



RANI CHANNAMMA UNIVERSITY, BELAGAVI

WEL-COME

**TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADUATE
PROGRAMMES – B.Sc**

VI Semester

w.e.f.

Academic Year 2016-17 and onwards

3. CHEMISTRY (OPTIONAL)

SIXTH SEMESTER B.Sc. COURSE

Chemistry

Paper-I

Code : 14BSCCHET61

Teaching Hours : 50 Hours

Inorganic Chemistry:

UNIT-I

Coordination compounds -II

09 hours

Crystal field theory(CFT) with reference to octahedral, distorted octahedral(Jahn-Teller distortion), tetrahedral and square planar complexes, calculation of crystal field stabilization energy, factors affecting $10Dq$, consequences of crystal field splitting on ionic radii of M^{+2} ions, enthalpy of hydration of M^{+2} ions, explanation of colour and magnetic properties of magnetic complexes, limitations of crystal field theory, calculation of magnetic moment using Gouy's method,

UNIT-II

Metal-ligand Equilibria:

05 hours

Stability constant, stepwise and overall formation constants, trends in step wise constants, factors affecting the stability of the metal complexes with reference to the nature of metal ion and ligand.

Chelates - definition, characteristics, factors influencing the stability of metal chelates and importance of chelates.

UNIT-III

Organometallic Chemistry

03 hours

Introduction, classification of organotransition metal complexes, 18 electron rule with respect to $[Fe(CO)_5]$, $[Ni(CO)_5]$, $[Mn(CO)_5]^+$, ferrocene, structure and bonding in metal olefins (Zeise's Salt).

Organic Chemistry:

UNIT-I

Carbohydrates

05 hours

Haworth and conformational formulae of glucose and fructose, mutarotation and its mechanism, osazone formation, Killani's synthesis, Ruff's degradation, epimers and epimerisation with respect to monosaccharides, interconversions of glucose and fructose.

UNIT-II

Vitamins and Harmones

03 hours

Vitamins: Classification and importance of vitamin-A, B₆, B₁₂, C, D and E. Synthesis of Vitamin-C from D(+)-glucose, synthesis of vitamin-A by Vandrop etal.

UNIT-III

Amino acids, Peptides and Proteins

06 hours

Classification, structure and stereochemistry(D and L) of amino acids, acid-base behaviour, iso-electric point and electrophoresis, peptides-nomenclature and structure of peptides, synthesis of a dipeptide(Bergmann synthesis), Classification of proteins, levels of protein structure(primary, secondary and tertiary structure), protein denaturation and renaturation.

UNIT-IV

Terpenoids

03 hours

Introduction, classification of terpenes, Ingold's isoprene rule, constitution of citral with synthesis, synthesis of α and β ionones, synthesis of α -terpeniol.

Physical Chemistry:

UNIT-I

Electronic Spectrum

05 hours

Concept potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules, energy levels and respective transitions, Frank-Condon principle.

UNIT-II

Physical properties and molecular structure

04 hours

Introduction-dipole moment, induced dipole moment, measurement of dipole moment by temperature variation method and its applications.

UNIT-III

Polymers

03 hours

Introduction, classification, determination of molar masses of macromolecules by viscometry and Donnan membrane equilibrium.

UNIT-IV

Quantum Chemistry

04 Hours

Photoelectric effect - Einstein's photoelectric equation, wave particle duality, de-Broglie hypothesis, de-Broglie equation(derivation), experimental verification-Davisson-Germer experiment.

Reference books for inorganic chemistry

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| 01. Advance Inorganic Chemistry Vol-I and II | Gurudeep Raj |
| 02. Advance Inorganic Chemistry | Satya Prakash |
| 03. Modern Inorganic Chemistry | R.D. Madan |
| 04. Inorganic Chemistry | James Huheey |
| 05. Concise Inorganic Chemistry | J.D. Lee |
| 06. Inorganic Chemistry | Shriver and Atkins |

Books recommended for organic chemistry:

01. Organic Chemistry P.L. Soni
02. Organic Chemistry I.L. Finar Vol-II
03. Biochemistry Voet and Voet

Books recommended for physical chemistry:

01. Molecular Spectroscopy C.N. Banwell
02. Physical Chemistry Atkins
03. Physical Chemistry Puri and Sharma, New edition

SIXTH SEMESTER B.Sc. COURSE

Chemistry

Paper-II

Code : 14BSCCHET62

Teaching Hours : 50 Hours

Inorganic Chemistry:

UNIT-I

Chromatography

07 hours

Principle, types, stationary and mobile phases, physical factors of separation, brief account of paper chromatography, calculation of R_f value, brief account of column chromatography and its applications.

Flame photometry: Principle, Limitations, Instrumentation, Flame photometric determination of Na and K.

Thermogravimetry: Principle and applications of thermogravimetric methods (TG and DTA).

Electrogravimetry: Principle, Instrumentation, Electrogravimetric determination of Copper.

UNIT-II

Soil Analysis

03 hours

Macro nutrients, trace metals and organic matter in soil. Determination of pH, Determination of nitrogen by alkaline permanganate method and phosphorus by Bray's and Olsen's method present in the soil.

UNIT-III

Electronic spectra of transition metal complexes

07 hours

Russel-Sandar's coupling in defining ground states of spectrochemical series, derivation of spectroscopic ground terms(d₁ to d₁₀ without J values), types of electronic transitions(d-d transitions, charge transfer transitions-MLCT and LMCT), selection rule for d-d transitions, Orgel- energy level diagram-d₁ and d₂ states, discussion of the electronic spectrum of [Ti(H₂O)₆]³⁺ complex ion.

Organic Chemistry:

UNIT-I

Chemotherapy

05 hours

Introduction, requirement of an ideal synthetic drug, classification, synthesis and uses of the following-

Antipyretics-antipyrine, paracetamol

Anaesthetics-novacaine(local) and pentothal sodium(general)

Antihistamines-chlorpheniramine maleate(CPM)

Antimalarials-paludrine, chloroquine

Antibiotics-chloromycetin, penicillin, tetracyclin

Para pharmaceutical reagents-Benedict's reagent, sodium citrate, Barfoed reagent

UNIT-II

Soaps and Detergents

03 hours

Soaps - Introduction, manufacture by modern process, cleaning action of soap.

Detergents - anionic, cationic, nonionic, with suitable examples, distinction between soaps and detergents, emulsifiers, stabilisers and builders.

UNIT-III

Reaction Mechanism

04 hours

a) Beckmann rearrangement

b) Favorskii rearrangement

c) Benzidine rearrangement

d) Benzilic acid rearrangement

UNIT-IV

NMR Spectroscopy

05 hours

Principle of Proton Magnetic Resonance(^1H NMR) spectroscopy, nmr spectrum, chemical shift, nuclear shielding and deshielding, spin-spin coupling($n+1$) rule, intensity(height) of the signal, TMS as internal standard-advantages, interpretation of PMR spectra of simple organic molecules such as ethyl bromide, n-propyl bromide, iso propyl bromide, ethanol, acetaldehyde and benzene.

Physical Chemistry:

UNIT-I

Electro motive force

11 hours

Reversible and irreversible cells, EMF of a chemical cell and its measurement by potentiometer, standard cell (Weston standard cell).

Types of electrodes - Reference electrode, calomel electrode, derivation of Nernst equation for emf of a cell, concentration cells- with and without transference, liquid junction potential and its derivation, salt bridge.

Applications of emf measurements-

1) Determination of pH: Using hydrogen electrode, quinhydrone electrode and glass electrode.

2) Potentiometric titrations: Acid-base and redox titration.

UNIT-II

Photochemistry

05 Hours

Photochemical reactions, laws of photochemistry – Beer's law, Lambert's Law, Beer-Lambert's Law, Grothus-Draper Law and Einstein's Law of photochemical equivalence, quantum efficiency or yield, reasons for high and low quantum efficiencies with examples, fluorescence, phosphorescence, photosensitization and chemiluminescence.

Reference books for inorganic chemistry

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|---|------------------------|
| 01. Instrumental methods of chemical analysis | Wilard martin and Dean |
| 02. Instrumental methods of chemical analysis | H. Kour. |
| 03. Quantitative Inorganic analysis | A.I. Vogel |

Books recommended for organic chemistry:

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|---------------------------------|-----------------|
| 01. Organic Spectroscopy | Y. R. Sharma |
| 02. Organic Spectroscopy | P.S. Kalsi |
| 03. Synthetic Organic Chemistry | Gurdeep Chatwal |

Books recommended for physical chemistry:

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|------------------------|-----------------|
| 01. Quantum Chemistry | Lewin |
| 02. Physical Chemistry | Atkins |
| 03. Physical Chemistry | Puri and Sharma |

CHEMISTRY PRACTICALS

SIXTH SEMESTER B.Sc. COURSE

Chemistry Practical

Paper-I

Code : 14BSCCHEP61

Total number of hours per week: 04

Internal Assessment=10 Marks

Total No. of hours per Semester: 52

Practicals: 40 Marks

A. Organic estimation

01. Estimation of phenol.
02. Estimation of aniline.
03. Estimation of acetamide.

04. Determination and saponification value of groundnut/coconut oil.
05. Determination of Iodine value of groundnut/coconut oil.
06. Estimation of glucose by Benedict's reagent.

B. Physical Chemistry Experiments

01. Determination of concentration of given acids mixture ($\text{HCl} + \text{CH}_3\text{COOH}$) conductometrically using standard NaOH .
02. Verification of Beer-Lambert's Law by colorimetric method and calculation of molar extension coefficient of FeCl_3 .
03. Verification of Beer-Lamberts Law by colorimetric method and calculation of molar extension coefficient of copper sulphate.
04. Determination of concentration of strong acid HCl by potentiometric titration against strong solution of NaOH .
05. Potentiometric titration of FeSO_4 against $\text{K}_2\text{Cr}_2\text{O}_7$.
06. Determination of the solubility and solubility product of sparingly soluble salts (Silver halides) by potentiometrically.
07. Determination of heat of neutralization of strong acid by strong base by water equivalent calorimetric method.
08. Determination of dissociation constant of weak acid (acetic acid) Potentiometrically.

Note: For examination:

50% students will perform organic estimation and 50% students will perform Physical.

CHEMISTRY PRACTICALS
SIXTH SEMESTER B.Sc. COURSE
Chemistry Practical
Paper-II
Code : 14BSCCHEP62

Total number of hours per week: 04
Internal Assessment=10 Marks
Total No. of hours per Semester: 52
Practicals: 40 Marks

A. Gravimetric experiments: Internal assessment-10 Marks and Experiment-30 Marks

01. Estimation of barium as Barium sulphate.
02. Estimation of aluminium as aluminium oxide.
03. Estimation of Iron as ferric oxide.
04. Estimation of lead as lead sulphate.

B. Dissertation/Tour report: 10 marks

The Dissertation/Tour report should be submitted at the time of **Chemistry Practical-VIb.**

Student shall be assigned either dissertation or Tour report. The topics for dissertation shall be selected either from the V and VI semester theory syllabi or general topics related to chemistry. For Tour report, student shall visit an Industry or Academic/Research institutions like BARC, IISc etc.

Note: For examination:

Gravimetric experiments and Dissertation/Tour report are Compulsory.

4. ELECTRONICS (OPTIONAL)

B. Sc. SEMESTER – VI

Electronics (Optional) PAPER – I

Total Teaching hours: 50, Teaching hours per week: 4 hours

ELE- 6.1: DIGITAL COMMUNICATION, SATELLITE COMMUNICATION & TELEVISION

UNIT - I : PULSE AND DIGITAL COMMUNICATION:

Introduction – sampling theorem, types- PAM, PWM, PPM, PCM – quantization. Digital communication systems – introduction, Digital modulations (FSK, PSK, and ASK). Advantage and disadvantages of digital transmission, Applications. Characteristics of data transmission circuits – Shannon limit for information capacity, Bandwidth requirements, Data transmission speed, Noise, Cross talk, Echo Suppressors, Distortion and Equalizer.

8Hrs.+2Hrs.Problems =10hrs