### SCHEME OF INSTRUCTION AND EXAMINATION FOR B. PHARMACY - II YEAR I SEMESTER

<table>
<thead>
<tr>
<th>COURSE NO.</th>
<th>SUBJECTS</th>
<th>PERIODS/WEEK (50 Mts.)</th>
<th>MARKS</th>
<th>DURATION OF EXAM.</th>
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<tr>
<td>PYT.2.105</td>
<td>Communicative English*</td>
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<tr>
<td>PYP.2.106</td>
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<tr>
<td>PYP.2.107</td>
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Candidates admitted into B.Pharm II year directly from Diploma Stream (lateral entry) should study the papers PYT.1.104 – Mathematics, PYT.1.105 – Basic computer applications & PYP.1.110 – Basic Computer Applications Practicals.

### SCHEME OF INSTRUCTION AND EXAMINATION FOR B. PHARMACY - II YEAR II SEMESTER

<table>
<thead>
<tr>
<th>COURSE NO.</th>
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<td>Ph. Organic Chemistry – II</td>
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<tr>
<td>PYT.2.202</td>
<td>Pharmaceutical Biochemistry</td>
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<tr>
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<tr>
<td>PYT.2.205</td>
<td>Environmental Studies*</td>
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PHARMACEUTICAL ORGANIC CHEMISTRY – I

Subject Code: PYT 2.101  Sessional: 30
Periods / week: 4  Examination: 70
Nature of exam: Theory  Exam Duration: 3 Hrs

Unit – I
Structure and Reactivity of Organic Molecules
Hybrid orbitals, Molecular orbitals and Covalent bond, Bond angles, Heterolysis, Polarity of covalent bond, Polarity of Molecules, Dipole moments, Intermolecular forces, Boiling Point, Melting Point, Solubility,
Electronic effects: Inductive effect, Electromeric or Mesomeric effect and Resonance. Isomerism (structural and spatial).
Reaction Progress - Activation Energy, Energy diagrams of Reactants and Products.

Unit – II
Aliphatic Hydrocarbons
Nomenclature, Physical properties, General Methods of Preparation and Characteristic reactions of Alkanes, Alkenes and Alkynes; Heats of combustion or Heats of Hydrogenation, Homologous series, Free radical reactions of Alkanes (Halogenation), Catalytic reduction and Electrophilic addition reactions of Alkenes and Alkadienes, Markonikov’s Addition, Anti Markonikov’s Addition, Peroxide effect or Kharasch effect, Cis-Trans reduction of alkynes, Acidity of 1-Alkynes. Electrophilic addition reactions of alkynes, stability of conjugated alkadienes and their addition reactions.

Unit – III
Halogen and Hydroxy Compounds
Nomenclature, General Methods of preparation, Relative reactivity of Halides and Hydroxy Compounds, primary, secondary and tertiary classes, Nucleophilic substitution reactions (SN 1 and SN 2 ) - Walden inversion, Elimination reactions (E 1 and E 2 ) - Sayetzeffs rule.
Nucleophilic substitution V s Elimination. Oxidation of alcohols;
Ethers: Nomenclature, Properties and Synthesis (Williamson's synthesis and Ziesel’s Method).

Unit – IV
A) Carbonyl Compounds (Aldehydes and Ketones)

Nomenclature, General Methods of Preparation, relative reactivities of Carbonyl Compounds, Nucleophilic addition reactions, Addition-Elimination reactions - Schiff's bases, oxidative reactions.

B) Carboxylic Acids and Acid Derivatives
(Acid Halides, Anhydrides, Esters and Amides)


Unit – V

Nitrogen Compounds
A) Nitro Compounds
Nomenclature, methods of preparation

B) Amines:
Nomenclature, primary, secondary and tertiary types, Relative Basicity of amines, Reactions of amines, Action of Nitrous acid, alkylation and acylation, Nucleophilicity of amines, Hinsberg's method of separation of amines.

Aryldiazonium salts - Reactions (synthetic applications) of aryldiazonium salts.

Examination: One question from each unit with internal choice.

Text books

2. Organic Chemistry by FERGUSON

Reference Books

2. Organic chemistry by Cram & Hammond.
Unit – I
Materials of Construction: Factors affecting the material selection for Pharmaceutical plants.
Ferrous Metals: Cast iron steels and Stainless steels,
Non-Ferrous Metals: Copper, Aluminum, Lead, Tin, Silver, Nickel, Zinc, Platinum, Chromium and their important alloys.
Nonmetals: Glass, Stoneware, Stone slate, Brick, Concrete, Asbestos, Rubber, Timber, Plastics.
Definition of unit operations, unit processes. Steady and unsteady states, dimensionless equations, dimensional formulas, dimensional analysis, and dimensionless groups.

Unit – II
Fluid Flow: Fluid static's, manometers, types of flow, Bernoulli's theorem, losses in mechanical energy of flowing fluids, measurement of fluids flow rate - orifice, venturi, pitot and rotameter, flow meters.
Heat Transfer: Nature of heat flow,
Conduction: - Fourier's law, thermal conductivity, compound resistance in series, heat flow through a cylinder - mean radius and mean area.
Convection: - Natural and forced convection, temperature gradients in forced convection, surface and over all coefficients. Parallel current and counter current flow.
Radiation: - black body, Stefan Boltzaman law, and gray body. Heaters, heat interchangers, scraped surface exchangers, extended surface equipment.
Steam as heating medium: - properties and uses of steam traps, vacuum pumps, condensers, entrainment separators, foam and its prevention.

Unit – III
Transportation of Materials
Solids: - Classification, principles of construction & uses of different types of conveyers, detailed study of belt, screw and pneumatic conveyers.
Fluids: - Pipes, tubes, joints, fittings, valves, Different types of reciprocating & rotary pumps, air lift pumps, screw pumps, monopumps, peristaltic pumps.
Gases: - Fans, Blowers, types of compressors, ejectors, vacuum pumps, jet pumps.

Unit – IV
Humidification dehumidification and air conditioning: Definition of various terms, wet bulb and adiabatic saturation temperatures, humidity chart, determination of humidity, methods of increasing and decreasing humidity. Air conditioning - applications in pharmacy.
Refrigeration: Definition; compression and absorption; types of refrigeration cycles; coefficient of performance, refrigerants and their choice; Brine systems, load and applications in pharmacy.

Unit – V

**Centrifugation:** Theoretical considerations, large scale centrifuges classification, perforated & non perforated basket centrifuges, disc centrifuge bowls, tubular bowl centrifuges, horizontal centrifuges, continuous centrifuges, vertical solid bowl centrifuge, laboratory equipment.

**Examination:** One question from each unit with internal choice.

**Text Books**

1. *Pharmaceutical Engineering* by Prof. K.Samba Murthy

**Reference Books**

2. Handbook of Chemical Engineering by Perry.
This course shall cover the theoretical basis of analysis with special reference to methods of assay mentioned in Indian Pharmacopoeia.

Unit – I

Unit – II
Physico-chemical concepts required for analysis such as electrolytic dissociation, Modern theory of acids, bases and salts - Bronstead - Lowry theory, Lewis electronic theory; chemical equilibrium, pH and buffer action, solubility product, common ion effect, hydrolysis of salts and amphoteric substances. Principles of Neutralization reactions; Theory of indicators and Neutralization indicators.

Unit – III

Unit – IV
Theory and applications of complexometric titration's, argentometry, iodometry, potassium iodate, potassium bromate, EDTA, non-aqueous tritrations redox titration's, ammonium sulphate, titanous chloride. Principles of gas analysis.

Unit – V
Stoichiometry of Ionic equations and Solutions: The Mole concept, Measuring of Moles of Elements and Compounds; Percentage Composition; Empirical and Molecular Formula; Balancing of Chemical Equations; Some analytical problems and calculations based on mass balance, limiting reagent theoretical yield and percentage yield;

Examination: One question from each unit with internal choice.

Text Books
2. Vogel’s Quantitative Inorganic Analysis by Basset, R.C.Denny & B.H.Jeffery, ELBS, U.K.,

Reference Books
Unit – I

Unit – II
Different biochemical reactions employed in identification of organisms, stains and staining, tolerance, Physiology and reproduction of bacteria, actinomycetes, fungi, yeasts and viruses. Microbial genetics and Variation: Introduction, genetic organization, mutation, mutagens, different types of mutants, physical and chemical mutagenesis repair mechanism and their isolation.

Unit – III
Disinfections: Factors influencing disinfections, dynamics of disinfections, different groups of disinfectants and antiseptics and their evaluation and applications. Sterilization: Premises and Equipment, detailed evaluation and application of different sterilization methods. Sterilization indicators and their importance.

Unit – IV

Unit – V
General principles of infection and communicable diseases. Significant symptoms, General modes of transmission of the following epidemic and endemic diseases.

Examination: One question from each unit with internal choice.

Text Books
1. Text book of Microbiology by Pelezair & Reid
2. Text book of Microbiology – Probisher
COMMUNICATIVE ENGLISH

Subject Code: PYT.2.105            Sessional : 30
Periods/Week: 3              Examination : 70
Nature of Examination: Theory     Exam Duration: 3 Hrs

Unit – I
Role and Importance of Communication; Verbal and Non-Verbal Communication; Group Communication, Effective Communication; Barriers to communication; Communication Mediums; Participating in discussions, Conduct of Seminars, Conferences etc., Making Presentations through collection, evaluation, organizing the information; Interacting with learners and teachers; Role of Wit and Humor in Communication

Unit – II
Spoken English Vs Written English; Formal / Informal English (one way/two way); British/ American/Indian English; How to introduce one self and others; How to tender apology; How to thank in different ways; Greetings; Some Polite Expressions; Agreements and Disagreements; How to use a dictionary; How to use a Thesaurus; Vocabulary Development; Synonyms and antonyms; Single word substitutes; comprehensions;

Unit – III
Communication through Letters; Official and Personal Letters; Letters of complaint; Letters of Enquiries; and Responses; Writing Memos, Circulars and Notices; What to avoid while writing; Writing Paragraph, Document and Scientific/Technical Report; Drafting & Delivering a Speech;

Unit – IV
Grammar in English: Tenses; Voice; Articles; Direct and Indirect speech; Degrees of Comparison; Common errors in English made by Indian Learners of English Concepts of Learning and Listening: Types and Methods of Learning and Listening; Learning and Listening of Knowledge, Attitudes, Skills and Practices.

Unit – V
The following Four Essays from “Selections from Modern English” prose Edited by Haladhar Panda are prescribed.
1. “Our Own Civilization” - C.EM. Joad
2. “ Andrew Carnegie” - E.H Carter

Examination : One question from each unit with internal choice.

Text Books

2. “Communicative English” E. Suresh kumar, Raj Kamal Publications, Hyderabad
3. “Selections of Modern English Prose” Ed. By Haladhar Panda, Published by Universities Press 9India) Pvt. Ltd., Hyderabad
List of Experiments

1. Organic Chemistry laboratory techniques.
2. Experiments in simple qualitative analysis including preparation of derivatives.
3. Nitration: Preparation of Nitrobenzene from Benzene.
5. Oxidation: Preparation of Benzoic acid from toluene or Benzylchloride.
6. Reduction: Preparation of m-Nitroaniline from m-Dinitro Benzene.
7. Esterification: Preparation of n-Butyl acetate from n-Butyl alchol.
10. Hydrolysis (Saponification): Preparation of Benzoic Acid from Methyl Benzoate OR Preparation of Benzoic acid from Benzamide.

Reference Books


PHARMACEUTICAL ANALYSIS – I

Subject code: PYP 2.107        Sessional : 25
Periods / week: 4              Examination : 50
Nature of exam: Practical       Exam Duration: 4 Hrs

List of Experiments

1. Calibration of Weights and Pipette and Burette.
2. Standardization of acid, bases, perchloric acid, potassium permanganate EDTA.
3. Experiments on Acidimetry and Alkalimetry.
4. Experiments on Oxidation and reduction reaction.
5. Experiments on Iodimetry and Iodometry.
6. Experiments based on complelxometric titration.
7. Non-aqeous titration using perchloric Acid.
8. Experiments based on gravimetry, silver salt method.

Reference Books

3. Indian Pharmacopoeia, Controller of Publications, Delhi, 1996.
List of Experiments

1. Basic equipments used in Microbiology Laboratory
2. Sterilization by dry heat and moist heat technique
3. Preparation of various media.
4. Aseptic transfer technique
5. Staining techniques
6. Study of bacterial motility by hanging drop technique
7. Biochemical reactions for identification of bacteria
8. Isolation of pure cultures
9. Enumeration & isolation of bacteria from air.
10. Bacteriology of milk and water
11. Preservation of cultures

Reference Books


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Unit – I
Aromatic Hydrocarbons (Benzene and Derivatives)

Unit – II
Stereo Chemistry
Stereoisomerism, conformational isomerism, Cis-trans (E & Z) isomerism, sequence rules for E & Z configurations. Enantiomerism and optical activity:
Plane of symmetry, asymmetry or chirality, plane polarized light, Relative (D & L) configurations, Absolute (R & S) configurations, sequence rules, Diastereomers, Meso structures, racemic modifications, concept of stereospecificity.

Unit – III
Heterocyclic Compounds Containing One Hetero Atom
Introduction, classification and nomenclature of Heterocyclic compounds, Ring structure, methods of preparation and characteristic reactions of pyrrole, furan, thiophene, Pyridine, Indole, Quinoline, Isoquinoline and Acridine. Structure and specific uses of two medicinally important compounds representing each of the heterocyclic systems.

Unit – IV
Heterocyclic Compounds Containing Two Hetero Atoms
Structure and preparation of Pyrazole, Imidazole, Benzimidazole, Oxazole, Isoxazole, thiazole, diazine, pyrimidin, pyrazine and phenothiazine.
Nomenclature and Ring Structure and specific uses of two medicinally important compounds representing each of the above heterocyclic systems; Benzofuran, Benzopyran, dioxane, cinnoline, phenazine, oxazine, triazine, triazole, tetrazole, phenam and cephem.

Unit – V
Synthetic Reagents and Reactions
Specific synthetic Applications (at least two) of the following reagents:
Lithium Aluminium Hydride (LAH), Lead Tetra Acetate (LTA), N-Bromosuccinimide (NBS), Selenium oxide, sodium periodate, perchloric acid,
Mechanism of the following reactions: Fries migration, Beckmann Re-arrangement, Birch reduction, Hoffman's hypobromite reaction, oppenneur oxidation. MPV reduction, ArndtEistert synthesis.

Examination: One question from each unit with internal choice.
Text Books


Reference Books

2. Pharmaceutical Chemistry, by T.M.Atherden, Bentley and Drivers, Oxford Univ. Press, U.K.,
PHARMACEUTICAL BIOCHEMISTRY

Subject code : PYT 2.202            Sessionsal        : 30
Periods / week : 4              Examination    : 70
Nature of exam: Theory            Exam Duration: 3 Hrs

Unit – I
Biochemical organization of the cell and transport processes across cell membrane.
The concept of free energy, determination of free energy change from equilibrium constant and reduction potential, energy rich compounds, production of ATP and its biological significance.

Unit – II
Enzymes - Nomenclature & classification, Kinetics, mechanism of action and inhibition, clinical applications of enzymes, isozymes and coenzymes.
Carbohydrate metabolism: - Glycolysis, gluconeogenesis, glycogenolysis, glycogen synthesis, metabolism of galactose, role of sugar nucleotides in biosynthesis; pentose phosphate pathway.
TCA cycle, its significance, Anapleuritic reactions, Effects of inhibitor and regulation of TCA cycle, Glyoxalate cycle.

Unit - III
Lipid metabolism - fate of dietary lipids; beta oxidation, oxidation of unsaturated fatty acids; synthesis of ketone bodies, biosynthesis, of saturated and unsaturated fatty acids, cholesterol metabolism, phospholipids and sphingolipids.

Unit – IV
Integration of carbohydrate, lipid and protein metabolism. Biosynthesis of RNA and DNA, Physical and chemical mutagenesis, DNA repair mechanism, recombinant DNA, mechanism of protein synthesis and its regulation, inborn errors in metabolism.

Unit – V
Principles involved and methods used in qualitative & quantitative analysis of blood for -SGPT, SGOT, Bilirubin, glucose, urea, cratinine, albumin, albumin:globulin ratio and their clinical significance. Principles involved and methods used in qualitative and quantitative analysis of urine for - glucose, ketone bodies, bile salts, bile pigments and albumin. Product inhibition, feed back inhibition, role of cyclic AMP in enzyme activation, repression and induction and control of enzyme synthesis by regulation of transcription.

Examination : One question from each unit with internal choice.

Text Books


Reference Books

Unit – I
Size reduction – Objectives, properties of solids, Classification of equipment. Important intermediate crushers & fine grinders, Cutting rolls, disk crushers, edge and end Runner mills, disintegrators, hammer mills, ball mills and their different modifications, colloid mill, impact mills, pin mills, fluid energy mills, particle size classifiers used with grinding mills.
Fluid classification methods – Cyclone separators, air separators, bag filters, scrubbers, air filters, size separation by settling, double cone classifier. Laws of settling, sedimentation, Elutriation.
Liquid extraction – Principles, Small and large scale equipment, pod biel niak extractor. Expression equipment for small and large scale operation.

Unit – II
Distillation and condensation – Different mass transfer operations, theory applied to binary mixtures; Distillation methods – Equilibrium and differential distillations, azeotropic distillation, rectification, sieve plate and packed columns, HEPT. Steam distillation – theory, equipment and applications, Molecular distillation – theory, equipment and applications. Automatic water stills, steam jacketed kettle, distillation under reduced pressure.

Unit – III
Gas absorption – Importance in pharmacy. Properties and type of tower packing. Tower construction and other commercial absorbers and their operations, two phase flow through packed tower. Pressure and Mass Transfer Coefficients; Desorption.
Unit - IV
Mixing – Definition and objectives; Types of mixers; Solid – solid mixing: Selection of mixer; Mixing of viscous masses; Kneading and burry mixtures; Ointment mills, triple roller mill.
Liquid – liquid and gas liquid mixing equipment: Different types of mixing impellers, their characteristics, operation and application.
Absorption and Ion exchange – Ion exchange operations, Ion exchange principles different types of Ion exchangers behaviors of ion exchange resins, applications.

Unit – V
Compaction – Scope, measurement of Punch forces, transmission of force through powders, distribution of forces in powder mass, effect of pressure on relative volume, lubrication of diewall, adhesion and cohesion of particles, factors effecting strength of granules and strength of tablets.
Automatic process control systems – Process variables (temperature, pressure flow, level and vacuum) and their measurement; Elements of automatic process control and introduction automatic process control systems.
Examination : One question from each unit with internal choice.

Text Books

1. Pharmaceutical Engineering by Prof.K.Samba murthy  

Reference books

1. Unit operations to chemical engineering by W.I.Macebe and J.C.Smith, Macrohill Int. book Co, London  
PHARMACOGNOSY - I

Subject code : PYT 2.204            Sessionsal        : 30
Periods / week : 4              Examination    : 70
Nature of exam: Theory             Exam Duration: 3 Hrs

Unit – I
Introduction to pharmacognosy, methods of classification of crude drugs. Systematic
description and storage of crude drugs. Plant hormones and their applications
Cultivation - Advantages and disadvantages of obtaining drugs from cultivated and wild Plants.
Variability of drug constituents due to exogenous and endogenous factors like altitude, light,
temperature, rainfall, propagation by seeds, vegetative means, selection, mutation, hybridization
and polyploidy.
Collection of Medicinal Plants - effect of season, time of collection and age of the plant on the
quality of active principles. Treatment subsequent to collection - desirable and undesirable
changes after collection / drying.

Unit – II
Plant Biosynthesis - Techniques employed in Biosynthetic pathways, precursor - product
sequence, competitive feeding, sequential analysis. Study of basic metabolic pathways,
Carbohydrate synthesis, Shikimic acid pathway, Isoprenoid biosynthesis.

Unit – III
Hazards - like infestation with spores of micro organisms eggs and steps to prevent the same.
Drugs deterioration by non living factors like moisture etc., and steps to prevent deterioration.
Adulterations of crude drugs and their detection. Quality control of crude drugs and
Phytochemicals. Study of the following methods for evaluation, identity, purity, quality by
organoleptic, microscopic, physical, chemical and biological characters; Moisture content
determination, determination of foreign organic matters and analysis of volatile oils, quantitative
microscopic exercises including lycopodium spore method, leaf constant, crude fibre content.

Unit – IV
Systematic Pharmacognostic study of following drugs
Carbohydrates - Agar, Tragacanth, acacia, starch, isabgol linseed, regenerated carbohydrate
fibres, cellulose, alginates and tamarind; Fixed Oils, Fats and Waxes - Chaulmoogroil, neem oil,
castor oil, olive oil, bees wax, spermaceti, carnaubawa, theorbroma oil, and lard.
Tannins - Myrobalan, Black catechu, Pale catechu, gal amla and arjuna.

Unit – V
Systemic Pharmacognostic study of the following Fibers: Cotton, Jute, Hemp, Rayon, Wool,
silk and Nylon.
Drugs from mineral and animal origin - Kaolin, talc Bentonite, Cod liver oil, Shark liver oil,
cantherides, Musk, Honey, and cochineal.
Proteins & Enzyme - Papain, Pepsi Gelatin, Pancreatint
Examination : One question from each unit with internal choice.

Text Books

1. Pharmacognosy by Trease G.T and Evans w.e 12 ed, Baillers Tindall Easboume, UK.
ENVIRONMENTAL STUDIES

Subject code : PYT 2.205             Sessionsal        : 30
Periods / week : 4              Examination    : 70
Nature of exam: Theory               Exam Duration: 3 Hrs

Unit – I
The Multidisciplinary Nature of Environmental Studies
Definition, Scope and Importance; Indicators for Sustainable Development;
Natural Resources: Forest, Land, Mineral, Food, Water and Energy Resources; Uses, Benefits,
Safety, Security and over-exploitation; Role of an individual in conservation of natural resources.
Sustainability Theory and Practice; Equitable use of resources for sustainable lifestyles;
Ecosystem: Concepts, Types, Characteristic Features, Structure and Functions

Unit – II
Biodiversity and Its Conservation
Introduction, Definition, Types and Levels of Biodiversity; Genetic, Species and Ecosystem
diversity; Species Richness; Indigenous Knowledge, Magnitude and Distribution of Biodiversity;
Medicinal and Economic Value of biodiversity; Consumptive and Productive use; Biodiversity at
Global, National and Local levels.
Biogeographical Classification of India - India as a mega-diversity nation and Hot spots; Threats
to biodiversity; Endangered and endemic species of India;
Conservation of biodiversity: In-situ conservation of biodiversity.
Relevance of Biotechnology and Nanotechnology in Sustainable Development, Production and
Environment Protection

Unit – III
Environmental Pollution and Its Problems
Local and Global Issues - Definition, causes, effects and control measures of:
a) Air pollution, b) Water pollution, c) Soil pollution, d) Marine pollution, e) Noise pollution, f)
Thermal pollution and g) Nuclear hazards
Role of an individual in pollution prevention and case studies of pollution.
Solid and Hazardous Waste Management: Causes, effects and control measures of urban and
industrial wastes; Development of Value added products from Solid Wastes;
Waste Minimization in Manufacturing Industry: Alternative Methods and Routes for Process
Development; Reduce, Recycle and Reuse; Cost Benefit analysis of a Process or Method and
Importance of Mass Balance; Case studies with reference to Pharma Industry;
Green House Gas Effects: Climate change, global warming, acid rain and forest, ozone layer and
ground water depletion.
Environmental Problems in India: Drinking Water, Sanitation and Public Health;

Unit – IV

Social Issues and the Environment
Social Problems related to poverty, energy, water, shelter, infrastructure, food, health, sanitation,
hygiene, landscape, livelihood, information, environment and value education. Effects of Human
Activities on the quality of Environment: Urbanization; Communication, Transportation,
Industrialization and Green revolution;
Water conservation, Rain Water harvesting, Watershed Management;
Resettlement and Rehabilitation of People, its problems and concerns. Case Studies.
Environmental ethics; Civic Sense, Issues and Possible Solutions.
Disaster management plan: Natural and Man Made disasters, floods, earthquake, cyclone, tsunami, landslides, nuclear accidents, fire and bioterrorism;
Case studies related to social issues: Wasteland reclamation. Consumerism and waste products.

Unit – V
Institutional Setup and Legislation
Government Regulatory Bodies in Monitoring and Enforcement of Environmental Regulations;
Right to Information Act, Wildlife Protection Act and Forest Conservation Act,
Environment Impact Assesment (EIA) Studies: Definition, Classification, Direct, Indirect and Cumulative Assessment of Impacts; Reversible, Irreversible, Negative and Positive Impacts;
Eco Audit and Eco Labelling (ISO: 14000); Environmental Management Plan (EMP); Design for Environment; Relavance of Command Control Paradigm in Environmental Governance; Issues involved in enforcement of environmental legislation. Public awareness.
Case Studies.

Note: Atleast one field visit is must for studying of Environment in a Local Area / Ecosystem / Industry and also an Assignment on Environment.

Examination: One question from each unit with internal choice.

Text Books

Reference Books
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email: mapin@icenet.net ( R )
7. Down to Earth, Centre for Science and Environment ( R )
9. Hawkins R.E, Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay ( R )
18. Survey of the Environment, The Hindu (M)

(M) Magazine, (R) Reference, (TB) Textbook
List of experiments

1. Synthesis of 2,5 – Dimethyl pyrrole from Acetonyl acetone
2. Synthesis of 2,5 – Dimethyl thiophene from Acetonyl acetone
3. Synthesis of 1,2,3,4-tetra hydrocarbazole from Cyclohezahone.
4. Synthesis of 4,5 – Dephenylimidazole from Benzil
5. Synthesis of 3,5 - Dimethylpyrazole from Acetonylaceton
6. Synthesis of 3,4-ethyl-l-phenyl-5-pyrazole from ethylacetoacetate
7. Synthesis of 3,5-Dimethyl isoxazole from Hydroxylamine
8. Synthesis of Benzimidazole from o – Phenylene diamine
9. Synthesis of Benzothiazole from o-Phenylene diamine
10. Synthesis of 2,3-Diphenyl Quinoline from o-Phenylene diamine and Benzil
11. Synthesis of Phenothiazon from Diphenylurea

Reference Books

PHARMACEUTICAL, BIOCHEMISTRY PRACTICALS

Subject code : PYP.2.207            Sessional         : 25
Period / week : 4              Examination    : 50
Nature of exam: Practical       Exam Duration: 4 Hrs

List of Experiments

1. Qualitative reactions for carbohydrates, proteins and amino acids.
2. Estimation of blood cholesterol, Glucose, Urea, Creatinine.
3. Liver function test.
4. Qualitative determination of normal and abnormal constituents of urine
5. Quantitative Estimation of Glucose and uric acid in urine.

Reference Books

PHARMACEUTICAL ENGINEERING – II PRACTICALS

Subject code : PYP.2.208            Sessional : 25
Period / week : 4               Examination : 50
Nature of exam: Practical    Exam Duration: 4 Hrs

List of Experiments

4. Determination of Reynolds number
5. Determination of heat transfer coefficient by mechanisms.
6. Determination of humidity of air by psychrometry & dew point method
7. Verification of Stokes Law
8. Efficiency of size reduction using different size reducing equipment.
9. Determination particle size distribution by sieve analysis
10. Rate of Drying of solids
11. Purification by simple distillation.
12. Drawing of symbols for unit operations
13. Drawing of equipment used in unit operations (for scale up/scale down)
Flow sheet Industries for manufacturing procedures of drugs.

Reference Books