

Total No. of Questions : 8]

SEAT No. :

P502

[Total No. of Pages : 2

[4234] - 102

M.Sc. - I

BOTANY

**BO - 1.2 : Plant Physiology and Biochemistry**

(2008 Pattern) (Sem. - I)

*Time : 3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) *Answer any five questions, taking at least two questions from each section.*
- 2) *Answer to the two sections should be written in SEPARATE answer book.*
- 3) *All questions carry equal marks.*
- 4) *Neat diagrams must be drawn WHEREVER necessary.*

**SECTION - I**

**Q1)** Give an account on electron transport chain in chloroplast. Add a note on Rubisco Activity.

**Q2)** Explain the process of glycogenesis giving its importance in plants.

**Q3)** Explain :

- a) Mechanism of action of Abscisic acid.
- b) Aquaporins and their role in water transport.

**Q4)** Write notes on any two :

- a) Metabolic changes during seed germination.
- b) Biotic stress
- c) Uniport and symport channels.

**P.T.O.**

## SECTION - II

**Q5)** Explain biosynthesis of phenolics.

**Q6)** What are proteins? Explain different protein structures.

**Q7)** Explain :

- a) Dissociation and association constants.
- b) Classification of lipids.

**Q8)** Write short notes on any two :

- a) Synthesis of starch
- b) NOD Factor
- c) Enzyme kinetics



Total No. of Questions : 8]

SEAT No. :

P504

[Total No. of Pages : 2

[4234] - 201

M.Sc. - I

BOTANY (Part - I)

BO - 2.1 : Systematics of Vascular Plants

(2008 Pattern) (Sem. - II)

*Time : 3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) *Answer any five questions, selecting at least two questions from each section.*
- 2) *Answer to the two sections should be written in separate answer books.*
- 3) *All questions carry equal marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** Give comparative account of spore producing organs in pteridophytes. [16]

**Q2)** Compare any two systems of gymnosperm classification with suitable examples. [16]

**Q3)** Describe the following : [16]

- a) Stelar evolution in pteridophytes.
- b) Distribution of gymnosperms in India.

**Q4)** Write notes on any two of the following : [16]

- a) Economic importance of gymnosperms.
- b) Evolutionary significance of heterosporous Pteridophytes.
- c) Pentoxylales.

**P.T.O.**

## SECTION - II

**Q5)** Enlist orders of subclass Liliopsida. Give salient features of order Liliopsida. **[16]**

**Q6)** Explain with suitable examples the role of palynology and phytochemistry in angiosperm systematics. **[16]**

**Q7)** Discuss the following : **[16]**

- a) Angiosperms as highly evolved and dominant group of plants.
- b) Describe ecades and ecotypes.

**Q8)** Write notes on any two of the following : **[16]**

- a) Concept of family and genus.
- b) Describe information of tools and their application in taxonomy.
- c) Conservation and utilization of Angiosperm taxonomy.



Total No. of Questions : 8]

SEAT No. :

P506

[Total No. of Pages : 2

[4234] - 203

M.Sc.

BOTANY

**BO - 2.3 : Molecular Biology and Genetic Engineering  
(2008 Pattern) (Semester - II)**

*Time : 3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) *Answer any five questions, selecting at least two questions from each section.*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *All questions carry equal marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** Describe the mechanism of transcription in prokaryotic cell. Add a note on importance of RNA polymerase. [16]

**Q2)** Write mechanism of initiation, elongation and termination of peptide chain in prokaryotic cell with schematic diagrams. [16]

**Q3)** a) Describe the rolling circle method and theta model of replication. [8]

b) Explain chemical, physical and spectroscopic properties of DNA. [8]

**Q4)** Write notes on any two of the following : [16]

a) Mechanism of Arabinose operon

b) Organization of promoter in eukaryotic cell

c) Types of DNA damage.

**P.T.O.**

## SECTION - II

**Q5)** Describe method of Agrobacterium mediated gene transfer. Write it's importance in plant genetic Engineering. **[16]**

**Q6)** What is DNA sequencing. Describe any two methods of DNA sequencing in details. **[16]**

**Q7) a)** Describe the structure of 'BAC'. **[8]**

b) Describe the Procedure for 'RAPD'. **[8]**

**Q8)** Write notes on any two : **[16]**

a) Preparation of plasmid DNA

b) 'Ti' and 'Ri' Plasmid

c) Important characters of plasmid vectors



Total No. of Questions : 8]

SEAT No. :

P508

[Total No. of Pages : 2

[4234] - 302

M.Sc. - II

BOTANY

**BO - 3.2 : Environmental Botany & Plant Diversity**

(2008 Pattern) (Sem. - III)

*Time : 3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) *Answer any five questions, selecting at least two questions from each section.*
- 2) *Answer to the two sections should be written in separate answer books.*
- 3) *All questions carry equal marks.*
- 4) *Neat-labelled diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** What is population ecology? Enlist and describe any three characters in detail

**Q2)** Describe and give an account of phytogeographic regions of India.

**Q3)** a) Explain ecological stability in ecosystem.

b) Describe various ecological effects of heavy metals.

**Q4)** Write notes on any two :

a) Indian Bio diversity Act.

b) Acid rain

c) EIA

**P.T.O.**

## SECTION - II

- Q5)** What is water pollution? Enlist its sources. Explain impact of Eutrophication on water quality.
- Q6)** What is species diversity? Comment on diversity indices, species richness & abundance alpha and beta diversity.
- Q7)** a) Describe the selections of plants and microbes in restoration ecology.  
b) Explain aesthetic, food and economical value and use of biodiversity.
- Q8)** Write notes on any two:
- a) Forms and structure of communities.
  - b) Factors affecting bio diversity.
  - c) CBD.





Total No. of Questions : 8]

SEAT No. :

P509

[Total No. of Pages : 2

[4234] - 303

M.Sc. - II

BOTANY

BO - 3.31 : Phycology - I

(2008 Pattern) (Sem. - III) (Special paper - I)

Time : 3 Hours]

[Max. Marks :80

*Instructions to the candidates:*

- 1) *Answer any FIVE questions, taking at least TWO questions from each section.*
- 2) *Answer to the TWO sections should be written in SEPARATE answer books.*
- 3) *All questions carry EQUAL marks.*
- 4) *Neat diagrams must be drawn WHEREVER necessary.*

**SECTION - I**

**Q1)** Give an outline of classification as per smith and comment on molecular systematics in algae.

**Q2)** a) Give an account of algae flagella architecture.

b) Comment on algae cell division.

**Q3)** a) Write briefly on chlorococcales,

b) Give brief account of thallus organization in blue green algae.

**Q4)** Write short notes on any two of the following :

a) Nostoc,

b) BGA as SCP,

c) Chloroplast variation in green algae.

**P.T.O.**

## SECTION - II

**Q5)** Give important characters of red algae and comment on its systematics.

- Q6)** a) Comment on life cycle pattern in brown algae,  
b) Write briefly on methods of reproduction in red algae.

- Q7)** a) Comment on intertidal algae,  
b) Give importance of phytoplanktons.

**Q8)** Write brief notes on any two of the following :

- a) Periodicity and succession of algae,  
b) Physico chemical properties of water,  
c) Lentic and Lotic water algae.



Total No. of Questions : 8]

SEAT No. :

P512

[Total No. of Pages : 2

[4234] - 306

M.Sc. - II

BOTANY

BO - 3.34 : Plant Physiology - I

(2008 Pattern) (Sem. - III) (Special Paper - I)

Time : 3 Hours]

[Max. Marks :80

Instructions to the candidates:

- 1) Answer any five questions, taking at least two questions from each section.
- 2) Answer to the two sections should be written in separate answer books.
- 3) All questions carry equal marks.
- 4) Neat diagrams must be drawn wherever necessary.

**SECTION - I**

**Q1)** Explain how water deficit affects the growth and metabolism? [16]

**Q2)** Give an account of mechanism of flooding tolerance. [16]

**Q3)** Describe the strategies applied by plants to reduce effects of salt stress. [16]

**Q4)** Write notes on any two of the followings : [16]

- a) Saline - alkaline and sodic soils.
- b) Transgenics for drought stress tolerance.
- c) Drought avoidance.

**SECTION - II**

**Q5)** Explain the generation of toxic products and scavenging systems developed by plants under stress conditions. [16]

**Q6)** What is photo inhibition? Explain mechanism of UV tolerance. [16]

**Q7)** Explain the strategies applied by plants to overcome ion toxicity. [16]

**Q8)** Write notes on any two of the followings : [16]

- a) Effects of free radicals on metabolism.
- b) Induction of stress by air pollutants.
- c) Growth regulators and stress tolerance.



Total No. of Questions : 8]

SEAT No. :

P514

[Total No. of Pages : 2

[4234] - 308

M.Sc.

BOTANY

**BO - 3.36 : Plant Biotechnology - I**

**(2008 Pattern) (Sem. - III) (Special Paper - I)**

*Time : 3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) *Answer any five questions, selecting at least two questions from each section.*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *All questions carry equal marks.*

**SECTION - I**

**Q1)** Define micropropagation. Discuss the advantages of tissue culture technique over conventional methods of crop improvement. **[16]**

**Q2)** a) Explain the laboratory design of a plant tissue culture laboratory. **[8]**

b) Discuss the protocol and schedule of observation of different types of cultures based on explants in plant tissue culture. **[8]**

**Q3)** a) How are explants sterilized and established under aseptic conditions?**[8]**

b) What is organogenesis? Distinguish between direct and indirect organogenesis. **[8]**

**Q4)** Write short notes on any two of the following : **[16]**

a) Applications of somaclonal variations.

b) Factors influencing morphogenesis.

c) Procedure and precautions of stock solutions.

**P.T.O.**

## SECTION - II

- Q5)** What are transgenic plants? Discuss with suitable example the development of transgenic plant for insect resistance. **[16]**
- Q6)** a) What are somatic hybrids? Explain their applications in plant biotechnology. **[8]**  
b) Explain steps of cryopreservation in plant biotechnology. **[8]**
- Q7)** a) What is phyto remediation? Discuss it with suitable examples for organic and metal polluted sites. **[8]**  
b) Describe the improvement of quality of proteins and carbohydrates by using transgenic plants. **[8]**
- Q8)** Write short notes on any two of the following : **[16]**
- a) Importance of cryopreservation.
- b) Mycorrhiza and BGA as biofertilizers.
- c) Operation and management of Green house.



Total No. of Questions : 8]

SEAT No. :

P516

[Total No. of Pages : 2

[4234] - 310

M.Sc. - II

BOTANY

BO - 3.38 : Seed Technology - I

(2008 Pattern) (Sem. - III) (Special Paper - I)

Time : 3 Hours]

[Max. Marks :80

*Instructions to the candidates:*

- 1) *Answer any five questions, selecting at least two questions from each section.*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *All questions carry equal marks.*
- 4) *Neat-labelled diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** Explain in detail, the Various physiological and biochemical changes during seed germination. **[16]**

**Q2)** Give a brief account on the economic importance and integrated management of seed borne diseases. **[16]**

**Q3)** What is seed dormancy? Mention the types and explain the methods of breaking dormancy? **[16]**

**Q4)** Write short notes on any two of the following : **[16]**

- a) Seed quality characteristics.
- b) Quarantine for seed.
- c) Chemical composition of seed.

**P.T.O.**

## SECTION - II

- Q5)** Describe the life of any one pest of stored grain and add a note on damage caused by pest and its control measures. **[16]**
- Q6)** Define seed deterioration. Explain the causes and preventive measures of seed deterioration. **[16]**
- Q7)** Describe the constructional features for a good seed warehouse and add a note on the general principles of seed storage. **[16]**
- Q8)** Write short notes on any two of the following : **[16]**
- a) Relation of insects and plants.
  - b) Development of microsporangium.
  - c) Factors affecting seed longevity.





Total No. of Questions : 8]

SEAT No. :

P518

[Total No. of Pages : 2

[4234] - 402

M.Sc. - II

BOTANY

**BO-4.2 : Applied Botany  
(2008 Pattern) (Sem. - IV)**

*Time : 3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) *Answer any five questions, selecting at least two questions from each section.*
- 2) *Answer to the two sections should be written in separate answer books.*
- 3) *All questions carry equal marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** Enlist seaweeds and explain principles and method of production of seaweeds. [16]

**Q2)** a) Give applications of algae in sewage treatment. [8]

b) Explain mass production technology and nutritive value of Spirulina. [8]

**Q3)** a) Enlist fungal organic acids. Add note on citric acid fermentation. [8]

b) What are fungal enzymes? Briefly write steps in production of fungal enzymes. [8]

**Q4)** Write notes on any two : [16]

a) Myconematicides.

b) Fungal SCP.

c) Fungi in mineral biotechnology and particulate adsorption.

**P.T.O.**

## SECTION - II

- Q5)** What are superficial and deep mycoses? Add a note on dermatomycoses and aspergillosis. [16]
- Q6)** a) Explain how fungi act as antitumour and antiviral agents. [8]  
b) Comment on mean, mode and median with suitable examples. [8]
- Q7)** a) Explain ANNOVA with suitable examples. [8]  
b) What is Regression and Correlation? [8]
- Q8)** Write explanatory notes on any two : [16]  
a) Search engines.  
b) Scope of bioinformatics.  
c) Methods of sequence analysis.



Total No. of Questions : 8]

SEAT No. :

P520

[Total No. of Pages : 2

[4234] - 404

M.Sc.

BOTANY

**BO - 4.42 : Mycology and Plant Pathology - II**

**(2008 Pattern) (Sem. - IV) (Special - II)**

*Time : 3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) *Attempt a total of five questions from the following, select atleast two questions from each section.*
- 2) *Answers to the questions from each section should be written in separate answer books.*
- 3) *Figures to the right indicate full marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** What are different methods of fermentation technology? Give detailed account of production of antibiotics. **[16]**

**Q2)** a) How fungi act as immunoregulator? **[8]**

b) Explain role of fungi in control of weeds and nematodes. **[8]**

**Q3)** a) Enlist six fungal enzymes. Add a note on steps in industrial production of enzymes. **[8]**

b) Discuss the role of fungi in food industry. **[8]**

**Q4)** Write explanatory notes on any two : **[16]**

a) White rot fungi in bioremediation.

b) Fungi in Homoeopathy and Ayurvedic medicines.

c) Mycofungicides and Mycoinsecticides.

**P.T.O.**

## SECTION - II

- Q5)** Give difference between subcutaneous and systemic mycoses. Explain mycetoma and its clinical aspects. [16]
- Q6)** a) Comment on physiology of diseased plants. [8]  
b) Give brief account of effect of environment on disease development. [8]
- Q7)** a) Give disease cycle of downy mildew and add a note on control measures. [8]  
b) Comment on white rust disease. [8]
- Q8)** Write explanatory notes on any two : [16]
- a) Structural and Biochemical defence mechanisms.  
b) Biotechnology and its role in plant pathology.  
c) Contributions of E. J. Butler and Millardet.



Total No. of Questions : 8]

SEAT No. :

P522

[Total No. of Pages : 2

[4234] - 406

M.Sc. - II

BOTANY

**BO - 4.44 : Plant Physiology - II**

(2008 Pattern) (Semester - IV) (Special Paper - II)

*Time : 3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) *Answer any five questions, selecting at least two questions from each section.*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *All questions carry equal marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** Describe biosynthesis, degradation and role of carotenoids. [16]

**Q2)** a) Explain photochemical reaction. [8]

b) Comment on recent research in India and abroad on climate change and productivity. [8]

**Q3)** a) Explain effect of elevated levels of CO<sub>2</sub> and O<sub>2</sub> on net assimilation rate. [8]

b) Give the causes of global warming and its effect on crop yield. [8]

**Q4)** Write notes on any two of the following : [16]

- a) Ozone layer depletion
- b) Pigment organisation in thylakoid membrane
- c) Chlorophyll degradation

**P.T.O.**

## SECTION - II

**Q5)** What are allelochemicals? Explain how they help in plant competition. [16]

**Q6)** a) Explain effect of fungal infection on plant metabolism. [8]

b) Explain how, viruses interact with the plants. [8]

**Q7)** a) What are different defence mechanism in host plants? Explain. [8]

b) Explain what is hypersensitive response. [8]

**Q8)** Write notes on any two of the following : [16]

a) Bt. Cotton

b) Photoreceptors

c) Circadian rythums



Total No. of Questions : 8]

SEAT No. :

P523

[Total No. of Pages : 2

[4234] - 407

M.Sc.

**BOTANY**

**BO-4.45 : Genetics, Molecular Biology and Plant Breeding - II  
(2008 Pattern) (Special Paper - II) (Semester - IV)**

*Time : 3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) *Attempt five questions with at least two questions from each section.*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *Draw neat labelled diagrams wherever necessary.*
- 4) *All questions carry equal marks.*

**SECTION - I**

**Q1)** Explain technique of chromosome microdissection and microcloning. [16]

**Q2)** a) Explain process of RFLP. [8]

b) Discuss gene-environment interaction. [8]

**Q3)** a) How is yield of DNA measured? [8]

b) Comment on map based cloning. [8]

**Q4)** Write in brief on any two of the following : [16]

a) Application of DNA amplification.

b) Colony and plaque hybridization.

c) Chromosome walking.

**P.T.O.**

**SECTION - II**

**Q5)** What are abiotic stresses? How are these characterized? [16]

**Q6)** a) Explain drought resistance mechanisms in plants. [8]

b) Write on drought tolerant cultivated varieties of crops. [8]

**Q7)** a) How the vitamin content is enhanced in crop? Add a note on enhancement of vitamin A. [8]

b) What is protein quality? Explain. [8]

**Q8)** Write in brief on any two of the following : [16]

a) Inter specific hybridization.

b) Somaclonal variations.

c) Domestication.





Total No. of Questions : 8]

SEAT No. :

P524

[Total No. of Pages : 2

[4234] - 408

M.Sc.

BOTANY

**BO - 4.46 : Plant Biotechnology - II (Special Paper - II)**

**(2008 Pattern) (Sem. - IV)**

*Time : 3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) *Answer any five questions, selecting at least two questions from each section.*
- 2) *Answer to the two sections should be written in separate answer books.*
- 3) *All questions carry equal marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** Explain functioning of PCR giving its principle and applications. [16]

**Q2)** a) Explain genomics with reference to biotechnology. [8]

b) Give the principle and method of western blotting. [8]

**Q3)** a) Describe various types DNA polymorphisms. [8]

b) Explain mode of action of any four enzymes used in recombinant DNA technology. [8]

**Q4)** Write explanatory notes on any two of the following : [16]

a) Shot gun sequencing.

b) Chromosome walking.

c) Functional genomics.

**P.T.O.**

## SECTION - II

**Q5)** Explain the mechanism of biological nitrogen fixation. **[16]**

**Q6) a)** Give applications of plant biotechnology in agriculture with suitable examples. **[8]**

b) Explain role of microbes in leaching of metals. **[8]**

**Q7)** What is Proteomics? Explain in detail any two procedures. **[16]**

**Q8)** Write explanatory notes on any two of the following : **[16]**

a) Plasmid vectors.

b) Genome annotations.

c) Phytoremediation - Role in environment protection.



Total No. of Questions : 8]

SEAT No. :

P525

[Total No. of Pages : 2

[4234] - 409

M.Sc.

BOTANY

**BO-4.47 : Plant Biodiversity (Special Paper - II)**

**(2008 Pattern) (Sem. - IV)**

*Time : 3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) *Answer any five questions, selecting at least two questions from each section.*
- 2) *Answer to the two sections should be written in separate answer books.*
- 3) *All questions carry equal marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** Explain the causes of loss of species extinction Add a note on the process responsible for species extinction. **[16]**

**Q2)** What is ex-situ conservation. Add a note on the types of ex-situ conservation. **[16]**

**Q3)** Comment on - **[16]**

- a) Role of UNESCO and ISBI in plant biodiversity management.
- b) Biodiversity Act.

**Q4)** Write notes on any two : **[16]**

- a) Reasons for loss in diversity of major ecosystems of the world.
- b) Concept of sustainable development.
- c) Sacred grooves.

**P.T.O.**

## SECTION - II

**Q5)** Explain the methodologies for evaluation of biodiversity. Add a note on biodiversity prospecting. **[16]**

**Q6)** Define biological invasions and comment on its ecological and economic impacts. Add a note on role of biotechnology in assessment of biodiversity and bioresources. **[16]**

**Q7)** Explain : **[16]**

- a) Role of metadatabases, virtual libraries in management of plant biodiversity.
- b) Ramsar convention.

**Q8)** Write notes on any two of the following : **[16]**

- a) Ecotourism and agroforestry.
- b) CBD.
- c) Impacts of biotechnology on biodiversity.



Total No. of Questions : 8]

SEAT No. :

P526

[Total No. of Pages : 2

[4234] - 410

M.Sc. - II

BOTANY

**BO - 4.48 : Seed Technology - II (Special Paper - II)**

**(2008 Pattern) (Semester - IV)**

*Time : 3 Hours]*

*[Max. Marks :80*

*Instructions to the candidates:*

- 1) Answer any five questions, selecting at least two questions from each section.*
- 2) Answers to the two sections should be written in separate answer books.*
- 3) All questions carry equal marks.*
- 4) Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** Give an brief account of seed production of maize and soyabean. [16]

**Q2)** Describe multiplication and storage of clones in potato. Add a note on true potato seeds (TPS) production. [16]

**Q3)** Explain post-harvest operations and preparation of seeds for processing. [16]

**Q4)** Write short notes on any two of the following : [16]

- a) Seed Village concept.
- b) Production and maintenance of nucleus.
- c) Electrical conductivity separations.

**P.T.O.**

## SECTION - II

**Q5)** Describe methods and working of Equipments used in seed treatment. [16]

**Q6)** Enlist major organisations involved in seed testing. Explain sampling methods and functioning of equipments used for seed testing. [16]

**Q7)** Give concept and procedure of artificial seed production. [16]

**Q8)** Write a short note on any two of the following : [16]

- a) Central seed committee and their functioning.
- b) PCR and southern hybridization.
- c) Seed certification.



Total No. of Questions : 8]

SEAT No. :

**P501**

[Total No. of Pages : 2

**[4234] - 101**

**M.Sc. - I**

**BOTANY**

**BO - 1.1 : Systematics of Non Vascular Plants**

**(2008 Pattern) (Sem. - I)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Answer any FIVE questions, taking at least Two questions from each section.*
- 2) *Answers to the TWO sections should be written in SEPARATE answer books.*
- 3) *All questions carry EQUAL marks.*
- 4) *Neat diagrams must be drawn WHEREVER necessary.*

**SECTION - I**

**Q1)** Comment on range of thallus organization in chlorophyta and write characters of life cycle pattern in order charales. **[16]**

**Q2)** Draw and describe external morphology and internal structure of sporophyte of order Anthocerotales. **[16]**

**Q3)** Write short answers of the following : **[16]**

- a) Asexual reproduction in cyanophyta.
- b) Position of algae in eight kingdom system.

**Q4)** Write short notes on any two of the following : **[16]**

- a) Evolutionary trends among algae.
- b) Characters of Chrysophyta.
- c) Sporophyte of Polytrichum.

**P.T.O.**

## SECTION - II

**Q5)** Give an account of thallus structure, spore producing structure and life cycle pattern in Myxomycetes. **[16]**

**Q6)** Give an outline classification of fungi as per by Smith and add a note on Biotrophs. **[16]**

**Q7)** Write short answers of the following : **[16]**

- a) Describe parasexuality in fungi.
- b) Comment on asexual reproduction in Mucorales.

**Q8)** Write short notes on any two of the following : **[16]**

- a) Basidiocarp.
- b) Sphero carpales.
- c) Vegetative reproduction in Bryophytes.





Total No. of Questions : 8]

SEAT No. :

P503

[Total No. of Pages : 2

[4234] - 103

M.Sc. - I

BOTANY

**BO - 1.3 : Principles of Genetics and Plant Breeding  
(2008 Pattern) (Semester - I)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Answer any five questions, selecting at least Two questions from each section.*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *All questions carry equal marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** Define quantitative and qualitative inheritance. Describe inheritance of Quantitative traits in Nicotiana and Zea mays.

**Q2)** Explain how ordered and unordered data is used for gene mapping in Neurospora.

**Q3)** Give an account of :

- a) Complementary factors.
- b) Multiple factor hypothesis.

**Q4)** Write notes on **any two** of the following :

- a) C value paradox.
- b) Chloroplast genome.
- c) Multiple factor hypothesis.

**P.T.O.**

## SECTION - II

**Q5)** What are chromosomal abberations? Describe different types of chromosomal abberations.

**Q6)** Give classification of mutation. Explain molecular basis of gene mutations.

**Q7)** Comment on :

- a) Pre and Post Mendelian development.
- b) Importance of genetic diversity in crop improvement.

**Q8)** Write short notes on :

- a) Heterosis.
- b) Types of incompatibility.
- c) Role of polyploidy in crop improvement.



Total No. of Questions : 8]

SEAT No. :

P505

[Total No. of Pages : 2

[4234] - 202

M.Sc.

BOTANY

**BO - 2.2 : Cell Biology and Instrumentation  
(2008 Pattern) (Semester - II)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Answer any five questions, selecting at least two questions from each section.*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *All questions carry equal marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** Give an account of the evolution of eukaryotic cell from prokaryotic cells. [16]

**Q2)** a) Explain biogenesis of cell wall. [8]

b) Describe ultra structure and functions of endoplasmic reticulum. [8]

**Q3)** a) Organization of chromosomes. [8]

b) Lysosomes are known as suicide bags explain. [8]

**Q4)** Write explanatory notes on any two of the following : [16]

a) Dosage compensation.

b) Role of cyclins in mitosis.

c) Glyoxy somes.

**P.T.O.**

## SECTION - II

- Q5)** Explain different types of microscopes studied by you. [16]
- Q6)** a) Distinguish SEM and TEM. [8]  
b) Applications of ultracentrifuge. [8]
- Q7)** a) Explain principles and working of ESR spectroscopy. [8]  
b) Functions of threonine kinase. [8]
- Q8)** Write explanatory notes on any two of the following : [16]
- a) Immunodiffusion.
  - b) Microtomy
  - c) Ion exchange chromatography



Total No. of Questions : 8]

SEAT No. :

P507

[Total No. of Pages : 2

[4234] - 301

M.Sc. - II

BOTANY

**BO - 3.1 : Developmental Botany and Plant Tissue Culture  
(2008 Pattern) (Semester - III)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) Answer any five questions, taking at least Two questions from each section.
- 2) Answers to the two sections should be written in separate answer books.
- 3) All questions carry equal marks.
- 4) Neat diagrams must be drawn wherever necessary.

**SECTION - I**

**Q1)** Give an account of intrinsic and extrinsic factors controlling the plant development.

**Q2)** Explain :

- a) Cytochemical changes in vegetative plant body leading vegetative to reproductive phase.
- b) Stages of anther development.

**Q3)** Comment on :

- a) Female gamete to Phyte
- b) Developmental routes to parthenocarpy.

**Q4)** Write short notes on any two of the following :

- a) Hormone signaling during growth and development.
- b) Expression of self incompatibility.
- c) Applications of developmental botany.

**P.T.O.**

## SECTION - II

- Q5)** What is somaclonal variation? Discuss types, causes and applications of somaclonal variations.
- Q6)** Give an account of applications of plant tissue culture in production of secondary metabolites.
- Q7)** a) What is meant by totipotency ? Explain the factors affecting to tipotency.  
b) Explain the protocol of micropropagation.
- Q8)** Write short notes on any two of the following :
- a) Role of plant growth regulators.
  - b) Transgenic plants.
  - c) Isolation of protoplasts.



Total No. of Questions : 8]

SEAT No. :

P510

[Total No. of Pages : 2

[4234] - 304

M.Sc. - II

BOTANY

**BO - 3.32 : Mycology and Plant Pathology - I  
(2008 Pattern) (Special Paper - I) (Semester - III)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Answer any FIVE questions, taking to least TWO questions from each section.*
- 2) *Answers to the TWO sections should be writtern in SEPARATE answer books.*
- 3) *All questions carry EQUAL marks.*
- 4) *Neat diagrams must be drawn WHEREVER necessary.*

**SECTION - I**

**Q1)** What are Deuteromycotina? Give detail account of conidiomata and conidia morphology in the Deuteromycotina. **[16]**

**Q2)** Write short answers of the following : **[16]**

- a) "Laboulbeniomycetes is interesting group". Amplify.
- b) Give Bessey's classification of fungi.

**Q3)** Give characters of zygomycotina. Discuss sporangia to conidial evolution in Mucorales. **[16]**

**Q4)** Write short notes on **any two** of the following : **[16]**

- a) Plasmodiophoromycetes
- b) Forms of Lichen
- c) Aphyloporales
- d) Fructifications in Gasteromycetes.

**P.T.O.**

## SECTION - II

**Q5)** Discuss in detail colonization strategies in fungi. Add a note on soil fungi. **[16]**

**Q6)** Write short answers of the following : **[16]**

- a) Comment on rhizosphere fungi.
- b) Briefly write on heterothallism.

**Q7)** Discuss different aspects of pathogenicity host resistance and virulence. How fungi are ideal organisms for genetical studies? **[16]**

**Q8)** Write short notes on **any two** of the following : **[16]**

- a) Fungal toxins.
- b) Fungal nitrogen nutrition.
- c) Fungal association with plants.
- d) Air borne fungi.





Total No. of Questions : 8]

SEAT No. :

P511

[Total No. of Pages : 2

[4234] - 305

M.Sc. (Part - II)

BOTANY

BO - 3.33 : Angiosperms

(2008 Pattern) (Semester - III) (Special Paper - I)

Time : 3 Hours]

[Max. Marks : 80

*Instructions to the candidates:*

- 1) *Answer any five questions, taking at least TWO questions from each section.*
- 2) *Answers to the TWO sections should be written in SEPARATE answer books.*
- 3) *ALL questions carry EQUAL marks.*
- 4) *Neat diagrams must be drawn WHEREVER necessary.*

**SECTION - I**

**Q1)** Discuss the role of Modern trends in systematics of Amentiferae and santalaceae.

**Q2)** Discuss :

- a) Objectives and functions of botanical gardens.
- b) Exocarpus and Mesembryanthemum.

**Q3)** Explain an organization, units, objectives and functions of herbarium.

**Q4)** Write notes on any two :

- a) Mughal gardens.
- b) ICBN
- c) Procedures of Biosystematic investigation.

**P.T.O.**

## SECTION - II

**Q5)** Explain floristic composition of India. Add a note on biodiversity of world.

**Q6)** Describe the following :

- a) Clausen's experiment.
- b) Effective and valid Publication.

**Q7)** Give aims and objectives of Biosystematics. Add a note on Numerical taxonomy.

**Q8)** Write notes on any two :

- a) Primitive features of centrospermae.
- b) Digital herbarium.
- c) Distinguishing features of Loranthoideae and viscoideae.



Total No. of Questions : 8]

SEAT No. :

P513

[Total No. of Pages : 2

[4234] - 307

M.Sc. -II

BOTANY

**BO-3.35 : Genetics, Molecular Biology and Plant Breeding-I  
(2008 Pattern) (Semester - III) (Special Paper - I)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Answer any five questions, taking at least Two questions from each section.*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *All questions carry equal marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** Explain structural and organizational complexity of eukaryotic chromosome.

**Q2)** a) Comment on any two methods of bacterial recombination.

b) Write briefly on inheritance of quantitative characters with suitable example.

**Q3)** a) Explain co-relation of genetic and physical maps.

b) Write an account of karyotype evolution.

c) Give an account of alien gene transfer in wheat through chromosome manipulation.

**Q4)** Write notes on **any two** of the following :

a) Null hypothesis

b) Haploid - origin and production

c) Gene targeting

**P.T.O.**

## SECTION - II

**Q5)** Explain population improvement through mass, progeny and recurrent selection.

**Q6)** Describe the method of handling of material treated with the mutagens and the progeny of M1, M2 and M3 generations.

**Q7)** a) Write an account of completely randomized block designs.

b) Give characteristics of monosomics and trisomics.

**Q8)** Write notes on any two of the following :

a) Biochemical genetics

b) Binomial expansion

c) Production of hybrid seeds.



Total No. of Questions : 8]

SEAT No. :

P515

[Total No. of Pages : 2

[4234] - 309

M.Sc. - II

BOTANY

BO - 3.37 : Plant Diversity

(2008 Pattern) (Special Paper - I) (Semester - III)

Time : 3 Hours]

[Max. Marks : 80

*Instructions to the candidates:*

- 1) *Answer any FIVE questions taking at least two questions from each section.*
- 2) *Answers to the TWO sections should be written in SEPARATE answer books.*
- 3) *All questions carry EQUAL Marks.*
- 4) *Neat diagrams must be drawn WHEREVER necessary.*

**SECTION - I**

**Q1)** Comment on global distribution of biodiversity and add a note on endemism and diversity.

- Q2)** a) Define micro and macro evolution. Add a note on Darwin's evidence for natural selection.
- b) Give comparison of different sampling techniques of biodiversity.

- Q3)** a) Describe fresh water wetlands.
- b) Explain marine ecosystem in detail.

**Q4)** Write short notes on any two :

- a) Determinants of genetic diversity.
- b) Diversity in domesticated species.
- c) Distribution of higher plant species diversity.

**P.T.O.**

## SECTION - II

**Q5)** Comment on algal and bryophyte diversity with reference to habit, habitat and distribution.

**Q6)** Explain :

- a) Levels of biodiversity.
- b) Global distribution of species richness.

**Q7)** Comment on :

- a) Species inventory.
- b) Origin and evolution of cultivated species diversity.

**Q8)** Write notes on any two :

- a) Microbial diversity.
- b) Sampling techniques for biodiversity assessment.
- c) Hotspots in India.



Total No. of Questions : 8]

SEAT No. :

P517

[Total No. of Pages : 2

[4234] - 401

M.Sc.

BOTANY

**BO - 4.1 : Plant Resources and Evolution  
(2008 Pattern) (Semester - IV)**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt a total of five questions from the following, selecting at least two questions from each section.*
- 2) *Answers to the questions from each section should be written in separate answer books.*
- 3) *Figures to the right indicate full marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*

**SECTION - I**

- Q1)** Describe two resins and two fibre yielding crops w.r.t. botanical name, part used, chemical constituents and therapeutic uses. **[8]**
- Q2)** a) Comment on the methods of phytochemical investigation w.r.t. secondary metabolites. **[8]**  
b) Enlist and describe Vavilov's center of origin. **[8]**
- Q3)** a) Give the significance of energy plantations . **[8]**  
b) What are secondary metabolites? Give a brief account of types of secondary metabolites present in medicinal plants with one example each **[8]**
- Q4)** Write explanatory notes on **any two** of the following : **[16]**  
a) Miller's experiment.  
b) Major events in evolutionary time scale.  
c) Concept of variation.

**P.T.O.**

## SECTION - II

- Q5)** Give monographic account of any one drug obtained from bark and rhizome. **[16]**
- Q6)** a) What is chemotaxonomy? Give its role in criminology. **[8]**  
b) Comment on microscopic evaluation for standardization of crude drugs. **[8]**
- Q7)** a) Write in brief on molecular tools in phylogeny. **[8]**  
b) Explain sexual selection in the mechanism of evaluation. **[8]**
- Q8)** Write explanatory notes on any two of the following : **[16]**
- a) Importance of ethnobotany.  
b) Cordaitales.  
c) Spontaneity of mutations.





Total No. of Questions : 8]

SEAT No. :

P519

[Total No. of Pages : 2

[4234] - 403

M.Sc. - II

BOTANY

BO - 4.41 : Phycology

(Special Paper - II) (2008 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) Answer any five questions, selecting at least two questions from each section
- 2) Answer to the two sections should be written in separate answer books.
- 3) All questions carry equal marks.
- 4) Neat diagrams must be drawn wherever necessary.

**SECTION - I**

**Q1)** Describe mass Production technology of Spirulina. comment on its nutritional value. [16]

**Q2)** a) Describe different methods used in isolation of algae. [8]

b) Explain in brief strain selection, and measurement of growth in culturing of algae. [8]

**Q3)** a) Describe processing and quality standards of large scale cultivation of algae. [8]

b) Give an account of different media used in culturing of algae. [8]

**Q4)** Write short notes on any two of the following : [16]

a) Nutritional value of Chlorella

b) Agarophytes

c) Maintenance of algal cultures.

**P.T.O.**

## **SECTION - II**

- Q5)** What is bioremediation? Explain the role of algae in sewage disposal and waste water treatment. **[16]**
- Q6)** a) Describe various types of biofertilizers and comment on seaweed liquid fertilizer. **[8]**  
b) Comment on the various seaweed resources of India. **[8]**
- Q7)** a) Explain in brief the role of algae in biotechnology. **[8]**  
b) Describe the use of algae in production of biofuel. **[8]**
- Q8)** Write short notes on any two of the following : **[16]**
- a) SCP
  - b) Tissue culture of marine Macroalgae
  - c) Algal biotechnology and entrepreneurship development.



Total No. of Questions : 8]

SEAT No. :

P521

[Total No. of Pages : 2

[4234] - 405

M.Sc. (Part - II)

BOTANY

BO-4.43 : Angiosperms - II

(2008 Pattern) (Special - II) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 80

*Instructions to the candidates:*

- 1) *Answer any five questions, selecting at least two questions from each section.*
- 2) *Answer to the two sections should be written in separate answer books.*
- 3) *All questions carry equal marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

**Q1)** What are avenues? Explain criteria for selection of trees for road-sides and public gardens. **[16]**

**Q2)** Explain :

- a) Somatic embryogenesis **[8]**
- b) Structure and distribution of wood elements. **[8]**

**Q3)** Enlist major timber yielding plants. Give distribution of wood elements and uses of any two timber plants. **[16]**

**Q4)** Write explanatory notes on any two of the following : **[16]**

- a) After care of trees.
- b) VAM application.
- c) Arborescent monocotyledons.

**P.T.O.**

## SECTION - II

**Q5)** Describe ultra structure of pollen. Add a note on its biochemical aspects. **[16]**

**Q6)** Explain foraging behaviour of bees in relation to pollen. Add a note on floral calender. **[16]**

**Q7) a)** Describe pollen germination in vivo and in vitro. **[8]**

b) Explain the steps involved in androgenesis. **[8]**

**Q8)** Write explanatory notes on any two of the following : **[16]**

a) Apomixis

b) Causes and significance of polyembryony.

c) Pollen storage.

