

M.Sc. Botany
(Semester-III)

MBOTCC-10: Cell Biology & Cytogenetics (5 Credits)

Time: 3hrs

Mark: 70

The question paper will consist of 7 questions divided into 3 sections.

Section A: Question No. 1 will be compulsory comprising ten objective type questions (two from each Unit) each carrying two marks ($10 \times 2 = 20$ marks).

Section B: Question No. 2 will also be compulsory and comprise five short answer type questions (one from each Unit) and students will have to attempt only four questions ($4 \times 3 = 12$ marks).

Section C: Five long answer type questions are to be set (one from each Unit) of which any three questions are to be answered ($3 \times 10 = 30$ marks).

Unit-I

Cell theory and organization of the cell (Prokaryotic and Eukaryotic)

Ultrastructure chemical composition of the following:

Cell wall, Plasma membrane, Cytoplasm and cytoplasmic organelles (origin, ultrastructure & function: Plastids, Mitochondria, Endoplasmic reticulum, ribosomes, Golgi complex, Lysosomes, Peroxisomes and Centrosomes)

Unit-II

Nucleus: Nuclear membrane, nuclear pore, nucleolus and karyolymph

Cell division, Cell cycle, mitosis, Cytokinesis, Cytokinesis and cell plate formation

Unit-III

Chromosome: Organization and special types

Mendelian genetics

Gene interaction

Sex determination

Chromosomal aberrations

Unit-IV

Extrauclear inheritance

Chromosomal aberration, polyploidy-types and role in speciation

Mutation- Molecular mechanism, induction by physical and chemical mutagens

Unit- V

Population Genetics

Microscopy: Phase contrast microscopy, Electron microscopy (SEM and TEM), Fluorescence microscopy

Microdensitometry

Abu 7/7/18

J. Bhattacharya
17/7/18

Babu 7/7/18

Amal
22/7/18
Amal
23/7/18

Amal
23/7/18

S. Saha
27/7/18

M.Sc. Botany
(Semester-III)

MINOTCC-11: Molecular Biology (3 Credits)

Time: 3hrs

Mark: 70

The question paper will consist of 7 questions divided into 3 sections.
Section A: Question No. 1 will be compulsory comprising ten objective types questions (two from each Unit) each carrying two marks ($1 \times 2 = 20$ marks).

Section B: Question No. 2 will also be compulsory and comprise five short answer type questions (one from each Unit) and students will have to attempt only four questions ($4 \times 5 = 20$ marks).

Section C: Five long answer type questions are to be set (one from each Unit) of which any three questions are to be answered ($3 \times 10 = 30$ marks).

Unit I

Organization of DNA; Nucleic acids as hereditary material; Structure and forms of DNA and RNA; double helix; supercoiling of DNA; Packaging of DNA in Prokaryotes and eukaryotes.

Unit II

DNA replication: DNA replication models; Mechanism of DNA replication; DNA damage and repair mechanisms; Different types of DNA damage and repair mechanisms; Diseases caused due to impairment in repair mechanism.

Unit III

Transcription: Importance of DNA binding Proteins; RNA polymerase-types, structure and functions; Mechanisms of Transcription in prokaryotes & Eukaryotes; Processing of RNA; m-RNA processing; 5' capping, 3' polyadenylation; splicing r-RNA & t-RNA processing; Genetic code; Coding of acids; Chemoperitoxins

Unit IV

Translation: Machinery and mechanism in prokaryotes and eukaryotes; role of t-RNA & ribosome; Post translational modification of proteins such as phosphorylation, acetylation, methylation and glycosylation

Unit V

Regulation of gene expression: Prokaryotes- Positive and negative control, inducible and repressible operators, lac operon, trp operon

Eukaryotes- Regulation at DNA, transcription, translation and post translational level

Antisense technology: Molecular mechanism of antisense molecules, application of antisense technologies.

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M.Sc. Botany
(Semester-III)

MBOTCC-11: Recombinant DNA Technology (3 Credits)

Time: Three

Mark: 30

The question paper will consist of 7 questions divided into 3 sections.
 Section A: Question No. 1 will be compulsory comprising ten objective type questions (two from each Unit) each carrying two marks (10x2=20 marks).
 Section B: Question No. 2 will also be compulsory and comprise five short answer type questions (one from each Unit) and students will have to attempt only four questions (4 x 5=20marks).
 Section C: Five long answer type questions are to be attempted from each Unit of which any three questions are to be answered (3 x 10=30 marks).

Unit I

rDNA technology: Techniques used in RDT: Polyacrylamide and agarose gel electrophoresis Blotting techniques; Southern, Northern and Western blotting Polymerase chain reaction and its applications, DNA sequencing. Various methods of DNA sequencing

Unit II

Core techniques and essential enzymes; Restriction enzymes-types and cleavage pattern; DNA ligase- types and ligation of DNA molecules *in vitro*.

Cutting vectors: Plasmid (natural, pBR322, R plasmid vectors), phages, cosmid, artificial chromosome vector, Shuttle vectors; Expression vector

Unit III

Passenger DNA: Different strategies used for isolation/synthesis of gene; Organ chemical synthesis of gene; Construction of genomic and cDNA libraries

Construction of rDNA: Different strategies for construction of rDNA (Use of restriction enzymes, Linkers, Adaptors, Homopolymer tailing)

Unit IV

Recombinant engineering: Different methods for selection of clone (antibiotic resistant markers, colony hybridization, plaque hybridization, immune screening)

Methods of rDNA transfer in suitable host: Electroporation, microinjection, particle gun method, direct uptake of DNA (CaCl₂ method), liposomes as transforming vehicle
 Expression of foreign gene

Unit V

Application of rDNA technology: In medicine, agriculture and environment protection
 DNA finger printing: Methodology and its application

Intellectual property rights, biopiracy and patenting: IPR, sovereignty rights, CBD, biosafety and patenting

Safety of recombinant DNA technology: Restriction and regulation for the release of GMOs; Social and ethical issues

Mr. A. G.

14/11/18 7.3.19

Mr. A. G.
13/11/19 7.3.19

M.Sc. Botany
(Semester-III)

MBOTCC-I: Plant Ecology and Environmental Biology (3 Credits)

Time: Three

Max: 70

The question paper will consist of 7 questions divided into 3 sections.

Section A: Question No.1 will be compulsory comprising ten objective type questions (two from each Unit) carrying two marks (10x2=20 marks).

Section B: Question No. 2 will also be compulsory and comprise five short answer type questions (one from each Unit) and students will have to attempt only four questions (4 x 5=20marks).

Section C: Five long answer type questions are to be set (one from each Unit) of which any three questions are to be answered (3 x 10=30 marks).

Unit- I

Organism and population concept; Naturity; Maturity; Density; Rate of population increase; r and k selection; Age and sex ratio; Aggregation

Interactions among populations: Commensalism, Amensalism, Mutualism, protocooperation and

Symbiosis, predation and parasitism, competition

Intraspecific and interspecific

Plant adaptations

Unit- II

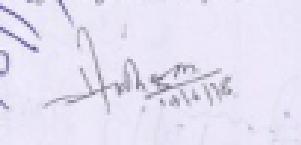
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|--------------------------------------|---|
| (i) Community Structure: | Physiognomy, Phenology, Sociability, Vitality, |
| Qualitative character: | Rackinizer's life forms |
| Quantitative Character: | Frequency, Density, Abundance, Cover and basal area |
| Synthetic character: | Presence and Constance, Fidelity, Importance |
| | Value index |
| Methods of studying plant community: | Quadrates, Transects, Bisection, Plotless method |
| | Classification of communities: Physiognomic classification, Floristic classification, Dynamic system, Continuum concept |
| (ii) Community dynamics: | |

Concept of Succession, Nutation, Invasion, Competition and reaction, Stabilization and Climax, Xerophyte and Hydroseric and their serial stage

Unit-III

Ecosystem: Abiotic and biotic components; Ecological pyramid; Structural organization of grassland, forest and aquatic ecosystem

Ecosystem energetics: Laws of thermodynamics, Productivity, energy food chain and ecosystem budget, Biogeochemical cycles



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Unit-IV

Environmental Pollutants: Air, Water, Soil, waste radioactive and noise pollution; Global warming; green house effect; O₃ depletion; Climate change

Unit-V

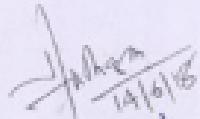
Environmental Awareness: Man and Biosphere (MAB); International Union for Conservation of Nature and Natural Resources (IUCN); United Nations Environment Programme (UNEP); World Environmental Day; Wildlife Preservation Act (1972); India Forest Conservation Act (1980)

MIBOTCC-14: Practical 3 (Based on MIBOTCC 5, 6, 7, 8 & 9) (9 Credits)

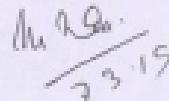
Time: 5 hrs

Mark: 70

1. Principle and use of different modern reagents used in Botany.
2. Cytological techniques Preparation of cytological stains, fixation of sample etc.
3. Mitotic slide preparation of common plant.
4. Meiotic slide preparation of common plant.
5. Karyotype analysis.
6. Calculation of allelic frequency.
7. Isolation of antibiotic resistant mutant by autoradiography technique.
8. Isolation of genomic DNA from cauliflower.
9. Spectrophotometric estimation of DNA by diphenyl method.
10. Separation of DNA by agarose gel electrophoresis.
11. Demonstration of amplification of DNA using PCR.
12. Study of local vegetation by quadrat method.
13. Study of ecological adaptations (Morphological and anatomical) in plants.
14. Water analysis for pollution studies (Dissolved Oxygen, BOD, Dissolved Carbon dioxide, Chloride, Alkalinity etc.)


 14/6/18
 Dr. S. R. Patil
 7/7/19
 Dr. S. R. Patil
 7/7/19
 Dr. S. R. Patil
 7/7/19


 Dr. N. G. Patil
 7/7/19


 Dr. N. G. Patil
 7/7/19