

S. V. UNIVERSITY
B.Sc. CHEMISTRY SYLLABUS UNDER CBCS
SEMESTER – II - W.E.F. 2016-17
Paper II (Physical & General Chemistry) 60 hrs. (4h/w)
PHYSICAL CHEMISTRY 30 hrs (2h / w)

UNIT-I

Solidstate

10h

Symmetry in crystals. Law of constancy of interfacial angles. The law of rationality of indices. The law of symmetry. Definition of lattice point, space lattice, unit cell. Bravis lattices and crystal systems. X-ray diffraction and crystal structure. Bragg's law. Defects in crystals. Stoichiometric and non-stoichiometric defects.

UNIT-II

1.Gaseous state

6 h

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.

2.Liquid state

4 h

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. Application of liquid crystals as LCD devices.

UNIT-III

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.

Signature of the Chairman / Chairperson (B.O.S.) :

Signature of the Members:

GENERAL CHEMISTRY

30 hrs (2h / w)

UNIT-IV

1.Surface chemistry

8 h

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 adsorption, chemisorption. Freundlich, Langmuir adsorption isotherms. Applications of adsorption

2.Chemical Bonding

7h

Valence bond theory, hybridization, VB theory as applied to ClF_3 , $\text{Ni}(\text{CO})_4$, Molecular orbital theory - LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N_2 , O_2 , CO and NO).

UNIT-V

Stereochemistry of carbon compounds

15 h

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

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

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

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

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. Stereochemistry of Organic compounds by E L Eliel
6. Advanced Organic Chemistry by F A Carey and R J Sundberg
7. Stereochemistry by P.S.Kalsi
8. Stereochemistry of Organic compounds by D. Nasipuri
9. Advanced physical chemistry by Bahl and Tuli
10. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan

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LABORATORY COURSE -II
Practical-II Analysis of Mixture Salt
(At the end of Semester-II)

30 hrs (2 h / w)

Qualitative inorganic analysis

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, aluminum, zinc, manganese, calcium, strontium, barium, potassium and ammonium.

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Model Paper - CHEMISTRY
Three Year B.Sc., Degree Examination, May-2017
Choice Based Credit System
SECOND SEMESTER
Part - II :: Chemistry
Paper - I Physical & General Chemistry
(New Syllabus w.e.f. 2016-17)

Time : 3 Hours

Max Marks :75

Answer any FIVE questions. Each question carry 5 marks

(5X5=25)

Section - A

1. Explain (a) Law of Constancy of interfacial angles (b) Law of rationality of indices.
2. Write about Joule-Thomson effect.
3. Derive the law of corresponding states.
4. Write notes on azeotropic mixtures.
5. Explain the structures of ClF_3 and $\text{Ni}(\text{CO})_4$ according to VBT.
6. Explain optical and electrical properties of colloids.
7. Discuss optical isomerism of tartaric acid and lactic acid
8. Explain protective colloids and gold number.

Section - B

Answer all questions. Each question carry 10 marks

(5X10=50)

Unit - I

9. Derive Bragg's equation? Discuss the application of Bragg's equation in studying the crystal structure of NaCl.

(OR)

10. Explain Crystal defects of Frenkel and Schottky.

Unit - II

11. Derive van der Waal's equation.

(OR)

12. Explain the classification of liquid crystals.

Unit - III

13. Define Critical Solution Temperature (CST)? Explain variation of solubility with temperature in Phenol - Water System.

(OR)

14. Explain (a) Raoult's law (b) Nernst distribution law.

Unit - IV

15. Derive Langmuir adsorption isotherm equation.

(OR)


16. Construct molecular orbital diagrams for CO and NO molecules.

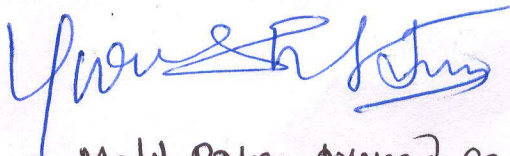
Unit - V

17. Write Cahn, Ingold & Prelog rules for R,S configuration with examples.

(OR)

18. (a) Explain E-Z configuration with examples.
(b) Explain molecular representations according to Fisher, Newman projection formula with suitable examples.


A. Anney



Model Paper prepared as per the Revised
Syllabus 2016-17