



Application No.

**INFORMATION BULLETIN**

**ADMISSION-CUM-SCHOLARSHIP ENTRANCE EXAMINATION**  
**(For Professional Courses)**  
[UNDER THE AEGIS OF GAYATRI COLLEGE OF BIOMEDICAL SCIENCE DEHRADUN]

**(ASEE-2010)**



**EXAMINATION UNIT (ASEE-2010)**  
**GAYATRI COLLEGE OF BIOMEDICAL SCIENCE**  
**GMS ROAD, BALLUPUR CHOWK,**  
**DEHRADUN-248001, UK, INDIA**  
**PHONE: 0135-3291585, MOBILE NO. - 09319066226/ 09368775650/ 09936339410**

Price: Rs. 500/ for General Category  
Rs. 400/ for SC/ ST/ OBC Category

## ┆ HOW TO OBTAIN THE APPLICATION FORM

### (i) BY HAND:

Candidates applying for 'ASEE-2010' may obtain the information bulletin & application form (inclusive of fee payable i.e. Rs. 500/ General Candidate, Rs. 400/ for OBC/SC/ST candidates) from the following center:

**GAYATRI COLLEGE OF BIOMEDICAL SCIENCE**  
**GMS ROAD, BALLUPUR CHOWK,**  
**DEHRADUN-248001, UK, INDIA**  
**PHONE: 0135-3291585, MOB- 09319066226/ 09368775650/ 09936339410**

After filling the form carefully, the candidate should send it to GCBMS office on or before Feb, 27, 2010 through registered/ speed post.

### (ii) BY POST:

Candidates may also obtain the information bulletin & application form by sending a DD (inclusive of fee payable i.e. Rs. 550/ For General, Rs. 450/ for OBC/SC/ST candidates) of any nationalized bank in favor of "Director, Gayatri College of Biomedical Science, Dehradun" payable at Dehradun on or before Feb, 10, 2010. The information bulletin, prospectus and application form would be send to candidate by speed post from GCBMS office on Feb, 11, 2010. The application form should be filled carefully by the candidate and should send it to GCBMS office on or before Feb, 27, 2010 through registered/ speed post.

### (iii) DOWNLOAD FROM WEBSITE:

Candidates may download the information bulletin & application form free of cost from our website <http://www.gcbms.co.in>. After filling the form carefully, the candidate should send it along with a DD of Rs. 500/ For General candidates and Rs. 400/ for OBC/SC/ST candidates, as examination fee (in case of downloaded form from website only) on or before Feb, 27, 2010:

┆ **NOTE: THE LAST DATE FOR FORM SUBMISSION IS FEB, 27, 2010. THE FORM REACHED AFTER THIS DATE WOULD NOT BE ENTERTAINED.**

## ┆ IMPORTANT DATES:

- ┆ Date of announcement = 05/01/2010, Friday.
- ┆ Last Date of Form submission=27/02/2010, Saturday.
- ┆ Date of Written Examination (ASEE-2010) = 18/04/2010, Sunday.
- ┆ Result Declaration = 26/04/2010, Monday.
- ┆ Counseling/ Registration starts from = 03/05/2010, Monday



## **ABOUT GCBMS**

The college is affiliated to HNB Garhwal University Srinagar, Garhwal (recognized by UGC, Govt. of India). HNB Garhwal University is a well-known UGC ranked Govt. University. The College is also approved and recognized by Department. Of Higher Education and Department of Medical Education and Health, Ministry of Health Govt. of Uttarakhand. It is being run under the aegis of Gayatri Vidyapeeth Society, which is a registered society with the Government of Uttarakhand, Dehradun. Our mission is to provide professional medical education, comprehensive medical health care, services and promotion of research activities. Establishment of Gayatri College of Biomedical Science is a step in this direction. We have established all Infrastructures, Labs, (Pharmaceutical Chemistry, Microbiology, Biochemistry and Biotechnology) fully equipped and functional Lecture theatres, audiovisual room and Library with adequate books and journals at, G.M.S Road, Dehradun. The college is managed by the governing body, which consists of professionals having more than 30 years experience in medical Education & experts in the field of Biotechnology and Microbiology. Gayatri College of Biomedical Science is located in the heart of the city on the main G.M.S. Road, approximately 3 km from the bus terminal and railway station. It is convenient to reach from all parts of the city with efficient city transports viz, auto rickshaws and local buses.

## **FACILITIES**

- A) Library
- B) Well equipped Laboratories
- C) Well furnished Class-rooms
- D) Separate Hostels For Girls & Boys
- E) OHP & LCD Projectors
- F) Transport (College Bus)
- G) Computer lab
- H) Internet Facility
- I) Medical Facility
- J) Railway Concession
- K) Diagnostic Lab & OPD
- L) Affiliation with Hospitals
- M) Specialized Industrial Training & Research

## **GCBMS STAFF**

- Dr Sachin Chauhan, M.Sc., Ph.D., (Director/ Principal)
- Dr. Harish Chandra, M.Sc., Ph.D., CSIR-NET(JRF), GATE (Asst. Prof. & Head, Microbiology)
- Mr. Atul Kumar Singh, M.Sc., Ph.D. (pursuing), CSIR-NET(JRF), GATE (Asst. Prof. & Head, Biotechnology)
- Mr. Rajat Singh B. Pharma., M.Tech., MBA (Lecturer & HOD, Pharma. Chem.)
- Dr. Nishant Rai, M.Sc. Ph.D., (Asst. Prof., Microbiology)
- Dr. Savita Goyal, M.Sc., Ph.D. (Asst. Prof., Pharma Chemistry)
- Mr. R. Prasad M.Sc., CSIR-NET(LS), (Lecturer, Microbiology)
- Dr. Kanchan Chatterji M.Sc., Ph.D. (Lecturer, Biotech)
- Ms. Chhaya Singh, M.Sc., Ph.D. (pursuing) (Lecturer, Biotech)
- Mr. Pankaj Dhiman, M.Sc., Ph.D. (pursuing), (Lecturer, Microbiology)
- Ms. Punam Joshi, M.Sc.-Pharma, (Lecturer, Pharma. Chem.)
- Mr. Sanjay Goyal, M.Sc. (Lecturer, Biotech)
- Mr. Amit Kumar Tripathi, M.Sc., (Lecturer, Biotech)
- Ms. Monika Tiwari, M.Sc., (Lecturer, Biotech)
- Mrs. Dolly Dabral, M.Sc. (Administrator)
- Mr. Anup Rawat, M.Sc. (Examination Controller)
- Mr. Anu Sartaj, M.Com. (Accountant)
- Mr. Dinesh Mamgain, M.Lib. (Librarian)



## COURSES/ PROGRAMS OFFERED

Courses of study	Fees	Scholarship Available	Duration
M.Sc. Biotechnology	Rs. 35,000/ Per Sem	Rs. 50,000/ Per Year	2 Years
M.Sc. Pharmaceutical Chemistry	Rs. 35,000/ Per Sem	Rs. 50,000/ Per Year	2 Years
M.Sc. Microbiology	Rs. 35,000/ Per Sem	Rs. 50,000/ Per Year	2 Years
B.Sc. Biotechnology (with CBZ)	Rs. 30,000/ Per Year	Rs. 24,000/ Per Year	3 Years
*M.Sc. Chemistry	Rs. 30,000/ Per Year	Rs. 24,000/ Per Year	2 Years

\*(Under Approval)

## ELIGIBILITY CRITERIA

Courses of study	Eligibility Criteria
M.Sc. Biotechnology	B.Sc. Biotech/CBZ or equivalent with $\geq 55\%$ marks
M.Sc. Pharmaceutical Chemistry	B.Sc. CBZ/ PCM or equivalent with $\geq 50\%$ marks
M.Sc. Microbiology	B.Sc. Microbiology/CBZ or equivalent with $\geq 50\%$ marks
B.Sc. Biotechnology (with CBZ)	10+2 with PCB with $\geq 45\%$ marks in aggregate
*M.Sc. Chemistry	B.Sc. CBZ/ PCM or equivalent with $\geq 50\%$ marks

\*(Under Approval)

## ABOUT ASEE-2010

The Scholarships are available for all courses. For Post Graduate courses the value of scholarship is Rs. 1 lakh each (Rs. 48,000/ each in case of M.Sc. Chemistry) and for UG course, Rs. 72,000/ each. Students applying for management seats are not eligible for scholarship. Selection will be through a written test. Candidates, meeting the eligibility criteria, will be called for the written test held on 18th, April, 2010. Such successful candidates according to course and seats will be informed by post. If candidates secure same marks in the ASEE-2010, the selection will be based on their academic record. Written examination will be held in following cities namely **Dehradun, Kanpur, Kolkata, and HarDOI (UP), Kesariya (Poorvi Champaran, Bihar)**. Each candidate must indicate his/her preference for the centre in the application. No TA/DA will be paid to the candidates to attend the exam under any circumstances. The candidates appearing in the qualifying exam may also apply. The scholarship will be provided to the successful and eligible candidate after taking admission in the GCBMS Dehradun.

## HOW TO APPLY

- Application must be sent in the format for "**Application Format ASEE-2010**" which can be downloaded ([Click here to Download Form](#)) from our website <http://www.gcbms.co.in> or may be obtained from "Gayatri College of Biomedical science GMS Road, Ballupur Chowk, Dehradun-248001, UK, India."
- Fill the application form very carefully. No column should be left blank. Write NA/NIL if no details are available. Do not attach copies of the certificates along with the application.
- Two photographs duly signed by the applicant must be affixed on the space provided in the application format. Unsigned applications will be rejected (photograph as well as declaration).
- Candidates should send application by speed post/ registered post.
- If the application form is bought from the GCBMS office, no Demand Draft as exam fee is needed.
- The application form along with a Demand Draft of Rs.500/ (for general candidates) or Rs.400/ (for SC/ ST/ OBC candidates) as entrance examination fee in favor of "**Director, Gayatri College of Biomedical Science**" payable at Dehradun should reach to the following address **on or before 27/02/2010** through registered post/ speed post.



# **SYLLABI FOR WRITTEN EXAMINATION (ASEE-2010)**

## **1. SYLLABUS FOR M.SC. MICROBIOLOGY [MMB]**

### **1. Diversity of Living World (5 Questions)**

Taxonomic aids, keys, specimen management; Systematics & binomial system of nomenclature; Classification of living organisms (5 kingdom system, major groups and principles of classification within each group); General description & Salient features of Monerans, Protists, Fungi, Plants and Animals (with major groups).

### **2. Biochemistry (8 Questions)**

Entropy, Enthalpy; Gibb's free energy concept; Laws of thermodynamics; Acids & bases; pH & buffers; Structure, function & metabolism of carbohydrates, proteins, lipids and nucleic acids; Enzymology: Classification and nomenclature of enzymes; Structure, Mechanism of action, single substrate and bi-substrate enzymes; Activators and inhibitors of enzymes; Factors affecting the activity of enzymes.

### **3. Plant Physiology (8 Questions)**

Minerals required by plant, their absorbable form, functions, deficiency symptoms, essentiality of minerals, N<sub>2</sub> metabolism, biological N<sub>2</sub> fixation; Cellular Metabolism: Gluconeogenesis, Glycogenesis and glycogenolysis, hormonal regulation; Oxidation of food, respiratory efficiency of various food components; transport and detoxification of ammonia, Lipid Metabolism; Photosynthesis: Basic principles of light absorption, excitation energy transfer, electron transports, cycles (C<sub>2</sub>, C<sub>3</sub>, C<sub>4</sub> & CAM), plant productivity, measurement of photosynthetic parameters; Physiological responses to abiotic stresses; Sensory photobiology; Physiological affects and mechanism of action of plant growth hormones.

### **4. Human Biology (8 Questions)**

General Morphology & Anatomy; Physiology: Control and Disorders of Digestion, Respiration, Body fluids and Circulation, Homeostasis, Excretion & Urea cycle, Skeleton system & muscle contraction, Nervous system; Immunobiology.

### **5. Classical Genetics (8 Questions)**

Principles of Inheritance and Variation: Mendelian genetics, Post Mendelian inheritance; chromosomal theory of inheritance; Linkage, recombination & crossing over; recombination frequency, linkage map; Mutation: General properties of mutations; molecular basis of gene mutation: biochemical basis of gene mutation DNA repair mechanisms. Pedigree analysis; Human karyotype-banding; genetic and environmental basis of sex determination, Y- and X-linked genes, Numerical and Structural abnormalities of human chromosomes and related syndromes: Human metabolic disorders; Maternal inheritance; Molecular Basis of Inheritance: Chemical nature of DNA and RNA; Biological functions of nucleic acids; Search for genetic material, RNA world; Replication; Transcription and processing of RNA, Genetic code; Translation, post-translational modification; Ribosomes; Regulation of Gene expression.

### **6. Cell & Molecular Biology (10 Questions)**

History of cell biology; Microscopy; Staining technique; Centrifugation; Radio-labeling techniques (RIA); Immuno-blotting; ELISA; Study of cytoplasm & plasma membrane; Structure & Function of Cell-organelles; Genes & Genome; C-value paradox; DNA packaging: Nucleosome model; DNA super-coiling; DNA Replication, recombination & repair; Transcription & RNA splicing; Translation of protein & gene regulation.

### **7. Modern Genetics (10 Questions)**

Gel Electrophoresis (Agarose/ PAGE/ SDS-PAGE/ Pulse-Field GE); Southern blotting, Northern blotting & Western Blotting; DNA Fingerprinting; Gene mapping; Chromosome banding; Genetics in modern agriculture, animal breeding, medicine, human behavior; Genetic Counseling; Gene therapy; HGP; Gene Activity in prokaryotes and eukaryotes; Signals for gene control – Hormones and growth factors; Bacterial transformation, transduction and conjugation, Bacterial chromosome; Bacteriophages: Types, structure and morphology.

## **8. Evolutionary Biology (8 Questions)**

Cosmic evolution – Physical basis of life; Theories of origin of life; Origin of life through biochemical evolution; Experimental evidences for origin of life; Evolution of the prokaryotic & eukaryotic cell; Direct & indirect evidences of evolution (specially study of fossils); Theories of organic evolution- Lamarckism & Darwinism; Speciation & variation; Origin and evolution of horse & man; Population Genetics; Genetic variations; Polymorphism; Gene frequency; Hardy Weinberg equilibrium; Genetic drift, Founder effect; Adaptive radiation; ecological significance of molecular variations.

## **9. Ecology (10 Questions)**

Ecology: definition, study, branches; Concept of ecosystem; Organism and its environment, distribution of biomes, major physical factors and the physiological responses shown by organisms; Physical adaptation of plants and animals, rules governing adaptations; Population attributes and growth, logistic curves, Darwinian fitness; Population interactions and their theories; Ecosystem structure and functions, ecosystem productivity and standing crop, decomposition in nature, energy flow in ecosystem, ecological pyramids, succession of community; Biogeochemical cycles; Biodiversity types and its patterns, importance of diversity, its loss and their causes, conservation strategies ; Environmental issues : Types of pollution, their indicators, causes, effects, prevention and treatment ; Deforestation, recommended forestation, reforestation, case, Chipko Movement; Ozone layer depletion; Global warming; Green house effect.

## **10. Biostatistics (5 Questions)**

General mathematical ability, Measures of central tendency (mean median & mode), standard deviation, variance & standard error, chi-square test.

## **11. Biology and Human Welfare (10 Questions)**

Health and disease; types of diseases, common diseases in humans; Immunology – Innate and Acquired immunity; Passive and active immunization; Organization and structure of lymphoid organ; Cells of the immune system; Nature of immune response; Structure and Functions of antibodies: Antigen-Antibody interactions; Humoral immune response; Cell mediated immunity; Auto-immunity; Allergies; Immunodeficiency disorders; etiology of HIV; types, genetics and biochemistry of cancer; Animal husbandry, management of farm animals, breeding strategies (natural and artificial) and their types, economic importance of each; Plant breeding, method of release of new variety, Single cell protein; Tissue culture technique, somatic hybridization; Microbes in Human Welfare: Technology associated and use of Microbes in household, industries, medicine, bio-active molecules, sewage treatment and sewage treatment plants, biogas production, bio-control agents, biofertilizers.

## **12. Microbiology & Biotechnology (10 Questions)**

Microbial Culture technique; microbial tools; Isolation, media preparation, cultivation, staining & preservation of microbes; Application of microbiology in dairy, agriculture, medicine and environmental engineering; technique of separation and isolation of DNA, RNA & Protein; Cryopreservation; Gene cloning, Restriction enzymes, Isoschizomers & Isocaudomers; Cutting & Joining of Nucleic acids, linkers & adapters; Vectors (plasmid/ viral & phage vectors/ cosmid/ fosmid/ BAC/ YAC/ HAC), types of vectors (cloning & expression vectors/ shuttle vectors), vectors for plants (Ti plasmid & Ri plasmid); genomic and cDNA libraries; nucleotide sequence comparisons and homologies; RFLP, SNP, VNTR, STR, RAPD; general description, types & application of PCR; Bio-reactors, upstream & downstream processing, large scale production; Totipotency & Pleuripotency; stem cell technology; Tissue engineering; Hybridoma technique: production, detection and applications of monoclonal antibodies; Study of vaccines: mechanism of vaccination; types of vaccines; OPV, Hepatitis-B vaccine, DNA vaccines, Edible vaccines; Application in agriculture: GMO for pest resistance, RNAi and dsRNA technology; Application in Medicine, genetically engineered products, gene therapy; Molecular diagnosis by PCR & ELISA; Transgenic animals: their physiology, biological products and their use for testing the safety of vaccine and chemicals; Bioethical issues.

## **2. SYLLABUS FOR M.SC. BIOTECHNOLOGY [MBT]**

### **1. Diversity of Living World (5 Questions)**

Taxonomic aids, keys, specimen management; Systematics & binomial system of nomenclature; Classification of living organisms (5 kingdom system, major groups and principles of classification within each group); General description & Salient features of Monerans, Protists, Fungi, Plants and Animals (with major groups).

### **2. Biochemistry (8 Questions)**

Entropy, Enthalpy; Gibb's free energy concept; Laws of thermodynamics; Acids & bases; pH & buffers; Structure, function & metabolism of carbohydrates, proteins, lipids and nucleic acids; Enzymology: Classification and nomenclature of enzymes; Structure, Mechanism of action, single substrate and bi-substrate enzymes; Activators and inhibitors of enzymes; Factors affecting the activity of enzymes.

### **3. Plant Physiology (8 Questions)**

Water relations: Properties of water, water in tissues and cells, Transport of water and solutes (food, nutrients, gases): Transport across cell membrane; soil-plant-atmosphere continuum; Minerals required by plant, their absorbable form, functions, deficiency symptoms, essentiality of minerals, N<sub>2</sub> metabolism, biological N<sub>2</sub> fixation; Cellular Metabolism: Gluconeogenesis, Glycogenesis and glycogenolysis, hormonal regulation; Oxidation of food, respiratory efficiency of various food components; transport and detoxification of ammonia, Lipid Metabolism; Photosynthesis: Basic principles of light absorption, excitation energy transfer, electron transports, cycles (C<sub>2</sub>, C<sub>3</sub>, C<sub>4</sub> & CAM), plant productivity, measurement of photosynthetic parameters; Physiological responses to abiotic stresses; Sensory photobiology; Physiological affects and mechanism of action of plant growth hormones; Photoperiodism and its significance, endogenous clock and its regulation, floral induction and development, Vernalization; Plant movements; Seed dormancy.

### **4. Human Biology (8 Questions)**

General Morphology & Anatomy; Physiology: Control and Disorders of Digestion, Respiration, Body fluids and Circulation, Homoeostasis, Excretion & Urea cycle, Skeleton system & muscle contraction, Nervous system; Immunobiology.

### **5. Classical Genetics (8 Questions)**

Principles of Inheritance and Variation: Mendelian genetics, Post Mendelian inheritance; chromosomal theory of inheritance; Linkage, recombination & crossing over; recombination frequency, linkage map; Mutation: General properties of mutations; molecular basis of gene mutation: biochemical basis of gene mutation DNA repair mechanisms. Pedigree analysis; Human karyotype-banding; genetic and environmental basis of sex determination, Y- and X-linked genes, Numerical and Structural abnormalities of human chromosomes and related syndromes: Human metabolic disorders; Maternal inheritance; Molecular Basis of Inheritance: Chemical nature of DNA and RNA; Biological functions of nucleic acids; Search for genetic material, RNA world; Replication; Transcription and processing of RNA, Genetic code; Translation, post-translational modification; Ribosomes; Regulation of Gene expression.

### **6. Cell & Molecular Biology (10 Questions)**

History of cell biology; Microscopy; Staining technique; Centrifugation; Radio-labeling techniques (RIA); Immuno-blotting; ELISA; Study of cytoplasm & plasma membrane; Structure & Function of Cell-organelles; Genes & Genome; C-value paradox; DNA packaging: Nucleosome model; DNA super-coiling; DNA Replication, recombination & repair; Transcription & RNA splicing; Translation of protein & gene regulation.

### **7. Modern Genetics (10 Questions)**

Gel Electrophoresis (Agarose/ PAGE/ SDS-PAGE/ Pulse-Field GE); Southern blotting, Northern blotting & Western Blotting; DNA Fingerprinting; Gene mapping; Chromosome banding; Genetics in modern agriculture, animal breeding, medicine, human behavior; Genetic Counseling; Gene therapy; HGP; Gene Activity in prokaryotes and eukaryotes; Signals for gene control – Hormones and growth factors; Bacterial transformation,

transduction and conjugation, Bacterial chromosome; Bacteriophages: Types, structure and morphology.

**8. Evolutionary Biology (8 Questions)**

Cosmic evolution – Physical basis of life; Theories of origin of life; Origin of life through biochemical evolution; Experimental evidences for origin of life; Evolution of the prokaryotic & eukaryotic cell; Direct & indirect evidences of evolution (specially study of fossils); Theories of organic evolution- Lamarckism & Darwinism; Speciation & variation; Origin and evolution of horse & man; Population Genetics; Genetic variations; Polymorphism; Gene frequency; Hardy Weinberg equilibrium; Genetic drift, Founder effect; Adaptive radiation; ecological significance of molecular variations.

**9. Ecology (10 Questions)**

Ecology: definition, study, branches; Concept of ecosystem; Organism and its environment, distribution of biomes, major physical factors and the physiological responses shown by organisms; Physical adaptation of plants and animals, rules governing adaptations; Population attributes and growth, logistic curves, Darwinian fitness; Population interactions and their theories; Ecosystem structure and functions, ecosystem productivity and standing crop, decomposition in nature, energy flow in ecosystem, ecological pyramids, succession of community; Biogeochemical cycles; Biodiversity types and its patterns, importance of diversity, its loss and their causes, conservation strategies ; Environmental issues : Types of pollution, their indicators, causes, effects, prevention and treatment ; Deforestation, recommended forestation, reforestation, case, Chipko Movement; Ozone layer depletion; Global warming; Green house effect.

**10. Biostatistics (5 Questions)**

General mathematical ability, Measures of central tendency (mean median & mode), standard deviation, variance & standard error, chi-square test.

**11. Biology and Human Welfare (10 Questions)**

Health and disease; types of diseases, common diseases in humans; Immunology – Innate and Acquired immunity; Passive and active immunization; Organization and structure of lymphoid organ; Cells of the immune system and their differentiation; Lymphocyte traffic; Nature of immune response; Structure and Functions of antibodies: Antigen-Antibody interactions; Humoral immune response; Cell mediated immunity; Immunological memory; Auto-immunity; Allergies; HLA system in human: MHC haplotypes; Transplantation types and problems; Immunodeficiency disorders; etiology of HIV; types, genetics and biochemistry of cancer; Drugs and alcohol abuse, Addiction, drug dependence, ill effects, prevention, its abuse in adolescents and its management; Strategies for food production and enhancement: Animal husbandry, management of farm animals, breeding strategies (natural and artificial) and their types, economic importance of each; Plant breeding, method of release of new variety, Single cell protein; Tissue culture technique, somatic hybridization; Microbes in Human Welfare: Technology associated and use of Microbes in household, industries, medicine, bio-active molecules, sewage treatment and sewage treatment plants, biogas production, bio-control agents, biofertilizers.

**12. Biotechnology & Genetic Engineering (10 Questions)**

Genetic engineering tools & technique; Technique of separation and isolation of DNA, RNA & Protein; Cryopreservation; Gene cloning, restriction enzymes, isoschizomers & isocaudomers; Cutting & joining of nucleic acids, linkers & adapters; Vectors (plasmid/ viral & phage vectors/ cosmid/ fosmid/ phasmid/ BAC/ YAC/ HAC), types of vectors (cloning & expression vectors/ shuttle vectors), vectors for plants (Ti plasmid & Ri plasmid), genomic and cDNA libraries, nucleotide sequence comparisons and homologies; RFLP, SNP, VNTR, STR, RAPD; General description, types & application of PCR; Bio-reactors, upstream & downstream processing, large scale production; Totipotency & Pleuripotency; Stem cell technology; Tissue engineering; Hybridoma technique: production, detection and applications of monoclonal antibodies; Study of vaccines: mechanism of vaccination; types of vaccines; OPV, Hepatitis-B vaccine, DNA

vaccines, Edible vaccines; Application in agriculture: GMO for pest resistance, RNAi and dsRNA technology; Application in Medicine, genetically engineered products, gene therapy; Molecular diagnosis by PCR & ELISA; Transgenic animals: their physiology, biological products and their use for testing the safety of vaccine and chemicals; Bioethical issues; Human Genome Project.

### **3. SYLLABUS FOR M.Sc. PHARMACEUTICAL CHEMISTRY [MPC]**

#### **1. Chemistry (50 Questions) [Compulsory for All]**

Atomic Structure; Periodic table & periodic properties; Chemical bonding; s-block elements; p-block elements; d-block elements & coordination compounds; chemistry of noble gases; Oxidation & reduction; Organo-metallic compounds

Hybridization; Mechanism of organic reaction; Stereochemistry of organic compounds; Isolation, purification, identification & classification of organic compounds; Isomerism; Hydrocarbons (aliphatic & aromatic); Alcohols; Phenols; Ethers & Epoxides; Aldehyde & ketones; Carboxylic Acids; Structure & Function of Bio-molecules (Carbohydrate, Proteins & Amino-acids, Nucleic Acids, Vitamins); Organic compounds of Nitrogen.

Chemical equilibrium & chemical kinetics; Gaseous state; Liquid state; Solid state; Colloidal system; Catalysts & catalysis; Solution; Distribution law; Thermodynamics; Entropy, Enthalpy; Gibb's free energy concept; Acids & bases; pH & buffers; Electrochemistry; Phase equilibrium; Surface Chemistry.

#### **2. Tools & Techniques in Pharmaceutics (10 Questions) [Compulsory for All]**

Disease Diagnosis techniques (including ELISA & PCR), Centrifugation and ultra centrifugation, gel permeation; Ion exchange chromatography, electrophoresis, hydrophobic interaction, partition chromatography; Colorimetry, UV-visible spectrophotometry, fluorescence spectroscopy, x-ray crystallography, radio isotopes techniques; Salt precipitation, precipitation with organic solvent; Microscopy-LM,TEM,SEM; Cell fractionation, cell growth determination; Chromosomal techniques-Staining, banding pattern, karyotyping; Mutagenic techniques- Bacterial and seed mutagenesis, recombination in bacteria, conjugation, transduction, breeding methods in plants, pedigree analysis, DNA isolation.

#### **3. Biology (30 Questions) [For BIO Group: PCB]**

Microbial culture tools & techniques; Isolation, media preparation, cultivation, staining & preservation of microbes; Application of microbiology in dairy, agriculture, medicine and environmental engineering;

History of cell biology; Microscopy; Staining technique; Centrifugation; Study of cytoplasm & plasma membrane; Structure & Function of Cell-organelles; Genes & Genome; DNA Replication; Transcription; Translation of protein & gene regulation.

Principles of Inheritance and Variation: Mendelian genetics, Post Mendelian inheritance; chromosomal theory of inheritance; Linkage, recombination & crossing over; recombination frequency; Mutation; Numerical and Structural abnormalities of human chromosomes and related syndromes.

Chemical nature of DNA and RNA; Biological functions of nucleic acids; Search for genetic material, RNA world; Replication; Transcription and processing of RNA, Genetic code; Translation, post-translational modification; Ribosomes; Regulation of Gene expression.

Structure, function & metabolism of carbohydrates, proteins, lipids and nucleic acids; Enzymology: Classification and nomenclature of enzymes; Structure, Mechanism of action, single substrate and bi-substrate enzymes; Activators and inhibitors of enzymes; Factors affecting the activity of enzymes.

Health and disease; types of diseases, common diseases in humans; Immunology – Innate and Acquired immunity; Passive and active immunization; Organization and structure of lymphoid organ; Cells of the immune system and their differentiation; Lymphocyte traffic; Nature of immune response; Structure and Functions of antibodies: Antigen-Antibody interactions; Humoral immune response; Cell mediated immunity; Immunological memory; Auto-immunity; Allergies; Immunodeficiency disorders; HIV;

Cancer; Drugs and alcohol abuse, Addiction, drug dependence, ill effects, prevention, its abuse in adolescents and its management.

DNA Fingerprinting; Genetics in modern agriculture, animal breeding, medicine, human behavior; Gene therapy; bacterial transformation, transduction and conjugation, Bacterial chromosome; Bacteriophages: Types, structure and morphology.

**4. Mathematics & Biostatistics (30 Questions) [For Math Group: PCM]**

Mensuration (calculation of length, width, height, area, volume etc.); Common algebra; Trigonometry; Mean, median, mode, standard deviation, variation, standard error; Probability and distribution; Correlation & regression; ANOVA; t-test; Z-test; chi-square test; Integration & Differentiation; Calculus; Geometry; Equation of Line.

**4. SYLLABUS FOR B.SC. BIOTECHNOLOGY (WITH CBZ) [BBT]**

**1. General Mathematical Calculations (10 Questions)**

Mensuration (calculation of length, width, height, area, volume etc.); Common algebra; Trigonometry; Time, speed & distance; Geometry; Average, percentage, profits & loss; Mean, median, mode, standard deviation, variation, standard error & chi-square test.

**2. General Mental Ability (3 Questions)**

3 questions would be based on general mental ability viz. Simple series completion; Coding-decoding; Analogy.

**3. General Awareness (5 Questions):**

5 Questions would be based on general awareness regarding science, pollution, population explosion, food crisis, fuel & energy crisis; Current knowledge concerning the above all.

**4. General Chemistry (12 Questions)**

Chemical equilibrium & chemical kinetics; Solution; Distribution law; Catalysts & catalysis; Colloidal system; Thermodynamics; Isolation, purification, identification & classification of organic compounds; Isomerism; Reaction Mechanisms of organic compounds;

**5. Biology (60 Questions)**

**a. Botany (10 Questions)**

Questions regarding bacteria, viruses, algae, fungi, bryophytes, pteridophytes, gymnosperms & angiosperms.

**b. Zoology (10 Questions)**

Questions regarding protozoa, platyhelminthes, annelida, arthropoda & chordata.

**c. Genetics (8 Questions)**

Mendel's law, mutation, genetic diseases & syndromes, chromosomal basis of inheritance; incomplete dominance.

**d. Cell & Molecular Biology (8 Questions)**

Microscopy; Prokaryotic vs. Eukaryotic cell; Study of cell organelles; Nucleus & chromosome; DNA replication, transcription & translation.

**e. Biochemistry & Immunology (8 Questions)**

Biomolecules (carbohydrate, protein, lipid, nucleic acids, vitamins, hormones etc.), pH & buffer, acid & bases; enzymes; Glycolysis & Krebs's cycle; Health and disease; types of diseases, common diseases in humans; Immunology – Innate and Acquired immunity; Passive and active immunization.

**f. Ecology, Evolution & Environment (8 Questions)**

Theories of origin of life; Origin of life through biochemical evolution; Experimental evidences for origin of life; Direct & indirect evidences of evolution (specially study of fossils); Theories of organic evolution- Lamarckism & Darwinism; Speciation & variation; Origin and evolution of horse & man; Ecology: definition, study, branches; Concept of ecosystem; Organism and its environment; Adaptation of plants and animals, rules governing adaptations; Darwinism; Ecosystem structure and functions, ecosystem productivity and standing crop, decomposition in nature, energy flow in ecosystem, ecological pyramids, succession of community; Biogeochemical cycles; Biological conservation strategies; Environmental issues : Types of pollution, their indicators,

causes, effects, prevention and treatment ; Deforestation & reforestation; Chipko Movement; Ozone layer depletion; Global warming; Green house effect.

**g. Applied Biology (8 Questions)**

Use of microbes, plants & animals for human beings.

**6. Introductory Biotechnology (10 Questions)**

Genetic engineering tools & technique; Technique of separation and isolation of DNA, RNA & Protein; Cryopreservation; Gene cloning, restriction enzymes; Cutting & joining of nucleic acids; Vectors (plasmid/ viral & phage vectors), vectors for plants (Ti plasmid & Ri plasmid); Bio-reactors, upstream & downstream processing, large scale production; Totipotency & pluripotency; Stem cell technology; Tissue engineering; Vaccination: mechanism of vaccination; types of vaccines; OPV, Hepatitis-B vaccine; Biotechnological products.

**5. SYLLABUS FOR M.Sc. CHEMISTRY [MCH]**

- 1. Inorganic Chemistry:** Graduation Level (33 Questions)
- 2. Organic Chemistry:** Graduation Level (33 Questions)
- 3. Physical Chemistry:** Graduation Level (34 Questions)

**QUESTION PATTERN**

Note: There would be 100 objective questions in paper carrying 2 marks each. There is a **negative marking** of  $\frac{1}{4}$  (for each wrong answer 0.5 marks will be deducted from overall scoring). All questions have 4 answers (A, B, C & D), in which one would be most correct. Candidate is expected to choose the most correct/ best suitable answer.

**RESULT DECLARATION**

Result will be declared on April, 26, 2010 on our website. The successful candidates would also be informed by post and by e mail.

**SHRI TEJ SINGH SCHOLARSHIP (STSS)**

Few scholarships are available for meritorious students as follows:

**For OBC/SC/ST Candidates:- Rs. 5000/-**

**For Girls/PH candidates:- Rs. 5000/-**

**For students securing above 90% marks in the last qualifying exam:- Rs. 50,000/-**

**For students securing 80% to 90% marks in the last qualifying exam:- Rs. 15,000/-**

**For students securing 70% to 79.99% marks in the last qualifying exam:- Rs. 10,000/-**

**For students securing 60% to 69.99% marks in the last qualifying exam:- Rs. 5,000/-**