SCHEME OF EXAMINATIONS

AND

SYLLABUS

M.Sc. (Previous) Pharmaceutical Chemistry

Effective from the Academic Session 2016-2017

Master of Science (M.Sc.)

Pharmaceutical Chemistry

Faculty of Science

UNIVERSITY OF KOTA

MBS Marg, KOTA (Rajasthan)-324 005

INDIA

M.Sc. Pharmaceutical Chemistry

Scheme of Examinations

M.Sc. (Previous) Pharmaceutical Chemistry

Paper Scheme

Paper-I	**Biostatistics and Computer**
Paper-II	**Quantitative Analytical Method**
Paper-III	**Stereochemistry and Reaction Mechanism**
Paper-IV	**Chemistry of Natural Products**
Paper-V	**Basic Pharmacology**
Paper-VI	**Biochemistry**
Paper-VII	**Practical**

M.Sc. (Final) Pharmaceutical Chemistry

Paper Scheme

Paper-I	**Modern Analytical Chemistry**
Paper-II	**Drug delivery System & Biopharmaceutics**
Paper-III	**Chemotherapeutic Agents**
Paper-IV	**Pharmacodynamic Agents**
Paper-V	**Drug Design**
Paper-VI	**Practical**
Paper-VII	**Project**

M.Sc. Pharmaceutical Chemistry

Syllabus

M.Sc. (Previous) Pharmaceutical Chemistry

Paper Scheme

Paper-I	**Biostatistics and Computer**
Paper-II	**Quantitative Analytical Method**
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Paper-V	**Basic Pharmacology**
Paper-VI	**Biochemistry**
Paper-VII	**Practical**

Paper-I (PC-401):
Biostatistics and Computer

Duration of Exam.: 3 Hrs. ***Max. Marks 100***

Unit I

Introduction and scope of biostatistics: presentation of data, classification of data, methods of collection of data, frequency distribution, graphical representation of data by histogram, frequency polygan, frequency curve and cumulative frequency curve. Central tendency and measures of depression, mean, median mode and their properties, partition value, standard deviation and coefficient of variation, simple correlation coefficient, regression coefficient, repression lines, test of significance : t test, z test, chi square test, f test, heterogenecity and independents of attributes.

Unit II: Testing of Hypothesis

Types of errors, power of test, test of significance based on normal distribution t test for mean population, difference of means of two normal populations, chi square test of goodness of fit, independent test of variance of normal population f test for variance ration, correlation, regression, latent square methods and its application, significance of coefficient of correlation rank, curve fitting and sign test .

Unit III: Basics of Computer

Simple model of computer and its working, important devices, computer language and their low and high level, introduction of microcomputers , concept of operating system, computer networking, concept of osi layers, introductions of software.

Unit IV: Introduction of C++ Programming
Difference between C^{++} and C, concepts of loops, basic data type and operators, sample program, conditional statements, concept of looping, introduction of arrays, class and object function and function overloading, constructor and destructor, file handling .

Unit V
Internet and its working , uniform resource locator, worldwide web, http, internet explorer, PDB, NRL30, BLAST AND FASTA, special software to align sequences, general DNA sequence database, protein structure database, genome project database, human mapping database .

Paper-II (PC-402): Quantitative Analytical Methods

Duration of Exam.: 3 Hrs. ***Max. Marks 100***

Unit I
Computations of analytical results / significant results, concept of errors, precision and accuracy, standard deviation, rejection of doubtful values with special reference to volumetric and gravimetric analysis, calibration of analytical equipments.

Unit II
Fundamental of volumetric analysis: Methods of expressing concentration, primary and secondary standards
Neutralization reactions: theory of indicators and neutralizations indicators

Unit III
Oxidation reduction titrations: Principal of oxidation reduction titration , redox indicators and their use in pharmaceutical analysis.
Precipitation titration: theory of precipitation titration and use of adsorption indicators.

Unit IV
Gravimetric analysis: Methods of gravimetric analysis
Complexmetric titration: Complexometric methods using EDTA, principal, chelating agents, indicator, titration with disodium edentate.

Unit V
Non aqueous titration: General discussion and principal of titration in nonaqueous media, aprotic, protophilic, protogenic, amphiprotic solvents, titration with perchloric acid, potassium methoxide, tetrabutyl ammonium hydroxide.

Paper-III (PC-403):
Stereochemistry and Reaction Mechanism

Duration of Exam.: 3 Hrs. ***Max. Marks 100***

Unit I
Optical isomerism, configurations, Cohn Engold Prelog rule for the designation of configuration, stereochemistry of carbon compounds with no chiral atom, biphenyls, allenes, alkylidenes, cycloalkanes and spirans, geometrical isomerism and stereochemistry of oliefins, Stereochemistry of tricovalent carbon.

Unit II
Stereoisomerism of rings, stability, ease of formation. Actual shape of six membered rings and relation to properties and reactivities, shape of rings other than the six member, fused and briged rings, stereoselective synthesis.

Unit III
Carbocation, carbanion, free radicals, formation and stability, mechanism of reaction and methods of determining them. mechanism involving aliphatic nucleophilic reactions, aliphatic electrophilic reactions.

Unit IV
Mechanism involving aromatic electrophilic reactions and aromatic nucleophilic rx , free radical rx, addition to carbon carbon multiple bonds and elimination reactions.

Unit V
Study of name reaction: Fries rearrangement, Beckman rearrangement, Hoffman rearrangement and Hoffman degradation, Curtious reaction, Schimdt reaction, Claisens condensation, Wittig reaction, Openhaur oxidation, Meerwin-Pondrof-Verli reduction, Birch reduction, Clemmensons reduction, Riemer-Tieman reaction, Wolf-Kishner reduction, Michael condensation, pinacol-pinnacolone rearrangement, aldol condensation, Cannizaro's reaction.

Paper-IV (PC-404):
Chemistry of Natural Products

Duration of Exam.: 3 Hrs. ***Max. Marks 100***

Unit-I
Heterocyclic compounds: five membered heterocycles: furan, thiphene, pyrole, thiazole, pyrazole, exazole, imidazole, six membered heterocycles : pyridine, pyrimidine, pyrazine.
Benzene heterocycles: quinoline, isoquinoline, indole, purine, caffeine, theophylline and the obromine

Unit II
Carbohydrates: Introduction, stereoisomerism, mutarotation, ring structure of glucose, configuration of monosaccharides, structure elucidation of disaccharides, sucrose, maltose, lactose, polysaccharides, starch glycosides, general structure elucidation.

Unit III
Alkaloids : General introduction, distribution in plants, isolation and purification. methods of structure determination, structure elucidation of atropine, quinine, cinchonine, structural feature of morphine.

Unit IV
Terpanoids: General introduction, isolation, structure elucidation of chiral, menthol, camphor.

Unit V
Steroids: General introduction and structural elucidation of sterols with special reference to cholesterol and ergosterol and cardiac glycosides.

Paper-V (PC-405):
Basic Pharmacology

Duration of Exam.: 3 Hrs. ***Max. Marks 100***

Unit I
History and development of pharmacology, introduction & general principle of route of drug administration, pharmacokinetics (absorption, distribution, metabolism, excretion), pharmacodynamics (mechanism of drug action) elementary introduction of adverse drug reaction, drug interaction and drug allergy.

Unit II
Toxicity: General concepts of toxicity, acute sub acute, chronic, toxicity tests, teratogenecity & carcinogenicity, tatrogenic, disease LD50, tolerance, habituation & addiction.
Poisoning: general principle and management of poisoning, symptoms& managements of heavy metals (mercury, copper, lead, iron) and drug (barbiturates, salicylates, morphine and morphine derivatives, alcohol and benzodiazepines) poisoning.

Unit III
Bioassays: General principle, general methods, biological variations and animal ethics,. Bioassay of insulin, heparin, detabocurarin, digitalis, acetylcholine adrenalin, histamine

Unit IV
General principle of screening of drugs, general screening methods, clinical trial, screening methods for evaluation of anti-inflammatory, analgesics,. Antipyretics and antiulcer, anticonvulsants, hepatoprotrective, antidiabetic, diuretic and drug acting on cns.

Unit V
Drug Allergy: Drug targeting, binding forces, patient compliance, pharmacogenetics and pharmacoe-pidimelogy.

Paper-VI (PC-406):
Biochemistry

Duration of Exam.: 3 Hrs. ***Max. Marks 100***

Unit I
Enzyme, enzyme kinetics, enzyme action, biological oxidation and reduction.

Unit II
Energy metabolism, bioenergetics, introduction of intermediary metabolism, carbohydrate metabolism

Unit III
Protein, nucleic acid metabolism, lipid metabolism, water and mineral metabolism.

Unit IV
Biosynthesis of protein , transmission and expression of genetic information, DNA genetic role, structure replication of mRNA and transcription, gene protein relationship and control of gene.

Unit V
Immunoglobulins: structural classification and their biological roles vitamins: skeleton structure and their biological role.

Paper-VII (PC-407):
Practical

1. Operating systems and its features
2. MS office, editing in word , database and excel , slide in ppt
3. Programming in c and C^{++} , factorial swapping , reverse no. printing , Fibonacci series, generation of series matrix , function overloading classes
4. Related to internet www , working of account , mail checking , search engine
5. Preparation of various indicators
6. Various filtration techniques
7. Preparation of various titration methods
8. Preparation of various titration reagents
9. Spectrophotometric analysis of amino acids , proteins , carbohydrates , cholesterol , ascorbic acid , aspirin and caffeine
10. Quantitative test for mono , di and polysaccharides
11. Quantitative determination of atropine , quinine , nicotine and morphine .
12. Extraction and purification of various extracts
13. Elucidation techniques
14. Basic pharmacy (LD50, ED50 ,chronic toxicity test of drugs)
15. Pisioning test of heavy metals
16. Screening methods of drugs .
17. Purification of enzymes
18. SDS page
19. enzyme immobilization
20. vitamin assay
21. chromatography of immunoglobulins

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