

Total No. of Questions : 7]

SEAT No. :

PE5539

[Total No. of Pages : 2

[6516]-101

M.Sc. - I

BOTANY

**BOUT 111 : Plant Systematics - I
(2019 Pattern) (CBCS) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any five questions from Q.2 to Q.7.*
- 3) *Questions 2 to 7 carry equal marks.*

Q1) Solve any five of the following. [10]

- a) Give the applications of algae as biofertilizer.
- b) What is concept of species?
- c) Distinguish between Hemiascomycetes and Euscomycetes
- d) Applications of Fungi as Biocontrol.
- e) What is Apogamy?
- f) Importance of Bryophytes in Horticulture.

Q2) a) Comment on morphology of thallus and anatomical peculiarities in phaeophyta. [7]

b) Describe sexual reproduction in charophyto. [5]

Q3) a) Describe thallus structure and hyphal modification in fungi. [7]

b) Comment on Heterothallism and sexual reproduction in zygomycotina.[5]

Q4) a) Describe sporophyte of Anthecerotales. [7]

b) Give distinguishing characters of order marchantiales. [5]

P.T.O.

- Q5)** a) Describe morphology and life cycle pattern in Rhodophyta. [7]
b) Write distinguishing characters and thallus structure in zygomycotina.[5]
- Q6)** a) Contribution of fungal studies in India and World. [7]
b) Comment on sporophyte of Eubryales. [5]
- Q7)** Write short notes on any two of the following. [12]
a) Explain thallus organisation in chlorophyta.
b) Describe Fructification in Ascomycotina.
c) Describe theory of reduction in Bryophytes.



Total No. of Questions : 7]

SEAT No. :

PE-5540

[Total No. of Pages : 2

[6516]-102
M.Sc. (Part - I)
BOTANY
BOUT-112: CELL BIOLOGY AND EVOLUTION
(2019 Pattern) (CBCS) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) *Q. 1 is compulsory.*
- 2) *Attempt any five questions from Q. 2 to Q. 7.*
- 3) *Questions 2 to 7 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following :

[10]

- a) Define glycocalyx
- b) What is Giant chromosome?
- c) What is kinase?
- d) Define Meiosis
- e) What is Darwinism?
- f) Define Receptor.

Q2) a) Explain the ultrastructure and function of mitochondrion.

[7]

b) What is polytene chromosome?

[5]

P.T.O.

- Q3)** a) What is cross talking? Explain with suitable example. [7]
b) Comment on the signalling transduction occurred during the biotic stress. [5]
- Q4)** a) What is mean by maturation promoting factor. [7]
b) Write a note on Apoptosis. [5]
- Q5)** a) Elaborate the theory of Lamarckism. [7]
b) What is gene divergence. [5]
- Q6)** a) Comment on the Biogenesis of lysosomes. [7]
b) Write a note on Actine filament. [5]
- Q7) Write short notes on any two of the following :** [12]
a) Phospholipase A2 signalling
b) Activatory protein kinase
c) Hardy - weinberg law.



Total No. of Questions : 7]

SEAT No. :

PE-5541

[Total No. of Pages : 2

[6516]-103

M.Sc. (Part - I)

BOTANY

**BOUT - 113 : Cytogenetics and Plant Breeding
(CBCS) (2019 Pattern) (Semester - I) (Paper - III)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Attempt any five questions from Q.2 to Q.7*
- 3) *Questions 2 to 7 carry equal marks.*
- 4) *Figures to the right indicate full marks.*

Q1) Solve any five of the following: [10]

- a) State Mendel's law of segregation.
- b) What is karyotype?
- c) Enlist any two objectives of plant breeding.
- d) Define mutation breeding
- e) Give any two applications of apomixis.
- f) What do you mean by Chimeras?

Q2) a) Explain the maternal effect in Limnaea peregra. [7]

b) Describe the heritability & its measures. [5]

Q3) a) Explain site specific recombination in phages. [7]

b) Give an applications of polyploids. [5]

P.T.O.

- Q4)** a) Define Hybridization & give the procedure for hybridization. [7]
b) Write in brief about centers of Origin of plant genetic resources. [5]
- Q5)** a) Describe the nature and classification of mutations. [7]
b) Write a note on breeding methods of oil & protein yielding plants. [5]
- Q6)** a) Explain mapping of bacterial genome by interrupted mating. [7]
b) Write a concept of gene, allele & multiple alleles. [5]
- Q7)** Write a short notes on any two of the following. [12]
a) Allele mining.
b) Primary and Secondary gene pool.
c) Concept of biopharming.



Total No. of Questions : 5]

SEAT No. :

PE-5542

[Total No. of Pages : 2

[6516]-104

M.Sc.

BOTANY

**BODT-114: Biofertilizer and Algal Technology
(2019 Pattern) (Semester - I) (Credit System)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates :

- 1) *Q. 1 is compulsory.*
- 2) *Solve any three questions from Q. 2 to Q. 5.*
- 3) *Questions 2 to 5 carry equal marks.*

Q1) Solve any five of the following :

[5]

- a) What is bio-hydrogen?
- b) Enlist N_2 fixing cyanobacteriae.
- c) Define mycorrhizae
- d) Give the algae used as food
- e) What is SCP?
- f) Enlist the biodiesel yielding algae

Q2) a) Describe the potential of algae as fine chemical & fuel.

[6]

b) Write shortly on Rhizobium as a biofertilizer.

[4]

P.T.O.

Q3) a) Explain importance of cyanobacteria as a biofertilizer. **[6]**

b) Write on agar production method from algae. **[4]**

Q4) a) Discuss genetically modified organisms used for biofertilizer **[6]**

b) Write the process of biodiesel extraction from algae. **[4]**

Q5) Write short notes on any two : **[10]**

a) Bio-hydrogen production from algae.

b) Application method of Rhizobium & cyanobacteria as a biofertilizer

c) Processes of cultivation of algae.



Total No. of Questions : 5]

SEAT No. :

PE-5543

[Total No. of Pages : 2

[6516]-105

M.Sc. (Part - I)

BOTANY

**BODT-114 : Pomoculture and Fruit Processing Technology
(2019 Pattern) (CBCS) (Paper - IV) (Semester - I)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Q. 1 is compulsory.
- 2) Solve any three questions from Q.2 to Q.5.
- 3) Questions 2 to 5 carry equal marks.

Q1) Solve any Five of the following.

[5]

- a) What is pruning.
- b) Enlist plant growth substances.
- c) Give advantages of vegetative reproduction.
- d) Define the role of preservatives.
- e) Give the role of pectin power.
- f) Give advantages of contour system.

Q2) a) Describe the role of plant growth substances in pomology

[6]

b) Explain the method of preparation of jam and jelly

[4]

Q3) a) Describe the methods of post harvest handlings of fruits

[6]

b) Write on parameters used as fruit maturity indices

[4]

P.T.O.

- Q4)** a) Explain the importance of fermentation in alcoholic drinks production. [6]
- b) Comment on problems of fruit setting. [4]

Q5) Write short notes on any two of the following: [10]

- a) Methods of preservations.
- b) Manufacture of champagne.
- c) Role of value addition in Nutrition.



Total No. of Questions : 7]

SEAT No. :

PE-5443

[Total No. of Pages : 2

[6516]-201

First Year M.Sc.

BOTANY

BOUT-121 : Plant Systematics - II

(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No.1 is compulsory.
- 2) Solve any five questions from Q.No.2 to Q.No.7.
- 3) Questions 2 to 7 carry equal marks.

Q1) Solve any five of the following:

[10]

- a) Give medicinal applications of pteridophytes.
- b) Describe affinities of gymnosperms with pteridophytes.
- c) Give distribution of gymnosperms in India.
- d) Comment on phylogenetic systems of classification as per Cronquist (1981)
- e) Give economic aspects of gymnosperms.
- f) Comment on APG system of classification.

Q2) a) Describe morphology and affinities of cycadales.

[7]

b) Give distinguishing characters of Psilotales.

[5]

Q3) a) Describe family Malvaceae w.r.t. general characters and affinities as per Bentham and Hooker's system of classification.

[7]

b) Describe morphology of sporophyte of Marsileales.

[5]

Q4) a) Describe morphology and affinities of Glossopteris.

[7]

b) Comment on origin and evolution of Angiosperms.

[5]

P.T.O.

- Q5)** a) Describe family Acanthaceae w.r.t. morphology and affinities as per Bentham and Hookers system of classification. [7]
b) Give an account on seed development in Gymnosperms. [5]
- Q6)** a) Give comparative account of morphology, anatomy and inter-relationships of Cycadales and Ginkgoales. [7]
b) Comment on the importance and need for classification in Angiosperms. [5]
- Q7)** Write short notes on any two of the following : [12]
a) Give classification of gymnosperms by Raizada and Sahni (1960)
b) Comment on stellar evolution.
c) Write on characteristics features of Angiosperms.



Total No. of Questions : 7]

SEAT No. :

PE-5444

[Total No. of Pages : 2

[6516]-202

First Year M.Sc.

BOTANY

**BOUT-122 : Molecular Biology
(2019 Pattern) (Semester - II)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any 5 questions from question 2 to 7.*
- 3) *Question 2 to 7 carry equal marks.*

Q1) Answer any five of the following:

[10]

- a) Explain any one application of Molecular Biology.
- b) What is Photoreactivation?
- c) RNA polymerase
- d) Micropipettes
- e) What is deamination?
- f) Initiator gene.

Q2) a) Enlist major equipments used in molecular biology with their role.

[7]

b) How genome organized in Prokaryotes?

[5]

Q3) a) Explain the Lac operon model.

[7]

b) What is transcription apparatus? Give the list and role of enzymes/factors involved in transcription processes.

[5]

Q4) a) Give the diagrammatic representation of mechanism of DNA replication in Prokaryotes.

[7]

b) What is blotting techniques? Explain any one.

[5]

Q5) a) What is Genetic code? Describe the properties of genetic code.

[7]

b) What are transposable elements? Explain the types and their role.

[5]

P.T.O.

- Q6)** a) Describe Watson and Crick model of DNA. [7]
b) Role of enzymes in molecular biology. [5]
- Q7)** Write short note on any two of the following. [12]
a) Explain genomics and proteomics in detail.
b) Give an comparative account of structure of Prokaryotic and eukaryotic gene.
c) What is gene regulation? Give the concept of positive/negative regulation.



Total No. of Questions : 7]

SEAT No. :

PE-5445

[Total No. of Pages : 2

[6516]-203

First Year M.Sc.

BOTANY

BOUT-123 : Biochemistry

(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No.1 is compulsory.
- 2) Solve any five questions from Q.No.2 to Q.No.7.
- 3) Questions 2 to 7 carry equal marks.

Q1) Solve any five of the following: [10]

- a) What is normality?
- b) Comment on nucleosides and nucleotides.
- c) What are aromatic amino acids?
- d) Write about quaternary protein structure.
- e) State about uncompetitive enzyme inhibition.
- f) Comment on leghaemoglobin.

Q2) a) Comment on biosynthesis of purines. [7]

b) Explain, why water is a universal solvent. [5]

Q3) a) What is a chemical bond? Explain various types of chemical bonds. [7]

b) Comment on properties of lipids and add a note on types of lipids. [5]

Q4) a) Discuss about synthesis and breakdown of glucose. [7]

b) Write general classification of proteins. [5]

Q5) a) Derive Michaelis-Menten equation. [7]

b) Discuss nitrate and ammonia assimilation. [5]

P.T.O.

- Q6)** a) State importance of primary and secondary metabolites. [7]
b) Discuss biosynthetic pathway for pigments. [5]
- Q7)** Write a short note on any two of the following: [12]
a) Give mathematical expression of pH. Add a note on biological buffer.
b) Write about extraction, qualitative and quantitative analysis of phenols and glycosides.
c) Give structure, classification and therapeutic plant sources of terpenes and alkaloids.



Total No. of Questions : 5]

SEAT No. :

PE-5446

[Total No. of Pages : 2

[6516]-204

First Year M.Sc.

BOTANY

**BODT-124 A : Floriculture and Nursery Management
(2019 Pattern) (Semester - II)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any three questions from Q.No.2 to Q.No.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Figures to the right side indicate full marks.*

Q1) Attempt any five of the following: **[5]**

- a) What is surface dressing of soil?
- b) Define floriculture.
- c) What do you mean by layout of nursery?
- d) Define harvesting index of flower.
- e) What is disbudding?
- f) Define cut flower.

Q2) a) Explain any three steps of flower processing. **[6]**

- b) What is growing medium? Write about its need for different purposes in nursery. **[4]**

Q3) a) Describe any two techniques of vegetative propagation used in nursery management. **[6]**

- b) Write about varietal wealth and export potential of scented rose. **[4]**

Q4) a) Enlist the prerequisites of commercial floriculture and describe any two of them. **[6]**

- b) What are different aspects of production of plants from seeds? Write about dormancy and pre-treatment of seeds. **[4]**

P.T.O.

Q5) Write short notes on any two of the following:

[10]

- a) Care of seed bed.
- b) Fencing in nursery management
- c) Value addition in flower processing.



Total No. of Questions : 5]

SEAT No. :

PE-5447

[Total No. of Pages : 2

[6516]-205

First Year M.Sc.

BOTANY

**BODT-124B : Mushroom Cultivation and Bio-Pesticides
Technology**

(2019 Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any three questions from Q.No.2 to Q.No.5.*
- 3) *Questions 2 to 5 carry equal marks.*

Q1) Solve any five of the following: **[5]**

- a) Enlist any two edible mushrooms.
- b) Enlist any two biocontrol agents.
- c) Cropping.
- d) Amensalism.
- e) Enlist any two pest of mushrooms.
- f) Pyrethrum.

Q2) a) Explain *Lentinus* mushroom cultivation method. **[6]**

b) How insects are working as a biocontrolling agents for different crop plants? **[4]**

Q3) a) How Karanja and Nicotine used as botanical pesticides? **[6]**

b) State the importance of mushrooms. **[4]**

Q4) a) Explain how mycorrhizal fungi and biofertilizers control plant diseases? **[6]**

b) Give the history of mushroom cultivation. **[4]**

P.T.O.

Q5) Write short notes on any two of the following:

[10]

- a) Economics of mushroom
- b) Edible mushroom
- c) Commercialization of biopesticides



Total No. of Questions : 7]

SEAT No. :

PE5544

[Total No. of Pages : 2

[6516]-301

M.Sc. - II

BOTANY

**BOUT 231 : Computational Botany
(2019 CBCS Pattern) (Semester - III)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Attempt any five questions from Q.2 to Q.7.*
- 3) *Questions 2 to 7 carry equal marks.*
- 4) *Figures to the right indicate full marks.*

Q1) Answer any five of the following. [10]

- a) Define median with suitable example.
- b) What is IPR?
- c) Define pH?
- d) What is SPSS? State any two uses of SPSS in biological data analysis.
- e) Define BLAST
- f) Define molarity with appropriate example.

Q2) a) Ten Competitors in a flower beauty contest are ranked by two judges in the following order : [7]

Judge 1	1	6	5	10	8	2	4	9	7	8
Judge 2	3	5	8	4	7	10	2	1	6	9

Use rank correlation coefficient to determine which pair has the nearest approach to common rank in deciding flower beauty.

- b) What is serial dilution in cell count analysis? A solution is prepared by mixing 20g of NaCl solution. Calculate the molarity of the NaCl solution if the volume of the solution is 1000 ml (NaCl mw 58.44g/mol) [5]

Q3) a) What is central tendency? Give detail account on coefficient of variance. [7]

- b) Enlist biostatistical softwares used in analysis and explain any one of them. [5]

P.T.O.

- Q4)** a) Give detail account on scientific communications. Write down steps involved in proposal writing. [7]
- b) Give a brief account on logical organization of scientific data and documentation. [5]
- Q5)** a) What is correlation? Explain in detail Karl-Pearson's coefficient of correlation. [7]
- b) Explain in detail Dunnet's test for comparison of treatment mean with control. [5]
- Q6)** a) What is data retrival tool in Bioinformatics? Explain PubMed and OMIM [7]
- b) Explain sampling & sampling distribution with suitable example and add a note on methods of samplings. [5]
- Q7)** Write short notes on any two of the following. [12]
- a) Measures of disperssion
- b) Oral forms of scientific communications.
- c) Types of sequences used in bioinformatics.



Total No. of Questions : 7]

SEAT No. :

PE-5545

[Total No. of Pages : 2

[6516]-302
M.Sc. (Part - II)
BOTANY
BOUT-232: DEVELOPMENTAL BOTANY
(2019 Pattern) (Semester - III) (CBCS)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) *Q. 1 is compulsory.*
- 2) *Attempt any five questions from Q. 2 to Q. 7.*
- 3) *Questions 2 to 7 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following :

[10]

- a) What is potency.
- b) What is dedifferentiation.
- c) What is skotomorphogenesis.
- d) Comment on stem cells.
- e) What is commitment.
- f) Define Juvenility.

Q2) a) Explain the organization of RAM with suitable diagram.

[7]

- b) Explain the ABC model of flower development.

[5]

- Q3)** a) What is competence? Add note on proximate induction and describe its competence. [7]
- b) Discuss the mechanism underlying vernalization. [5]
- Q4)** a) Discuss the development of Stamen with suitable diagram. [7]
- b) Explain molecular basis of shoot development. [5]
- Q5)** a) Explain the physiology of plant development. [7]
- b) Write short note on male germ unit. [5]
- Q6)** a) Explain radial and axile pattern of development. [7]
- b) Explain reproductive structure in plant. [5]
- Q7) Write short notes on any two of the following.** [12]
- a) Juvenility - characteristic transition to adult phase.
- b) Significance of double fertilization.
- c) Epigenetics.



Total No. of Questions : 7]

SEAT No. :

PE-5546

[Total No. of Pages : 2

[6516]-303

M.Sc. (Part - II)

BOTANY

BOUT - 233 : Plant Physiology

(2019 Credit Pattern) (CBCS) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Attempt any 5 questions from Q.2 to Q.7*
- 3) *Questions 2 to 7 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following:

[10]

- a) Enlist essential elements.
- b) Define photo - oxidation of water.
- c) Give the types of Soil.
- d) What is the Photorespiration?
- e) Give the role of cytokinin.
- f) What is Vernalization?

Q2) a) What are C₄ plant? Explain the mechanism of C₄ cycle.

[7]

b) Give an account of properties of water.

[5]

Q3) a) What is Photoperiodism? Explain the mechanism of vernalization.

[7]

b) Explain Fatty acid biosynthesis.

[5]

P.T.O.

- Q4)** a) Explain Active & passive transport. Give the role of ATPase & PPase.[7]
b) What is photorespiration? Explain the photorespiration mechanism & significance. [5]
- Q5)** a) Give schematic presentation of Glycolysis. add a note on significance.[7]
b) What is seed dormancy? Explain type of dormancy & causes. [5]
- Q6)** a) Explain the mechanism of opening & closing of stomata. [7]
b) What is Respiration? Explain the organization of respiratory electron transport system. [5]
- Q7) Write a short notes on any two of the following. [12]**
a) Schematic presentation of secondary metabolite pathways.
b) CAM Pathway
c) Cyanide resistance pathway.



Total No. of Questions : 5]

SEAT No. :

PE-5547

[Total No. of Pages : 2

[6516]-304
M.Sc. (Part - II)
BOTANY
BODT-234b : Angiosperm Taxonomy
(2019 Pattern) (CBCS) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Q. 1 is compulsory.*
- 2) *Attempt any three questions from Q.2 to Q.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following.

[5]

- a) Define taxonomy.
- b) What are monographs?
- c) Define biodiversity.
- d) What is herbarium.
- e) What is precipitation reaction?
- f) Palynotaxonomy.

Q2) a) What is IUCN. Describe its categories.

[6]

b) Comment on embryological characters of taxonomic importance. **[4]**

Q3) a) What is RAPD. Give applications of RAPD in molecular systematics.

[6]

b) What is ICN? Comment on principle of Priority. **[4]**

P.T.O.

Q4) a) Define endemism? Discuss types of endemism. [6]

b) Applications of SEM and TEM in plant systematics. [4]

Q5) Write short notes on any two of the following: [10]

a) Botanic gardens of the world.

b) Criteria for use of chemical in plant taxonomy.

c) PCR.



Total No. of Questions : 5]

SEAT No. :

PE-5548

[Total No. of Pages : 2

[6516]-305
M.Sc. (Part - II)
BOTANY
BODT-234 : Genetics and Plant Breeding
(2019 Pattern) (CBCS) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Q. 1 is compulsory.*
- 2) *Attempt any three questions from Q.2 to Q.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following.

[5]

- a) What is C banding?
- b) Define Mutation
- c) What is Outbreeding?
- d) Give any one Application of Hardy Weinberg law in breeding
- e) What is hybridization based marker?
- f) Define Geographical Indication.

Q2) a) Give on account on Application of karyotyping Analysis in taxonomy.

[6]

b) Explain Interspecific Variations.

[4]

Q3) a) Explain briefly MAS Application in plant Breeding.

[6]

b) Describe the Hardy Weinbergs principle.

[4]

P.T.O.

Q4) a) Describe the transposable element in bacteria. [6]

b) Describe the conditions for granting breeding rights. [4]

Q5) Write short notes on any two of the following: [10]

a) Notes on Insitu hybridization.

b) Giemsa C banding.

c) Simple Coefficient Analysis.



Total No. of Questions : 5]

SEAT No. :

PE-5549

[Total No. of Pages : 2

[6516]-306
M.Sc. (Part - II)
BOTANY
BODT-234: MYCOLOGY
(2019 Pattern) (Semester - III) (CBCS)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates :

- 1) *Q. 1 is compulsory.*
- 2) *Attempt any three questions from Q. 2 to Q. 5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following :

[5]

- a) Write any two significance of Fungi.
- b) What is Karyogamy?
- c) Define Mycelium
- d) What is Homothallic Fungi?
- e) Define plasmodium
- f) What is sclerotia?

Q2) a) Describe the general characters and structural variations in dictyosteliomycetes.

[6]

- b) Give an outline of L.E. Hawkers system (1966) of classification of fungi upto order

[4]

P.T.O.

Q3) a) Describe the general characters and structural variations in pyrenomycetes. [6]

b) Comment on uredinales fungi. [4]

Q4) a) Write the general characteristics and structural variations in chytridiomycetes. [6]

b) Comment on sexual spores in basidiomycetes. [4]

Q5) Write short notes on any two of the following. [10]

a) Comment on mycelia sterilia.

b) General characteristics of polypores.

c) Affinities of fungi with plants and animals.



Total No. of Questions : 5]

SEAT No. :

PE-5550

[Total No. of Pages : 2

[6516]-307
M.Sc. (Part - II)
BOTANY
BODT-234d : Plant Biotechnology
(2019 Pattern) (CBCS) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Q. 1 is compulsory.*
- 2) *Attempt any three questions from Q.2 to Q.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following.

[5]

- a) Define transgenic plants.
- b) What is genetic engineering?
- c) Write scope of biotechnology.
- d) Define recombinant technology.
- e) Write any two importance of plant tissue culture.
- f) Write any two objectives of biosafety of biotechnology.

Q2) a) Describe the structure of Ti Plasmid and organization of T DNA. [6]

b) Comment on agrobacterium mediated gene transfer. **[4]**

Q3) a) Define somaclonal variation. Write their applications & limitations. [6]

b) Comment on physical & biological contaminants of biosafety. **[4]**

P.T.O.

- Q4)** a) What is patent? Explain the process of patenting. [6]
b) Describe the structure of cauliflower mosaic virus. [4]

Q5) Write short notes on any two of the following: [10]

- a) Plant breeder rights.
- b) Promoters
- c) Plant derived vaccines.



Total No. of Questions : 5]

SEAT No. :

PE-5551

[Total No. of Pages : 2

[6516]-308
M.Sc. (Part - II)
BOTANY
BODT-234C : Plant Ecology
(2019 Credit Pattern) (CBCS) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Q. 1 is compulsory.*
- 2) *Attempt any three questions from Q.2 to Q.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following.

[5]

- a) What is ecological succession.
- b) Write about geology as factor affecting plant distributions.
- c) What is herbivory?
- d) Define plant ecology.
- e) Write any one method of biodiversity management.
- f) Define biogeochemical cycle.

Q2) a) Describe 'r' and 'k' selection as life history strategy.

[6]

b) Describe concept of climax in ecological succession.

[4]

Q3) a) Explain structure and function of estuarine ecosystem.

[6]

b) Describe nature and composition of plant community.

[4]

P.T.O.

- Q4)** a) Explain the levels of species diversity and its measurement. [6]
b) Describe concept of limiting factors. [4]

Q5) Write short notes on any two of the following: [10]

- a) Scope of plant ecology.
- b) Major drivers of biodiversity change.
- c) Edges and ecotones of community.



Total No. of Questions : 5]

SEAT No. :

PE-5552

[Total No. of Pages : 2

[6516]-309
M.Sc. (Part - II)
BOTANY
BODT-234F : Seed Science
(2019 Pattern) (CBCS) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Q. 1 is compulsory.*
- 2) *Attempt any three questions from Q.2 to Q.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following.

[5]

- a) Define seed Technology.
- b) What is seed Dormancy?
- c) What is quick viability?
- d) Give fullform of PCR.
- e) What is Artificial seed?
- f) What is recalcitrant seed?

Q2) a) What is the scope of Seed Technology in Agriculture?

[6]

b) Explain causes of seed dormancy.

[4]

Q3) a) What is moisture testing and how does it affect seed quality?

[6]

b) Describe the seed production process in maize.

[4]

P.T.O.

- Q4)** a) Explain the primary components found in seeds. [6]
b) What types of equipment are used for seed sampling & dividing? [4]

Q5) Write short notes on any two of the following: [10]

- a) Difference between seed and a grains.
- b) True potato seeds.
- c) Use of PCR for varietal identification.



Total No. of Questions : 7]

SEAT No. :

PE-5448

[Total No. of Pages : 2

[6516]-401

S.Y. M.Sc.

BOTANY

**BOUT-241 : Botanical Technique
(2019 Pattern) (Semester - IV)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 compulsory.*
- 2) *Solve any questions from Q.No.2 to Q.No.7*
- 3) *Q.No.2 to Q.No.7 carry equal marks.*
- 4) *Neat diagram must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following:

[10]

- a) What is Resolution?
- b) Give the principle of microtomy.
- c) Write the principle of affinity chromatography.
- d) Give the applications of X-ray crystallography.
- e) Define Autoradiography.
- f) Write the applications of ELISA.

Q2) a) Give the principle, working and applications of fluorescence microscopy. **[7]**

b) Describe principle and applications of column chromatography. **[5]**

Q3) a) Explain in detail ultra centrifugation and their types. **[7]**

b) Describe principle and applications of spectrophotometer. **[5]**

P.T.O.

- Q4)** a) Describe principle, working and applications of Atomic absorption spectroscopy. [7]
b) Explain principle and applications of Gas chromatography. [5]
- Q5)** a) Describe principle, working and applications of centrifugation technique. [7]
b) Explain principle and procedure of flow cytometry. [5]
- Q6)** a) Describe the principle, working and applications of microtomy. [7]
b) Describe various aspects of Agarose gel electrophoresis. [5]
- Q7)** Write short notes on any two of the following : [12]
a) NMR
b) PAGE
c) Digital Herbarium



Total No. of Questions : 7]

SEAT No. :

PE-5449

[Total No. of Pages : 2

[6516]-402

S.Y. M.Sc.

BOTANY

**BOUT-242 : Advanced Ecology
(2019 Pattern) (Semester - IV)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any 5 questions from question 2 to 7.*
- 3) *Question 2 to 7 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn whenever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following:

[10]

- a) Define Ecosystem.
- b) What is Mutualism & it's examples?
- c) Define Biome.
- d) What is Environmental Ethics?
- e) Define Parasitism.
- f) Give any two importance of Biodiversity.

Q2) a) Explain the concept of ecosystem stability and it's impact on plants and ecosystems. **[7]**

b) Describe Habitat characterization. **[5]**

Q3) a) Explain Plant Relation with edaphic factors. **[7]**

b) Write a note on Wildlife Protection Act 1972. **[5]**

Q4) a) Describe Environmental impact Assessment. **[7]**

b) Explain role of Bio-indicators in pollution control. **[5]**

Q5) a) Explain Environmental Ethics in detail. **[7]**

b) Write a note on Biomes. **[5]**

P.T.O.

- Q6)** a) Define Biodiversity and explain methods of Biodiversity conservation. [7]
b) Write a note on gene Pool. [5]

- Q7)** Write short note on any two of the following. [12]
a) Ecological Perturbations
b) Biomass carbon sequestration
c) Concept of carrying capacity



Total No. of Questions : 5]

SEAT No. :

PE-5450

[Total No. of Pages : 2

[6516]-403

S.Y. M.Sc.

BOTANY

**BODT-243 B : Advanced Medicinal Botany
(2019 Pattern) (Semester - IV)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any three questions from Q.No.2 to Q.No.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right side indicate full marks.*

Q1) Answer any five of the following: **[5]**

- a) Give the significance of pharmacognosy.
- b) Enlist two applications of *Terminalia Arjuna*.
- c) Define Glycosides.
- d) Give two examples of Aromatic plants.
- e) Define Excipients.
- f) What are Nutriceuticals?

Q2) a) Give the scope and importance of plants in cosmaceuticals. **[6]**

b) What are crude drugs? Give the classification of crude drugs. **[4]**

Q3) a) Give chemical and physical methods of drug evolution. **[6]**

b) Write the source and microscopic characters of *Aloevera*. **[4]**

Q4) a) Write the methods of cultivation and applications in *Withania Somnifera*. **[6]**

b) Write on case study of any one Ayurvedic drug industry from India. **[4]**

P.T.O.

Q5) Write short notes on any two of the following:

[10]

- a) Note on processing of Herbal drugs.
- b) Explain Morphological and Biological methods in drug evolution.
- c) Give the applications and cultivations of *Curcuma longa*.



Total No. of Questions : 5]

SEAT No. :

PE-5451

[Total No. of Pages : 2

[6516]-404

S.Y. M.Sc.

BOTANY

**BODT-243 C : Advanced Plant Physiology
(2019 Pattern) (Semester - IV)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any three questions from Q.No.2 to Q.No.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right side indicate full marks.*

Q1) Answer any five of the following: [5]

- a) Mention the role of pigments in photo protection.
- b) What is stress physiology?
- c) Give the concept of ATP synthesis.
- d) What do you mean by CAM idling?
- e) Give the function of PEP case.
- f) What is post harvest physiology?

Q2) a) Explain the organization and functioning of photosynthetic ETS in eukaryotic organism. [6]

b) Describe the ripening of fruits. [4]

Q3) a) Explain physiological mechanism that protects plants in drought and flooding stress. [6]

b) Describe the influence of light on photosynthesis. [4]

P.T.O.

- Q4)** a) Give the comparative account of aerobic and anaerobic respiration. **[6]**
b) Describe the case study for improvement of stress tolerance by recombinant DNA technology. **[4]**

Q5) Write short notes on any two of the following: **[10]**

- a) Role of respiration in plant carbon balance.
- b) Mechanism of action of fungicides.
- c) Tolerance mechanism against insects.



Total No. of Questions : 5]

SEAT No. :

PE-5452

[Total No. of Pages : 2

[6516]-405

S.Y. M.Sc.

BOTANY

**BODT-243 (A) : Applied Mycology
(2019 Pattern) (Semester - IV)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any three questions from Q.No.2 to Q.No.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right side indicate full marks.*

Q1) Answer any five of the following: **[5]**

- a) What is leaf spot?
- b) Define Mycoweedicides.
- c) What is seed pathology?
- d) Define Mycorrhiza.
- e) Enlist any two fermented products of food fungi.
- f) Define Biodeterioration.

Q2) a) Define Industrial Mycology? Explain fungal metabolites in brief. **[6]**

b) Explain fungal food spoilage. **[4]**

Q3) a) Explain forest pathology and it's significance. **[6]**

b) Write a note on types of Mycorrhiza. **[4]**

Q4) a) What is Mucoprotein and it's role in fermented food. **[6]**

b) Write a note on types of Mushroom. **[4]**

P.T.O.

Q5) Write short notes on any two of the following:

[10]

- a) Micorrhiza as a Biofertilizer.
- b) Industrial Mycology.
- c) Fungi as a Biopesticides.



Total No. of Questions : 5]

SEAT No. :

PE-5453

[Total No. of Pages : 2

[6516]-406

S.Y. M.Sc.

BOTANY

**BODT-243 D : Industrial Biotechnology
(2019 Pattern) (Semester - IV)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any three questions from Q.No.2 to Q.No.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right side indicate full marks.*

Q1) Answer any five of the following: **[5]**

- a) What is enzyme?
- b) Define antibiotics.
- c) Enlist any two food additives.
- d) Define Xenobiotics.
- e) What is biofiltration?
- f) What are AM fungi?

Q2) a) Comment on the importance of organic acids in fermentation. **[6]**

b) Write a note on ex-situ bioremediation. **[4]**

Q3) a) Elaborate the sources for bioplastic production. **[6]**

b) What is microbial food? Explain with suitable examples. **[4]**

Q4) a) What is biotechnology? Give it's scope and importance. **[6]**

b) Give note on biofuels. **[4]**

P.T.O.

Q5) Write short notes on any two of the following:

[10]

- a) Immobilization of enzymes.
- b) Slurry phase treatment.
- c) Role of biotechnology in metabolite production.



Total No. of Questions : 5]

SEAT No. :

PE-5454

[Total No. of Pages : 2

[6516]-407

S.Y. M.Sc.

BOTANY

**BODT-243 E : Seed Technology
(2019 Pattern) (Semester - IV)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any three questions from Q.No.2 to Q.No.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right side indicate full marks.*

Q1) Answer any five of the following: **[5]**

- a) What is seed deterioration?
- b) What is field inspection?
- c) Define seed pathology.
- d) Mention the factors affecting seed storage.
- e) What is seed treatment?
- f) Define seed technology.

Q2) a) Explain in detail steps in seed processing. **[6]**

b) Explain Automatic packing machine. **[4]**

Q3) a) Describe the procedure and observation during field inspection. **[6]**

b) Write on seed legislation in India. **[4]**

Q4) a) Explain in detail any one pest of pulses w.r.t. their life cycle, way of infection and control measures. **[6]**

b) Write objectives of seed processing. **[4]**

P.T.O.

Q5) Write short notes on any two of the following:

[10]

- a) Ideal ware house for seed storage.
- b) Minimum seed certification standards.
- c) Observations during field inspections.



Total No. of Questions : 5]

SEAT No. :

PE-5455

[Total No. of Pages : 2

[6516]-408

S.Y. M.Sc.

BOTANY

**BODT-244 : Herbal Technology
(2019 Pattern) (Semester - IV)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any three questions from Q.No.2 to Q.No.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following: **[5]**

- a) Define herbal technology.
- b) What is prebiotics?
- c) Write long form of IPR.
- d) Name the organization who give guidelines for evaluation of drugs?
- e) Write any two source of carotenoids.
- f) What is selection criteria for herbal materials?

Q2) a) Explain preparation and standardization of Arishta. **[6]**

b) Give scope and future prospects of herbal industry. **[4]**

Q3) a) Explain classification of herbal products based on herbal texture. **[6]**

b) Give scope and role of medicinal plants in *Siddha*. **[4]**

Q4) a) Describe herbal plants used in oral hygiene products. **[6]**

b) Write industries and institutions involved in work on medicinal and aromatic plants in India. **[4]**

P.T.O.

Q5) Write short notes on any two of the following:

[10]

- a) Bioprospecting and Biopiracy
- b) Medicinal plants as a source of alkaloids
- c) Processing of herbal raw materials



Total No. of Questions : 5]

SEAT No. :

PE-5456

[Total No. of Pages : 2

[6516]-409

S.Y. M.Sc.

BOTANY

**BODT-244 A : Plant Tissue Culture Technology
(2019 Pattern) (Semester - IV)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any three questions from Q.No.2 to Q.No.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following: [5]

- a) What is totipotency?
- b) What is Haploid?
- c) What is germplasm?
- d) Enlist any two culture media.
- e) What is electroporation?
- f) What is genetic engineering?

Q2) a) Comment on role of Hormones in PTC. [6]

b) Discuss production of secondary metabolites through PTC. [4]

Q3) a) Describe organogenesis with suitable example. [6]

b) Comment on factors affecting transformation. [4]

Q4) a) Discuss merits and demerits of invitro propagation, give example. [6]

b) Comment on genetic transformation in plants, give it's example. [4]

P.T.O.

Q5) Write short notes on any two of the following:

[10]

- a) Cybridization
- b) Biolistic transfer of gene
- c) Bioreactors



Total No. of Questions : 5]

SEAT No. :

PE-5457

[Total No. of Pages : 2

[6516]-410

S.Y. M.Sc.

BOTANY

**BODT-244 : Research Methodology
(2019 Pattern) (Semester - IV)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any three questions from Q.No.2 to Q.No.5.*
- 3) *Questions 2 to 5 carry equal marks.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Answer any five of the following: [5]

- a) Enlist the types of research.
- b) What is research?
- c) What is primary data?
- d) Define proteomics.
- e) Enlist any four model organisms.
- f) Define plagiarism.

Q2) a) What are the criterias of good research? [6]

b) Describe the biological problems in Genetics. [4]

Q3) a) Describe the different steps in report writing. [6]

b) Explain the techniques in imaging of tissues. [4]

Q4) a) How to maintain a laboratory records? [6]

b) Write a note on reproducibility. [4]

P.T.O.

Q5) Write short notes on any two of the following:

[10]

- a) Model organisms
- b) Poster presentation
- c) Qualitative verses quantitative research.

