

# VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

## Syllabus for on 2019

### F. Y. B.Sc. Chemistry; Semester – I

(Paper : 01 : Inorganic & Physical Chemistry)

**Total Hours : 30h**

#### **UNIT : 01 : SOLID STATE**

**10 h**

Definition of space lattice, Unit cell, Difference between crystalline and amorphous state, types of crystals with illustrations, Law of crystallography. Steno's law and laws of symmetry, lattice planes, Miller indices, Bravais indices, type of cubic system, diagrammatic representation of cubic system and  $d_{100}$ ,  $d_{110}$ ,  $d_{111}$  planes, Bragg's equation (X-ray diffraction), Crystal structure of NaCl, KCl. (Numerical based on Bragg's equation and Miller indices)

#### **Reference Books :**

1. Essentials of physical chemistry by A. S. Bhal and G. D. Tuli, Pub : S. Chand
2. Advance physical chemistry by D. N. Bajpai, Pub : S. Chand
3. Numerical problems by Dogra and Dogra (for numerical)
4. A textbook of physical chemistry by A. S. Negi and S. C. Anand, Pub : New Age International (for numerical)

#### **UNIT : 02**

##### **A. ACID – BASE THEORIES**

**04 h**

Arrhenius theory, Lowry Bronsted theory, Lewis theory, Solvent – Solute concept of acid-base, Soft-Hard acid base and its application.

#### **Reference Books :**

1. Essentials of physical chemistry by A. S. Bahl and G. D. Tuli, Pub : S. Chand

##### **B. Atomic Structure**

**06 h**

Historical perspective of atomic structure; Rutherford's atomic model, Bohr's theory and its limitation, Spectrum of Hydrogen atom (Lyman, Balmer, Paschen, Brackett & Pfund), Quantum numbers, Aufbau, Hund and Pauli exclusion principles, Penetration and shielding, Effective nuclear charge (Slater rule)

#### **Reference Book :**

1. University General Chemistry by C.N.R. Rao, Pub : McMillan
2. Principles of Physical Chemistry by Maron & Pruton, 4<sup>th</sup> edition, Pub: Oxford & IBH
3. Physical Chemistry by G. M. Barrow
4. Advance inorganic chemistry (Vol. II) by Satya Prakash, G. D. Tuli, S. K. Basu, R. D. Madan; Pub. S. Chand

#### **UNIT : 03 :**

##### **A. CHEMICAL KINETICS**

**06 h**

Chemical kinetics and its scope, rate of reaction, factors affecting rate of reaction : temperature, concentration, pressure, solvent, light and catalyst, Molecularity of reaction, Classification of chemical reaction, Order of reaction with illustration (first order, second



order, third order, zero order, pseudo first order) reaction, : second order (a=b), half life and mean life.

**Reference Books :**

1. Essentials of physical chemistry by A. S. Bahl and G. D. Tuli, Pub : S. Chand
2. Advance physical chemistry by D. N. Bajpai, Pub : S. Chand
3. Numerical problems by D. V. S. Jain, Pub. McGraw Hill (for numerical)

**B. PERIODIC PROPERTIES**

**04 h**

Definition of atomic and ionic radii, ionisation energy, electron affinity and electron negativity, S-Block elements : Comparative study, diagonal relationship, salient features of hydrides.

**Reference Books :**

1. Modern inorganic chemistry by Gurdeep Raj
2. Principals of inorganic chemistry by Puri, Sharma and Kalia; Pub. Vishal publishing
3. Inorganic Chemistry by J. D. Lee



VEER NARMAD SOTH GUJARAT UNIVERSITY, SURAT

Syllabus on 2019

For

F. Y. B. Sc. Semester- I

Paper-II

(Organic Chemistry)

**UNIT I:(A) Alkanes and Cycloalkanes: 10 Hrs.**

Alkanes : IUPAC nomenclature of branched and unbranched alkanes, Alkyl group, Classification of carbon atoms in alkanes. Isomerism in Alkanes, sources, methods of formation special reference to **Wurtz reaction, Kolbe reaction and Corey-House reaction and decarboxylation of carboxylic acids**). Physical properties and chemical reactions of alkanes. Mechanism of free radical halogenations of alkanes: orientation, reactivity & selectivity.

**(B) Cycloalkanes :** Nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and its limitations. Ring strain in small rings (Cyclo propane and cyclo butane), Theory of strainless ring. The case of cyclo propane ring: banana bonds

**UNIT II : Stereochemistry 10 Hrs.**

- (a) Isomerism :- Optical activity , Chiral and Achiral molecules,  
(b) Optical isomerism of tartaric acid, Enantiomers, diastereomers( Threo&Erythro), Meso compounds Resolution of Racemates, inversion retention and racemization .  
(c) Geometrical Isomerism: Alkene derivative & oximes E & Z system of nomenclature.  
(d) Relative and absolute configuration, sequence rules. D & L and R & S system of nomenclature.

**UNIT III (A) Heterocyclic compounds : 5 Hrs.**

Nomenclature aromaticity , and synthesis properties uses and canonical structures of Pyrrol, Benzopyrol Furan , Benzofuran, Thiophene, Benzothiophene.

**(B) PolynuclearHydrocarbons : 3 Hrs.**

Classification aromaticity and Industrial preparation, , properties, uses and canonical structures of Napthalene , Anthracene and Phenanthrene.

**(C) Organic Qualitative Analysis 2 Hrs.**

**(I) Elemental Analysis (Lassaign's Test with equation)**

**(II) Solubility of Organic Compound (Ref. : Vogel's qualitative organic analysis)**

Chemical Methods : Solubility in  $\text{NaHCO}_3$ ,  $\text{NaOH}$  and  $\text{HCl}$  , Acid, Base and Phenol and amphoteric compounds ( Sulphanilic acid and Anthranilic acid )



## F. Y. B.Sc. Chemistry Practical syllabus 2019

### Semester- I

#### A) ORGANIC SPOTTING

Primary tests, Ignition test, Detection of Elements, Nature of the substance (solubility test), Functionalgroup tests, C. T., Molecular formula, Structural formula & M. P./ B. P. of the givensubstance.

ACID – Benzoic, Phthalic acid, Succinic acid.

BASE – Aniline, p – Toluidine

PHENOL – Resorcinol, a Naphthol, b Naphthol

NEUTRAL –

CARBOHYDRATE – Glucose , Fructose

KETONE – Acetone, Acetophenone

ESTER – Methyl salicylate, Methylacetate

ALCOHOL – Methanol , Ethanol

HYDROCARBON – Toluene , Naphthalene

NITRO HYDROCARBON – Nitrobenzene, m-di-nitrobenzene

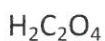
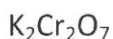
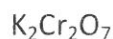
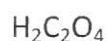
HALOGENATED HYDROCARBON – Carbon tetrachloride, Chlorobenzene,

AMIDE – Urea, Benzamide

ANILIDE – Acetanilide

N. B. Candidate should perform the analysis of at least 08 substances.

#### B) VOLUMETRIC EXERCISE



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

