

# GOVERNMENT COLLEGE BIROHAR (JHAJJAR)

Summary of Lesson Plans of College Faculty for Academic Session 2023-2024

Name of Assistant/Associate Professor: Dr. Shivami Takhar

Class: B.Sc. Ist Year Subject: Inorganic Chemistry

Semester: II<sup>nd</sup>

| Months                   | Topics/Chapters to be Covered   |
|--------------------------|---|
| <b>January<br/>2024</b>  | <p>Hydrogen Bonding and Vander Waals' forces: Hydrogen bonding - Definition, Types and effects of hydrogen bonding on properties of substances, application. Brief discussion of various types of Vander Waals' forces.</p> <p>Metallic bond and Semiconductors:- Metallic Bond - Brief introduction to metallic bond, band theory of metallic bond. Semiconductors - Introduction, types and applications.</p>   |
| <b>February<br/>2024</b> | <p>S-Block Elements:- Comparative study of the elements including diagonal relationships, salient features of hydrides, methods of preparation. Solvation and complexation tendencies including their functions in biosystems.</p> <p>Chemistry of noble gases:- Chemical properties, chemistry of xenon, structure &amp; bonding of fluorides, oxides and oxyfluorides of xenon.</p> <p>p-block elements:- Emphasis on comparative study of properties of p-block elements, diagonal relationships and method of preparation.</p> <p style="text-align: center;">UT - I</p> <p>Assignment I =&gt; Noble gases.</p>                   |
| <b>March<br/>2024</b>    | <p style="text-align: center;">UT - I =&gt; S, block elements.</p> <p>Boron family:- Diborane - properties and structure, Borane - Chemical properties and structure of trihalides of Boron - Trends in Lewis acid character, structure of Aluminium (III) Chloride.</p> <p>Carbon family:- Carbonation, <math>sp</math>-<math>sp^2</math>, carbides, <math>sp^3</math> carbons, silicates, Silicones.</p> <p>Nitrogen family:- oxides - structure of oxides of N.P. oxyacids - structure &amp; selective acid of</p> <p>Atomthesis of oxycnids of Nitrogen &amp; phosphorus<br/>Structure of white, yellow &amp; red phosphorus.</p> |

April  
2024

oxygen family :- oxyacids of sulphur - structures  
and acidic strength  $H_2O_2$  - structure,  
properties and uses.

Halogen family :- Basic properties of halogen  
interhalogens, types, properties, hydrides  
and oxyacids of chlorine - structure &  
comparison of acids and strength.

UT - II,  
Revision.

  
Signature of Asst/Asso. Professor

# GOVERNMENT COLLEGE BIROHAR (JHAJJAR)

Summary of Lesson Plans of College Faculty for Academic Session 2023-2024

Name of Assistant/Associate Professor: Dr. Shivani Takhar

Class: B.Sc. III<sup>rd</sup> year Subject: Inorganic Chemistry

Semester: VI

| Months           | Topics/Chapters to be Covered  |
|------------------|--|
| January<br>2024  | 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-ethylene complexes. Mononuclear carbonyls and the nature of bonding in metal carbonyls.                              |
| February<br>2024 | Acid and Bases, HSAB Concept:- Arrhenius, Brønsted-Lowry, the Lux-Flood, Solvent System and Lewis concepts of acids and bases. Relative strength of acids and bases. Concept of Hard and Soft acids and Bases. Symbiosis, Electronegativity and hardness and softness.<br>Assignment I:- Silicones and phosphazenes. |
| March<br>2024    | Bioinorganic Chemistry:- Essential and trace elements in biological processes, metalloproteins with special reference to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference of $Ca^{2+}$ .<br>Nitrogen fixation.<br>VI-I: Organometallic Chemistry.           |



**April  
2024**

UT - II on Acid and Bases and HSAB concept  
Revision.

  
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# GOVERNMENT COLLEGE BIROHAR (JHAJJAR)

Summary of Lesson Plans of College Faculty for Academic Session 2023-2024

Name of Assistant/Associate Professor: Dr. SHIVANI JAKHAR


Class: B.Sc. II<sup>nd</sup> year Subject: Organic Chemistry

Semester: IV

| Months                   | Topics/Chapters to be Covered  |
|--------------------------|--|
| <b>January<br/>2024</b>  | <p>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.</p> <p>- Application of IR spectroscopy in structure elucidation of simple organic compounds.</p>  |
| <b>February<br/>2024</b> | <p>Amines: Structure &amp; nomenclature of 1<sup>o</sup>, 2<sup>o</sup> and 3<sup>o</sup> amines. Separation of mixture of affecting basicity of amines. Structural features alkyl and aryl amines. Preparation of compounds, nitrites, reduction of nitro aldehydic &amp; ketonic compounds. Gabriel-phthalimide reaction, Hofmann-Bromamide reaction.</p> <p>Electrophilic aromatic substitution in aryl amines, reaction of amines with nitrous acid.</p> |
| <b>March<br/>2024</b>    | <p><u>VI - I : IR</u><br/> <u>Diazonium Salts</u> :-&gt; Mechanism of diazotisation, Structure of benzene diazonium chloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO<sub>2</sub> and CN groups, reduction of diazonium salts to hydroxylamines, coupling reaction and its synthetic application.</p> <p style="text-align: center;">Assignment - I</p> <p>Aldehydes &amp; Ketones: Nomenclature &amp; structure of the carbonyl group.</p>    |

April  
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Synthesis of aldehydes and ketones, PCC, mechanism  
of nucleophilic additions to carbonyl group  
with particular emphasis on benzoin, aldol,  
Perkin and Knoevenagel condensations.  
Condensation with ammonia & its derivatives,  
Wittig reaction, Mannich Reaction, oxidation  
of aldehydes, Baeyer-Villiger oxidation  
of ketones, Cannizzaro reaction. MPV, Clemmensen,  
Wolf-Kishner, Hittler & NaBH<sub>4</sub> reductions.  
UT-II  
Revision.



Signature of Asst/Asso. Professor