SRI A S N M GOVERNMENT COLLEGE, PALAKOL, W.G. DT
(Affiliated to Adikavi Nannaya University, Rajahmundry)
(Accredited with NAAC "B" Grade with 2.61 CGPA points)
SEMESTER-V

Paper - V (INORGANIC, PHYSICAL & ORGANIC CHEMISTRY)

INORGANIC CHEMISTRY **45 hrs (3 h / w)**

UNIT – I

Coordination Chemistry: **8h**

IUPAC nomenclature - bonding theories - Review of Werner's theory and Sidgwick's concept of coordination - Valence bond theory - geometries of coordination numbers 4-tetrahedral and square planar and 6-octahedral and its limitations, crystal filed theory - splitting of d-orbitals in octahedral, tetrahedral and square-planar complexes - low spin and high spin complexes - factors affecting crystal-field splitting energy, merits and demerits of crystal-field theory. Isomerism in coordination compounds - structural isomerism and stereo isomerism, stereochemistry of complexes with 4 and 6 coordination numbers.

UNIT-II

1. Spectral and magnetic properties of metal complexes: **4h**

Types of magnetic behavior, spin-only formula, calculation of magnetic moments, experimental determination of magnetic susceptibility-Gouymethod.

2. Stability of metal complexes: **3h**

Thermodynamic stability and kinetic stability, factors affecting the stability of metal complexes, chelate effect, determination of composition of complex by Job's method and mole ratio method.

ORGANIC CHEMISTRY

UNIT- III

Nitro hydrocarbons: **3h**

Nomenclature and classification-nitro hydrocarbons, structure -Tautomerism of nitroalkanes leading to aci and keto form, Preparation of Nitroalkanes, reactivity -halogenation, reaction with HONO (Nitrous acid),Nef reaction and Mannich reaction leading to Micheal addition and reduction.

UNIT – IV

Nitrogen compounds: **12h**

Amines (Aliphatic and Aromatic): Nomenclature, Classification into 1°, 2°, 3° Amines and Quarternary ammonium compounds. Preparative methods –

1. Ammonolysis of alkyl halides 2. Gabriel synthesis 3. Hoffman's bromamide reaction (mechanism).

Reduction of Amides and Schmidt reaction. Physical properties and basic character - Comparative basic strength of Ammonia, methyl amine, dimethyl amine, trimethyl amine and aniline - comparative basic strength of aniline, N-methylaniline and N,N-dimethyl aniline (in aqueous and non-aqueous medium), steric effects and substituent effects. Chemical

properties: a) Alkylation b) Acylation c) Carbylamine reaction d) Hinsberg separation e) Reaction with Nitrous acid of 1°, 2°, 3° (Aliphatic and aromatic amines). Electrophillic substitution of Aromatic amines – Bromination and Nitration. Oxidation of aryl and Tertiary amines, Diazotization.

PHYSICAL CHEMISTRY

UNIT- V

Thermodynamics **15h**

The first law of thermodynamics-statement, definition of internal energy and enthalpy. Heat capacities and their relationship. Joule-Thomson effect- coefficient. Calculation of w, for the expansion of perfect gas under isothermal and adiabatic conditions for reversible processes. State function. Temperature dependence of enthalpy of formation-Kirchoff s equation. Second law of thermodynamics. Different Statements of the law. Carnot cycle and its efficiency. Carnot theorem. Concept of entropy, entropy as a state function, entropy changes in reversible and irreversible processes. Entropy changes in spontaneous and equilibrium processes.

List of Reference Books

1. Concise coordination chemistry by Gopalan and Ramalingam
2. Coordination Chemistry by Basalo and Johnson
3. Organic Chemistry by G.Mare loudan, Purdue Univ
4. Advanced Physical Chemistry by
5.Text book of physical chemistry by S Glasstone
6.Concise Inorganic Chemistry by J.D.Lee
7. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan
8. A Text Book of Organic Chemistry by Bahl and Arun bahl
9.A Text Book of Organic chemistry by I L Finar Vol I
10.Advanced physical chemistry by Gurudeep Raj

SRI A.S.N.M. GOVERNMENT COLLEGE (AUTONOMOUS) PALAKOL, W.G. Dt.
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MODEL PAPER
THREE YEAR B.Sc. DEGREE EXAMINATIONS
III B.Sc. SEMESTER V
PAPER V: INORGANIC, ORGANIC& PHYSICAL CHEMISTRY

Time: 3Hrs. **Max. Marks: 75**

PART-A

Answer all questions. Each carries **TEN** marks. **5 x 10=50 Marks**

1. A) Explain the formation of $Fe(CN)_6^{4-}$ and $Fe(CN)_6^{3-}$ on the basis of Valence Bond Theory.

(OR)

B) Explain the sterio chemistry of complexes with 4 & 6 coordination numbers.

2. A) How do you Determine the magnetic susceptibility of metal complexes using Guoy balance method

(OR)

B) How do you Determine the composition of metal complexes using Job's method?

3. A) Write the methods of preparation of Nitroalkanes.

(OR)

B) Explain the Mannich reaction and Micheal addition

4. A) How amines are prepared from Gabriel synthesis and Hoffmann bromamide method?

(OR)

B) Write any four electrophilic substitution reactions of aromatic amines.

5. A) Derive Kirkoff's equation .

(OR)

B) Describe the Carnot Cycle.

PART-B

Answer any **FIVE** of the following questions. Each carries **FIVE** marks. **5 x 5=25 Marks**

6. Explain the EAN rule with suitable examples.
7. Explain the silent features of Crystal field theory.
8. Write the factors effecting stability of metal complexes?
9. Write Mechanism of Nef reaction.
10. Explain the basicity of amines.
11. Write a note on Diazotization.
12. State and explain Jouls- Thomson effect.
13. Write a note on Entropy.

LABORATORY COURSE – V
Practical Paper – V Organic Chemistry
(At the end of semester V) **30 hrs (3h / W)**

Organic Qualitative Analysis: **50M**

Analysis of an organic compound through systematic qualitative procedure for functional group identification including the determination of melting point and boiling point with suitable derivatives.

Alcohols, Phenols, Aldehydes, Ketones, Carboxylic acids, Aromatic Primary Amines, Amides and Simple sugars.

LABORATORY COURSE – VI
Practical Paper – VI Physical Chemistry
(At the end of semester V) **30 hrs (3h / W)**

50M

1. Determination of rate constant for acid catalyzed ester hydrolysis.
2. Determination of molecular status and partition coefficient of benzoicacid in Benzene and water.
3. Determination of Surface tension of liquid
4. Determination of Viscosity of liquid.
5. Adsorption of acetic acid on animal charcoal, verification of Freundlisch isotherm.