**TEACHER WISE LESSON PLAN**

**DEPARTMENT OF CHEMISTRY**

 **EVEN SEMESTER 2023-24**

**2nd SEMESTER MEDICAL**

**INORGANIC CHEMISTRY**

**FACULTY: Deepak Kumar**

**Lesson Plan BSc 2Semester Medical Inorganic Chemistry Syllabus (theory) for session 2023-24**

**January**

**UNIT 1**

Hydrogen Bonding – Definition, Types, effects of hydrogen bonding on properties of substances, application. Discussion of various types of Vander Waals Forces. Metallic Bond- Introduction to metallic bond, band theory of metallic bons. Semiconductors- Introduction, types and applications.

**UNIT 2 s-BLOCK ELEMENTS**

 Comparative study of the elements, diagonal relationships, salient features of hydrides (methods of preparation excluded), solvation and complexation tendencies including their function in biosystems.

**Assignment – I**

**February**

**UNIT 2 NOBLE GASES**

Chemistry of Noble Gases, Chemical properties of the noble gases with emphasis on their low chemical reactivity, chemistry of xenon, structure and bonding of fluorides, oxides & oxyfluorides of xenon.

**Test – I**

**March**

**UNIT 3 p -BLOCK ELEMENTS**

Comparative study of properties of p-block elements (including diagonal relationship and excluding methods of preparation).

**Boron family (13th group**)

 Diborane – properties and structure (as an example of electron – deficient compound and multicentre bonding. Borazene – chemical properties and structure Trihalides of Boron – Trends in lewis. Acid character structure of aluminium (III) chloride.

 **Carbon Family (14th group)**

 Catenation, p π– d π bonding , carbides, fluorocarbons, silicates , silicons – general methods of preparations, properties and uses.

**April**

**UNIT 4 p-BLOCK ELEMENTS**

**Nitrogen Family (15th group)**

Oxides – structures of oxides of N, P oxyacids – structure and relative acid strengths of oxyacids of Nitrogen and Phosphorus. Structure of white, yellow and red phosphorus.

**Oxygen Family (16th group)**

Oxyacids of sulphur – structures and acidic strength H2O2 – structure, properties and uses.

**Halogen Family (17th group)**

Basic properties of halogen, interhalogens types properties, hydro and oxyacids of chlorine– structure and comparison of acid strength.

**2nd SEMESTER MEDICAL**

**ORGANIC CHEMISTRY**

**Lesson plan, B.Sc.Medical**

**Academic Year -2023-24, 2nd semester**

**Faculty – Dr. SUDESH KUMARI**

**JANUARY-FEBRUARY 2024**

***Alkenes*:**  Nomenclature of alkenes, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff’s rule, hydroboration–oxidation, oxymercuration reduction, ozonolysis, hydration, hydroxylation and oxidation with KMnO4.

***Arenes and Aromaticity***: Nomenclature of benzene derivatives: Aromatic nucleus and side chain. Aromaticity: the Huckel rule, aromatic ions, annulenes up to 10 carbon atoms, aromatic, anti - aromatic and non – aromatic compounds.

**Assignment I**

**MARCH 2024**

***Arenes and Aromaticity***: Aromatic electrophilic substitution general pattern of the mechanism, mechansim of nitration, halogenation, sulphonation and Friedel-Crafts reaction. Energy profile diagrams. Activating, deactivating substituents and orientation.

***Dienes and Alkynes***: Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene. Chemical reactions 1,2- and 1,4- additions (Electrophilic & free radical mechanism), Diels-Alder reaction.

Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration- oxidation of alkynes.

**APRIL 2024**

***Alkyl and Aryl Halides***: Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, SN2 and SN1 reactions with energy profile diagrams. Methods of formation and reactions of aryl halides. The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides.

**Test I**

**2nd SEMESTER B. Sc. Pass MEDICAL**

**PHYSICAL CHEMISTRY**

**Teacher Name – Bhagyashree Date**

**January 2024**

Kinetics-I:-Rate of reaction, rate equation, factors influencing the rate of a reaction –concentration, temperature, pressure, solvent, light, catalyst. Order of a reaction, integrated rate expression for zero order, first order, second and third order reaction. Half life period of a reaction. Methods of determination of order of reaction.

Kinetics-II Effect of temperature on the rate of reaction – Arrhenius equation.

**February 2024**

Kinetics-II: Theories of reaction rate – Simple collision theory for unimolecular and bimolecular collision. Transition state theory of Bimolecular reactions

Electrochemistry-I: Electrolytic conduction, factors affecting electrolytic conduction, specific, conductance, molar conductance, equivalent conductance and relation among them, their variation with concentration. Arrhenius theory of ionization, Ostwald’s Dilution Law. Debye- Huckel – Onsager’s equation for strong electrolytes (elementary treatment only) Transport number, definition and determination by Hittorfs methods, (numerical included)

**March 2024**

Electrochemistry-II:-Kohlrausch’s Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it. Application of Kohlarausch’s Law in calculation of conductance of weak electrolytes at infinite dilution. Applications of conductivity measurements: determination of degree of dissociation, determination of Ka of acids determination of solubility product of sparingly soluble salts, conductometric titrations.

**April 2024**

Definition of pH and pKa, Buffer solution, Buffer action, Henderson-Hasselbach equation, Buffer mechanism of buffer action.

Assignment on Kinetics

Test of 1st unit

**References**

1. **Modern Physical Chemistry, B. Sc. part 1, Semester 2, by Dr. S. Kiran.**
2. **Pradeep’s Physical Chemistry, Vol. 1, Semester 2, by Dr. S.C. Kheterpal.**
3. **JBD Physical Chemistry, B. Sc. part 2, Semester 2, by M.S.Khanna.**

**LESSON PLAN 2023-2024**

**2nd SEMESTER NON-MEDICAL**

**INORGANIC CHEMISTRY**

**FACULTY: DR. RITU MALIK**

**JANUARY 2024**

**UNIT 1**

Hydrogen Bonding – Definition, Types, effects of hydrogen bonding on properties of substances, application. Discussion of various types of Vander Waals Forces. Metallic Bond- Introduction to metallic bond, band theory of metallic bons. Semiconductors- Introduction, types and applications.

**FEBRUARY 2024**

**UNIT 2 s-BLOCK ELEMENTS**

 Comparative study of the elements, diagonal relationships, salient features of hydrides (methods of preparation excluded), solvation and complexation tendencies including their function in biosystems.

**Assignment – I**

**NOBLE GASES**

Chemistry of Noble Gases, Chemical properties of the noble gases with emphasis on their low chemical reactivity, chemistry of xenon, structure and bonding of fluorides, oxides & oxyfluorides of xenon.

**Assignment II**

**MARCH 2024**

**UNIT 3 p -BLOCK ELEMENTS**

Comparative study of properties of p-block elements (including diagonal relationship and excluding methods of preparation).

**Boron family (13th group**)

 Diborane – properties and structure (as an example of electron – deficient compound and multicentre bonding. Borazene – chemical properties and structure Trihalides of Boron – Trends in lewis. Acid character structure of aluminium (III) chloride.

 **Carbon Family (14th group)**

 Catenation, p π– d π bonding , carbides, fluorocarbons, silicates , silicons – general methods of preparations, properties and uses.

**ASSIGNMENT III**

**APRIL 2024**

**UNIT 4 p-BLOCK ELEMENTS**

**Nitrogen Family (15th group)**

Oxides – structures of oxides of N, P oxyacids – structure and relative acid strengths of oxyacids of Nitrogen and Phosphorus. Structure of white, yellow and red phosphorus.

**Oxygen Family (16th group)**

Oxyacids of sulphur – structures and acidic strength H2O2 – structure, properties and uses.

**Halogen Family (17th group)**

Basic properties of halogen, interhalogens types properties, hydro and oxyacids of chlorine– structure and comparison of acid strength.

**Test - I**

**2nd SEMESTER NON-MEDICAL**

**ORGANIC CHEMISRY**

**Teachers – Sonam Baghel**

**January-February**

***Alkenes*:**  Nomenclature of alkenes, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff’s rule, hydroboration–oxidation, oxymercuration reduction, ozonolysis, hydration, hydroxylation and oxidation with KMnO4.

***Arenes and Aromaticity***: Nomenclature of benzene derivatives: Aromatic nucleus and side chain. Aromaticity: the Huckel rule, aromatic ions, annulenes up to 10 carbon atoms, aromatic, anti - aromatic and non – aromatic compounds.

Test: Alkenes

 **March**

***Arenes and Aromaticity***: Aromatic electrophilic substitution general pattern of the mechanism, mechansim of nitration, halogenation, sulphonation and Friedel-Crafts reaction. Energy profile diagrams. Activating , deactivating substituents and orientation.

Assignment : Arenes

***Dienes and Alkynes***: Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene. Chemical reactions 1,2- and 1,4- additions (Electrophilic & free radical mechanism), Diels-Alder reaction.

Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration- oxidation of alkynes .

**April**

***Alkyl and Aryl Halides***: Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides , SN2 and SN1 reactions with energy profile diagrams. Methods of formation and reactions of aryl halides. The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides.

**Reference Books:**

 **1.Modern Organic Chemistry, BSc part 1, Semester 2, by Dr. J.M. Seghal.**

* **Pradeep’s Organic Chemistry, Vol. 1, Semester 2, by Dr. S.N. Dhawan.**
* **JBD Physical Chemistry, BSc part 2, Semester 2, by M.S.Khanna.**
* **R.Chand Organic Chemistry, BSc part 2, Semester 2, by Dr. S.L. Vasishta**

**2nd SEMESTER NON- MEDICAL**

**PHYSICAL CHEMISTRY**

**Teacher Name- *Pooja Singh***

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| **January 2024** |

Kinetics-I:-Rate of reaction, rate equation, factors influencing the rate of a reaction –concentration, temperature, pressure, solvent, light, catalyst. Order of a reaction, integrated rate expression for zero order, first order, second and third order reaction. Half life period of a reaction. Methods of determination of order of reaction.

Kinetics-II Effect of temperature on the rate of reaction – Arrhenius equation.

Assignment on *Kinetics-I.*

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| **Feb-March 2024** |

Kinetics-II:- Theories of reaction rate – Simple collision theory for unimolecular and bimolecular collision. Transition state theory of Bimolecular reactions

Electrochemistry-I:- Electrolytic conduction, factors affecting electrolytic conduction, specific, conductance, molar conductance, equivalent conductance and relation among them, their variation with concentration. Arrhenius theory of ionization, Ostwald’s Dilution Law. Debye- Huckel – Onsager’s equation for strong electrolytes (elementary treatment only) Transport number, definition and determination by Hittorfs methods, (numerical included).

Test on *Electrochemistry-I.*

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| **April 2024** |

Electrochemistry-II:-Kohlarausch’s Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it. Application of Kohlarausch’s Law in calculation of conductance of weak electrolytes at infinite diloution. Applications of conductivity measurements: determination of degree of dissociation, determination of Ka of acids determination of solubility product of sparingly soluble salts, conductometric titrations. Definition of pH and pKa, Buffer solution, Buffer action, Henderson-Hazel equation, Buffer mechanism of buffer action.

**Reference Books:**

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* **Pradeep’s Physical Chemistry, Vol. 1, Semester 2, by Dr. S.C. Kheterpal.**
* **JBD Physical Chemistry, BSc part 2, Semester 2, by M.S.Khanna.**

**2nd SEMESTER BIOTECH**

**INORGANIC CHEMISTRY**

**FACULTY: Deepak Kumar**

**Lesson Plan BSc 2Semester Biotech Inorganic Chemistry Syllabus (theory) for session 2023-24**

**Jan**

**UNIT 1**

Hydrogen Bonding – Definition, Types, effects of hydrogen bonding on properties

 of substances, application. Discussion of various types of Vander Waals Forces.

 Metallic Bond- Introduction to metallic bond, band theory of metallic bond

 Semiconductors- Introduction, types and applications.

**Feb**

**UNIT 2 s-Block Elements**

 Comparative study of the elements, diagonal relationships, salient features of

 hydrides (methods of preparation excluded), solvation and complexation

 tendencies including their function in biosystems.

**March**

**UNIT 2 Noble Gases**

 Chemistry of Noble Gases, Chemical properties of the noble gases with emphasis

 on their low chemical reactivity, chemistry of xenon, structure and bonding of

 fluorides, oxides & oxyfluorides of xenon.

**UNIT 3 p -Block Elements**

 Comparative study of properties of p-block elements (including diagonal

 relationship and excluding methods of preparation).

 **Boron family (13th group**)

 Diborane – properties and structure (as an example of electron – deficient

 compound and multicentre bonding)

 Borazene – chemical properties and structure Trihalides of Boron – Trends in lewis

 Acid character structure of aluminium (III) chloride.

 **Carbon Family (14th group)**

 Catenation, p π– d π bonding , carbides, fluorocarbons, silicates , silicons – general

 methods of preparations, properties and uses.

**April**

**UNIT 4 p-Block Elements**

 **Nitrogen Family (15th group)**

 Oxides – structures of oxides of N, P oxyacids – structure and relative acid strengths

 of oxyacids of Nitrogen and Phosphorus. Structure of white, yellow and red phosphorus.

 **Oxygen Family (16th group)**

 Oxyacids of sulphur – structures and acidic strength H2O2 –structure, properties and uses.

 **Halogen Family (17th group)**

 Basic properties of halogen, interhalogens types properties, hydro and oxyacids of chlorine– structure and comparison of acid strength.

**2nd SEMESTER BIOTECH**

**ORGANIC CHEMISTRY**

**Lesson plan, B.Sc. Biotech**

**Academic Year -2023-24, 2nd semester**

**Faculty: Dr. SUDESH KUMARI**

**JANUARY-FEBRUARY 2024**

***Alkenes*:**  Nomenclature of alkenes, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff’s rule, hydroboration–oxidation, oxymercuration reduction, ozonolysis, hydration, hydroxylation and oxidation with KMnO4.

***Arenes and Aromaticity***: Nomenclature of benzene derivatives: Aromatic nucleus and side chain. Aromaticity: the Huckel rule, aromatic ions, annulenes up to 10 carbon atoms, aromatic, anti - aromatic and non – aromatic compounds.

**Assignment I**

**MARCH 2024**

***Arenes and Aromaticity***: Aromatic electrophilic substitution general pattern of the mechanism, mechansim of nitration, halogenation, sulphonation and Friedel-Crafts reaction. Energy profile diagrams. Activating, deactivating substituents and orientation.

***Dienes and Alkynes***: Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene. Chemical reactions 1,2- and 1,4- additions (Electrophilic & free radical mechanism), Diels-Alder reaction.

Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration- oxidation of alkynes.

**APRIL 2024**

***Alkyl and Aryl Halides***: Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, SN2 and SN1 reactions with energy profile diagrams. Methods of formation and reactions of aryl halides. The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides.

**Test I**

**2nd SEMESTER Biotech**

**PHYSICAL CHEMISTRY**

**Teacher Name – Bhagyashree Date**

**January 2024**

Kinetics-I:-Rate of reaction, rate equation, factors influencing the rate of a reaction –concentration, temperature, pressure, solvent, light, catalyst. Order of a reaction, integrated rate expression for zero order, first order, second and third order reaction. Half life period of a reaction. Methods of determination of order of reaction.

Kinetics-II Effect of temperature on the rate of reaction – Arrhenius equation.

**February 2024**

Kinetics-II:- Theories of reaction rate – Simple collision theory for unimolecular and bimolecular collision. Transition state theory of Bimolecular reactions

Electrochemistry-I: Electrolytic conduction, factors affecting electrolytic conduction, specific, conductance, molar conductance, equivalent conductance and relation among them, their variation with concentration. Arrhenius theory of ionization, Ostwald’s Dilution Law. Debye- Huckel – Onsager’s equation for strong electrolytes (elementary treatment only) Transport number, definition and determination by Hittorf’s methods, (numerical included)

**March 2024**

Electrochemistry-II: Kohlrausch’s Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it. Application of Kohlarausch’s Law for calculation of conductance of weak electrolytes at infinite dilution. Applications of conductivity measurements: determination of degree of dissociation, determination of Ka of acids determination of solubility product of sparingly soluble salts, conductometric titrations.

**April 2024**

Definition of pH and pKa, Buffer solution, Buffer action, Henderson-Hasselbach equation, Buffer mechanism of buffer action.

Assignment on Kinetics

Test of 1st unit

**References**

1. **Modern Physical Chemistry, B. Sc. part 1, Semester 2, by Dr. S. Kiran.**
2. **Pradeep’s Physical Chemistry, Vol. 1, Semester 2, by Dr. S. C. Kheterpal.**
3. **JBD Physical Chemistry, B. Sc. part 2, Semester 2, by M. S. Khanna.**

### Dr. PINKU (Department of Chemistry)

### Lesson plan B. Sc 2nd Semester Botany (Hons.) Chemistry (theory) for session 2023-24,

### PAPER: 180-EL-203331.

**JANUARY, 2024**

**Topics** - **Kinetics Rate of reaction**- rate equation, factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst. Order of a reaction, integrated rate expression for zero order, first order, Half life period of a reaction. Methods of determination of order of reaction, effect of temperature on the rate of reaction – Arrhenius equation.

**Topics**- **Alkenes-** Nomenclature of alkenes, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides. The Saytzeff rule, Chemical reactions of alkenes ⎯ mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff’s rule

TEST- I (CHEMICAL KINETICS)

**FEBRUARY, 2024**

**Arenes and Aromaticity**- Nomenclature of benzene derivatives: Aromatic nucleus and side chain. Aromaticity: the Huckel rule, aromatic ions, aromatic, anti - aromatic and non - aromatic compounds.

**Dienes and Alkynes** - Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Chemical reactions ⎯ 1,2 and 1,4 additions (Electrophilic & free radical mechanism) ,Diels- Alder reaction, Nomenclature, structure and bonding in alkynes., acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions.

**Alkyl and Aryl Halides** - Nomenclature and classes of alkyl halides, Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, SN2 and SN1 reactions. The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions of aryl halides. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides

ASSIGNMENT-I

**MARCH, 2024**

**Topics-** Periodic Properties Atomic and ionic radii, ionization energy, electron affinity and electronegativity – definition, trends in periodic table (in s & p block elements).

**s-Block** Elements Comparative study of the elements including, diagonal relationships and salient features of hydrides (methods of preparation excluded**).**

 **p-Block** Elements Emphasis on comparative study of properties of p-block elements (including diagonal relationship and excluding methods of preparation).

**Boron family (13th gp):-** Diborane – properties and structure (as an example of electron – deficient compound and multicentre bonding), Borazene – chemical properties and structure.

**Carbon Family (14th group**) Allotropy of carbon, Catenation, pהּ –dהּ bonding (an idea), carbides, fluorocarbons– general methods of preparations, properties and uses.

 **Nitrogen Family (15th group)**Oxides – structures of oxides of N,P. oxyacids – structure and relative acid strengths of oxyacids of Nitrogen and phosphorus. .

 **Oxygen Family (16th group)** Oxyacids of sulphur – structures and acidic strength Halogen Family (17th group) Basic properties of halogen, hydro and oxyacids of chlorine – structure and comparison of acid strength.

ASSIGNMENT-II

 **APRIL, 2024**

**Electrochemistry** - Electrolytic conduction, factors affecting electrolytic conduction, specific, conductance, molar conductance,equivalent conductance and relation among them, their vartion with concentration. Arrhenius theory of ionization, Ostwald’s Dilution Law. Debye- Huckel – Onsager’s equation for strong electrolytes (elementary treatment only), Kohlarausch’s Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it. Application of Kohlarausch’s Law in calculation of conductance of weak electrolytes at infinite dilution. Applications of conductivity -measurements: determination of degree of dissociation, determination of Ka of acids determination of solubility product of sparingly soluble salts, conductometric titrations. Definition of pH and pKa, Buffer solution, Buffer action, (elementary idea only).

**Reference Books:**

* **Modern Inorganic Chemistry, BSc part 1, Semester 2, by Dr. S.P. Jauhar.**
* **Modern Organic Chemistry, BSc part 1, Semester 2, by Dr. J.M. Seghal.**
* **Modern Physical Chemistry, BSc part 1, Semester 2, by S. Kiran.**
* **Pradeep’s Organic Chemistry, Vol. 1, Semester 2, by Dr. S.N. Dhawan.**
* **Pradeep’s Inorganic Chemistry, Vol. 1, Semester 2, by Dr. K.K. Bhasin.**
* **Pradeep’s Physical Chemistry, Vol. 1, Semester 2, by Dr. S.C. Kheterpal.**

**2nd SEMESTER ZOO(Hons.)**

**Teachers - Dypsy Khapra**

 **January 2024**

 **Topics- Periodic Properties :** Atomic and ionic radii, ionization energy, electron affinity and electronegativity – definition, trends in periodic table (in s & p block elements).

**Topics** - **Kinetics Rate of reaction**- rate equation, factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst. Order of a reaction, integrated rate expression for zero order, first order, Half life period of a reaction. Methods of determination of order of reaction, effect of temperature on the rate of reaction – Arrhenius equation.

Test of chapter Chemical kinetics

 **February 2024**

**Topics** - **Alkenes** - Nomenclature of alkenes, , mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides,. The Saytzeff rule, Chemical reactions of alkenes ⎯ mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff’srule .

**s-Block** Elements Comparative study of the elements including, diagonal relationships and salient features of hydrides (methods of preparation excluded**).**

 **p-Block** Elements Emphasis on comparative study of properties of p-block elements (including diagonal relationship and excluding methods of preparation).

**Boron family (13th gp):-** Diborane – properties and structure (as an example of electron – deficient compound and multicentre bonding), Borazene – chemical properties and structure.

**Electrochemistry** - Electrolytic conduction, factors affecting electrolytic conduction, specific, conductance, molar conductance,equivalent conductance and relation among them, their vartion with concentration. Arrhenius theory of ionization, Ostwald’s Dilution Law. Debye- Huckel – Onsager’s equation for strong electrolytes (elementary treatment only), Kohlarausch’s Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it. Application of Kohlarausch’s

**Assignment of S Block and P Block elements**

 **March 2024**

**Carbon Family (14th group**) Allotropy of carbon, Catenation, pהּ –dהּ bonding (an idea), carbides, fluorocarbons– general methods of preparations, properties and uses.

 **Arenes and Aromaticity**- Nomenclature of benzene derivatives:. Aromatic nucleus and side chain. Aromaticity: the Huckel rule, aromatic ions, aromatic, anti - aromatic and non - aromatic compounds.

**Electrochemistry ;** Law in calculation of conductance of weak electrolytes at infinite dilution. Applications of conductivity -measurements: determination of degree of dissociation, determination of Ka of acids determination of solubility product of sparingly soluble salts, conductometric titrations. Definition of pH and pKa, Buffer solution, Buffer action, (elementary idea only).

Assignment :Electrochemistry

 **April 2024**

**Nitrogen Family (15th group)** Oxides – structures of oxides of N,P. oxyacids – structure and relative acid strengths of oxyacids of Nitrogen and phosphorus. .

 **Oxygen Family (16th group)** Oxyacids of sulphur – structures and acidic strength Halogen Family (17th group) Basic properties of halogen, hydro and oxyacids of chlorine – structure and comparison of acid strength.

**Dienes and Alkynes** - Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes.,. Chemical reactions ⎯ 1,2 and 1,4 additions (Electrophilic & free radical mechanism) ,Diels- Alder reaction, Nomenclature, structure and bonding in alkynes., acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions

**Alkyl and Aryl Halides** - Nomenclature and classes of alkyl halides, Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, SN2 and SN1 reactions. The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions of aryl halides. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides.

**Test of chapter : Dienes and Alkyl Aryl halide**

**Reference Books:**

1. **Modern Inorganic Chemistry, BSc part 1, Semester 2, by Dr. S.P. Jauhar.**
2. **Modern Organic Chemistry, BSc part 1, Semester 2, by Dr. J.M. Seghal.**
3. **Modern Physical Chemistry, BSc part 1, Semester 2, by S. Kiran.**
4. **Pradeep’s Organic Chemistry, Vol. 1, Semester 2, by Dr. S.N. Dhawan.**
5. **Pradeep’s Inorganic Chemistry, Vol. 1, Semester 2, by Dr. K.K. Bhasin.**
6. **Pradeep’s Physical Chemistry, Vol. 1, Semester 2, by Dr. S.C. Kheterpal.**

**4th SEMESTER MEDICAL+ BIOTECH**

**INORGANIC CHEMISTRY**

**Faculty: Deepak Kumar**

**Lesson Plan BSc 4 Semester Medical Inorganic Chemistry Syllabus Theory for session 2023-24**

**Jan**

**Theory of Qualitative and Quantitative Inorganic Analysis-I**

Chemistry of analysis of various acidic radicals, Chemistry of identification of acid radicals in typical combinations, Chemistry of interference of acid radicals including their removal in the analysis of basic radicals.

**Feb**

**April**

**Theory of Qualitative and Quantitative Inorganic Analysis-II**

Chemistry of analysis of various groups of basic radicals, Theory of precipitation, co- precipitation, Post- precipitation, purification of precipitates.

**Assignment -II**

**March**

**Chemistry of f –block Elements Lanthanides**

Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds.

**Test - I**

**April**

**Chemistry of f – block elements Actinides**

General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from U, Comparison of properties of Lanthanides and Actinides and with transition elements.

**Test - II**

**4th SEMESTER MEDICAL+ BIOTECH**

**ORGANIC CHEMISTRY**

**Faculty: Sonam Baghel**

***January***

Section-A

Infrared (IR) absorption spectroscopy

Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds. Applications of IR spectroscopy in structure elucidation of simple organic compounds.

**February**

Section-B

Amines

Structure and nomenclatu re of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines.Structuralfeatu res affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds. Gabrielphthalimide reaction, Hofmann bromamide reaction. electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid.

**March**

Section-C

Diazonium Salts

Mechanism of diazotisation, structure of benzene diazonium chloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO2 and CN groups, reduction of diazonium salts to hyrazines, coupling reaction and its synthetic application.

Nitro Compounds

Preparation of nitro alkanes and nitro arenes and their chemical reactions. Mechanism of electrophilic substitution reactions in nitro arenes and their reductions in acidic, neutral and alkaline medium.

***April***

Section-D

Aldehydes and Ketones

Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, advantage of oxidation of alcohols with chromium trioxide (Sarett reagent) pyridinium chlorochromate (PCC) and pyridinium dichromate.,

Physical properties. Comparison of reactivities of aldehydes and ketones.

Mechanism of nucleophilic additions to carbonyl group with particular

emphasis on benzoin, aldol, Perkin and Knoevenagel condensations.

Condensation with ammonia and its derivatives. Wittig reaction. Mannich

reaction.Oxidation of aldehydes, Baeyer–Villiger oxidation of ketones,

Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, LiAlH4 and

NaBH4 reductions.

1. **Modern Physical Chemistry, BSc part 2, Semester 4, by S. Kiran Kavya.**
2. **Pradeep’s Physical Chemistry, Vol. 1, Semester 4, by Dr. S.C. Kheterpal.**

**JBD Physical Chemistry, BSc part 2, Semester 4, by M.S.Khanna and Dr. Gurcharan Dass**

**4th SEMESTER MEDICAL+ BIOTECH**

**PHYSICAL CHEMISTRY**

***Faculty : Pooja Singh***

**January 2024**

*Thermodynamics-II*: Second law of thermodynamics, need for the law, different statements of the law, Carnot’s cycles and its efficiency, Carnot’s theorem, Thermodynamics scale of temperature. Concept of entropy – entropy as a state function, entropy as a function ofV & T, entropy as a function of P & T, entropy change in physical change,entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.

*Thermodynamics-III:* Third law of thermodynamics: Nernst heat theorem, statement of concept of residual entropy, evaluation of absolute entropy from heat capacity data.

Assignment on *Thermodynamics-II.*

**Feb-March 2024**

*Thermodynamics- III:*

Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, A &Gas criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P, V and T.

*Electrochemistry:*

Electrolytic and Galvanic cells – reversible & Irreversible cells , conventional representation of electrochemical cells. EMF of cell and its measurement, Weston standard cell, activity and activity coefficients. Calculation of thermodynamic quantities of cell reaction ( G, H & K). Types of reversible electrodes – metal- metal ion gas electrode, metal –insoluble salt- anion and redox electrodes. Electrode reactions, Nernst equations, derivation of cell EMF and single electrode potential.

Test on *Electrochemistry*.

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| **April 2024**  |

*Electrochemistry:*

Standard Hydrogen electrode, reference electrodes, standard electrodes potential, sign conventions, electrochemical series and its applications.

Concentration cells with and without transference, liquid junction potential,application of EMF measurement i.e. valency of ions, solubility product activity coefficient, potentiometric titration (acid- base and redox). Determination of pH using - Hydrogen electrode, Quinhydrone electrode and glass electrode by potentiometric Methods.

**Reference Books:**

1. **Modern Physical Chemistry, BSc part 2, Semester 4, by S. Kiran Kavya.**
2. **Pradeep’s Physical Chemistry, Vol. 1, Semester 4, by Dr. S.C. Kheterpal.**
3. **JBD Physical Chemistry, BSc part 2, Semester 4, by M.S.Khanna and Dr. Gurcharan Dass.**

**4th SEMESTER NON MEDICAL**

**PHYSICAL CHEMISTRY**

***Faculty : Khushbu Jain***

**Jan 2024**

*Thermodynamics-II*: Second law of thermodynamics, need for the law, different statements of the law, Carnot’s cycles and its efficiency, Carnot’s theorem, Thermodynamics scale of temperature. Concept of entropy – entropy as a state function, entropy as a function ofV & T, entropy as a function of P & T, entropy change in physical change,entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.

*Thermodynamics-III:* Third law of thermodynamics: Nernst heat theorem, statement of concept of residual entropy, evaluation of absolute entropy from heat capacity data.

Assignment on *Thermodynamics-II.*

**Feb- March 2024**

*Thermodynamics- III:*

Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, A &Gas criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P, V and T.

*Electrochemistry:*

Electrolytic and Galvanic cells – reversible & Irreversible cells , conventional representation of electrochemical cells. EMF of cell and its measurement, Weston standard cell, activity and activity coefficients. Calculation of thermodynamic quantities of cell reaction ( G, H & K). Types of reversible electrodes – metal- metal ion gas electrode, metal –insoluble salt- anion and redox electrodes. Electrode reactions, Nernst equations, derivation of cell EMF and single electrode potential.

Test on *Electrochemistry*.

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| --- |
| **April 2024** |

*Electrochemistry:*

Standard Hydrogen electrode, reference electrodes, standard electrodes potential, sign conventions, electrochemical series and its applications.

Concentration cells with and without transference, liquid junction potential,application of EMF measurement i.e. valency of ions, solubility product activity coefficient, potentiometric titration (acid- base and redox). Determination of pH using - Hydrogen electrode, Quinhydrone electrode and glass electrode by potentiometric Methods.

**Reference Books:**

1. **Modern Physical Chemistry, BSc part 2, Semester 4, by S. Kiran Kavya.**
2. **Pradeep’s Physical Chemistry, Vol. 1, Semester 4, by Dr. S.C. Kheterpal.**
3. **JBD Physical Chemistry, BSc part 2, Semester 4, by M.S.Khanna and Dr. Gurcharan Dass.**

**LESSON PLAN 2023-2024**

**4th SEMESTER NON-MEDICAL**

**INORGANIC CHEMISTRY**

**Faculty: Dr. RITU MALIK**

**Jan. 2024**

**Chemistry of f –block Elements Lanthanides**

Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds.

**Assignment I**

**Feb. 2024**

**Chemistry of f – block elements Actinides**

General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from U, Comparison of properties of Lanthanides and Actinides and with transition elements.

**Assignment II**

**March 2024**

**Theory of Qualitative and Quantitative Inorganic Analysis-I**

Chemistry of analysis of various acidic radicals, Chemistry of identification of acid radicals in typical combinations, Chemistry of interference of acid radicals including their removal in the analysis of basic radicals.

**Assignment III**

**April 2024**

**Theory of Qualitative and Quantitative Inorganic Analysis-II**

Chemistry of analysis of various groups of basic radicals, Theory of precipitation, co- precipitation, Post- precipitation, purification of precipitates.

**Test I**

**4th SEMESTER NON-MEDICAL**

### Dr. PINKU (Department of Chemistry)

### Lesson plan for session 2023-24,

**JANUARY, 2024**

**Infrared (IR) absorption spectroscopy**: Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds. Applications of IR spectroscopy in structure elucidation of simple organic compounds.

**FEBRUARY, 2024**

**Aldehydes and Ketones:** Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, advantage of oxidation of alcohols with chromium trioxide (Sarett reagent) pyridinium chlorochromate (PCC) and pyridinium dichromate.,Physical properties. Comparison of reactivities of aldehydes and ketones. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction.Oxidation of aldehydes, Baeyer–Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, LiAlH4 and NaBH4 reductions.

**TEST-I**

**MARCH, 2024**

**Diazonium Salts**: Mechanism of diazotisation, structure of benzene diazonium chloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO2 and CN groups, reduction of diazonium salts to hyrazines, coupling reaction and its synthetic application.

**Nitro Compounds:** Preparation of nitro alkanes and nitro arenes and their chemical reactions. Mechanism of electrophilic substitution reactions in nitro arenes and their reductions in acidic, neutral and alkaline medium.

**ASSISGNMENT-I**

**APRIL, 2024**

**Amines:** Structure and nomenclatu re of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines.Structuralfeatu res affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds. Gabrielphthalimide reaction, Hofmann bromamide reaction. electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid.

**Refrence Books:**

1. **Modern Organic Chemistry, BSc part 2, Semester 4, by S. Kiran Kavya.**
2. **Pradeep’s Organic Chemistry, Vol. 1, Semester 4, by Dr. S.N. Dhawan**
3. **JBD Organic Chemistry, BSc part 2, Semester 4, by Dr. Shish Ram Yadav**
4. **Laxmi Organic chemistry by Dr. S. K. Bansal, Pooja Wadhwa & Dr. Paresh Arora**

**4th SEMESTER ZOOLOGY HONS.**

**Lesson Plan for Chemistry Syllabus B. Sc. Zoo (H) 4thsem**

**Paper Code – ZOO 404**

**Academic Year – 2023-24, Even semester**

**Teachers –Rustam Singh**

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| **Month** | **Topics** |
| Jan-Feb. | **Thermodynamics**Third law of thermodynamics: Nernst heat theorem, Thermodynamic functions G, H, E, A & S.Criteria for thermodynamic equilibrium and spontaneity of a process in terms of thermodynamic functions. **Chemical Equilibrium**Equilibrium constant and free energy, concept of chemical potential, Thermodynamic derivation of law of chemical equilibrium. Clapeyron equation and Clausius – Clapeyrou equation and its applications.**Electrochemistry**Electrolytic and Galvanic cells – reversible & irreversible cells, conventional representation of electrochemical cells. EMF of cell and its measurement, Weston standard cell, activity and activity coefficients. Calculation of thermodynamic quantities of cell reaction (G, H & K). Nernst equation, prediction of single electrode potential and EMF of cell. Reference electrodes - standard hydrogen electrode & calomel electrode, standard electrode potential, sign convention, electrochemical series and its applications. |
| Feb-March | **Non-aqueous Solvents**Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid NH3 and liquid SO2.**Acids and Bases, HSAB Concept**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.Chemistry of f – block elements**Lanthanides**Occurrence, Electronic structure, oxidation states and ionic radii and lanthanide contraction and complex formation of lanthanide compounds.**Actinides**General features and chemistry of actinides, Comparison of properties of Lanthanides andActinides and with transition elements. Elementary idea about the transuranic elements.ASSIGNMENT : F block elements. |
| March -April | **Infrared (IR) absorption spectroscopy**Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups.**Amines**Structure and nomenclature of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Gabriel- phthalimide reaction, Hofmann bromamide reaction. Electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid.**Diazonium Salts**Mechanism of diazotisation, structure of benzene diazonium chloride, replacement of diazo group by H, OH, F, Cl, Br, I, NO2 and CN groups.**Aldehydes and Ketones**Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, advantage of oxidation of alcohols with chromium trioxide (Sarett reagent) pyridinium chlorochromate (PCC) and pyridinium dichromate.,. Comparison of reactivities of aldehydes and ketones. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin and aldol, condensations. Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction. |

**4th SEMESTER BOTANY HONS.**

**Lesson Plan for Chemistry Syllabus B. Sc. Bot (H)**

**Paper Code – 180-CU-403784**

**Academic Year – 2023-24, Even semester**

**Teacher: Dr. Sudesh Kumari**

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| --- | --- |
| **Month** | **Topics** |
| Jan-Feb 2024 | **Thermodynamics**Third law of thermodynamics: Nernst heat theorem, Thermodynamic functions G, H, E, A & S.Criteria for thermodynamic equilibrium and spontaneity of a process in terms of thermodynamic functions. **Chemical Equilibrium**Equilibrium constant and free energy, concept of chemical potential, Thermodynamic derivation of law of chemical equilibrium. Clapeyron equation and Clausius – Clapeyrou equation and its applications.**Electrochemistry**Electrolytic and Galvanic cells – reversible & irreversible cells, conventional representation of electrochemical cells. EMF of cell and its measurement, Weston standard cell, activity and activity coefficients. Calculation of thermodynamic quantities of cell reaction (G, H & K). Nernst equation, prediction of single electrode potential and EMF of cell. Reference electrodes - standard hydrogen electrode & calomel electrode, standard electrode potential, sign convention, electrochemical series and its applications.**Assignment I** |
| March 2024 | **Non-aqueous Solvents**Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid NH3 and liquid SO2.**Acids and Bases, HSAB Concept**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.Chemistry of f – block elements**Lanthanides**Occurrence, Electronic structure, oxidation states and ionic radii and lanthanide contraction and complex formation of lanthanide compounds.**Actinides**General features and chemistry of actinides, Comparison of properties of Lanthanides andActinides and with transition elements. Elementary idea about the transuranic elements. |
| March-April 2024 | **Infrared (IR) absorption spectroscopy**Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups.**Amines**Structure and nomenclature of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Gabriel- phthalimide reaction, Hofmann bromamide reaction. Electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid.**Diazonium Salts**Mechanism of diazotisation, structure of benzene diazonium chloride, replacement of diazo group by H, OH, F, Cl, Br, I, NO2 and CN groups.**Aldehydes and Ketones**Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, advantage of oxidation of alcohols with chromium trioxide (Sarett reagent) pyridinium chlorochromate (PCC) and pyridinium dichromate.,. Comparison of reactivities of aldehydes and ketones. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin and aldol, condensations. Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction.**Test I** |

**INORGANIC CHEMISTRY**

**6th SEMESTER Medical**

### NEERU SINGAL (Department of Chemistry)

### Lesson plan (theory) for session 2023-24,

**January**

**Acids and Bases, HSAB Concept**

Arrhenius, Bronsted — Lowry, the Lux — Flood, Solvent system and Lewis concepts of acids & bases, relative strength of acids & bases.

**February**

**Acids and bases,HSAB concept**

Concept of Hard and soft acid and bases. Symbiosis, electronegativity and hardness and softness.

**Test of chapter Acid and Base**

**Bioinorganic Chemistry**

Essential and trace elements in biological processes, metalloporphyrins with special reference to hemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Ca2+. Nitrogen fixation.

 **March**

# Organometallic Chemistry

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 and the nature of bonding in metal carbonyls

Assignment of unit Organometallic Chemistry

**April**

**Silicones and Phosphazenes**

Silicones and phosphazenes, their preparation, properties, structure and uses.

Assignment on Silicones and phosphazenes.

**Reference Books:**

1. **Modern Inorganic Chemistry, BSc part 3, Semester 6, by Dr.S.P.Jauhar.**
2. **Pradeep’s Inorganic Chemistry, Vol. 3, Semester 6, by Dr. K.K. Bhasin.**

**6th SEMESTER MEDICAL**

**ORGANIC CHEMISTRY**

**Ms. PAYAL ARORA**

### JANURARY 2024:-

**Heterocyclic Compounds-I**

Introduction: Molecular orbital picture 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.

FEBURARY 2024

**HeterocyclicCompounds-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.

### MARCH 2024

### OrganosulphurCompounds

Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, sulphonamides and sulphaguanidine. Synthetic detergents alkyl and aryl sulphonates.

 **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 ethylacetoacetate.

### SyntheticPolymers

Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers.

Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy re sins and polyurethanes.

Natural and synthetic rubbers.

#  APRIL 2024

### Amino Acids, Peptides& Proteins

Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation of alpha -amino acids.Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides. Classical peptide synthesis, solid– phase peptide synthesis. Structures of peptides and proteins: Primary & Secondary structure.

**6th SEMESTER B.Sc. Pass course Medical**

**PHYSICAL CHEMISTRY**

**Name of Teacher:- Pooja Yadav**

**Month:- January 2024**

**Spectroscopy-III**

**Electronic Spectrum**

Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck- Condon principle.Qualitative description of sigma and pie and n molecular orbital (MO) their energy level and respective transitions.

Assignment of unit 1

**Month:- FEBRUARY 2024**

**Photochemistry**

Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grotthus-Drapper law, Stark- Einstein law (law of photochemical equivalence) Jablonski diagram depiciting various processes occurring in the excited state, qualitative description of fluorescence,phosphorescence, Non radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes (simple examples).

Test of unit 2 (photochemistry)

**Month: - March 2024**

**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, relative lowering of vapour pressure, molelcular weight determination, Osmosis law of osmotic pressure and its measurement, determination of molecularweight 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..

Assignment of unit 3

**Month :- April 2024**

Experimental methods for determining various colligative properties. Abnormal molar mass, degree of dissociation and association of solutes

**Phase Equilibrium** Statement and meaning of the terms – phase component and degree of freedom, thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system –Example – water and Sulphur systems. Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilerisation of lead

Test of unit 4

**Reference Books:**

1. **Modern PHYSICAL Chemistry, BSc part 3, Semester 6, by DR S. KIRAN**
2. **Pradeep’s PHYSICAL Chemistry, Vol. 3, Semester 6, by Dr. S.C. KHETRPAL**

### NEERU SINGAL (Department of Chemistry)

### Lesson plan B. Sc 6th Semester non-medical Inorganic Chemistry (theory) for session 2023-24,

**January**

**Acids and Bases, HSAB Concept**

Arrhenius, Bronsted — Lowry, the Lux — Flood, Solvent system and Lewis concepts of acids & bases, relative strength of acids & bases.

**February**

**Acids and bases,HSAB concept**

Concept of Hard and soft acid and bases. Symbiosis, electronegativity and hardness and softness.

**Test of chapter Acid and Base**

**Bioinorganic Chemistry**

Essential and trace elements in biological processes, metalloporphyrins with special reference to hemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Ca2+. Nitrogen fixation.

 **March**

# Organometallic Chemistry

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 and the nature of bonding in metal carbonyls

Assignment of unit Organometallic Chemistry

**April**

**Silicones and Phosphazenes**

Silicones and phosphazenes, their preparation, properties, structure and uses.

Assignment on Silicones and phosphazenes.

**Reference Books:**

1. **Modern Inorganic Chemistry, BSc part 3, Semester 6, by Dr.S.P.Jauhar.**
2. **Pradeep’s Inorganic Chemistry, Vol. 3, Semester 6, by Dr. K.K. Bhasin.**

**6th SEMESTER NON-MEDICAL**

**ORGANIC CHEMISTRY**

### Dypsy Khapra (department of chemistry)

### Jan-Feb 2024:-

**Heterocyclic Compounds-I**

Introduction: Molecular orbital picture 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.

**HeterocyclicCompounds-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.

### February 2024:-

### OrganosulphurCompounds

Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, sulphonamides and sulphaguanidine. Synthetic detergents alkyl and aryl sulphonates.

 **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 ethylacetoacetate.

#  March 2024:-

### SyntheticPolymers

Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers.

Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy re sins and polyurethanes.

Natural and synthetic rubbers.

### April 2024:-

### Amino Acids, Peptides& Proteins

Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation of alpha -amino acids.Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides. Classical peptide synthesis, solid– phase peptide synthesis. Structures of peptides and proteins: Primary & Secondary structure.

**PHYSICAL CHEMISTRY 6th sem**

**Name of Teacher:- pooja**

**Class: B.sc final (N.M)**

 **Jan-Feb 2024**

**Spectroscopy-III**

**Electronic Spectrum**

Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck- Condon principle.Qualitative description of sigma and pie and n molecular orbital (MO) their energy level and respective transitions.

Discussion of previous year's paper

Assignment of unit 1

**Feb 2024**

**Photochemistry**

Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grotthus-Drapper law, Stark- Einstein law (law of photochemical equivalence) Jablonski diagram depiciting various processes occurring in the excited state, qualitative description of fluorescence,phosphorescence

Non radiative processes (internal conversion, intersystem crossing),quantum yield, photosensitized reactions-energy transfer processes (simpleexamples).

Test of unit 2 (photochemistry)

**March 2024**

**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, relative lowering of vapour pressure, molelcular weight determination, Osmosis law of osmotic pressure and its measurement, determination of molecularweight 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.

Discussion of previous year's papers

Assignment on unit 2

**April 2024**

**Phase Equillibrium**

Statement and meaning of the terms – phase component and degree of freedom,thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system

Discussion of previous year's papers

Test of unit 4

**Reference Books:**

1. **Modern PHYSICAL Chemistry, BSc part 3, Semester 6, by DR S. KIRAN**
2. **Pradeep’s PHYSICAL Chemistry, Vol. 3, Semester 6, by Dr. S.C. KHETRPAL**

 –Example – water and Sulpher systems.Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilerisation of lead

**6th SEMESTER BIOTECH**

**INORGANIC CHEMISTRY Academic Year – 2023-24, Even semester**

**Neeru Singal( Department of chemistry)**

**January**

**Acids and Bases, HSAB Concept**

Arrhenius, Bronsted — Lowry, the Lux — Flood, Solvent system and Lewis concepts of acids & bases, relative strength of acids & bases.

**February**

**Acids and bases,HSAB concept**

Concept of Hard and soft acid and bases. Symbiosis, electronegativity and hardness and softness.

**Test of chapter Acid and Base**

**Bioinorganic Chemistry**

Essential and trace elements in biological processes, metalloporphyrins with special reference to hemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Ca2+. Nitrogen fixation.

 **March**

# Organometallic Chemistry

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 and the nature of bonding in metal carbonyls

Assignment of unit Organometallic Chemistry

**April**

**Silicones and Phosphazenes**

Silicones and phosphazenes, their preparation, properties, structure and uses.

Assignment on Silicones and phosphazenes.

**Reference Books:**

1. **Modern Inorganic Chemistry, BSc part 3, Semester 6, by Dr.S.P.Jauhar.**
2. **Pradeep’s Inorganic Chemistry, Vol. 3, Semester 6, by Dr. K.K. Bhasin.**

**6th SEMESTER BIOTECH**

**ORGANIC CHEMISTRY**

###  Ms. PAYAL ARORA

### Jan 2024:-

**Heterocyclic Compounds-I**

Introduction: Molecular orbital picture 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.

**HeterocyclicCompounds-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.

### FEB 2024:-

### OrganosulphurCompounds

Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, sulphonamides and sulphaguanidine. Synthetic detergents alkyl and aryl sulphonates.

 **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 ethylacetoacetate.

MARCH 2024:-

### SyntheticPolymers

Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers.

Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy re sins and polyurethanes.

Natural and synthetic rubbers.

#  APRIL 2024:-

### Amino Acids, Peptides& Proteins

Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation of alpha -amino acids.Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides. Classical peptide synthesis, solid– phase peptide synthesis. Structures of peptides and proteins: Primary & Secondary structure

**6th SEMESTER B.Sc. Biotech**

**PHYSICAL CHEMISTRY**

**Name of Teacher:- Pooja Yadav**

**Month:- January**

**Spectroscopy-III**

**Electronic Spectrum**

Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck- Condon principle.Qualitative description of sigma and pie and n molecular orbital (MO) their energy level and respective transitions.

Assignment of unit 1

**Month:- February**

**Photochemistry**

Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grotthus-Drapper law, Stark- Einstein law (law of photochemical equivalence) Jablonski diagram depiciting various processes occurring in the excited state, qualitative description of fluorescence,phosphorescence, Non radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes (simple examples).

Test of unit 2 (photochemistry)

**Month: - March**

**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, relative lowering of vapour pressure, molelcular weight determination, Osmosis law of osmotic pressure and its measurement, determination of molecularweight 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..

Assignment of unit 3

**Month :- April**

Experimental methods for determining various colligative properties. Abnormal molar mass, degree of dissociation and association of solutes

**Phase Equilibrium** Statement and meaning of the terms – phase component and degree of freedom, thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system –Example – water and Sulphur systems. Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilerisation of lead

Test of unit 4

**Reference Books:**

1. **Modern PHYSICAL Chemistry, BSc part 3, Semester 6, by DR S. KIRAN**
2. **Pradeep’s PHYSICAL Chemistry, Vol. 3, Semester 6, by Dr. S.C. KHETRPAL**