

1. तृतीय सप्ताह - Black Body Radiation & Planck's radiation law along with application.
2. चतुर्थ सप्ताह - Photoelectric effect & Postulates of quantum mechanics.

अगस्त 2023

3. प्रथम सप्ताह - Quantum mechanical operators, commutation relations, Hamiltonian operators, average value of square of Hamiltonian as a positive quantity.
4. द्वितीय सप्ताह - Role of operators in quantum mechanics.
5. तृतीय सप्ताह - To show quantum mechanically that position and momentum cannot be predicted simultaneously, Determination of wave function and energy of particle in one dimensional box.

6. चतुर्थ सप्ताह - optical activity, Polarization - (Clausius-Mossotti equation - derivation excluded).

सितंबर 2023

7. प्रथम सप्ताह - Orientation of dipoles in an electric field, dipole moment, induced dipole moment, measurement of dipole moment - temp. method and refractivity method.
8. द्वितीय सप्ताह - Dipole moment and structure of molecules, Magnetic permeability, magnetic susceptibility and its determination.
9. तृतीय सप्ताह - Application of magnetic susceptibility, magnetic properties - paramagnetism, diamagnetism & ferromagnetism.

10. चतुर्थ सप्ताह - Electromagnetic radiation regions of spectrum, basic features of spectroscopy.

अक्टूबर 2023

11. प्रथम सप्ताह - Statement of Born-Oppenheimer approximation, Degrees of freedom.

12. द्वितीय सप्ताह - Selection rules, energy levels of simple rigid rotator, rotational spectra of diatomic molecules.

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BSc I (MEP-20) Chemistry Major P-I
(Test - Sem)

2021-2023-24

3/10

Course work - 2023

1. Kinetics of Molecular theory of gases. Maxwell distribution of Velocities & energies

2. Calculation of root mean square velocity, Average & Most probable Velocities.

3. Collision diameter, collision number, collision frequency & mean free path (Derivation excluded)

4. Deviation of Real gases from ideal behaviour. Derivation of Vander Waals Equation of State.

5. Application of Vander Waal Eq. of state in calculation of Boyle's temp. (Compression factor)

6. Deviation of Gaseous state & Test.

7. Critical Phenomenon, Critical temp, Critical Pressure, Critical Volume & their determination.

8. PV isotherms of Real gases, Continuity of state.

9. Isotherms of Vander Waals equation, Relationship between critical constants & Vander Waals constants.

10. Critical compressibility factor. The law of corresponding state. (Revision & Test)

11. Liquid state - Structure of liquids, & properties of liquids.

12. Surface tension. & its applications.

13. Refractive index & Vapour pressure

14. Viscosity & optical Rotatory.

15. Solid state, Classification of s.p.s. (Revision & Test)

of Interfacial angles, Laval Rational Indices. 9/10

- 17 13th Unit - Miller indices, elementary ideas of symmetry elements.
- 18 14th Unit - Seven crystal system, fourteen Bravais lattices.
- 19 15th Unit - X-ray diffraction, Bragg's law, & equation. A simple account of Laue Method.
- 20 16th Unit - Rotating crystal method & powder method. Structure of KCl, CsCl & NaCl.
- 21 5th Unit (12th Dec - 2023) - Revisional Liquid State
- 22 17th Unit - Revision of Solid State & Test.

(II Sem) → BSE (NEP-20) Chemistry Major (March - 2024)

- 1 1st Unit - Kinetics - Rate of Reaction, Rate equation & types
- 2 2nd Unit - Factors Affecting the Rate of a Reaction, Conc. Temp.
- 3 3rd Unit - Pressure, Solvent, Light & Catalyst.
- 4 4th Unit - Order of Reaction, integrated rate expression for zero & 2nd order Reaction & Half life period. Sum - 24
- 5 5th Unit - Arrhenius equation, Distribution law.
- 6 6th Unit - Nernst distribution law - its thermodynamic derivation. Nernst distribution law after association & dissociation of solute in one of the phase of distribution law (1)
- 7 7th Unit - Degree of Hydrolysis & Hydrolysis constant of Ammonia. Covalent Bond.
- 8 8th Unit - Valence Bond (approach) Theory & limitations of simple molecular.
- 9 9th Unit - Lewis Based Valence shell electron pair repulsion theory (VSEPR) & Hybridization.

2024
Jan note :- Hybridization structure - linear, trigonal, square
planar, tetrahedral.

Feb note - Trigonal Bipyramidal & octahedral arrangements.

Feb note - Molecular orbital theory (MO) of homonuclear (H_2 , O_2)

Feb note - Heteronuclear (CO, NO) diatomic molecules,
Dipole moment & % age of ionic character of
covalent bond.

2024

Jan note - Revision & Test of Chemical Kinetics &
Distribution law.

Feb note - Revision & Test of Covalent Bond.

Feb note - Unit 11 - 2024

Physical chemistry (BSc III) 6th (2nd sem) 2023-24

2024

Jan note :- Need for Statistical Thermodynamics, thermo-
dynamics probability, Maxwell Boltzmann distribution statistic.

Feb note :- Born-Oppenheimer approximation, partition function &
Physical significance.

Feb note - factorization of partition function.

Feb note - Photochemistry, Interaction with matter, Difference between
thermal & photochemical processes.
2024

Jan note - Law of photochemistry, Grotthuss Draper's law, Stark-
Einstein law (law of photochemical equivalence), Jablonski's diagram
depicting various processes occurring in the excited state.

Feb note :- qualitative description of fluorescence, phosphorescence,
non-radiative processes (internal conversion, inter system cross-
ing).

Feb note - Quantum yield, Photoinitiated reaction - energy
transfer process (simple reactions).

(8) समस्या :- Solution, Dilute Solution, & colligative properties
Ideal-Non Ideal Solution, Methods of expressing concentration of solutions. Dilute Solution.

(9) समस्या :- Raoult's law, colligative properties (i), Relative lowering of vapour pressure.

(10) समस्या :- Elevation in B.P. Depression in freezing pt. osmotic pressure -
SIGN - 2024

(11) समस्या :- Thermodynamic Derivation of relation between Solute & Elevation in B.P. & Depression in freezing pt.

(12) समस्या :- Application of colligative properties in calculation of molar mass, of Normal, dissociated & associated solute in solution.

(13) समस्या :- Phase Equilibrium - Statement & meaning of the terms phase, component & degree of freedom, Thermodynamic derivation of Gibbs phase rule. Phase equilibrium of one component system - Example - water system

(14) समस्या - Phase equilibrium of two component system, Solid - liquid equilibrium, Simple eutectic Example Pb-Ag system Desilverization of Lead.
(May - 2024, NE - 2024)

(15) समस्या - Revision & test.

31/12/23 - 2023

1. Exp. No. : - (i) To determine the strength of the given acid solution (oxalic acid) conductometrically.
2. Exp. No. : - To determine the Solubility & Solubility product of a sparingly soluble electrolyte conductometrically.
3. Exp. No. : - To determine the strength of the given acid solution (oxalic acid) potentiometrically.
4. Exp. No. : - Strength of Oxalic acid by potentiometrically.
31/12/23 - 2023
5. Exp. No. : - To determine the molecular mass of a non-volatile solute by Rast method.
6. Exp. No. : - To standardize the given acidic HCl solution by potentiometrically.
7. Exp. No. : - To standardize the given oxalic acid by potentiometrically.
8. Exp. No. : - Separate the green colour of spinach leaves by Thin layer chromatography.
31/12/23 - 2023
9. Exp. No. : - Separation of a mixture of coloured organic compd. using common organic solvent.
10. Exp. No. : - To prepare m-nitroaniline from m-dinitrobenzene.
11. Exp. No. : - purification of m-dinitrobenzene & m.p.
12. Exp. No. : - To prepare pure sample of S-Benzyl-isothiocyanate from Thiourea.
13. Exp. No. : - To prepare P-Bromoaniline from P-Bromoacetanilide.

14 पुनः लेखन → To prepare o-chlorobenzoic acid from anthranilic acid.

(15) प्रश्नोत्तर :- Purification of S Benzyl isothiocyanate, chloride, p-Bromoaniline & ortho chlorobenzoic acid. & find mpt. of each.

(16) पुनः लेखन :- General guidance for semimicro qualitative analysis of mixture.

(17) पुनः लेखन :- Revision of physical practical & general awareness.

STAGE - 2023

18. पुनः लेखन :- Revision of organic preparation.

19. प्रश्नोत्तर :- Common ion effect, Solubility product, Toxic product, pptization, Common

STAGE - 2024 →

(1) पुनः लेखन :- Salt analysis of given mixture - (Acidic & Basic Radical Analysis)

(2) प्रश्नोत्तर :- Dilute Acid Test. CO_3^{2-} , S^{2-} , SO_3^{2-} , SO_3^{2-} , NO_2^-

(3) पुनः लेखन :- Conc. Acid Test. Cl^- , Br^- , I^- , CH_3COO^- , SO_4^{2-} , PO_4^{3-} , NO_3^- , oxalate

(4) पुनः लेखन - Basic Radical group test. (Test 2 Incl.)
(Hru - 2024) Hg^{2+} , Pb^{2+} , Ag^+ , Hg^{2+} , Pb^{2+} , Cu^{2+} , Mn^{2+} , Cd^{2+} , Ni^{2+} , Sb^{3+} , Sn^{2+} , Sn^{4+}

(5) पुनः लेखन :- 3 & 4th gp. test of given mixture
 Fe^{3+} , Al^{3+} , Co^{3+} , Co^{2+} , Ni^{2+} , Zn^{2+}

(6) प्रश्नोत्तर - 5 & 6th gp test
 Ca^{2+} , Sr^{2+} , Cu^{2+} , Mn^{2+} , K^+ , NH_4^+

(7) पुनः लेखन - Dilute & conc. Acid Base Test of mixture

(8) पुनः लेखन - 1-6th gp Basic Radical Test of mixture.

(9) पुनः लेखन - Both Acidic & Basic Radical Test

- 1) Redox titration - Revision of Redox titration.
- 2) Iodometric titration - Revision of Iodometric titration.
- 3) Surface tension - To find the surface tension $MgSO_4$ solution.
- 4) Organic preparation - Revision of organic preparation.

(Exam started on 12/12/2023 date)

BSc B.Ph. - 2024. (Practical)

- 1 - Complexometric titration $Mg^{2+}/EDTA$
- 2 - Complexometric titration $Mg^{2+}/EDTA$ (Repetition)
- 3) Viscosity of given liquid - By Ostwald, $MgSO_4$
- 4) Refractive index / Specific Refractivity - Acetone, Ester, Ethanol
Date - 2024
- 5) T.L.C to separate organic compd.
- 6) Paper chromatography - Pb^{2+}, NO_3^-
- 7) " - $Cu^{2+} & Cl^-$
- 8) " - $Ni^{2+} & PO_4^{3-}$
- 9) Paper chromatography - Pb^{2+}, Cu^{2+}, Cl^-
Date - 2024 NO_3^-
- 10) Viscosity of Sugar / Coloured solution.
- 11) Revision of T.L.C. Spinach leaves.
- 12) Revision of Specific Refractivity - epl.
- 13) Evaluation & other testing for
- 14 - Assessment
Date 2024 - Examination

- 14 ग्राम त्वाटे :- mixture analysis
- 15 फ्लुइड त्वाटे - mixture analysis
- 16 द्रव त्वाटे - mixture analysis
- 17 रजत - Revision of all Mayo's experiments

Practical examination in May 2024
 BSc I year (MEP-2020)

(Lesson plan)

Practical - Chemistry ग्राम त्वाटे
 सिस्ते - 2023

- (1) ग्राम त्वाटे :- Redox titration $Fe^{2+} / KMnO_4$
- (2) द्रव " Redox titration $Fe^{2+} / K_2Cr_2O_7$
- (3) द्रव " Redox titration $C_2O_4^{2-} / KMnO_4$
- (4) रजत " Redox titration $C_2O_4^{2-} / K_2Cr_2O_7$

प्रारंभिक - 2023

ग्राम त्वाटे - Iodometric titration. Ca^{2+} / Hg^{2+} persel.

(6) द्रव त्वाटे - Preparation of Iodoform from acetone.

(7) द्रव त्वाटे - Preparation of Iodoform from ethanol

(8) रजत त्वाटे - Preparation of m-Dinitrobenzene.

(31/01 - 2023)

(9) ग्राम त्वाटे - Preparation of Aspirin.

(10) द्रव त्वाटे: Preparation of DiBenzal acetone

(11) द्रव त्वाटे :- To find the surface tension of given liquid. By Drop No. method

(12) रजत त्वाटे - To find the surface tension of given liquid Drop wt method.