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VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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-: પરિપત્ર :-

વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન રસાયણશાસ્ત્ર વિષય ચલાવતી સ્નાતક કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૧૯–૨૦ થી અમલમાં આવનાર B.Sc.Sem.-I અને Sem. II ના અભ્યાસક્રમ અંગે રસાયણશાસ્ત્ર વિષયની અભ્યાસસમિતિની તા.૨૬/૦૪/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંક : ૨ અન્વયે કરેલ નીચેની ભલામણ વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૫/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંક:૨૭ અન્વયે સ્વીકારી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલએ તેની તા.૦૭/૦૬/૨૦૧૯ ની સભાના ઠરાવ ક્રમાંક: ૫૫ અન્વયે સ્વીકારી મંજૂર કરેલ છે. તેની જાણ સંબંધકર્તા શિક્ષકો અને વિદ્યાર્થીઓને કરવી, તદ્ઉપરાંત તેનો અમલ કરવો.

કેમેસ્ટ્રી વિષયની અભ્યાસસમિતિની તા.૨૬/૦૪/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંક: ૨

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૧૯–૨૦ થી અમલમાં આવનાર B.Sc.Sem-I & Sem-II નો અભ્યાસક્રમ મંજૂર કરી તે મંજૂર કરવા વિજ્ઞાન વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૫/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંક:૨૭

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૧૯–૨૦ થી અમલમાં આવનાર B.Sc.Sem-I & Sem-II નો અભ્યાસક્રમ સ્વીકારી તે મંજૂર કરવા એકેડેમિક કાઉન્સિલને ભલામણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૦૭/૦૬/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંક: ૫૫

:: આથી ઠરાવવામાં આવે છે કે, વિજ્ઞાન વિદ્યાશાખાએ તેની તા. ૦૨/૦૫/૨૦૧૯ ની સભાના ઠરાવ ક્રમાંક : ૨૭ અન્વયે ભલામણ કરેલ શૈક્ષણિક વર્ષ ૨૦૧૯–૨૦ થી અમલમાં આવનાર B.Sc.Sem-I & Sem-II નો અભ્યાસક્રમ સ્વીકારી મંજૂર કરવામાં આવે છે.

બિડાણ: ઉપર મુજબ

ક્રમાંક : એકે./પરિપત્ર/કેમેસ્ટ્રી/૧૦૩૮૪/૧૯
તા. ૨૧–૦૬–૨૦૧૯

ઈ.ચા. કુલસચિવ

પ્રતિ,

૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની રસાયણશાસ્ત્ર વિષય ચલાવતી સ્નાતક કોલેજોના આચાર્યશ્રીઓ .
૨) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા
૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

...તરફ જાણ તેમજ અમલ સારૂ.

VEER NARMAD SOTH GUJARAT UNIVERSITY, SURAT

Proposed Syllabus on **12/02/2019**

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, Aklyl 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 redical 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 ofcyclo 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 Recimates, inversion retention and racemization .

(c) Geometrical Isomerism: Alkene derivative &oximes E & Z system of nomenclature.

(d) Relative and absolute configuration, sequence rules. D & Land R & S system of nomenclature.

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

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

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

Classification aromaticityand 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 $NaHCO_3$,NaOH and HCl , Acid, Base and Phenol and amphoteric compounds (Sulphanilic acid and Anthranilic acid)

VEER NARMAD SOTH GUJARAT UNIVERSITY, SURAT

Proposed Syllabus on **12/02/2019**

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

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Proposed Syllabus for

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'sequation 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; Ruatherford's atomic model, Bohr's theory and its limitation, Spectrum of Hydrogen atom (Lyman, Balmer, Paschen, Brackett &Pfund), Quantum numbers, Auf bau, 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, 4th 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

F. Y. B.Sc. Chemistry Practical proposed 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

H_2SO_4	$NaHCO_3$	HNO_3
$KMnO_4$	$H_2C_2O_4$	KOH
$KMnO_4$	$FeSO_4$	$K_2Cr_2O_7$
$K_2Cr_2O_7$	$Fe\text{-}NH_4\text{-}SO_4$	$KMnO_4$
$H_2C_2O_4$	$KMnO_4$	$FeSO_4$

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

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Proposed Syllabus for
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. Consise Inorganic Chemistry (5^{th} 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

F. Y. B.Sc. Chemistry Practical proposed 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^{+}, $NH4^{+}$.

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 $Na_2S_2O_3$ against I_2 solution
4. 0.1 N $H_2C_2O_4$ $2H_2O$ against $KMnO_4$ solution
5. 0.1 N $K_2Cr_2O_7$ against $FeSO_4.7H_2O$ Or$FeSO_4,(NH_4)_2SO_4$ $10H_2O$ solution

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