Basic Principles (Lecture 1)

- **Introduction to organic chemistry**
  - ✓ Definition
  - ✓ Difference between organic and inorganic molecules
- **Scope of organic chemistry**
  - ✓ Scope in pharmacy
  - ✓ Scope in other areas
- **Structure of organic molecule**
  - ✓ Structure of molecule
  - ✓ Structure of atom
  - ✓ Electronic configuration
  - ✓ Structure of atomic orbitals
- **Hybridization in Carbon- sp3, sp2, sp.**
  - ✓ Sp3 hybridization
  - ✓ Electronic configuration in ground, excited and hybridized state
  - ✓ Structure
  - ✓ Example

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 5-8; 11-20.

2. A textbook of Organic Chemistry by Bahl and Bahl, Page No-59-71

Basic Principles (Lecture 2)

- **Hybridization in Carbon- sp3, sp2, sp.**
  - ✓ **Sp2 hybridization**
  - ✓ Electronic configuration in ground, excited and hybridized state
  - ✓ Structure
  - ✓ Example-ethene
  - ✓ **Sp hybridization**
  - ✓ Electronic configuration in ground, excited and hybridized state
  - ✓ Structure
  - ✓ Example-ehtylene
- **Hybridization in Nitrogen- sp3, sp2, sp.**
- **Sp3 hybridization**
  - ✓ Electronic configuration in ground, excited and hybridized state
  - ✓ Structure
  - ✓ Example-ammonia
- **Sp2 hybridization**
  - ✓ Electronic configuration in ground, excited and hybridized state
  - ✓ Structure
  - ✓ Example-emines

- **Sp hybridization**
  - ✓ Electronic configuration in ground, excited and hybridized state
  - ✓ Structure
  - ✓ Example-nitriles
- **Hybridization in Oxygen- sp3, sp2.**
- **Sp3 hybridization**
  - ✓ Electronic configuration in ground, excited and hybridized state
  - ✓ Structure
  - ✓ Example-water
- **Sp2 hybridization**
  - ✓ Electronic configuration in ground, excited and hybridized state
  - ✓ Structure
  - ✓ Example-carbonyl group

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 20-24.

2. A textbook of Organic Chemistry by Bahl and Bahl, 71-77.

Basic Principles (Lecture 3)

- **Electronegativity:**
  - ✓ Definition
  - ✓ Concept
  - ✓ Examples
- **Dipole moment**
  - ✓ Concept
  - ✓ Formula
  - ✓ Unit
  - ✓ Examples with values
- **Polar Molecules**
  - ✓ Definition
  - ✓ Concept
  - ✓ Examples of polar and non polar molecules

References-

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 44-47.

2. A textbook of Organic Chemistry by Bahl and Bahl, Page No-78-80

Basic Principles (Lecture 4)

- **Factors affecting electron availability**
- **Inductive effect**
  - ✓ Definition
  - ✓ Concept
  - ✓ + I effect
  - ✓ Examples
  - ✓ -I Effect
  - ✓ Examples
  - ✓ **Applications**
    1. Effect on bond length
    2. Effect on dipole moment
    3. Effect on acidity of carboxylic acids

References:

1. Reaction mechanism and reagents in Organic Chemistry, Gurudeep R Chatawal, 54-61.

2. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 149-152.

3. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No-90.

Basic Principles (Lecture 5)

- **Applications of inductive effect**
    4. Effect on basic strength of amines
    5. Reactivity of alkyl halides

- **Electromeric effect**
    - ✓ Concept
    - ✓ Examples
    - ✓ Applications

- Difference between Inductive effect and electromeric effect

References:

1. Reaction mechanism and reagents in Organic Chemistry, Gurudeep R Chatawal, 63-69.

2. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 152-154.

2.A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No-91-92.

Basic Principles (Lecture 6)

- **Resonance/ Mesomeric effect**

✓ Concept

✓ +M effect

✓ -M effect

✓ Examples

✓ Resonating structure

✓ Rules for writing resonating structures

✓ Rules for deciding stability and contribution of resonating structure

- **Applications**

1. Effect on bond length
2. Dipole moment
3. Stability
4. Acidity of phenols
5. Neutral nature of amides
6. Acidity of carboxylic acids

- Difference between inductive and mesomeric effect

References:

1. Reaction mechanism and reagents in Organic Chemistry, Gurudeep R Chatawal, 70-85.

2. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page

Basic Principles (Lecture 7)

- **Hyperconjugation**
  - ✓ Concept
  - ✓ Mechanism
  - ✓ Examples
  - ✓ Applications
    1. Bond length
    2. Dipole moment
    3. Stability of carbonium ions and free radicals

References:

1. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatawal, Himalaya Publishing House, 86-96.

2. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 171-176.

Basic Principles (Lecture 8)

Steric effect

- Introduction
- Steric acceleration
- Steric retardation
- Applications

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 176-179.

Structure Property Relationship (Lecture 9)

- Intermolecular forces
  - ✓ Introduction
  - ✓ Types
    1. Dipole –Dipole interaction
       - ✓ Concept
       - ✓ Examples
    2. Dipole-induced dipole interactions
       - ✓ Concept
       - ✓ Examples
    3. Londons forces
       - ✓ Concept
       - ✓ Examples
    4. Hydrogen Bonding
       - ✓ Concept
       - ✓ Examples

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 225-228

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatawal, Himalaya Publishing House, 145-169.

3. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No-82-83.

Structure Property Relationship (Lecture 10)

Effect of intermolecular forces on physical and chemical properties

1. Solubility
2. Melting point and boiling point
3. Stability
4. Reactivity

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 229-235.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatawal, Himalaya Publishing House, 145-169.

Structure Property Relationship (Lecture 11)

- **Stereochemistry**
  - ✓ Introduction
  - ✓ Isomerism- introduction, definition, classification
  - ✓ Structural Isomers-
    - ➢ Positional
    - ➢ functional
    - ➢ Chain
    - ➢ Metamerism
    - ➢ Tautomerism
  - ✓ Stereoisomers: concept and classification
    - ➢ Enantiomers
    - ✓ Concept
    - ✓ Properties
    - ✓ Examples

References:

1. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatawal, Himalaya Publishing House, 170-191.

2. Advanced General Organic Chemistry, S K Ghosh, Third edition, Part I, 271-274; 344-352.

3. A textbook of Organic Chemistry by Bahl and Bahl, Page No-115-118;123-129.

Structure Property Relationship (Lecture 12)

- **Diastereomers**
  - ✓ Concept
  - ✓ Examples
  - ✓ Properties
- **Difference between Enantiomers and distereomers**
- **Meso Compounds**
  - ✓ Concept
  - ✓ Examples
  - ✓ Properties

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 352-353.

2. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No- 130-131.

Structure Property Relationship (Lecture 13)

- **Geometric Isomerism**
  - ✓ Concept
  - ✓ Cis –trans nomenclature
  - ✓ Rules
  - ✓ Examples
  - ✓ E/Z nomenclature
  - ✓ Rules
  - ✓ Examples

References:

1. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatawal, Himalaya Publishing House, 237-243.

2. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 369-375.

3.A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No- 118-121.

Structure Property Relationship (Lecture 14)

- **R and S nomenclature**
  - ✓ Introduction
  - ✓ Rules for deciding priority
  - ✓ Deciding priority
  - ✓ Deciding R/S nomenclature
  - ✓ Examples

References:

1. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatawal, Himalaya Publishing House, 220-224.

2. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 329-337.

3. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No- 133-136.

Structure Property Relationship (Lecture 15)

- Tautomerism
  - ✓ Introduction
  - ✓ Classification
    1. Open system
    2. Ring-chain tautomerism
    3. Valence Tautomerism
- Open system of tautomerism
  1. Introduction
  2. Classification
  3. Examples
- Ring Chain Tautomerism
  1. Introduction
  2. Examples
- Valence Tautomerism
  1. Concept
  2. Examples
- Tautomerism in acetocaetate
- Difference between tautomerism and resonance

References:

1. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatawal, Himalaya Publishing House, 108-144.

2. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 274-285.

Classes of reactions and reagents (Lecture 16)

- Introduction to chemical reaction
- Bond fission
- Generation of cations (Carbocation), anion (Carbanion) and free radicals reactions
- Difference between ionic and free radical reactions
- Reaction reagents:
- Nucleophiles
- Electrophiles
- Difference between nucleophiles and electrophiles

References:

1. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 1-5; 9-11.

2. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 500-506.

3.A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No- 92; 97.

Classes of reactions and reagents (Lecture 17)

- **Classes of reactions**
    1. Addition reactions

       Concept and examples

        I. Nucleophilic addition reaction

        II. Electrophilic addition reaction

        III. Free radical addition

    2. Substitution reactions

       Concept and examples

        I. Nucleophilic substitution reaction

        II. Electrophilic substitution reaction

    3. Elimination reactions

       Concept and examples

    4. Rearrangement reactions

       Concept and examples

- Collision theory
- Transition state theory

References:

1. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 5-8.

2. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 500-506.

2.A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No- 97-101.

Reaction Intermediates (Lecture 18)

- **Introduction**
- **Carbocations**
  - Structure
  - Classification
  - Methods of preparation
  - Reactions
  - Stability
- **Carbanion**
  - ✓ Structure
  - ✓ Classification
  - ✓ Methods of preparation
  - ✓ Reactions
  - ✓ Stability

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 510-517.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 12-39.

3.A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No- 93-94.

Reaction Intermediates (Lecture 19)

- **Carbon free radicals**
  - ✓ Structure
  - ✓ Classification
  - ✓ Methods of preparation
  - ✓ Reactions
  - ✓ Stability
- Carbenes
  - ✓ Structure
  - ✓ Methods of preparation
  - ✓ Reactions
- Nitrenes
  - ✓ Structure
  - ✓ Methods of preparation
  - ✓ Reactions

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 506-509; 517-523.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House,12; 40-43; 421-431.

3. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No- 95-96.

Alkenes and alkynes (Lecture 20)

- **Elimination reactions:**
  - ✓ Introduction
  - ✓ Types
  - ✓ α elimination with example
  - ✓ β elimination with example
  - ✓ ɤ elimination with example
  - ✓ δ elimination with example
  - ✓ **Saytzeffs Rule**
  - ✓ Concept
  - ✓ Examples for Saytzeff
  - ✓ **Hoffmann's rule**
  - ✓ Concept
  - ✓ Examples for Saytzeff

- **Reference**

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 785-788.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House,407-409; 417-421.

Alkenes and alkynes (Lecture 21)

- **Unimolecular Elimination reaction (E1)**
  1. Introduction
  2. General Reaction
  3. Example
  4. Mechanism
  5. Reaction Kinetics

- **Factors affecting E1 reaction**
  1. Nature of substrate
  2. Nature of solvent
  3. Nature of incoming nucleophile
  4. Nature of leaving group

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 788-791.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House,412-416.

Alkenes and alkynes (Lecture 22)

- **Bimolecular Elimination reaction (E2)**
  1. Introduction
  2. General Reaction
  3. Example
  4. Mechanism
  5. Reaction Kinetics

- **Factors affecting E2 reaction**
  1. Nature of substrate
  2. Nature of solvent
  3. Nature of incoming nucleophile
  4. Nature of leaving group

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 791-797.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 409-416.

Alkenes and Alkynes (Lecture 23)

- **Elimination reaction (E1cb)**
  1. Introduction
  2. General Reaction
  3. Example
  4. Mechanism
  5. Reaction Kinetics

- **Factors affecting E1cb reaction**
  1. Nature of substrate
  2. Nature of solvent
  3. Nature of incoming nucleophile
  4. Nature of leaving group

- **Question paper discussion**

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 797-801.

Alkenes and Alkynes (Lecture 24)

- **Hydrogenation**

1. Introduction
2. Example
3. Mechanism
4. Homogeneous hydrogenation
5. Heterogeneous hydrogenation
6. Stereochemistry

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 645-648.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House,1002-1008.

Alkenes and Alkynes (Lecture 25)

- **Halogenation**

1. Introduction
2. Example
3. Mechanism
4. Stereochemistry

- **Addition of hydrogen halide**

1. Introduction
2. Example
3. Mechanism
4. Markonikov's rule
5. Anti Markonikov's rule
6. Stereochemistry

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 621-628.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 356-362.

Alkenes and Alkynes (Lecture 26)

- **Halohydrin formation**
  - ✓ Introduction
  - ✓ Example
  - ✓ Mechanism

- **Oxymercuration-demercuration**
  - ✓ Introduction
  - ✓ Example
  - ✓ Mechanism

- **Hydroboration-oxidation**
  - ✓ Introduction
  - ✓ Example
  - ✓ Mechanism

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 648-656.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 362-365.

Alkenes and Alkynes (Lecture 27)

- **Hydroxylation**
  - ✓ Introduction
  - ✓ Example
  - ✓ Mechanism
  - ✓ Stereochemistry

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 633-640.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House,407-409; 417-421.

Alkenes and Alkynes (Lecture 28)

- **Ozonolysis**
    1. Introduction
    2. Example
    3. Mechanism
    4. Stereochemistry

- **Allylic substitution using NBS**
    1. Introduction
    2. Example
    3. Mechanism

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 641-644.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House,370-371; 784-789.

Alkenes and Alkynes (Lecture 29)

- **Conjugated dienes**
  - ✓ Introduction
  - ✓ Examples

- **1-2 and 1-4 addition**
  - ✓ Introduction
  - ✓ Examples
  - ✓ Mechanism

- **Diels alder reaction**
  - ✓ Introduction
  - ✓ Examples
  - ✓ Components
  - ✓ Mechanism

References:

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 674-693.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 378-399.

Alkenes and Alkynes (Lecture 30)

- **Alkenes**
  1. Introduction
  2. Methods of preparation

- **Alkynes**
  1. Introduction
  2. IUPAC nomenclature
  3. Methods of preparation
  4. Reactions

References:

1.A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No-227-233; 256-264.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 403-405.

Benzene and Aromaticity (Lecture 31)

- Introduction
- Structure of benzene
- Stability
- Huckel's rule for aromaticity
- Examples of aromatic compounds
- Preparation of benzene
- Properties

References:

1. A textbook of Organic Chemistry by Bahl and Bahl, Page No-654-663.

Benzene and Aromaticity (Lecture 32)

- **Electrophilic substitution reaction**
- Introduction
- Mechanism
- Energy profile diagram

- **References:**

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 933-938.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 473-475.

Benzene and Aromaticity (Lecture 33)

- **Halogenation**

1. Introduction
2. General reaction
3. Mechanism
4. Examples

- **Nitration**

1. Introduction
2. General reaction
3. Mechanism
4. Examples

- **References:**

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 956-962; 968-974.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 476-479.

3. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No-664-666.

Benzene and Aromaticity (Lecture 34)

- **Sulphonation**

1. Introduction
2. General reaction
3. Mechanism
4. Examples

- **Friedal Craft Acylation**

1. Introduction
2. General reaction
3. Mechanism
4. Examples

- **Friedal Craft Alkylation**

1. Introduction
2. General reaction
3. Mechanism
4. Examples

- **References:**

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 962-968; 975-986.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 480-483.

3. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No-666-668.

Benzene and Aromaticity (Lecture 35)

Orientation and reactivity – monosubstituted benzene

Introduction to

- **Activators:**

1. Definition
2. Mechanism
3. Examples

- **Deactivators:**

1. Definition
2. Mechanism
3. Examples

- **Effect of activators and deactivators on reactivity**

- **References:**

1. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No-683-685; 688-690 .

Benzene and Aromaticity (Lecture 36)

Orientation and reactivity – monosubstituted benzene

- **o/p directors**

1. Definition
2. Mechanism
3. Examples

- **m- directors**

1. Definition
2. Mechanism
3. Examples

- **Effect of activators and deactivators on reactivity**

- **References:**

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 938-944.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 483-494.

3. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No-684-688.

Benzene and Aromaticity (Lecture 37)

- **Substitution Nucleophilic Unimolecular Aromatic**
- Introduction
- General Reaction
- Example
- Mechanism

- **Substitution Nucleophilic Bimolecular Aromatic**
- Introduction
- General Reaction
- Example
- Mechanism
- Factors affecting

- **References:**

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 591-600.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 501-503.

Benzene and Aromaticity (Lecture 38)

- **Substitution Nucleophilic internal Aromatic**

1. Introduction
2. General Reaction
3. Example
4. Mechanism

- Revision

- **References:**

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 602-605.

2. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal, Himalaya Publishing House, 503-506.

IUPAC Nomenclature (Lecture 39)

- **Compounds containing C and H (O) only**

1. Alkanes

- Rules for IUPAC
- Examples

2. Alkenes

- Rules for IUPAC
- Examples

3. Alkynes

- Rules for IUPAC
- Examples

4. Alcohols

- Rules for IUPAC
- Examples

5. Aldehydes

- Rules for IUPAC
- Examples

6. Ketones

- Rules for IUPAC
- Examples

- **References:**

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 107-140.

IUPAC Nomenclature (Lecture 40)

- **Compounds containing C, H and O only**

1. Carboxylic acids

- Rules for IUPAC
- Examples

2. Esters

- Rules for IUPAC
- Examples

3. Ethers

- Rules for IUPAC
- Examples

4. Anhydride

- Rules for IUPAC
- Examples

- **References:**

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 107-140.

2. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No-143-171.

IUPAC Nomenclature (Lecture 41)

- **Compounds containing C, H ,N (O)**

1. Amines

- Rules for IUPAC
- Examples

2. Cyanides (Nitriles)

- Rules for IUPAC
- Examples

3. Amides

- Rules for IUPAC
- Examples

4. Nitro compunds

- Rules for IUPAC
- Examples

- **References:**

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 107-140.

2. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No-143-171.

IUPAC Nomenclature (Lecture 42)

- **Compounds containing C, H ,S (O) and/or halogens**

1. Alkyl halides

- Rules for IUPAC
- Examples

2. Thiols

- Rules for IUPAC
- Examples

3. Sulphonic acids

- Rules for IUPAC
- Examples

4. Sulphonyl halides

- Rules for IUPAC
- Examples

5. Acid halides

- Rules for IUPAC
- Examples

- **References:**

1. Advanced General Organic Chemistry A Modern Approach Part I by S K Ghosh, Page No 107-140.

2. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No-143-171.

Alkanes (Lecture 43)

- **Introduction**
- Physical properties
- Preparation
    1. Hydrogenation of alkenes or alkynes
    2. Reduction of alkyl halides
    3. Decarboxylation of carboxylic acids
    4. Hydrolysis of Grignard Reagents
    5. Wurtz synthesis
- Reactions
    1. Halogenation
    2. Nitration
    3. Sulphonation
    4. Oxidation
    5. Isomerisation

- **References:**

1. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No-189-204.

Alkanes (Lecture 44)

- Reactions
    1. Halogenation
    2. Nitration
    3. Sulphonation
    4. Oxidation
    5. Isomerisation

- **References:**

1. A textbook of Organic Chemistry by Bahl and Bahl, S Chand and Company Ltd., Page No-189-204.

(Lecture 45)

Annual Examination Paper Discussion of previous years.