

Rayat Shikshan Sanstha's
Dahiwadi College Dahiwadi
Department of Chemistry
Course Outcomes

B.Sc. I Semester- I

Paper: I Physical Chemistry

On completion of the course B.Sc.I student will able to

1. understand distribution law , process of extraction, solubility and distribution indicators.
2. Understand basics terminology involved in thermodynamics and Carnot's cycle efficiency.
3. Understand basic concepts and terminologies involved in chemical kinetics.
4. Understand deviation of real gas from ideal behavior and different types of gaseous law.
5. Understand properties of rays, terminologies and types of nuclear radiations in nuclear chemistry.

Paper: II Inorganic Chemistry

On completion of the course B.Sc.I student will able to

1. Understand the concept of ionic bond, formation, Born-Haber Cycle, Fajans rule, radius ratio, effect and calculations.
2. Understand the theories, diagrams and applications of VBT, VSEPR theory, MOT, LCAO method.
3. Understand Arrhenius, Brønsted-Lowry, Lewis theory, Lux-Flood concept of acids and bases.
4. Understand of P-block elements of alkali metals and Alkaline earth metals
5. Understand physical, chemical properties and structure and bonding of Xe compounds
6. Understand ionic product of water, Buffer solutions.

B.Sc. I Semester- II

Paper: III Organic Chemistry

On completion of the course B.Sc.I student will able to

1. Understand basic concept, preparation, stability and applications of reactive intermediate.
2. understand different types of isomerism and nomenclature of stereoisomers.
3. understand properties, preparations, applications of cycloalkane, cycloalkenes and alkenes.
4. understand the preparations and applications of synthetic reagents.
5. understand properties, importance terms, theory, applications of Huckel rule and aromatic nucleophilic and electrophilic substitution reactions..

Paper IV Industrial Chemistry

On completion of the course B.Sc.I student will able to

1. understand basic concept of Industrial chemistry.
2. Understand physical parameter, physical and chemical properties of water
3. Understand the classification and properties of fuels.
4. understand various operations used in industry.
5. Understand classification and manufacture of fertilizer.

B.Sc. II Semester- III

Paper: V Organic Chemistry

On completion of the course B.Sc.II student will able to

1. Understand basic concept, preparation, stability and applications of reactive intermediate.
2. understand different types of isomerism and nomenclature of stereoisomers.
3. understand properties, preparations, applications of aromatic hydrocarbon.
4. understand the preparations and applications of synthetic reagents.
5. understand properties, importance terms, theory, applications of Huckel rule and aromatic compound.

Paper :VI Analytical chemistry:

On completion of the course, S.Y B.Sc. student will able to

1. To study classification of analysis, sampling & errors
2. To know how to use stoichiometry to analyze the result of precipitation.
3. To study theoretical principles in qualitative analysis & application of complex formation.
4. Understand the importance of analytical chemistry in analysis of compounds by titrimetric, gravimetric and instrumental methods.
5. To know the importance of sampling methods and ways of interpretation of results of analysis.
6. Determine the causes of errors and their minimization during analysis
7. Learn the application of types of titrations for quantitative analysis of the samples.

8. To analysis nitrogen, phosphorous & potassium

B.Sc. II Semester- IV

Paper :VII Physical chemistry

On completion of the course B.Sc. II student will able to

1. Understand basics concepts, terminologies applications involved in thermodynamics.
2. Understand concept third order reaction, method of determination of order of reaction. effect of temperature on rate of reaction.
3. Understand physicals properties of liquids,
4. Understand basics concept of electrochemistry. Debye-Huckel theory of conductance, Kohlrausch law, buffer solutions and its types.

Paper: VIII Inorganic Chemistry

On completion of the course, B.Sc.II student will able to

1. Understand study of d block elements and various properties of transition metals.
2. Understand study of f block elements, various properties and separation of lanthanides.
3. Understand about coordination with respect to werner's theory, CFT, John teller distortion, CFSE, High spin and low spin complexes, factor affecting on CFT and limitation of CFT.
4. Understand ligand, structural requirements, classification of chelating agents and applications of chelating agents.
5. Understand about classification, types, mechanism, and industrial applications of catalyst.

Practical Chemistry Practical

On completion of the course B.Sc.I student will able to

1. Understand the determination of heat of solution, equivalent weight, surface tension etc.
2. Carry out rate of reaction, heat of ionization of weak acid
3. Carry out quantitative analysis by gravimetric method
4. Carry out qualitative analysis of acidic and basic radicals.
5. Learn the applications of types of titrations for various estimations
6. Carry out quantitative analysis by volumetric method.
7. Carry out the water analysis.
8. Handle viscometer to determine the viscosity and relative viscosity of liquids.
9. Perform qualitative analysis of organic compounds.
10. Estimate of acetamide/aniline aspirin.

B.Sc. III Semester-V

Paper: IX Physical chemistry.

On completion of the course, B.Sc.III student will able to

1. Understand dual nature of matter, hypothesis, Heisenberg uncertainty principle, wave equation.
2. Understand rotational, vibrational spectra of diatomic molecule and Raman spectra.
3. Understand different law of photochemistry, concept quantum yield and fluorescence and phosphorescence from Jablonski diagram.
4. Understand Raoult's law, vapour pressure, boiling point of miscible and immiscible liquids, types of solubility of partially miscible liquids.
5. Understand the types of electrodes, cells and application of emf measurements.

Paper: X Inorganic chemistry

On completion of the course, B.Sc.III student will able to

1. Understand the basic concept of hard & soft acids and bases.
2. Understand the types of isomerism, theory examples and merits of MOT.
3. Understand basics concept, types, methods of preparations and applications of polymers.
4. Understand metal bonding, properties, classification, preparation and applications of semiconductors and superconductors.
5. Understand nomenclature, synthesis and structural studies of Li, Be and Al organometallic compounds.

Paper: XI Organic chemistry

On completion of the course, B.Sc.III student will able to

1. Understands basics terms, Woodward Fisher rule and calculation of λ_{max} in UV spectroscopy.
2. Understands basics terms, different types of vibrations, factor affecting on IR frequencies and frequencies of different functional groups in IR spectroscopy
3. Understands basics terminologies involved in NMR spectroscopy.

4. Understands basic terms, and fragmentation of organic compounds involved in Mass spectroscopy.
5. Learn Physical methods of structure elucidation which includes IR, UV, NMR & Mass Spectroscopy
- 6s. Solve the problems based on IR, UV, NMR, Mass Spectroscopy.

Paper : XII Industrial chemistry

On completion of the course, B.Sc. III student will be able to

1. Understand physical chemical principle and manufacturing process of heavy chemical like NH_3 , H_2SO_4 , HNO_3 , NaHCO_3 .
2. Understand types, methods and applications of corrosion and passivity.
3. Understand manufacturing of sugar and byproducts of sugar industry..
4. Understand materials, types, cleaning action and manufacturing of soap and detergent.
5. Understand manufacturing of Beer and spirit.
6. Understand terminology, properties, characterizations, methods of preparations and applications of nanomaterials. .

B.Sc. III Semester-VI

Paper :XIII Physical chemistry.

On completion of the course, B.Sc. III student will be able to

1. Understand the types of spectra, Rotational, Vibration and Electronic energy levels.
2. Difference between order and Molecularity
3. Understand the first, second and third order reaction.
4. Understand the concept anisotropic, isotropic, etc figure, polymorphism,
5. Learn concept Photoelectric effect, Compton Effect and Heisenberg's uncertainty principals.
6. Understand the concept of X- ray analysis.

Paper: XIV Inorganic chemistry

On completion of the course, B.Sc. III student will be able to

1. Understand classification, mechanism of SN_1 & SN_2 reaction for inert and labile complexes, theories and applications of trans effect .
2. Understand thermodynamic and kinetic stability, stability constant and factors affecting on stability of complexes.
3. Understand types, nuclear fission, and applications of radio isotopes as tracers.
4. Understand electronic configuration, preparation of transuranic elements, IUPAC nomenclature of elements of super heavy elements.
5. Understand extraction, types, heat treatments of steel and iron.
6. Understand essential and trace elements, structure and biological role of hemoglobin and myoglobin.

Paper: XV Organic chemistry

On completion of the course, B.Sc. III student will be able to

1. Understand different types of names reactions and their mechanism and applications.
2. Understand different types of organic synthetic reagents their formation, mechanism and uses.
3. Understand reactions of $\text{C}=\text{C}$ and carbon-carbon triple bond.
4. Understand natural products their structure, formation, isolations, evidences and synthesis.
5. Understand drugs classifications, synthesis, applications of selected drugs and some sulphur drugs. .

Paper: XVI Analytical Chemistry

On completion of the course, B.Sc. III student will be able to

1. Understand different types of titration methods.
2. Understand pH, types of electrodes, measurement of pH, different types of potentiometric and redox titrations.
3. Understand principles involved in colourimetry, deviation of Beer- law, methods of measurement of absorbance by colorimeter and spectrophotometer.
4. Understand principle, Instrumentation and application of flame photometer
5. Understand principle, types, working and applications of various chromatographic techniques. .
6. To know basic concept in analytical chemistry.

laboratory work

Physical Chemistry Practical

On completion of the course, B.Sc. III student will able to

- 1.) Know Partition Law ,Viscosity., Adsorption, Solubility of reaction..
- 2.) Know Chemical kinetics, energy of activation of first order reaction ,second order reaction (Equal concentrations), (Unequal concentrations).
- 3.) know Potentiometry , Titration of strong acid with strong alkali.
- 4.) Know study the effect of substituent on dissociation constant of weak acid with respect to acetic acid and monochloroacetic acid (cell constant to be given).
- 5.) Know determination of velocity constant of hydrolysis of ethyl acetate by NaOH solution by conductometric method.
- 6.) Know determination of the normality of citric acid in lemon by titrating it against standard 0.2 N NaOH solution by conductometric method
- 7.) Know determination of λ_{∞} of strong electrolyte (NaCl or KCl) and to verify Onsager equation.
- 8.) Know determination o the percentage composition of unknown mixture by (i) graphical method and (ii) by composition law (Densities of pure liquids A & B be given) by refractometry .
- 9.) Know determination of the molar refractivity of methyl acetate, ethyl acetate, n-hexane and carbon tetrachloride and calculate the refraction equivalents of C, H and Cl atoms.
- 10.) Know determination of concentration of unknown solutions by Spectrophotometric method.
- 11) Know determination of the pH, pKa and Ka of various acids by potentiometry.
- 12). Measure refractive index, molar refraction and unknown concentration of various solvents.

Inorganic practical

On completion of the course, B.Sc. III .student will able to

1. Estimate ores and alloy by gravimetric method.(Fe,Ni,Ba)
2. Prepare and determine percent purity of various inorganic complexes.
4. Perform chromatographic technique (paper chromatography).
5. Titrimetric estimation of percentage purity of FAS, $\text{Cu}(\text{NH}_3)_4$, $\text{K}_3[\text{Al}(\text{Ox})_3]$, $\text{K}_3[\text{Fe}(\text{OX})_3]$
6. Estimate commercial analysis of talcum powder, Potash alum, Milk/Lassi , Boric acid .
7. Titrimetric estimation of Na, Mg, Zn by Ion exchange method

Organic practical:

On completion of the course, B.Sc. III student will able to

1. Separate & individual analysis of binary organic mixture.
 2. Separate and analyze binary water soluble mixture.
 3. Quantitative analysis –organic estimate – sucrose, sap value of oil, glucose by volumetric method
 4. Understand the double burette titration method.
 5. know the determination of site of unsaturation of organic compounds
 6. Understand Thin Layer Chromatographic techniques and physical constant.
 7. know the preparation of organic derivative.
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Department of Chemistry
Programme Specific Outcome

To enable the students-

1. To promote understanding of basic facts and concepts in Chemistry while retaining the excitement of Chemistry.
 2. To make students capable of studying Chemistry in academic and Industrial courses.
 3. To expose the students to various emerging new areas of Chemistry and apprise them with their prevalent in their future studies and their applications in various spheres of chemical sciences.
 4. To develop problem solving skills in students.
 5. To expose the students to different processes used in Industries and their applications.
 6. To developed ability and to acquire the knowledge of terms, facts, concepts, processes, techniques and principles of subjects,
 7. To develop ability to apply the knowledge of contents of principles of chemistry.
 8. To inquire of new knowledge of chemistry and developments therein.
 9. To expose and to develop interest in the fields of chemistry
 10. To develop proper aptitude towards the subjects.
 11. To develop the power of appreciations, the achievements in Chemistry and role in nature and society.
 12. To develop skills required in chemistry such as the proper handling of apparatus and chemicals
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