

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Syllabus for on 2019

F. Y. B.Sc. Chemistry; Semester – II

(Paper : 01 : Inorganic & Physical Chemistry)

Total Hours : 30h

UNIT : 01

A. CONDUCTANCE AND IONIC EQUILIBRIUM

06 h

Electrical conductance, Specific conductance, equivalent conductance, Molar conductance, Effect of dilution on concentration, Cell constant, Determination of Cell constant, Ostwald's dilution law and its limitations, Acid & Basic buffer actions (Henderson-Hasselbach equation), Buffer capacity, Numerical.

B. THERMODYNAMICS

04 h

Second law of thermodynamics (in detail), Carnot cycle and its efficiency, Entropy concept, Change of entropy for reversible isothermic, isobaric, isochoric and adiabatic processes. Entropy change for ideal gases (T & V as variables, P & T as variables), Numerical.

Reference Book :

1. Physical Chemistry by ArunBahl, B. S. Bahl and G. D. Tuli; Pub. S. Chand
2. Advance physical chemistry by D. N. Bajpai; Pub : S. Chand
3. Text book of physical chemistry by P. L. Soni, O. P. Dharma; Pub. S. Chand

UNIT : 02 :

04 h

A. BASIC PRINCIPLES OF QUALITATIVE ANALYSIS

[I] Dry Reaction : theory behind borax bead test with equation, Flame test (Theory, structure of non luminous Bunsen flame)

[II] Analysis of Cation : Application of common ion effect, solubility product constant. Complexometric reactions involved in qualitative analysis;

1. For identification [reaction between Cu(II) ion with ammonia, Fe(III) with thiocyanide, NH_4^+ with Nessler Reagent].
2. For masking [Cd^{+2} , Cu^{+2}].
3. Separation of two ions [Ag-Hg , Zn^{+2} , Mn^{+2}]

Reference Books :

1. Qualitative analysis by R. A. Day and A. L. Underwood
2. Vogel's qualitative Inorganic analysis

B. Coordination Chemistry

06 h

Shape of d-orbitals, CFT – Basic assumption, splitting of d-orbitals in Octahedral, Tetrahedral, Square planer complexes, distribution of d^x electrons in Octahedral and Tertahedral complexes and CFSE.

Reference Book :

1. Inorganic chemistry by Wahid Malik, G. D. Tuli, R. D. Madan; Pub. S. Chand
2. Coordination Chemistry by GurdipChatwal, M. S. Yadav; Pub. Himalaya pub. house



3. Advance inorganic chemistry (Vol. II) by Satya Prakash, G. D. Tuli, S. K. Basu, R. D. Madan; Pub. S. Chand

UNIT : 03 :

[A] CHEMICAL BONDING

05 h

Definition of chemical bonds (covalent, co-ordinate covalent, ionic, metallic, H-bond, Wan der walls forces of attraction), Polarisability (Fajan's rule), Molecular Orbital theory ; LCAO method, Bonding molecular orbital, non-bonding molecular orbital, anti-bonding molecular orbital, bond order, magnetic properties and molecular orbital energy level diagram of hetero diatomic molecule : CO and NO, VSEPR theory.

Reference Book :

1. Conside Inorganic Chemistry (5th ed.) by J. D. Lee
2. Basic Inorganic Chemistry by Cotton & Wilkinson.
3. Inorganic Chemistry – Principles of structure and reactivity by J. E. Huheey, E. A. Keiter; Pub. Person Education Publishers.

[B] PHYSICAL PROPERTIES AND CHEMICAL CONSTITUTION

05 h

Classification of physical properties (additive, constitutive, colligative, additive-constitutive), Atomic volume, Molar volume and Chemical constitution, Kopp's law, Surface tension, Drop number method, Parachor, Viscosity, Determination of viscosity by Ostwald viscometer, Define : Refraction, Specific refraction, molar refraction, Numerical.

Reference Book :

1. Principles of Physical chemistry by Puri, Sharma and Madan; Pub. Vishal publishing
2. Essentials of physical chemistry by A. S. Bhal and G. D. Tuli, Pub : S. Chand
3. Advance physical chemistry by D. N. Bajpai, Pub : S. Chand



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Syllabus on 2019

For

F. Y. B. Sc. Semester- II

Paper-II

(Organic Chemistry)

UNIT: I: Reaction mechanism :10 Hrs.

- (a) Homolytic and Heterolytic fission free radicals carbonium ions (carbocations) and carbanions reactive intermediates carbenes , arynes and nitrenes.
- (b) Types of reagents, electrophiles nucleophiles .
- (c) Eletromeric, inductive, conjugative effect.
- (d) Types of reactions : Addition, substitution, elimination, rearrangments. Addition, and Substitution with respect to electrophilic and nucleophilic reaction, SN^1 & SN^2
- (e) Mechanism of (i) addition reaction to alkenes and dienes (ii) substitution in benzene Ring, nitration ,sulfonation, alkylation , acylation, halogenation., cyanohydrin formation andacetal formation,
- (f) Mechanism of Perkin reaction, Benzoin Condensation andCannizaro's reaction

UNIT II: (A) Empirical formula, Molecular formula, and Structural formula: 4 Hrs.

Determination of empirical formula and its relation with molecular formula
determination of molecular weight of (a) Organic acid by Silver saltmethod and
(b) organic base by chloroplatinate method and its limitations .
Numerical example.

(B) Carbohydrates:

6 Hrs.

Modern definition of carbohydrates, classification of carbohydrates, function of Carbohydrates,optical isomers, Diastereoisomers,enantiomersracimatesof Glucose and Fructose, Stricture of Glucose and Fructoseisomers,mutarotation, glucoside linkage (Pyranose and Furanose)D & L isomers of Glucose and Fructose, derivatives of Monosaccharide, step up and stepdown synthesis, kilyani synthesis, conversion of glucose to Fructose andconversion of Fructose to glucose.

UNIT – III (A) Alkenes, dienes and alkynes : 10Hrs.

- (a) Alkenes : Nomenclature, method of preparation, properties and uses of ethylene and propyleneMorkwonikoffs rule and Satytzeff rule, polymerization of ethylene styrene andvinyl chloride. Alkenes.Reactions: Hydroboration, Oxidation, Epoxidation, Ozonolysis, Oxymercuration, Hydroxylation, Hydrohalogenation, Dehydrohalogenations, Hydration.
- (b) Dienes : Nomenclature, classification of dienes methods of formation of Butadiene chemical reactions 1,2 and 1,4 additions, Diel's – Alder reaction.
- (c) Alkynes : Nomenclature , methods of formation, chemical reactions: Hydroboration, Oxidation,metal ammonia reduction, oxidation, polymerization. Electrophilic and nucleophilic addition reactions of acetylene.



Reference Books

- (1) Organic chemistry vol.I and vol. II by I.L.Finar (Longman group)
- (2) Organic chemistry by P.L.Soni
- (3) Organic chemistry by R.T.Morrison and Boyd Prentice Hall India.
- (4) Organic chemistry by B.K. Sharma.
- (5) Organic chemistry by Bahland Bahl
- (6) Organic reaction mechanism by Mukharji and singh
- (7) Fundamentals of Organic chemistry by Soloman, John Wiely



F. Y. B.Sc. Chemistry Practical syllabus 2019 Semester-II

A. INORGANIC QUALITATIVE ANALYSIS

LIST OF INORGANIC CHEMICALS

CHLORIDES : Cu^{+2} , Fe^{+3} , Mn^{+2} , Co^{+2} , Ni^{+2} , Ca^{+2} , Ba^{+2} , Sr^{+2} , Na^{+} , K^{+} , NH_4^{+} .

BROMIDES : Sr^{+2} , Na^{+} , K^{+} , NH_4^{+} .

IODIDE : K^{+}

NITRATE : Pb^{+2} , Co^{+2} , Ni^{+2} , Ba^{+2} , Sr^{+2} , Na^{+} , K^{+} , NH_4^{+} .

SULPHIDE : Zn^{+2} , Sb^{+3} .

SULPHATE : Cu^{+2} , Al^{+3} , Fe^{+2} , Zn^{+2} , Mn^{+2} , Co^{+2} , Ni^{+2} , Mg^{+2} , Na^{+} , K^{+} , NH_4^{+} .

CHROMATE : Na^{+} , K^{+}

CARBONATE : Cu^{+2} , Zn^{+2} , Mn^{+2} , Co^{+2} , Ni^{+2} , Ca^{+2} , Ba^{+2} , Sr^{+2} , Mg^{+2} , Na^{+} , K^{+} , NH_4^{+}

PHOSPHATE : Cu^{+2} , Al^{+3} , Fe^{+3} , Zn^{+2} , Mn^{+2} , Ca^{+2} , Ba^{+2} , Sr^{+2} , Mg^{+2} , Na^{+} , K^{+} , NH_4^{+}

OXIDE : Sb^{+3} , Zn^{+2}

N. B. Candidate should perform the analysis of at least 8 compounds.

B. PREPARATIO OF STANDARD SOLUTION (BY STUDENTS) OF FOLLOWING.

1. 0.1 N succinic acid against NaOH
2. 0.1 N KHP against NaOH/KOH
3. 0.01 N $\text{Na}_2\text{S}_2\text{O}_3$ against I_2 solution
4. 0.1 N $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ against KMnO_4 solution
5. 0.1 N $\text{K}_2\text{Cr}_2\text{O}_7$ against $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ Or $\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ solution

N. B. Candidate should perform at least 3 volumetric exercises.

