

Hemchandracharya North Gujarat University. Patan.

F.Y.B.Sc.

Chemistry. (CC CH 201)

Semester: II

UNIT: 1 : (A) : COORDINATION COMPOUNDS

- Definition
- Nomenclature of Complex.
- Werner's theory and its experimental verification.
- Concept of Effective Atomic Numbers (E.A.N.) for Coordination Compounds.
- Limitations of Valence bond theory of transition metal Complexes.
- An Elementary idea of (C.F.T.) Crystal field splitting of d-orbital in Oh and Td.
- Factors affecting to the crystal field splitting.
- Application of common complexes & chelates.

(B) : ACTINIDE.

- Electronic Configuration.
- Oxidation state.
- Synthesis of ${}_{94}^{239}\text{Pu}$, ${}_{94}^{241}\text{Pu}$.

UNIT: 2 : STEREO CHEMISTRY OF ORGANIC COMPOUNDS

Introduction of Stereo Isomers;

- Optical isomerism :
General, Discussion of elements of symmetry, Molecular chirality, Enantiomers, Optical activity, Properties of enantiomers, Chiral and achiral molecules with two stereogenic centers, Diastereomers, Threo and Erythro diastereomers, Meso compounds.
- Geometrical isomerism:
Definition and general discussion of geometric isomers, General methods of structure determination (physical methods), E-Z nomenclature (Simple illustration should be given).
- Conformational isomerism:
Definition, Conformational analysis of ethane, n-butane with rotational and torsional diagram, Conformation of cyclohexane, Axial and equatorial bonds, Newmann projection, Saw horse formula, Fisher & flying wedge formula, Difference between conformation and configuration.

Unit: 3 : CHEMICAL KINETICS.

- Introduction of following terms.
- Rate of reaction, Order of reaction, Molecularity.
- Rate equation for second order reaction. ($a = b$) & ($a \neq b$).
- Characteristics of second order reaction.
- Rate equation for third order reaction ($a = b = c$)
- Characteristics of third order reaction.
- Consecutive reaction.
- Parallel reaction.
- Reversible reaction
- Numerical.

Unit :4 : ANALYTICAL CHEMISTRY

- Introduction to Analytical Chemistry
- Classification of Classical and Electroanalytical Techniques.
- Literature of Analytical Chemistry (Names of Author and Publishers for Any Ten Books, Journals and Reviews)
- Criterion for Selection of analytical Techniques.
- Analytical Data Treatment
 - Error, Types of errors, Accuracy and Precision.
 - Statistical Terms :
Mode, Average, Median, Deviation,
Average Deviation, Relative Average Deviation,
Standard Deviation & Coefficient of variance.
 - Q-Test for the rejection of result and related numericals.
 - Significant figures.
 - 2.5 d and 4.0 d rules.

: REFERENCE BOOKS :

INORGANIC CHEMISTRY

1. 'Source Book on Atomic Energy' by Glastone, 1969.
2. 'Modern Inorganic Chemistry' by G.F.Liporni, ELBS, 4th edn. coiling Educational. 1983.
3. 'Inorganic Chemistry' D.F.Shriver. P.W.Atkinss and C.H.Longford, 3rd edn, ELPS Oxford University Press, 1999.
4. 'Nuclear and Redio Cnemistrv' by G fried lander, J.W.Kcnned. E.S.macias and J.M.MiIIer, 3rd edn, John wiley, 1981.
5. 'Essentials of Nuclear Chemistry' H.J.Arnical, 4th edn, New Age International. 1995.
6. 'Concise Inorganic Chemistry' J.D.Lee. 5th edn.
7. 'Inorganic Chemistry', D.F.Slirjver, P.W.Atkinss, 3rd edn, Oxferd. 1999.
8. 'Concise Inorganic Chemistry' J.D.Lee, 4th edn, Champman and hall ELBS, 1991.
9. 'Inorganic Chemistry' by A.G.Sharp, 3rd edn, ELBS, Longman, 1990.

ORGANIC CHEMISTRY

1. 'Organic reaction and mechanism, P.S.Kalsi, New Age international Publishers.
2. Text book of organic Chemistry. P.S.Kalsi, New Age international Publishers.
3. Organic Chemistry Vol. I & II. S.M.Muklierji, S.P.Singh. R.P.Kapoor.
4. Reaction mechanism in Organic Chemistry, S.M.Mukhergi. S.P.Singh. 3rd edn. Macmillan.
5. Reaction Mechanism and Reagents in Organic Chemistry, Gurdeep R. Chatwal 4th edn, Himalaya Publication House.
6. Text book of Organic Chemistry, Arun Bahal, S.Chand.
7. Organic Chemistry, R.Morrison and R.Boyd, 6th edn, Pearson Education 2003.
8. Organic Chemistry. T.W.Graham Solomons, 4th edn. John Wilay. 1998.

PHYSICAL CHEMISTRY

1. Advance Physical Chemistry by Gurdeepraj.
2. Physical Chemistry (Question and Answer) by R.N.Madan, G.D.Tuli. . S.Chand.
3. Principal of Physical Chemistry by Puri Sharma, Pathania.
4. Chemical Thermodynamics by R.P.Rastogi and R.R.Misra.
5. Nuclear Chemistry by C.V.Shekhar, Dominent-Publisher. New Delhi.
6. Essentials of physical Chemistr by B.S.Bahal, Arun Bahal. G. D.Tuli.
7. Physical Chemistry by P.W.Atkins. 5th edn. Oxferd 1994 7th edn-2002.
8. Physical Chemistry b R.A.Albert and RJ.Silby, John Wiley 1995.
9. Physical Chemistry by G.H.Barrow. 5th edn, Mac Graw Hill . 1988. 6th edn. 1996.
10. Physical Chemistry by W.J.Moore. 4th edn. Orient Longmans 1969.

ANALYTICAL CHEMISTRY

1. Fundamentals of Analytical Chemistry by Skoos & West.
2. Analytical Chemistry, Garry D.Christain.
3. Analytical Chemistry, Day & Underwood.
4. Analytical Chemistry by Lerry & Hergins.
5. Qualitative Analysis by A.I.Vogel, 5th edn.

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F.Y.B.Sc. Semester: II

Chemistry Practical (Laboratory Course) CH LC-201

This syllabus is to be completed by assigning two laboratory sessions per week. Each of two hours. Total laboratory work is 60 hrs /sem (4 hrs /week) or 15 weeks.

The number of students in the laboratory batch should not exceed fifteen (15).

The medium of instruction should be English in laboratory course.

1. Inorganic Chemistry

Semi micro Analysis:

- Cation analysis: separation and identification of ions from group I, II, III-A, III-B, IV, V-A, V-B.
- Anion analysis like Cl^- , Br^- , I^- , NO_3^- , NO_2^- , SO_4^{2-} , SO_3^{2-} , S^{2-} , CrO_4^{2-} , CO_3^{2-} , PO_4^{3-} (Water Soluble and insoluble).
- Candidate should perform the analysis of at least 10 compounds.

2. Volumetric Titrations

- 1) To determine the strength of NaOH and Na_2CO_3 present in the solution mixture of NaOH & Na_2CO_3 and to find out their percentage composition.
- 2) To determine the strength of $NaHCO_3$ and Na_2CO_3 present in the solution mixture of $NaHCO_3$ & Na_2CO_3 and to find out their percentage composition.
- 3) To determine the Normality, gram/liter and molarities of $H_2C_2O_4 \cdot 2H_2O$ and H_2SO_4 present in the solution mixture of $H_2C_2O_4 \cdot 2H_2O$ & H_2SO_4 by using X N NaOH and Y N $KMnO_4$ solutions.
- 4) To determine the Normality, gram/liter and molarity of $H_2C_2O_4 \cdot 2H_2O$ and $K_2C_2O_4$ present in the solution mixture of $H_2C_2O_4 \cdot 2H_2O$ & $K_2C_2O_4$ by using X N NaOH and Y N $KMnO_4$ solutions.
- 5) To determine the amount of Ca^{+2} and Mg^{+2} ion by EDTA solution from the mixture solution of $CaCl_2$ and $MgCl_2$.

3. Demonstrations

- Melting point and Boiling point of an organic compound.
- Calibration of burette and Pipette.