AC 7-4-2014
Item No. – 4.6

UNIVERSITY OF MUMBAI

Syllabus for the F.Y.B.Sc.

Program: B.Sc.

Course: Chemistry

(Credit Based Semester and Grading System with Effect from the academic year 2014-2015)

F.Y.B.Sc. Chemistry Syllabus

For Credit Based Semester and Grading System
To be implemented form the Academic year 2014-2015

SEMESTER I

Course Code	Unit	Topics	Credits	L/Week
USCH101	I	Chemical Thermodynamics-I Chemical Kinetics – I	2	1
	II	Molecular Spectroscopy-I Polymers-I Recent trends Scope and Introduction to Analytical Chemistry		1
	III	Calibration of Glassware and Chemical Calculations		1
USCH102	I	Atomic Structure Periodic Table and Periodicity of Properties Chemical Bonding	2	1
	II	Bonding and Structure of Organic Compounds Types of Arrows		1
	III	Nomenclature of Organic Compounds Fundamentals of Organic Reaction Mechanisms Concept of Carbon Acid Reagents Recent Trends in Chemistry		1
USCHP1			2	6

SEMESTER II

Course Code	Unit	Topics	Credits	L/Week
USCH201	I	Gaseous State Nuclear Chemistry	2	1
	II	Buffers Oxidation & Reduction Introduction to Gravimetric Analysis		1
	III	Titrimetric Analysis –I		1
USCH202	I	Comparative Chemistry of Main Group Elements Comparative Chemistry of Carbides , Nitrides , Oxides and Hydroxides of Group-I and II Elements	2	1
	II	Acid-Base Theories Stereochemistry of organic Compounds		1
	III	Mechanism of organic reactions Functional group interconversion		1
USCHP2			2	6

Course Code	Credits	
USCH101	**2 Credits (45 Lectures)**	
Unit I : **1.1CHEMICAL THERMODYNAMICS-I (8L)** Thermodynamic terms: System, Surrounding, Boundaries Sign Conventions, State Functions, Zeroth law- Statement, Internal Energy and Enthalpy: Significance, examples, (Numericals expected.) First law of Thermodynamics and its limitations, Second law – Statements and discussion, Mathematical expression. Qualitative discussion of Carnot cycle for ideal gas and mechanical efficiency, (Numericals expected.)(Derivation not expected). Concept of Entropy, Entropy for isobaric, isochoric and isothermal processes (derivation expected). **1.2 CHEMICAL KINETICS – I (7L)** Rate of Reaction, rate constant, Measurement of Reaction Rates Order &Molecularity of reaction, Integrated rate equation of first and second order reactions (with equal initial concentration of reactants). (Numericals expected) Determination of order of reaction by a) Integration method b) Graphical Method c) Ostwald's Isolation Method d) Half Time method. (Numericals expected).		**15 Lectures**
Unit II: **2.1MOLECULAR SPECTROSCOPY-I (4L)** Electromagnetic radiation, Electromagnetic Spectrum, Planck's equation, Interaction of EMR with matter-Absorption, Emission, Scattering, Flourescence, Electronic, Vibrational and Rotational transitions. (Numericals expected). **2.2POLYMERS-I (3L)** Monomer, Repeat Unit, Polymer, Linear and Branched polymers, Homopolymer, Copolymer, Types of copolymers-Random, Block, Alternate,		**15 Lectures**

Graft. Natural Polymers-Source, Structure & Properties of Starch, Cellulose, Protein, Silk, Wool, Rubber. **2.3RECENT TRENDS (1L)** Introduction to Premier Indian research Institutes in Chemistry, ShantiswaroopBhatnagar Awardees in last 5 years in Chemistry. **2.4 Scope and Introduction to analytical chemistry (7L)** **2.4.1 Analytical chemistry** Qualitative and Quantitative analysis ,Chemical analysis –Based on nature of information of the sample sought and based on size of the sample used ,Classification of analytical method-Classical and Instrumental methods – types, advantages and disadvantages **2.4.2 Steps involved in Chemical analysis** Purpose of analysis, Sampling ,Selection of a method for analysis-Factors, Processing of the sample, Actual analysis, Processing data, Presentation of results and Interpretation of results. **2.4.3 Applications of analytical methods in various fields** Organic, Pharmaceticals, Electronic and Environmental analysis	
Unit III: **3.1 Calibration of Glass ware and Chemical calculations (15L)** **3.1.1** Calibration of pipette, volumetric flask, Burette **3.1.2** Measurements in analytical chemistry S.I units -Fundamental Units (Mass, amount of substance, distance, time, temperature, current) and Derived Units(Area,Volume,density,velocity,force, pressure,energy,heat,work,power,charge, potential, resistance, frequency) (S.I Units and Symbol only) **3.1.3** Uncertainty of measurements Significant figures- concept, Rules and examples (Numericals expected)	**15 Lectures**

3.1.4 Chemical calculations Expressing concentration of solutions –Normality, Molality, Molarity, Formality, interconversion between molality and molarity , Mole fraction, Weight ratio, Volume ratio, Weight to volume ratio, ppb,ppm,millimoles,milliequivalents (Numericals expected)	

Course Code	Credits	
USCH102	**2 Credits (45 Lectures)**	
Unit I: **1.1 Atomic Structure**. Structure of Atom: **(5L)** Rutherford's Atomic Model; Bohr's Theory; dual Nature of electrons; Heisenberg's Principle of uncertainity; Quantum Numbers; Pauli Principle **1.2 Periodic Table and Periodicity of Properties**. **(5L)** Long form of Periodic Table; Classification of elements as main group, transition, and inner transition elements; Periodicity in the following properties: Atomic and ionic size; electron gain enthalpy;ionization enthalpy,effective nuclear charge (Slater rule); electronegativity :Pauling,Mulliken and Allred Rochow electronegativities . (Numerical problems expected, wherever applicable) **1.3 Chemical Bonding (5L)** Types of chemical bonds;Comparision between ionic and covalent bonds; polarizability (Fajan's Rules) Shapes of simple molecules: Lewis Dot structures; Sidgwick-Powell theory; Basic VSEPR Theory for AB_n type molecules with and without lone pair of electrons,isoelectronic Principle; Applications and Limitations of VSEPR Theory.		**15 Lectures**
Unit II: **2.1 Concept of Qualitative Analysis**: **(7L)** (Macro,Semi-Micro,Micro,Ultra Micro,Trace Analysis) Testing of Gaseous Evolutes, Role of Papers impregnated with Reagents in qualitative analysis (With reference to papers impregnated with Starch-Iodide, Potassium Dichromate, Lead cetate,Dimethyl Glyoxime, and Oxine reagents) (balanced Chemical Reactions expected). Precipitation Equilibria: Effect of Common Ions, Uncommon Ions; Oxidation State, Buffer Action,		**15 Lectures**

Complexing agents on precipitation of ionic compounds. (Balanced Chemical Equations and Numerical Problems Expected) **2.2Bonding and structure of organic compounds (4L)** 2.2.1 Hybridisation of carbon, oxygen and nitrogen atoms in the following functional groups; orbital overlap and shapes of the specified molecules containing these functional groups : alcohol (methyl alcohol), ether (dimethyl ether), aldehyde (formaldehyde), ketone (acetone), carboxylic acid (acetic acid), ester (methyl acetate), cyanide (methyl cyanide), amine (methyl amine), amide (acetamide). **2.3 Types of arrows. (4L)** 2.3.1 Electronic effects in organic molecules: Inductive effect (or polarisation), polar covalent bonds and dipole moment. Delocalised bonds and resonance - drawing resonance structures, concept of formal charge hyperconjugation. 2.3.2 Aromaticity: Characteristics of aromatic compounds, criteria for aromaticity, resonance energy,Huckels rule, benzenoid hydrocarbons (benzene, naphthalene, anthtracene and phenanthracene) 2.3.3 Bonds weaker than a covalent bond: Hydrogen bond – intermolecular hydrogen bonding in alcohols - effect on b.p. and solubility; Van der Waal's forces in straight and branched chain alkanes.	
Unit III: **Nomenclature of organic compounds** **3.1** Review of basic rules of IUPAC nomenclature. **(2L)** **3.2.** Nomenclature of mono & bi-functional aliphatic compounds on the basis of priority order of the following classes of compounds: alkanes,	**15 Lectures**

alkenes, alkynes, haloalkanes, alcohols, ethers, aldehydes, ketones, carboxylic acids, carboxylic acid derivatives (acid halides, esters, anhydrides, amides), nitro compounds, nitriles & amines; including their cyclic analogues. **(3L)** **3.3Fundamentals of organic reaction mechanisms. (4L)** 3.3.1 Reactive intermediates: 3.3.2 Carbon radicals (alkyl, Allyl, Benzyl) Formation, structure and stability based on resonance and hyperconjugation. 3.3.3 Carbocations and carbon radicals [alkyl, allyl, benzyl]: Formation , structure and stability based on inductive effect, resonance and hyperconjugation. 3.3.4 Carbanions : Formation, structure and stability based on inductive effect, resonance and s-character of trichloromethyl carbanions, allyl carbanions, benzyl carbanions, carbanions from terminal alkynes and active methylene compounds. **3.4. Concept of carbon acid. (1L)** **3.5 Reagents: (3L)** 3.5.1 Electrophiles and nucleophiles. 3.5.2 Acids and bases : Lowry-Bronsted and Lewis concepts. 3.5.3 Acidity and basicity of organic compounds based on inductive effect and resonance with reference to acid characters of alcohols, phenols and carboxylic acids and basic characters of aliphatic amines and aniline . **3.6 Recent trends in Chemistry (2L)** 3.6 .1Introduction to research journals in chemistry. 3.6.2 Nobel prize winners in Chemistry in last 5 years.	

Course Code	Credits
USCHP1	2 Credits

PRACTICAL COURSE PHYSICAL CHEMISTRY

1. To determine the rate constant for the hydrolysis of ester using HCl as catalyst.
2. To determine the rate constant for the hydrolysis of ester using H_2SO_4 as catalyst, using scientific calculator by Regression analysis.
3. To determine the rate constant for the saponification reaction between ethyl acetate and NaOH by back titration method.
4. To determine enthalpy of dissolution of salt (like KNO_3).

PRACTICAL COURSE ANALYTICAL CHEMISTRY

1. Determination of amount of $NaHCO_3$ + Na_2CO_3 in the given solid mixture titrimetrically.
2. Determination of the amount of Potassium oxalate and oxalic acid in the given solution titrimetrically
3. Determination of % composition of $BaSO_4$ and NH_4Cl in the given mixture gravimetrically.
4. Determination of % composition of ZnO and $ZnCO_3$ in the given mixture gravimetrically.

PRACTICAL COURSE INORGANIC CHEMISTRY

Semi-Micro Inorganic Qualitative Analysis of a sample containing Two Cations and Two Anions. Cations: (from amongst) Pb^{2+}, Ba^{2+},Ca^{2+},Sr^{2+},Cu^{2+},Cd^{2+},Fe^{3+},Ni^{2+}, Mn^{2+},Mg^{2+},Al^{3+},Cr^{3+},K^{+},NH_4^{+}

Anions : (from amongst) CO_3^{2-}, SO_3^{2-} , S^{2-}, NO_2^{-} , NO_3^{-}, Cl^{-}, Br^{-}, I^{-} , SO_4^{2-} , PO_4^{3-}

(Scheme of analysis should avoid use of sulphide ion in any form for precipitation /separation of cations).

PRACTICAL COURSE ORGANIC CHEMISTRY

1) Crystallization Acetamide / salicylic acid from hot water using fluted filter paper.

2) Characterization organic compounds containing only C, H, (O) elements (no element test):

Compounds belonging to the following classes; carboxylic acid, phenol, aldehyde/ ketone, ester, alcohol, hydrocarbon. (Minimum 7 compounds)

Course Code	Credits	
USCH201	**2 Credits (45 Lectures)**	
Unit I : **1.1 GASEOUS STATE (7L)** Ideal Gas laws, Kinetic theory of gases, Maxwell-Boltzmann's distribution of velocities (qualitative discussion), Ideal gases, real gases, compressibility factor, Boyle's temperature. (Numericals expected) Deviation from ideal gas laws, reasons for deviation from ideal gas laws, van der Waals equation of state, Joule-Thomson effect –qualitative discussion and experimentation, Inversion temperature. **1.2 NUCLEAR CHEMISTRY-I (8L)** Natural Radioactivity – Introduction, Types of radiation (α, β, ϒ) & their properties. Group Displacement Law, Mechanism of β – ray emission. Isobars, Isotopes & Isotones. Radioactive decay, Derivation for decay constant and half life period (Numericals expected).		**15 Lectures**
Unit II: **2.1BUFFERS (4L)**– Introduction, Types of buffers, Derivation of Henderson equation for acidic and Basic buffers, Buffer action, Buffer capacity. (Numericals expected.) **2.2 OXIDATION&REDUCTION (4L)**– Oxidising and Reducing agents, Oxidation number, Rules to assign Oxidation numbers with examples ions like oxalate, permanganate and dichromate. Balancing redox reactions by ion electron method **2.3 Introduction to Gravimetric Analysis (7L)** **2.3.1** Solubility product and Precipitation. **2.3.2** Factors affecting solubility of precipitate. **2.3.3** Conditions of precipitation, nucleation, particle size, crystal growth, colloidal state, ageing of precipitate/digestion of precipitate. **2.3.4** Impurities in the analytical precipitate- Co-precipitation and Post		**15 Lectures**

precipitation. Washing, drying and ignition of precipitate.	
Unit III: **3.1 Titrimetric Analysis –I** **3.1.1** Terms – Titration ,Titrant , titrand, End point, Equivalence point, Titration Error ,Indicator **3.1.2** Primary and Secondary standards- characteristics and examples **3.1.3** Types of Titration –Acid –Base, Redox. Precipitation, Complexometric titration. **3.1.4** Acid – base titration.-Strong Acid Vs Strong Base -Theoretical aspects of titration curve and end point evaluation. Theory of Acid –Base Indicators, Choice and suitability of Indicators .	**15 Lectures**

Course Code	Credits	
USCH202	**2 Credits (45 Lectures)**	
Unit I: **1.1Comparative Chemistry of Main Group Elements**: Metallic and Non-Metallic Nature, Oxidation States, Electronegativity, Anamolous behavior of Second Period elements, allotropy. Catenation, Diagonal relationship. **(5 L)** **1.2 Comparative Chemistry of Carbides , Nitrides , Oxides and hydroxides of Group-I and II elements**. Some important compounds: a) Na_2CO_3 ; b) NaOH; c) NaCl ; d) $NaHCO_3$; e) CaO; $CaCO_3$ **(5L**) **1.3** Oxides of carbon ,Oxides and Oxyacids of Sulfur and Nitrogen with respect to Environmental aspects. **(5L)**		**15 Lectures**
Unit II: **2.1 Acid-Base Theories** Arhenious ; Lowry-Bronsted ;Lewis ; Solvent-Solute;Lux-Flood;Hard and Soft Acids and Bases-HSAB(with respect to toxicity of inorganic species);Usanovich Definition. **(8L)** **2.2Stereochemistry of organic Compounds (7L)** 2.2.1 Isomerism – Types of isomerism: constitutional isomerism (chain, position and functional) and stereoisomerism. 2.2.2. Chirality: Configuration, asymmetric carbon atom, stereogenic/ chiral centers, chirality, representation of configuration by "flying wedge formula" and projection formulae – Fischer, Newman and Sawhorse. The interconversion of the formulae. 2.2.3. Stereochemistry of carbon compounds with one and two similar and dissimilar asymmetric carbon atoms; enantiomers, diastereomers, and racemic mixtures cis-trans, threo, erythro and meso isomers. 2.2.4. Diastereomerism (cis-trans isomerism) in alkenes and cycloalkanes (3 and 4 membered ring) 2.2.5. Conformation: Conformations of ethane. Difference between configuration and conformation.		**15 Lectures**

Mechanism of organic reactions: 3.1 Classification of organic reactions based on mechanism. **(8L)** 3.1.1 Substitution: Nucleophilic substitution in alkyl halides (S_N1 and S_N2), electrophilic substitution in benzene (Friedel Crafts alkylation), Radical substitution (Chlorination and bromination of methane and propane). 3.1.2 Addition: Electrophilic addition (Markovnikov addition of HX to alkenes); Radical addition (AntiMarkovnikov addition of HBr to alkenes in presence of peroxide); Nucleophilic addition to aldehydes and ketones (addition of HCN and aldol addition). 3.1.3 Elimination: Dehydrohalogenation of alkyl halides (E1 and E2). 3.1.4 Rearrangement: Hydrolysis of neopentyl chloride. 3.1.5 Pericyclic reactions: Diels-Alder cycloaddition. **3.2Functional group interconversion** based on the preparations and reactions of the following classes of organic compounds: haloalkanes and alcohols. **(7L)** 3.2.1 Hydrocarbons 3.2.2 Alkanes: Methods of formation: Kolbe reaction,Wurtz reaction, decarboxylation of carboxylic acids; hydrogenation of alkenes and hydrolysis of Grignard reagent Reactions: Halogenation of alkanes 3.2.3Alkenes: Methods of formation: Dehydrohalogenation of alkyl halides, Dehydration of alcohols; Reduction of alkynes Reactions: Addition of hydrogen, halogen, HX, HX in presence of peroxide, H_2SO_4, allylic halogenation using NBS; Ozonolysis, epoxidation; hydroboration- oxidation; ; Oxidation using $KMnO_4$ & OsO_4. 3.2.4Alkynes:Methods of formation: Dehydrohalogenation of alkyl dihalides, alkylation of terminal alkynes. Reactions: Addition of hydrogen, halogen, HX, H_2O, hydroboration oxidation; Hydroboration-oxidation, Ozonolysis, 3.2.5 Alkyl halides: Methods of formation: Halogenation of alkanes , Hydrohalogenation of alkenes and alkynes, Reaction of alcohols with $SOCl_2$	

and PCl_5. Reactions: S_N reactions with hydroxide, alkoxide,cyanide, ammonia, amines, acetylide ion, silver acetate. Dehydrohalogenation, Formation and synthetic applications of Grignard reagent. 3.2.6 Alcohols: Methods of formation: Hydration of alkenes, Hydrolysis of alkyl halides, Reduction of aldehydes and ketones. Reactions:Reaction with HX, PX_3, Dehydration,esterification, oxidation.	

Course Code	Credits
USCHP2	2 Credits

PRACTICAL COURSE PHYSICAL CHEMISTRY

1. To standardize commercial sample of NaOH using KHP and to write material safety data of the chemicals involved.
2. To standardize commercial sample of HCl using Borax and to write material safety data of the chemicals involved.
3. To study the reaction $NaHSO_3$ and $KMnO_4$ and balancing the reaction in acidic, alkaline and neutral medium.
4. To study the kinetics of reaction between thiosulphate ion and HCl.

PRACTICAL COURSE ANALYATICAL CHEMISTRY

1. Determination of acetic acid in Vinegar by titrimetric method.
2. Determination of strength of HCl in Commercial sample.
3. Determination of the amount of Mg(II) present in the given solution complexometrically
4. Determination of the amount of Fe(II) present in the given solution titrimetrically

PRACTICAL COURSE INORGANIC CHEMISTRY

1. Inorganic Preparations
   i. Copper Sulfate from Copper(II) Oxide;
   ii. Barium Chromate from Barium Chloride;
2. Volumeteric Analysis:- (Any Two)
   i. To study the Transfer of electrons (Titration of sodium thiosulfate with potassium dichromate);
   ii. Determination of the strength of sodium carbonate and sodium bicarbonate by titration with standard acid solution using phenolphthalein and methyl orange as indicators;
   iii. Determination of the volume strength of hydrogen peroxide solution,by titration with standardized potassium permanganate solution.

PRACTICAL COURSE ORGANIC CHEMISTRY

Characterization of organic compounds containing C, H, (O), N , S ,halogen elements. (Element tests to be done)

Compounds belonging to the following classes: amine, amide, nitro compound, thioamide, haloalkane, haloarene. (Minimum 7 compounds)

SUGGESTED REFERENCES 202

1. B.Douglas, D.H. McDaniel and J.J.Alexander, Concepts and Models of Inorganic Chmistry, 2nd edition, John Wiley & Sons, (1983).
2. Gary Wulfsberg, Inorganic Chemistry ; Viva Books PA Ltd., New Delhi; (2002).
3. W.W.Porterfield,***Inorganic Chemistry-An Unified Approach***, Academic press(1993);
4. D.F.Shriver, P.W.Atkins and C.H. Langford, Inorganic Chemistry, 3rd edition Oxford University Press, (1999).
5. Asim K.Das, ***Fundamental Concepts of Inorganic Chemistry***,(Volumes-I,II and III)CBS Pub.(2000)
6. N.N.Greenwood and A.Earnshaw, Chemistry of Elements, Pergamon, (1984).
7. P. K. Dutta, 'General and Inorganic Chemistry',Levant Books,15th Edition,(2003).

SUGGESTED REFERENCE 101 & 201

1. Fundamental of Analytical Chemistry-Skoog D.A. and West D.M. Saunders, College Publication
2. Introduction to Instrumental Analysis, R. D. Brown, McGraw Hill.
3. Instrumental Methods of Analysis, H. H. Willard, L. L. Meritt and J. A. Dean, Affiliated East-West Press.
4. Quality in the Analytical Chemistry laboratory –Neil T.Crosby,Florence Elizabeth Prichard, Ernest.J Newman – John Wiley&Sons Ltd
5. Principles and Practice of Analytical Chemistry-Fifield F.W. and Kealey D, Black well Science
6. Analytical Chemistry, Christain, WSE / Wiley
7. Basic concepts of Analytical Chemistry, S.M.Khopkar, New Age International(P) Ltd
8. Quantitative Analysis, R.A Day &A.L Underwood, Prentice Hall Publication
9. Chemical Analysis in the laboratory –A Basic guide by Irene Muller-Harvey ,Richard .M.Baker ,Royal Society of Chemistry
10. Textbook of Quantitative Inorganic Analysis-Vogel A.I.

SUGGESTED REFERENCE 102

1. J. Barrett and A. Malati, 'Fundamentals of Inorganic Chemistry',East-West Press Edition(2006)
2. C.M. Day and Joel Selbin, 'Theoretical Inorganic Chemistry', Affiliated East West Press Pvt.Ltd., (1985).
3. J.D.Lee, Concise 'Inorganic Chemistry', 5th ed., Blackwell Science Ltd., (2005).
4. James E.Huheey, 'Inorganic Chemistry', 3rd edition, Harper & Row, Publishers, Asia, Pte Ltd., (1983).
5. R. J. Gillespie and I. Hargittai, The VSEPR Model of Molecular Geometry,Dover Publication,(2012).
6. J. Barrett, 'Inorganic Chemistry in Aqueous Solutions'; The Royal Society of Chemistry (2003).
7. T. Moeller and R. O'Connor, 'Ions in Aqueous Systems'; McGraw-Hill Book Company, (1972).

SUGGESTED REGERENCE 102 & 202

1. Organic Chemistry: S.H.Pine
   McGraw Hill. Kogakusha Ltd.
2. Organic Chemistry : John McMurry
   5th Ed.Cornell University
3. Advance Organic Chemistry : Jerry March
   Wiley Eastern Ltd.
4. Aguide to IUPAC Nomenclature of Organic Compounde : Richer
   Interscience Publications
5. Organic Chemistry : T.W.G.Solomons, C.B.Fryhle, 2000
   John Wiley and Sons
6. Organic Chemistry vol 1,byV.K. Ahluwalia ,Ane books pvt .Ltd

SUGGESTED REGERENCE 102 & 202

1. Organic Chemistry : T.W.G.Solomons, C.B.Fryhle, 2000
   John Wiley and Sons
2. Organic Chemistry : Morrison and Boyd
   Allyn & Bacon Inc.
3. Organic Chemistry : Francis A. Carey, 1996
   3rd Ed. McGraw Hill
4. Fundamentals of Organic Chemistry : G.Mare Loudon, 2002
   4th Ed.
5. Reaction Mechanism : Peter Sykes, 1999
   Orient Longman
6. Organic Chemistry – Seyhan N.Ege, 1984.
   D.C.Heath & Co.
7. Organic Reactions With Mechanism by S.P.Bhutani ,Ane book Pvt.Ltd.

FYBSC CHEMISTRY 2014-2015

QUESTION PAPER PATTEREN

FOR :-PAPER 101/102 PHYSICAL ANALYTICAL AND FOR PAPER 201/202 INORGANIC AND ORGANIC

Q.NO 1 ON UNIT 1

A OR A 05
B OR B 05
C OR C 05
D (MULTIPLE CHOICE QUESTIONS) 05 TOTAL = 20

Q.NO 2 ON UNIT 2

A OR A 05
B OR B 05
C OR C 05
D (MULTIPLE CHOICE QUESTIONS) 05 TOTAL = 20

Q.NO 3 ON UNIT 3

A OR A 05
B OR B 05
C OR C 05
D (MULTIPLE CHOICE QUESTIONS) 05 TOTAL= 20

FYBSC CHEMISTRY PRACTICAL PATTREN 2014-2015

SEMESTER I		SEMESTER II	
EXPERIMENT	MARKS	EXPERIMENT	MARKS
ANY ONE EXPERIMENT FROM 101	40	ANY ONE EXPERIMENT FROM 201	40
ANY ONE EXPERIMENT FROM 102	40	ANY ONE EXPERIMENT FROM 202	40
VIVO--VOCE	10	VIVO--VOCE	10
JOURNAL	10	JOURNAL	10
	100		100

GRAND TOTAL THEORY EXTERNAL 60 + 60 = 120
INTERNAL 40 + 40 = 80

200
PRACTICAL EXAM PER SEMESTER 100

Grand Total **300**