**A.S.D.GOVERNMENT DEGREE COLLEGE FOR WOMEN (A), KAKINADA**

**DEPARTMENT OF CHEMISTRY**

**BOARD OF STUDIES: 2017-18**

**FIRST YEAR, SEMESTER - II**

 **PHYSICAL & GENERAL CHEMISTRY – II Dt: 29th June,2017**

 **PHYSICAL CHEMISTRY - II 30h (2h/W)**

**UNIT – I**

1. **SOLID STATE: 10h**

Symmetry in crystals. Law of constancy of interfacial angles. The Law of rationality of indices. The law of symmetry. Definition of lattice point, unit cell. Bravais lattice and crystal systems. X-ray diffraction and crystal structure. Bragg’s law. Determination of crystal structure by Bragg’s method and the powder method. Indexing of planes and structure of NaCl and KCl Crystals. Defects in Crystals: Stoichiometric and non-Stoichiometric defects.

 **UNIT - II**

1. **GASEOUS STATE: 6h**

Compression factors, deviation of real gases from ideal behavior. Vander Waal’s equation of state. P-V Isotherms of real gases, Andrew’s isotherms of carbon dioxide, continuity of state. Critical phenomena. The vander Waal’s equation and the critical state.Law of Corresponding states. Relationship between critical constants and vander Waal’s constants. Joule Thomson effect.

1. **LIQUID STATE 4h**

Structural differences between solids, liquids and gases. Liquid crystals, the mesomorphic state. Classification of liquid crystals into Smectic and Nematic. Differences between liquid crystal and solid / liquid. Applications of liquid crystals as LCD devices.

 **UNIT - III**

1. **SOLUTIONS 10h**

**Liquid-liquid - Ideal solutions -** Raoult’s law. Ideally dilute solutions, Henry’s law. Non-ideal solutions. Vapour pressure – composition and vapour pressure-temperature curves. Azeotropes- HCl-H2O, ethanol-water systems and fractional distillation.

**Partially miscible liquids** **–** phenol - water, trimethylamine-water, nicotine-water systems. Effect of impurity on consulate temperature.

**Immiscible liquids and steam distillation -** Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.

**GENERAL CHEMISTRY 30h (2h/W)**

**UNIT - IV**

1. **COLLOIDS AND SURFACE CHEMISTRY: 8h**

Definition of colloids. Solids in liquids(sols), preparation, purification, properties- kinetic, optical, electrical. Stability of colloids, Hardy-Schulze law, protective colloid

Liquids in liquids (emulsions) preparation, properties, uses. Liquids in solids (gels) preparation, uses.

**Adsorption:** Physical adsoption, chemisorption. Freundlich, Langmuir adsorption isotherms. Applications of adsorption.

1. **CHEMICAL BONDING 7 h**

 Hybridization – sp,sp2,sp3,sp3d,sp3d2(Becl2,Bcl3,CCl4,Pcl5,SF6)Valence bond theory,VB theory as applied to ClF3,Ni(CO)4, Molecular orbital theory – LCAO method,Construction of M.O diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N2,O2,CO and NO)

**UNIT - V**

1. **STEREOCHEMISTRY OF CARBON COMPOUNDS**: **15h**

Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae.

Optical isomerism: optical activity-wave nature of light, plane polarized light,opticalrotation and specific rotation.

Chiral molecules- definition and criteria(symmetry elements)-Definition of enantiomers and diasteomers – Explanation of optical isomerism with examples Glyceraldehyde,Lactic acid,Alanine,Tartaric acid,2,3-dibromopentane.

D,L and R,S configuration methods and Geometrical isomerism – E,Z- configuration with examples.

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**LABORATORY COURSE: 30 hrs (2 h / w)**

**Practical – II** (At the end of Semester – II)

**Qualitative Inorganic analysis and Inorganic Preparations:**

1. **Qualitative Inorganic analysis:**

Analysis of Mixture salts containing two anions and two cations (from two different groups) from the following:

**Anions:** Carbonate, Sulphate, Chloride, Bromide, Iodide, Acetate, Nitrate, Borate, Phosphate.

**Cations:** Lead, Copper, Cadmium, Iron, Aluminum, Zinc, Manganese, Calcium, Strontium, Barium, Potassium and Ammonium.

1. **Inorganic Preparations:** Any **one** of the following preparations:
2. Potash alum
3. Hexamine cobalt (III) chloride
4. Potassium tris(oxalato) chromate

**ECOMMENDED TEXT BOOKS AND REFERENCE BOOKS:**

**Inorganic Chemistry**

1. Concise Inorganic Chemistry by J.D.Lee
2. Basic Inorganic Chemistry by Cotton and Wilkinson
3. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan
4. Inorganic Chemistry by R R Heslop and P.L. Robinson
5. Modern Inorganic Chemistry by C F Bell and K A K Lott
6. University Chemistry by Bruce Mahan
7. Qualitative Inorganic analysis by A.I.Vogel
8. A textbook of qualitative inorganic analysis by A.I. Vogel
9. Inorganic Chemistry by J.E.Huheey
10. Inorganic Chemistry by Chopra and Kapoor
11. Coordination Chemistry by Basalo and Johnson
12. Organometallic Chemistry – An introduction by R.C.Mehrotra and A.Singh
13. Inorganic Chemistry by D.F.Shriver, P.W.Atkins and C.H.Langford
14. Inorganic Chemistry by Philips and Williams, Lab Manuals
15. Introduction to inorganic reactions mechanisms by A.C.Lockhart
16. Theoretical inorganic chemistry by McDay and J.Selbin
17. Chemical bonding and molecular geometry by R.J.Gillepsy and P.L.Popelier
18. Advanced Inorganic Chemistry By Gurudeep Raj
19. Analytical chemistry by Gary D Christian, Wiley India
20. Analytical Chemistry by G.L.David Krupadanam, et al, Univ. Press
21. Selected topics in inorganic chemistry by W.D.Malik, G..D.Tuli, R.D.Madan
22. Concepts and models of Inorganic Chemistry by Bodie Douglas, D.McDaniel and J.Alexander
23. Modern Inorganic Chemistry by William L. Jolly
24. Concise coordination chemistry by Gopalan and Ramalingam
25. Satyaprakash’s modern inorganic chemistry by R.D.Madan.

**Organic Chemistry**

1. Organic Chemistry By R T Morrison and R.N.Boyd
2. Organic Chemistry by T.J.Solomons
3. Organic Chemistry by L.G.Wade Sr
4. Organic Chemistry by D.Cram, G.S.Hammond and Herdricks
5. Modern Organic Chemistry by J.D.Roberts and M.C.Caserio
6. Text book of Organic Chemistry by Ferguson
7. Problems and their solutions in organic Chemistry by I.L.Finar
8. Reaction mechanisms in Organic Chemistry by S.M.Mukherji and S.P.Singh
9. A guide book to mechanisms in Organic Chemistry by Peter Sykes
10. Organic spectroscopy by J.R.Dyer
11. Organic Spectroscopy by William Kemp
12. Fundamentals of organic synthesis amd retrosynthetic analysis by Ratna Kumar Kar
13. Comprehensive practical organic qualitative analysis by V.K.Ahluwalia & Sumta Dhingra
14. Comprehensive practical organic chemistry: Preparation and quantitative analysis by V.K.Ahluwalia and Reena Agarwal.
15. Organic Chemistry by Janice Gorzynski
16. Organic Chemistry by Stanley H Pine
17. Fundamentals of Organic Chemistry by John Mc Murray, Eric Simanek
18. Organic Chemistry by Francis A Carey
19. Text book of Organic Chemistry by K.S.Mukherjee
20. Organic Chemistry by Bhupinder Meha & Manju Mehta
21. Organic Chemistry by L.G.Wade Jr, Maya Shankar Singh
22. Elementary organic spectroscopy by Y.R. Sharma
23. Chemistry & Industry by Gurdeep R. Chatwal
24. Applied Chemistry by Jayashree Ghosh
25. Drugs by David Krupadanam
26. Pharmacodynamics by R.C.Srivastava, Subit Ghosh
27. Analytical Chemistry by David Krupadanam
28. Green Chemistry – V.K.Ahluwalia
29. Organic Synthesis by V.K.Ahluwalia and R.Agarwal
30. New trends in Green Chemistry –by V.K.Ahluwalia & M.Kidwai
31. Industrial Chemistry by B.K.Sharma
32. Industrial Chemistry by Banerji
33. Industrial Chemistry byM.G.Arora
34. Industrial Chemistry by O.P.Veramani & A.K.Narula
35. Synthetic Drugs by O.D.Tyagi & M.Yadav
36. Medicinal Chemistry by Ashutoshkar
37. Medicinal Chemistry by P.Parimoo
38. Pharmacology & Pharmacotherapeutics by R.S Satoshkar & S.D.Bhandenkar
39. Medicinal Chemistry by Kadametal P-I & P.II
40. European Pharmacopoeia
41. Vogel’s Qualitative organic analysis.
42. Laboratory manual of Organic Chemistry by Raj K Bansal

**Physical Chemistry**

1. Physical chemistry A molecular approach by Donald A. Mcquarrie and

John D. Simon.

1. Physical chemistry by G M Barrow
2. Principles of physical chemistry by Prutton and Marron
3. Physical chemistry by Peter Atkins, Julio D. Paula
4. Physical Chemistry by Ira N Levine
5. Elements of Physical Chemistry by Peter Atkins, Julio D. Paula
6. Text book of Physical Chemistry by P.L.Soni, O.P.Dharmarha and Q.N.Dash
7. Solid State Chemistry and its applications by Anthony R. West
8. Text book of physical chemistry by K L Kapoor
9. Thermodynamics for Chemists by S Glasston
10. Chemical Kinetics by K J Laidler
11. An Introduction to Electrochemistry by S Glasston
12. Physical chemistry through problems By S K Dogra