ST.JOSEPH’S COLLEGE FOR WOMEN (AUTONOMOUS) VISAKHAPATNAM

I SEMESTER **CHEMISTRY** Time:4Hrs/Week

CH 1202 (3) **INORGANIC & PHYSICALCHEMISTRY** Max.Marks:100

w.e.f.20-21 admitted batch-“20AH”  **SYLLABUS**

**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 courses.

## INORGANIC CHEMISTRY:

## UNIT– I:

**CHEMISTRY OF P-BLOCK ELEMENTS:**

**Group 13:** Preparation & structure of Diborane, Borazine

**Group 14:** Preparation, classification and uses of silicones

**Group 15**: Preparation & structures of Phosphonitrilic halides {(PNCl2)nwhere n=3, 4

**Group 16**: Oxides and Oxoacids of Sulphur (structures only)

**Group 17**: Pseudohalogens, Structures of Interhalogen compounds.

**UNIT – II:**

## CHEMISTRY OF D-BLOCK ELEMENTS:

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 oxidationstates.

## CHEMISTRY OFF-BLOCK ELEMENTS:

Chemistry of lanthanides - electronic structure, oxidation states, lanthanide contraction, consequences of lanthanide contraction, magnetic properties. Chemistry of actinides - electronic configuration, oxidation states, actinide contraction, comparison of lanthanides and actinides.

**3.THEORIES OF BONDINGINMETALS:**

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

## PHYSICALCHEMISTRY

**UNIT- III**

**SOLIDSTATE:**

Symmetry in crystals. Law of constancy of interfacial angles. The law of rationality of indices. The law 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 defects.

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## UNIT – IV:

1. **GASEOUSSTATE 6h**

van der Waal's equation of state. Andrew's isotherms of carbon dioxide, continuity of state. Critical phenomena. Relationship between critical constants and vander Waal's constants. Law of corresponding states. Joule- Thomson effect. Inversion temperature.

## LIQUIDSTATE 4h

Liquid crystals,mesomorphicstate. Differences between liquid crystal and solid/liquid. Classification of liquid crystals into Smectic and Nematic. 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 consulate temperature. Immiscible liquids and steam distillation. Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.

## IONICEQUILIBRIUM 3h

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

## DILUTESOLUTIONS 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. ClassTests, Worksheets and Quizzes
  3. Presentations,ProjectsandAssignmentsandGroupDiscussions:Enhancescriticalthinking skills and personality
  4. Semester- end Examination: critical indicator of student’s learning and teaching methods adopted by teachers through out the semester.

## List of Reference Books

1. Principles of physical chemistry by Prutton andMarron
2. Solid State Chemistry and its applications by Anthony R.West
3. Text book of physical chemistry by K LKapoor
4. Text book of physical chemistry by SGlasstone
5. Advanced physical chemistry by Bahl andTuli
6. Inorganic Chemistry byJ.E.Huheey
7. Basic Inorganic Chemistry by Cotton andWilkinson
8. A textbook of qualitative inorganic analysis by A.I.Vogel
9. Atkins,P.W.&Paula,J.deAtkin’sPhysicalChemistryEd.,OxfordUniversityPress 10thEd(2014).
10. Castellan,G.W.PhysicalChemistry4thEd.Narosa(2004).

11. Mortimer,R. G.PhysicalChemistry3rdEd. Elsevier:NOIDA,UP(2009).

12. Barrow,G.M.PhysicalChemistry

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ST.JOSEPH’S COLLEGE FOR WOMEN (AUTONOMOUS) VISAKHAPATNAM

I SEMESTER **CHEMISTRY** Time:2Hrs/Week

CH 1252(2)  **INORGANIC&PHYSICALCHEMISTRY** Max.Marks:50

20-21 admitted batch-“20AH”  **PRACTICAL SYLLABUS – IA**

## Qualitative inorganic analysis (Minimum of Six mixtures should be analysed)

**COURSE OUTCOMES:**

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

1. Understand the basic concepts of qualitative analysis of inorganicmixture
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 qualitativeanalysis

## ANALYSIS OF SALT MIXTURE : 50M

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

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

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

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