SRI VENKATESWARA UNIVERSITY :: TIRUPATI

FIRST YEAR B.Sc. CHEMISTRY
FIRST SEMESTER
Revised Syllabus Under CBCS W.E.F. 2020-21

Course I - INORGANIC & PHYSICAL CHEMISTRY

60 hrs. (4h/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. Explainthe differencebetweensolid,liquidandgasesinter msof intermolecularinteractions.
3. Applytheconceptsofgasequations,pHandelectrolyteswhilestudying otherchemistrycour ses.

INORGANIC CHEMISTRY

24 hours

UNIT –I

Chemistry of p-block elements **8 hours**

Group 13: Preparation & structure of Diborane, Borazine

Group 14: Preparation, classification and uses of silicones

Group 15: Preparation & structures of Phosphonitrilic halides {$(PNCl_2)_n$where 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: **6hours**

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.

1. 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, comparison of lanthanides and actinides.

3. Theories of bonding in metals: 4hours

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.

PHYSICAL CHEMISTRY

36hours

UNIT-III

Solidstate 10hours

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.

UNIT-IV

1. Gaseous state 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. Lawof corresponding states. Joule- Thomson effect. Inversion temperature.

2.Liquid state 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.

2.Ionic equilibrium **3h**

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

3.Dilute solutions **7h**

Colligative properties- RLVP, Osmotic pressure, Elevation in boing point and depression in freezing point. Experimental methods for the determination of molar mass of a non-volatile

solute using osmotic pressure, Elevation in boing point and depression in freezing point. Abnormal colligative properties. Van't Hoff factor.

Co-curricular activities and Assessment Methods

1. ContinuousEvaluation:Monitoringtheprogressof student'slearning
2. ClassTests,WorksheetsandQuizzes
3. Presentations,ProjectsandAssignmentsandGroupDiscussions:En hancescriticalthinking skillsand personality
4. Semester-endExamination:criticalindicatorofstudent'slearningandteachin gmethodsadoptedby teachersthroughoutthesemester.

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'sPhysicalChemistryEd.,Oxford UniversityPress 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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LABORATORY COURSE –I

30hrs (2 h / w)

Practical-I Analysis of SALT MIXTURE (At the end of Semester-I)

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

50 M

Course outcomes:

At the end of the course, the 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 **50 M**

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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CHEMISTRY Course-I: INORGANIC & PHYSICAL CHEMISTRY

MODEL QUESTION PAPER

Time: 3 hours Maximum Marks: 75

PART- A 5 X 5 = 25 Marks

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

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

PART- B 5 X 10 = 50 Marks

Answer **ALL** the questions. Each carries TEN marks

9.(a)Explain Classification, Preparations & uses of Silicones

(or)

(b). (i) What are Pseudohalogens.

(ii) Explain the Structures of any one AX3& AX5interhalogen compounds.

10 (a). What is Lanthanide Contraction? Explain the Consequences of Lanthanide Contraction.

(or)

(b). (i) Explain the magnetic properties of d- block elements.
(ii) Explain about Conductors, Semi-Conductors& Insulators using Band Theory.

11.(a). Write an essay on Crystal defects.

(or)

(b). What is Bragg's Law. Explain the determination of structure of a crystal by powder method.

12.(a). Derive the relationship between Critical constants &Vanderwaal constants

(or)

(b).(i) Write any 5 differences between liquid crystals & liquids, solids

(ii) Write the applications of Liquid crystals.

13.(a). Explain Nernst distribution Law. Explain its applications

(or)

(b). What are colligative properties. Write experimental methods for determination of molar mass of a non-volatile solute by using Elevation in boiling point & depression in freezing point.

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