to next experiment • Surface tension measurement using stalgamometer (use of organic solvents excluded) (Experiment -4) • Viva-voce
Week 6, 02/05/2022 – 07/05/2022 • Discussion on previous week experiment • Introduction to next experiment

- Study of the variation of surface tension of a detergent solution with concentration (Experiment -5)
- Viva-voce

Week 7, 09/05/2022 - 14/05/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Determination of the viscosity of a liquid or dilute solution using an Ostwald's viscometer (Experiment -6)
- Viva-voce

Week 8, 16/05/2022 – 21/05/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Study of the variation of viscosity of an aqueous solution with concentration of solute (Experiment -7)
- Viva-voce

Week 9, 23/05/2022 – 28/05/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Acid hydrolysis of methyl acetate with hydrochloric acid (Experiment -8)
- Viva-voce

Week 10, 30/05/2022 – 31/05/2022

- Discussion on previous week experiment
- Lab record
- Viva-voce

Session 2021-22 (Even semester)

LESSON PLAN (FROM APRIL 2022 TO MAY 2022)

Name of the Assistant/Associate Professor : Mrs. Sonia Saroya

Class: B.Sc. II (4th Semester) **Section: A &B**

Subject: Polynuclear hydrocarbons and UV, IR Spectroscopy **Paper: CCL-604(i)**

UNIT–I

Week 1, 04/04/2020 – 09/04/2022

- 1 Introduction
- 1.1 Properties with reference to electrophilic and nucleophilic substitution of Napthalene
- 1.2 Properties with reference to electrophilic and nucleophilic substitution of Anthracene
- 1.3 Properties with reference to electrophilic and nucleophilic substitution of Furan
-

Week 2,11/04/2020 – 16/04/2022

- 2 Brief revision of previous week topics
- 2.1 Properties with reference to electrophilic and nucleophilic substitution of Pyrrole
- 2.2 Properties with reference to electrophilic and nucleophilic substitution of Thiophene
- 2.3 Properties with reference to electrophilic and nucleophilic substitution of Pyridine

UNIT-II

Week 3, 18/04/2022 – 23/04/2022

- 1Introduction
- 1.1 Preparation: Claisen ester condensation
- 1.2 Keto-enoltautomerism

Week 4, 25/04/2022 - 30/04/2022

- 2 Brief revision of previous week topics
- 2.1 Reactions: Synthetic uses of ethyl acetoacetate (preparation of non-hetero molecules having upto 6 carbon)
- Minor Test

UNIT-III

Week 5, 02/05/2022 – 07/05/2022

- 1Introduction
- 1.1 Application of visible, ultraviolet and infrared spectroscopy in organic molecules
- 1.2 Electromagnetic radiations, electronic transitions, λmax&εmax

Week 6, 09/05/2022 - 14/05/2022

- 2 Brief revision of previous week topics
- 2.1 Chromophore, auxochrome, bathochromic and hypsochromic shifts
- 2.2 Application of electronic spectroscopy

Week 7, 16/05/2022 – 21/05/2022

- 3 Brief revision of previous week topics
- 3.1 Woodward rules for calculating λmax of conjugated dienes and α,β-unsaturated compounds
- 3.2 Problem solving
- Assignment

UNIT-IV

Week 8, 23/05/2022 – 28/05/2022

- 1 Introduction
- 1.1 Infrared radiation and types of molecular vibrations
- 1.2 functional group and fingerprint region
- 1.3 IR spectra of alkanes, alkenes and simple alcohols (inter and intramolecular hydrogen bonding)

Week 9, 30/05/2022 – 31/05/2022

- 2 Brief revision of previous week topics
- 2.1 IR spectra of aldehyde and ketones
- 2.2 IR spectra of carboxylic acids and their derivatives effect of substitution on >C=O stretching absorptions)

Session 2021-22 (Even semester)

LESSON PLAN (FROM APRIL 2022 TO MAY 2022)

Name of the Assistant/Associate Professor : Ms. Sonia Saroya

Class: B.Sc. II (6th Semester) **Group: C-1& C-3**

Subject: Chemistry Practicals **Paper: CCL-609 (i)**

Week 1, 01/04/2022 – 02/04/2022

- Introduction
- Do's and don't in laboratory
- Handling of chemical and glassware
- Maintaining of lab note book and lab record

Week 2, 04/04/2020 – 09/04/2022

- Paper chromatographic separation of Fe^{3+}, $A1^{3+}$ and Cr^{3+} (Experiment -1)
- Viva-voce

Week 3,11/04/2020 – 16/04/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Paper chromatographic separation of Ni^{2+}, Co^{2+} ,Mn^{2+} and Zn^{2+} (Experiment -2)
- Viva-voce

Week 4, 18/04/2022 – 23/04/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Preparation of tetraamminecarbonatocobalt (III) nitrate. (Experiment -3)
- Viva-voce

Week 5, 25/04/2022 - 30/04/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Preparation of tetraamminecopper (II) sulphate (Experiment -4)
- Viva-voce

Week 6, 02/05/2022 – 07/05/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Potassium trioxalatoferrate (III) trihydrate (Experiment -5)
- Viva-voce

Week 7, 09/05/2022 - 14/05/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic Qualitative Organic Analysis of Organic Compounds and preparation of one of its derivative-I (Experiment -6)
- Viva-voce

Week 8, 16/05/2022 – 21/05/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic Qualitative Organic Analysis of Organic Compounds and preparation of one of its derivative-II (Experiment -7)
- Viva-voce

Week 9, 23/05/2022 – 28/05/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic Qualitative Organic Analysis of Organic Compounds and preparation of one of its derivative-III (Experiment -8)
- Viva-voce

Week 10, 30/05/2022 – 31/05/2022

- Discussion on previous week experiment
- Systematic Qualitative Organic Analysis of Organic Compounds and preparation of one of its derivative-IV (Experiment -9)
- Viva-voce

Session 2021-22 (EVEN semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor: Dr. Prince Kumar

Class: B.Sc. I (2nd Semester)
Subject: Physical chemistry **Paper: CCL 204**

UNIT –I
Week 1, 04/10/2021 – 09/10/2021 • Review of thermodynamics and the Laws of Thermodynamics. • Important principles and definitions of thermochemistry. Concept of standard state and standard enthalpies of formations
Week 2, 11/10/2021 – 16/10/2021 • Integral and differential enthalpies of solution and dilution. Calculation of bond energy, bond dissociation energy
Week 3, 18/10/2021 – 23/10/2021 • Resonance energy from thermochemical data. Variation of enthalpy of a reaction with temperature – Kirchhoff's equation.
Week 4, 25/10/2021 – 30/10/2021 • Statement of Third Law of thermodynamics and calculation of absolute entropies of substances.
Week 5, 01/11/2021 - 06/11/2021 • 5 Brief revision of previous week topics • Variation of enthalpy of a reaction with temperature – Kirchhoff's equation. **Week 5 (01/11/2021 – 07/11/2021 : Diwali Break)**
UNIT –II
Week 6, 08/11/2021 – 13/11/2021 • Free energy change in a chemical reaction.
Week 7, 15/11/2021 - 20/11/2021 • Thermodynamic derivation of the law of chemical equilibrium. Distinction between G and G
Week 8, 22/11/2021 – 27/11/2021 • Le Chatelier's principle.
Week 9, 29/11/2021 – 04/12/2021 • Brief revision of previous week topics • Relationships between Kp, Kc and Kx for reactions involving ideal gases

Week 10, 06/12/2021 – 11/12/2021

- Brief revision of previous week topics

UNIT –III

Week 11, 13/12/2021 – 18/12/2021

- Strong, moderate and weak electrolytes, degree of ionization

Week 12, 20/12/2021 – 25/12/2021

- Factors affecting degree of ionization, ionization constant and ionic product of water.

Week 13, 27/12/2021 – 01/01/2022

- Ionization of weak acids and bases,

Week 14, 03/01/2022 – 08/01/2022

- Brief revision of previous week topics
- pH scale, common ion effect.

Week 15, 10/01/2022 – 15/01/2022

- Brief revision of previous week topics

Week 16, 17/01/2022 – 22/01/2022

Degree of ionization, ionization constant and ionic product of water.Solubility and solubility product of sparingly
soluble salts – applications of solubility product principle

UNIT –IV

Week 17, 24/01/2022 – 29/01/2022

- Salt hydrolysis-calculation of hydrolysis constant,

Week 18, 31/01/2022 – 05/02/2022

- Brief revision of previous week topics
- Degree of hydrolysis and pH for different salts. Buffer solutions.

Session 2021-22 (even semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor: Dr. Prince Kumar

Class: B.Sc. III (6th Semester) **Section: A & B**

Subject: POLYNUCLEAR HYDROCARBONS **Paper: CCL-604(i)**

UNIT–I

Week 1, 04/10/2021 – 09/10/2021

- Properties of the following compounds with reference to electrophilic and nucleophilic substitution

Week 2, 11/10/2021 – 16/10/2021

- Naphthalene, Anthracene, Furan, Pyrrole, Thiophene, and Pyridine.

Week 3, 18/10/2021 – 23/10/2021

- 3 Brief revision of previous week topics

Week 4, 25/10/2021 – 30/10/2021

- Brief revision of previous week topics

Week 5, 01/11/2021 - 06/11/2021

- 5 Brief revision of previous week topics

Naphthalene, Anthracene, Furan, Pyrrole, Thiophene, and Pyridine.

Week 5 (01/11/2021 – 07/11/2021 : Diwali Break)

UNIT–II

Week 6, 08/11/2021 – 13/11/2021

- Preparation: Claisen ester condensation. Keto-enoltautomerism

Week 7, 15/11/2021 - 20/11/2021

- Brief revision of previous week topics

Week 8, 22/11/2021 – 27/11/2021

- Reactions: Synthetic uses of ethyl acetoacetate (preparation of non-hetero molecules having upto 6 carbon).

Week 9, 29/11/2021 – 04/12/2021

- Reactions: Synthetic uses of ethyl acetoacetate (preparation of non-hetero molecules having upto 6 carbon).4.2 Reactions: Nitration, bromination and sulphonation

Week 10, 06/12/2021 – 11/12/2021

- Brief revision of previous week topics

UNIT –III

Week 11, 13/12/2021 – 18/12/2021

- Application of visible, ultraviolet and infrared spectroscopy in organic molecules
- Minor test

Week 12, 20/12/2021 – 25/12/2021

- Electromagnetic radiations, electronic transitions, λmax&εmax, chromophore, auxochrome, bathochromic and hypsochromic shifts.

Week 13, 27/12/2021 – 01/01/2022

- Application of electronic spectroscopy and Woodward rules for calculating λmax of conjugated dienes and α,β-unsaturated compounds.

Week 14, 03/01/2022 – 08/01/2022

- Brief revision of previous week topics

Week 15, 10/01/2022 – 15/01/2022

- Brief revision of previous week topics
- Application of electronic spectroscopy and Woodward rules for calculating λmax of conjugated dienes and α,β-unsaturated compounds.

UNIT –IV

Week 16, 17/01/2022 – 22/01/2022

- Infrared radiation and types of molecular vibrations

Week 17, 24/01/2022 – 29/01/2022

- functional group and fingerprint region. IR spectra of alkanes, alkenes and simple alcohols (inter and intramolecular hydrogen bonding)

Week 18, 31/01/2022 – 05/02/2022

- 3 Brief revision of previous week topics
- aldehydes, ketones, carboxylic acids and their derivatives (effect of substitution on >C=O stretching absorptions).

Session 2021-22 (Odd semester)

LESSON PLAN (FROM OCTOBER 2021 TO JANUARY 2022)

Name of the Assistant/Associate Professor: Dr. Prince Kumar

Class: B.Sc. II (3rd Semester) **Group: C-& D**

Subject: Chemistry practicals **Paper: CCP-309**

Section A : Physical Chemistry

Week 1, 04/10/2021 – 09/10/2021

- Introduction
- Do's and don't in laboratory
- Handling of chemical and glassware
- Maintaining of lab note book and lab record

Week 2, 11/10/2021 – 16/10/2021

- Determination of molecular weight by Rast method (Experiment -1)
- Viva-voce

Week 3, 18/10/2021 – 23/10/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Strong acid *vs*. strong base (Experiment -2)
- Viva-voce

Week 4, 25/10/2021 – 30/10/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Weak acid *vs*. strong base (Experiment -3)
- Determination of equivalent conductance of weak acid (Experiment -4)
- Viva-voce

Week 5, 01/11/2021 - 06/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Determination of CST of Phenol water system (Experiment -5)
- Viva-voce

Week 5 (01/11/2021 – 07/11/2021 : Diwali Break)

Week 6, 08/11/2021 – 13/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Effect of impurity of NaCl on CST of Phenol water system (Experiment -6)
- Viva-voce

Week 7, 15/11/2021 - 20/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Phase diagram of a binary system by cooling curve (Experiment -7)
- Viva-voce

Section B : Organic Chemistry

Week 8, 22/11/2021 – 27/11/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Separation of amino acids by paper chromatography (Experiment -8)
- Viva-voce

Week 9, 29/11/2021 – 04/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Determination of conc. of glycine by formylation method (Experiment -9)
- Viva-voce

Week 10, 06/12/2021 – 11/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Titration curve of glycine (Experiment -10)
- Viva-voce

Week 11, 13/12/2021 – 18/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Action of salivary amylase on starch and effect of temperature (Experiment -11 & 12)
- Viva-voce

Week 12, 20/12/2021 – 25/12/2021

- Discussion on previous week experiment
- Introduction to next experiment
- Differentiation between reducing and non reducing sugars (Experiment -13)
- Viva-voce.

Week 13, 27/12/2021 – 01/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-I (Experiment -14)
- Viva-voce

Week 14, 03/01/2022 – 08/01/2022

- Discussion on previous week experiment
- Introduction to next experiment

- Systematic qualitative organic analysis-II (Experiment -15)
- Viva-voce

Week 15, 10/01/2022 – 15/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-III (Experiment -16)
- Viva-voce
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Week 16, 17/01/2022 – 22/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-IV (Experiment -17)
- Viva-voce

Week 17, 24/01/2022 – 29/01/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-V (Experiment -18)
- Viva-voce

Week 18, 31/01/2022 – 05/02/2022

- Discussion on previous week experiment
- Introduction to next experiment
- Systematic qualitative organic analysis-VI (Experiment -19)
- Viva-voce