

SEMESTER-I

Course- I (Inorganic & Physical Chemistry)

60hrs (4hrs/w)

Course outcomes: At the end of the course, the student will be able to;

1. Understand the basic concepts of p-block elements
2. Explain the difference between solid, liquid and gases in terms of intermolecular interactions.
3. Apply the concepts of gas equations, pH and electrolytes while studying other chemistry course

INORGANIC CHEMISTRY

24 h

UNIT - I

Chemistry of p-block elements

8h

Group-13 : Preparation & Structure of Diborane , Borazine

Group -14 : Preparation , classification and uses of Silicones.

Group15 : Preparation Structures of Phosphonitrilic halides $\{(PNCl_2)_n$ where $n=3, 4\}$

Group:16 : Classification of Oxides and Oxo acids of sulphur (Structure only)

Group:17 : Pseudo halogens , structures of Interhalogen compounds

UNIT - II

1. Chemistry of d-Block elements:

6h

Characteristics of d-block elements with special reference to electronic configuration, variable valence, Magnetic properties, Catalytic properties and ability to form complexes , Stability of various oxidation States.

2. Chemistry of f- block elements:

6h

Chemistry of lanthanides - electronic structure , oxidation States , Lanthanide contraction, Consequences of Lanthanide contraction , magnetic properties . chemistry of actinides - electronic configuration , Oxidation States , actinide contraction , Separation of lanthanides and actinides(Ion exchange method) .

3. Theories of Bonding in metals :

4h

Valence bond theory and Free electron theory , explanation of thermal and electrical conductivity of metals based on these theories , Band theory - formation of bands, explanation of conductors , semiconductors and their classification and insulators .

UNIT- III**Solid state****10h**

Symmetry in crystals, Law of constancy of interfacial angles, The Law of rationality of Indices, The Laws of symmetry, Miller indices, Definition of lattice point, space lattice, Unit cell. Bravais Lattices and crystal systems. X-ray diffraction and crystal structure, Bragg's Law, powder method. Defects in crystals, stoichiometric and non-stoichiometric crystal defects.

UNIT-IV**1. Gaseous state****6h**

van der Waals equation of state, Andrew's Isotherms of carbon dioxide, Continuity of state, Critical phenomenon, Relation between critical constants and van der Waals constants, Law of Corresponding states, Joule-Thomson effect, Inversion temperature.

2. Liquid State**4h**

Liquid crystals, Mesomorphic state, Differences between liquid crystals and solid/liquid, Classification of liquid crystals into smectic, nematic and cholesteric liquid crystals, Application of liquid crystals as LCD Devices.

UNIT- V**Solutions, Ionic equilibrium & dilute solutions****1. Solutions****6h**

Azeotropes- HCl-H₂O system and ethanol-water system. Partially miscible liquids-phenol-water system. Critical solution temperature (CST), Effect of impurity on consolute temperature. Immiscible liquids and steam distillation. Nernst Distribution law. Calculation of the partition coefficient. Applications of distribution law.

2. Ionic equilibrium**3h**

Ionic product, common ion effect, solubility and solubility product and their applications. Calculations based on solubility product.

3. Dilute solutions**7h**

Colligative properties- RLVP, Osmotic pressure, Elevation in boiling point and depression in freezing point. Experimental methods for the determination of molar mass of a non-volatile solute using osmotic pressure, Elevation in boiling point and depression in freezing point. Abnormal colligative properties. Van't Hoff factor.

Co-curricular activities and Assessment Methods

1. Continuous Evaluation: Monitoring the progress of student's learning
2. Class Tests, Work sheets and Quizzes
3. Presentations, Projects and Assignments and Group Discussions: Enhances critical thinking skills and personality Semester-end Examination: critical indicator of student's learning and teaching methods adopted by teachers throughout the semester.

List of Reference Books

1. Principles of physical chemistry by Prutton and Marron
2. Solid State Chemistry and its applications by Anthony R. West
3. Text book of physical chemistry by K L Kapoor
4. Text book of physical chemistry by S Glasstone
5. Advanced physical chemistry by Bahl and Tuli
6. Inorganic Chemistry by J.E.Huheey
7. Basic Inorganic Chemistry by Cotton and Wilkinson
8. A textbook of qualitative inorganic analysis by A.I. Vogel
9. Atkins, P.W. & Paula, J. deAtkin's Physical Chemistry Ed., Oxford University Press 10th Ed (2014).
10. Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).
11. Mortimer, R.G. Physical Chemistry 3rd Ed. Elsevier: NOIDA, UP (2009).
12. Barrow, G.M. Physical Chemistry
13. Chemistry for degree students by Dr.R.L.Madan

LABORATORY COURSE -I

30hrs (2h/w)

Practical-I

Analysis of Salt Mixture (At the end of semester-I)

Qualitative inorganic analysis (Minimum of six mixtures should be analysed) 50M

Course out comes:

At the end of the course student will be able to;

1. Understand the basic concepts of qualitative analysis of inorganic mixture.
2. Use glassware ,equipment and Chemicals and follow experimental procedures in the laboratory.
3. Apply the concepts of common Ion effect, solubility product and concepts related to qualitative analysis.

ANALYSIS OF SALT MIXTURE

50Marks

Analysis of mixture salt containing two anions and two cations (From two different groups) from following

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

Cations: Lead, Copper, Iron, Aluminium, Zinc, Nickel, Manganese, Calcium, Strontium, Barium, Potassium and Ammonium.

MODEL PAPER

DEPARTMENT OF CHEMISTRY

SRR & CVR Govt . Degree College(A)Vijayawada ,Andhrapradesh,INDIA
(NAAC B+ (III Cycle with CGPA -2.6 & District Identified college)

FIRST YEAR B.Sc., DEGREE EXAMINATION

SEMESTER-I

CHEMISTRY Course-I: INORGANIC & PHYSICAL CHEMISTRY

Time: 3 hours

Maximum Marks: 60

PART- A

5 X 4 = 20 Marks

Answer any FIVE of the following questions. Each carries Four marks

1. Explain the structure of Borazine
2. Explain the preparation & structures of Phosphonitrilic compounds.
3. Explain in brief, catalytic properties & stability of various oxidation states of d- block elements.
4. Explain Actinide Contraction.
5. Write short note on Bravais lattices and crystal systems.
6. Describe Andrew's isotherms of carbon dioxide
7. What are Smectic Nematic liquid Crystals? Explain.
8. Explain about Critical Solution Temperature
9. Write about Common ion effect & Solubility product.
10. Explain Raoult's law

PART- B

5X 8 = 40 Marks

Answer ALL the questions. Each carries EIGHT marks

11. Explain Classification, Preparations & uses of Silicones
(or)
12. (i) What are Pseudo halogens.
(ii) Explain the Structures of any one AX₃& AX₅ interhalogen compounds.
13. What is Lanthanide Contraction? Explain the Consequences of Lanthanide Contraction.
(or)
14. (i) Explain the magnetic properties of d- block elements.
(ii) Explain about Conductors, Semi-Conductors& Insulators using Band Theory.
15. Write an essay on Crystal defects.
(or)
16. What is Bragg's Law. Explain the determination of structure of a crystal by powder method.
17. Derive the relationship between Critical constants & van der Waals constants
(or)

18. (i) Write any 5 differences between liquid crystals & liquids
(ii) Write the applications of Liquid crystals.
19. (a). Explain Nernst distribution Law. Explain its applications
(or)
20. What are Colligative properties? Write experimental methods for determination of molar mass of a non-volatile solute by using Elevation in boiling point.
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