



①

SURGUJA VISHWA VIDYALAYA, AMBIKAPUR C.G.

Syllabus of Chemistry For Ph.D. Entrance 2017

SECTION- A

RESEARCH METHODOLOGY

- **Meaning, Nature, Significance and Future of Research.
- **Process of Research, Hypothesis, Literature Survey, Sampling, Data Collection, Interviewing, Questionnaire, Report Writing.
- **How to write a Dissertation and Thesis, Conclusion and its application.
- **Role and use of computer in research.

.....

SECTION-B

** Stereo Chemistry:-
 Configuration and Chirality, Optical Isomerism, R-S
 Conversion, Enantiotropic and Distereotopic Method Of
 Resolution, Asymmetric Synthesis, Geometrical Isomerism, E-Z
 Conversion, Conformational Analysis, Stereospecific And
 Stereoselective Synthesis.

** Organic Reaction Mechanism:-
 Generation, Structure, Stability and Reactivity of
 Carbocation, Free Radical, Carbene and Nitrene. Mechanism Of
 Nucleophilic Substitution SN1 SN2, Elimination E1 E2, Addition
 Reaction.

** Reactions By Name:-
 Sandmeyer reaction, Hunsdiecker reaction, Vilsmeier
 reaction, Gattermann Koch reaction, The Van Richter, Sommelet-

All
7/9/17

Uda
7/9/17

PK Singh
5-09-17

Hause
Rearrang
Rearrang
** Oxidation
Reaction,
Meerwin
** Spectrosc
help of U
** Photo C
Reaction
Reaction
** General
Electronic
containing
Alkaloids.
* Period
periodicity.
* Chemica
theory.
Aton
inciple, M
nfigurati
General
ansitic
ents (d
enclat
ation
lex, I
al C
clusi

Hause Reaction, Beckmann Rearrangement, Wagner Meerwein Rearrangement, pinacol - Pinacolone Rearrangement, Benzil-Benzilic Rearrangement, Favorski Rearrangement, Bayer Villiger Oxidation.

** Oxidation and Reduction:-

Swern Oxidation, Oppenauer Oxidation, Prevost Reaction, Catalytic Hydrogenation, Dissolving Metal Reduction, Meerwin & Pondrof Varley Reduction, Wolf Kishner Reduction.

** Spectroscopy:-

Structure Elucidation Of Organic Compounds with the help of UV-VIS, IR, 1H, 13C, NMR analysis.

** Photo Chemistry and Pericyclic Reactions:-

Main feature of Photochemistry and Pericyclic Reactions, Classification Of Pericyclic Reactions, Electrocyclic Reactions, Cycloaddition Reactions & Sigmatropic Reactions.

** General Organic Chemistry:-

Nomenclature Of Heterocyclic Compounds, Stereo Electronic Effect, Synthesis and Reactivity of Common Heterocyclic containing One or Two Hetero Atom. Study of Steroids Terpenoids and Alkaloids.

** Periodic Table, Periodic Classification Of Elements, Chemical Periodicity.

** Chemical Bonding Including Shape Of Molecules, VSEPR Theory, MO Theory.

** Atomic Structure, Bohr's Theory, Heisenberd Uncertainty Principle, Madelung Constant, Quantam Numbers (n, l, m & s), Electronic Configuration, Hund's Rule, Pauli Exclusion Principle. Aufbau Principle.

** General study of s & p block Elements.

** Transition Elements and Co-Ordination Compound, Inner Transition Elements (d and f Block), Characteristics of 3d Elements, Structure and Nomenclature of Co-Ordination Compounds, VBT and CFT of Co-Ordination Compounds, Colour and Megnatic Property of Metal Complex, Ligend Field Theory, Trans Effect.

** Metal Complex and Metal Cluster, STYX Code, Crown Ether, Cryptand and Inclusion Compound.

Alk
5/09/17

Ush
7/9/17

Rajk
5-09-17

(3)

** Reaction Mechanism of Transition Metal Complex, Acid Hydrolysis, Reaction Without M-L Cleavage, Electron Transfer Reaction, Marcus Hush Theory, Inner and Outer Sphere Mechanism.

** Bioinorganic- Photosystem, Porphyrins, Nitrogen Fixation, Biological Role of Ca, Mg, Na and K ions.

** Basic Principles Of Quantum Mechanics, Postulates, Harmonic Oscillation and the H-atom, Including Shape of Atomic Orbitals, Spin Angular Momentum.

** Chemical Thermodynamics, Reversible & Irreversible Process, 1st 2nd and 3rd Laws of Thermodynamics and its Applications, Gibb's & Helmholtz Energy, Free Energy Change, La Chatelier Principle, Maxwell's relation.

** Electro Chemistry- Nernst Equation, Redox Systems, Electrochemical Cells, Debye-Huckel Theory, Kohlrausch's Law, Transport Number, EMF, Corrosion.

** Chemical Kinetics- Reactions of Various Order, Arrhenius Equation, Collision Theory, Transition State Theory, Enzyme Kinetics, Photophysical and Photochemical Process, Catalyst.

** Analytical Chemistry- Principles of Qualitative and Quantitative Analysis, Acid Base Oxidation Reduction and Precipitation Reaction, Use of Indicator and Organic Reagents in Inorganic Analysis, Radioactivity, Nuclear Reaction, Application of Isotope.

** Solid State- Crystal structure, Bragg's Law and Application, Band structure of Solids.

** Theory of Gases- Maxwell-Boltzmann Distribution Law.

1. Dr. Rohit Kumar Bargah

2. Dr. Amit Kumar Bawaria

3. Smt. Saroj Tirkey

4. Dr. Usha Sukla