# BHARATHIAR UNIVERSITY, COIMBATORE-641 046

## B.Sc. PHARMACEUTICAL CHEMISTRY WITH COMPULSORY DIPLOMA IN TEXTILE CHEMISTRY (CBCS PATTERN)

(For the students admitted during the academic year 2008-2009 and onwards)

### SCHEME OF EXAMINATIONS

<table>
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<tr>
<th>Part</th>
<th>Study Components</th>
<th>Course Title</th>
<th>Ins. hrs / week</th>
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* For subjects without practical
** For subjects with Practical

### ALLIED SUBJECTS

1. Mathematics
2. Physics
3. Botany
4. Zoology
5. Biochemistry

Note: The regulations, the syllabus for Value Education – Human Rights, II and III year will be uploaded shortly.
GENERAL CHEMISTRY PAPER I

Teaching hours: 60 hours per semester (4 hours per week)

Subject Description: This paper presents the basic principles of Chemistry.

Goals: To enable the students to learn about the basic principles of Chemistry.

Objective: To understand the important concepts of Chemistry.

CONTENTS

UNIT I
Ionic bonding - ionic crystals, NaCl and CsCl crystal structure, Lattice energy and its determination using Born-Haber cycle, factors affecting crystal lattice energy, properties of ionic crystals (high melting point, hardness, electrical conductivity in molten condition and in solution) - ion polarization - Fajan’s rule-solubility of ionic compounds in polar solvent.

UNIT II
Structure and shape of molecules: VSPER Theory and geometry of molecules. Hybridization and geometry of sp, sp$^2$, sp$^3$, dsp$^2$, dsp$^3$, d$^2$sp$^3$, sp$^3$d$^2$ and sp$^3$d$^3$. Bonding, shapes and structures of the following molecules: Molecules with Sigma bonds only – BeCl$_2$, SnCl$_2$, BF$_3$, CH$_4$, SiF$_4$, XeF$_4$, PCl$_5$, IF$_5$, SF$_6$, and IF$_7$.

UNIT III
Polar effects – inductive effect, mesomeric effect, electromeric effect, hyper conjugation and steric effects. Classification of reagents: Electrophiles, Nucleophiles and Free radicals. Types of reaction: Polar reactions involving carbonium ions and carbanions with simple examples.

UNIT IV
Aliphatic Hydrocarbons: Restricted rotation about single bond preferred rotational conformations.

Alkenes: Preparation by Witting reaction – Mechanisms of beta elimination – E1, E2 and cis elimination – Hoffmann’s rule and Saytzeff’s rule. Addition reactions with hydrogen, halogen, hydrogen halide (Markownikoff’s rule) and hydrogen bromide (Peroxide effect).

UNIT V
2. Cycloalkanes: Pre[araropn by Dickmann ring closure and by reducation of aromatic hydrocarbons – ring opening reactions of cyclopropane with H$_2$, Br$_2$ and HI.
GENERAL CHEMISTRY PAPER II

Teaching hours: 60 hours per semester (4 hours per week)

Subject description:
This paper presents the concept of resonance and wave mechanical treatment of electrons.

Goals:
To enable the students to learn about the basic concept of resonance and wave theory.

Objectives:
To study the resonance in benzene and quantum theory.

CONTENTS
UNIT I:
Ozone and hydrogen peroxide – preparation, properties, structure, uses comparison between the two.
Selenium and Tellurium – Extraction, properties and Uses. Oxides and oxyacids of Se and Te. A comparative study of Sulphur, Selenium, Tellurium and their compounds (hydrides, oxides, halides)

UNIT II:
Alkynes: Acidity of Alkynes – formation of acetylides-addition of water with HgSO₄ catalyst-hydroboration.

UNIT III:
Liquid crystals–the concept of mesomorphic state-typical liquid crystalline substances and their properties.
Properties of liquids like surface tension and viscosity – Review of structural differences between solids, liquids and gases.
Condensed phases-Coefficients of thermal expansion and compressibility of liquids and solids.

UNIT IV:
Failure of classical theory in explaining black body radiation- planck's theory of quantization of energy – Einstein theory of photoelectric effect-compton effect.
De Broglie theory of wave-particle dualism-Heisenberg’s uncertainty principle.

UNIT V:
An elemantry treatment of Schrodinger wave equation – quantum numbers concept of orbitals-significance of $\psi$ & $\psi^2$ free particles and particle in a box (one and three dimensional)
The covalent bonds-the hydrogen molecule – the vlance bond method hydrogen molecule ion-molecular orbital method-molecular orbitals for homonuclear and heteronuclear diatomic molecules.
Teaching hours: 60 hours per semester (5 hours per week)

Subject description:
This paper presents the concept of coordination chemistry, aromaticity and thermodynamics.

Goals:
To enable the students to learn about aromaticity, thermodynamics and coordination chemistry.

Objectives: To study the principles of thermodynamics and coordination chemistry.

Contents
UNIT I:

UNIT II:
Chemistry of Boron family – Group discussion – Electron acceptor behaviour and electron deficiency of boron hydrides; bonding in diboranes; NaBH₄, LiBH₄ preparation, properties, structure and uses- borozoels, borides.
Classification of silicate- simple silicates chain silicates and sheet silicates only.

UNIT III:
Aromaticity-Huckel’s rule Non-benzenoid aromatic compounds like cyclopentadienyl anion. Toluene and Isopropyl benzene and side chain substitution – polymerization of styrene. Vinyl chloride Relative reactivity of methyl, ethyl and vinyl chlorides. Gringaard reagents and synthetic applications-Nucleophilic substitution reaction – Sₘ1, Sₘ2 and Sₘᵢ reactions – Effect of solvent-nucleophile, structure of substrate and neighbouring group participation, elimination versus substitution-Benzene mechanism and intermediate complex mechanism.

UNIT IV:

UNIT V:
reaction at constant volume – dependence of the heat of reaction on temperature and Kirchoff’s equation.

TEXTBOOKS FOR REFERENCE:


GENERAL CHEMISTRY PRACTICAL I

Organic Analysis and Organic Preparations

I & II Semesters (3 hours per week)

Systematic Analysis of Organic substances:

Detection of Elements (N, S, Halogens)

To distinguish between aliphatic and aromatic

To distinguish between saturated and unsaturated

Functional group tests for phenols, acids (mono and di), aromatic primary amine, amides, diamides, carbohydrates, nitro compounds, aldehydes, ketones.