

M.Sc. Botany
(Semester-I)

Signature
7/3/19
University Professor & Head
University Department of Botany
B. B. A. Bihar University
Muzaffarpur

MBOTCC-I: Phycology, Mycology and Bryology (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 (10x2=20 marks).
Section B: Question No. 2 will also be compulsory and comprise five short answer types questions (one from each Unit) and students will have to attempt only four questions (4 x 5=20marks).
Section C: Five long answer types 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

Thallos organization of algae, Cell ultra-structure and Reproduction: vegetative, asexual and sexual
Role of pigments, reserve food, cell wall, flagella, eye spot and pyrenoids in classification and evolution of algae
Use of algae as food, feed and in industry
Indian phycologists and their contributions

Unit II

Salient features of Protochlorophyta, Chlorophyta, Charophyta, Xanthophyta, Bacillariophyta, Phaeophyta and Rhodophyta

Unit III

Lichen: General Account, Classification, Distribution, Morphology, Anatomy, Reproduction & Economic importance.
General characters of fungi, cell ultra structure, unicellular and multicellular organization, cell wall composition, nutrition: saprobic, biotrophic, symbiotic, reproduction: vegetative, asexual and sexual; heterokaryosis, heterokaryon and plasmogamy
Classification of fungi. Recent trends

Unit IV

Brief account of Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina, Deuteromycota
Phylogeny of Fungi
Fungi in industry, medicine and as food
Fungi as biocontrol agents

Unit V

Classification and general features of Marchantiata and Jungermanniata, Anthocerotales, Sphagnales and Polytrichales
Evolutionary trends in spermatophytes
Vegetative propagation and perennation
Mechanism of dehiscence of capsules and dispersal of spores
Conducting tissues in Bryophytes
Economic importance of Bryophytes

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MBOTCC-2: Microbiology and Plant Pathology (5 Credits)

Time: 3hrs

Marks: 70

The question paper will consist of 7 questions divided into 5 sections.

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

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

Section C: Five long answer types 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

General introduction; History and scope of microbiology; theory of spontaneous generation
Methods of microbiology: Sterilization-Different types of sterilization (moist heat, dry heat, filtration, radiation and chemicals)
Diversity of microorganisms: Archaea, Bacteria, Cyanobacteria, Phytoplasm, Rickettsia

Unit II

Structure of bacteria: Ultra structure of Gram positive and Gram negative bacteria; reproduction (vegetative, asexual and genetic recombination); Nutritional classification of bacteria; economic importance of bacteria

Viruses: Nature, characteristics and ultrastructure of Viruses (TMV and Bacteriophages), multiplication (Lytic and Lyso-genic cycles) and transmission of viruses; economic importance; a brief account of Viridae and Prion.

Unit III

Agriculture Microbiology: Biological nitrogen fixation and Biofertilizer
Industrial Microbiology: Industrial production of organic acids (citric acid), antibiotics (penicillin) and enzymes (amylase)

Unit IV

Classification of Plant disease and appearance of symptoms due to different microbes
Role of enzyme and toxin in pathogenesis
Effect of infection on the physiology of host with special reference to photosynthesis, respiration, nitrogen metabolism and osmoregulation
Host defence mechanism with special reference to structural and biochemical defence

Unit V

Seed pathology with special reference to seed-borne mycoflora, mycotoxins and its hazard Quarantine regulation and seed certification
Rhizosphere and rhizoplane microflora and its significance in soil borne disease
Etiology, symptoms and control measures of the following plant diseases:
Rust of linseed, Leaf blight of maize, Tikka disease of groundnut, Bunchy top of banana, black tip of mango, Yellow vein mosaic of bhindi, Little leaf of brinjal and Citrus canker

Answer
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12/18

M.Sc. Botany
(Semester-I)

MBOTCC-3: Pteridophyta, Gymnosperms & Paleobotany (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 (10x2=20) marks.

Section B: Question No. 2 will also be compulsory and comprise five short answer type questions (two 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 (two from each Unit) of which any three questions are to be answered (3 x 10=30 marks).

Unit- I

Classification of Pteridophytes

Detailed general features: vegetative and reproductive, with special reference to development, characterization, position and kind of prothallium provided to the spore producing organs of the sporophytes and sexuality of the gametophytes in the following classes/orders:

Polypodiids - Polypodales

Lycopodiids - Lycopodiiales, Selaginiales and Isoetes

Special discussion has to be made about

Stelar evolution within Lycopodiiales

Gametophytic variations and evolution in Lycopodiiales and

Heterospory in seed plants with special reference to Selaginiales.

Unit- II

Sporangioids - Epizoids (only a brief account)

Paraphyses

Characterization, classification and distinction between Dasyporiangiate,

Protoperisporangiate and Leptosporangiate

Structure, reproduction and Phylogenetic considerations of the followings:

Dasyporiangiate - Oligosporales

Protoperisporangiate - Osmundales

Leptosporangiate - Marsiliales, Salviniates and Filicales

Special reference has to be made about the followings:

Cytology vs. phylogeny of ferns

Role of polyploidy in evolution of ferns

Economic importance of pteridophytes

Unit-III

Characteristic features, distribution and economic importance of gymnosperms

Classification of Gymnosperms

Comparative morphology, anatomy, reproductive structures and interrelationships of the following living orders

Cycadales

Ginkgoales

Taxales

Jan 7/23/19

Jan 7/13/19

ANS 4-3-15

1/1/19

Jan 14/6/18

Dr. K. Suresh 7/3

Alena 21/3/19

Unit-IV

Coniferales: Characteristic features, families of modern conifers, their distinguishing features, evolution of female cone with reference to "transition conifers" as evolutionary link between cordaitales and coniferales

Comparative account of reproductive structures of Ephedrales, Gnetales, angiosperms features within the group

Evolutionary trend in sporophytic and gametophytic structures

Unit-V

Types and Nomenclature of fossils; Fossilization process and geological time-scale;

Principles and objectives of fossil study

Comparative morphology, anatomy, reproductive structure and activities of the following fossil groups:

- Psilophytales
- Lepidodendroales
- Cycadales
- Cordaitales
- Pteridophytales

24/6/15

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MBOTCC-4: Practical 1 (Based on MBOTCC 1, 2 & 3) (5 Credits)

Time: 90m

Marks: 70

1. Principles and use of different sterilization instruments like autoclave, oven, Laminar air flow system etc.
2. Preparation of media (Potato Dextrose Agar).
3. Isolation of fungi from soil.
4. Identification of fungal isolates.
5. Preparation of Nutrient Agar (NA) media.
6. Isolation of bacteria from water.
7. Characterization of bacterial isolate by Gram's staining.
8. Counting of fungal spore by haemocytometer.
9. Temporary slide preparation and study of common Algae.
10. Temporary slide preparation and study of common Fungi.
11. Study of vegetative habit, anatomy and reproductive morphology of common Bryophyta (*Marchantia, Anthoceros* etc.).
12. Study of vegetative habit, anatomy and reproductive morphology of common Pteridophyta (*Pellaea, Equisetum, Ginkgo, Marsilea* etc.).
13. Study of vegetative habit, anatomy and reproductive morphology of common Gymnosperm (*Cycas, Pinus, Ginkgo, Gossypium* etc.).
14. Study of different fungal diseases- Rust of linseed, Blight of potato, Rust of wheat, Stem gall of coriander, Downy mildew, Powdery mildew etc.

Sharma
19/04/16

Alam
7/3/19

Ana

Prakash

Sharma
7/3/19

Arora
8-3-19

M.Sc. Botany
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MBOTCC-5: Biofertilizer Technology (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 (five 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 3=12marks).

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

Unit-I

Introduction to biofertilizers - Structure and characteristic features of the following biofertilizer organisms: Bacteria: *Azospirillum*, *Azotobacter*, *Rhizobium* and *Psuedomonas*; Cyanobacteria: *Anabaena*, *Nostoc*; Fungi: *Gloves* etc.

Unit-II

Nitrogenous Biofertilizers: Bacteria - Isolation and purification of *Azospirillum* and *Azotobacter*, mass multiplication of *Azospirillum* and *Azotobacter*, formulation of inoculum of *Azospirillum* and *Azotobacter*, application of inoculants of *azospirillum* and *Azotobacter*. Isolation and purification of *Rhizobium*, mass multiplication and inoculum production of *Rhizobium*, Methods of application of *Rhizobium* inoculants.

Unit-III

Isolation and purification of Cyanobacteria- Mass multiplication of cyanobacterial bioinoculants - Trough or Tray method, Pit method, Field method; methods of application of cyanobacterial inoculum. *Azolla* - mass cultivation and application in rice fields.

Unit-IV

Mycorrhizae - Ecto and endomycorrhizae and their importance in agriculture. Isolation of AM fungi - Wet sieving method and sucrose gradient method. Mass production of AM inoculants and field applications. Isolation and Purification of phosphate solubilizers. Mass multiplication and field applications of phosphate solubilizer (*Pseudomonas striata*).

Unit-V

Biofertilization processes -Decomposition of organic matter and soil fertility and vermicomposting Biofertilizers: Storage, shelf life, quality control and marketing.

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