**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P680**

# [3827] - 404

## M.Sc. - II

## BOTANY

## BO - 4.42: MYCOLOGY & PLANT PATHOLOGY

## (2008 Pattern) (New) (Sem. - IV)

## (Special paper II)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions:***

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)*** What is Fermentation technology? Describe different types of Fermentation technology studied by you.

***Q2)*** a) How fungi are used in production of enzymes.

b) Give the role of fungi in lignocellulose conversions in paper industry.

***Q3)*** Comment on:

a) Secondary metabolites.

b) Fungi in mineral biotechnology.

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

a) Gibberellins.

b) Fermented Foods.

c) Antiviral agents.

***P.T.O.***

## SECTION - II

***Q5)*** Give an account of classification of plant diseases?

***Q6)*** a) How environment affects in plant diseases?

b) Give a brief account of pathogensis.

***Q7)*** Comment on:

a) Contributions of E.J. Butter and K.L. Mehta.

b) Causal organism, symptoms & control measures of leaf spot & rot diseases.

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

a) Physiology of infected plant.

b) Beneficial activities of fungi.

c) Tinea.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P 661** **[3827] - 101**

**M.Sc. - I**

**BOTANY**

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

**(2008 Pattern) ( New Course) (Sem. - 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)*** Describe the range of thallus in Rhodophyta and add a note on Sexual and asexual reproduction.

***Q2)*** a) Discuss taxonomic significance of heterocysts in cyanophyta.

b) "Algae in diversified habitats." Discuss.

***Q3)*** a) Give a comparative account of sporophytes of Riccia and Anthoceros.

b) "Evolutionary trends in algae". Comment.

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

a) Vegetative reproduction in Bryophytes.

b) Spores in cyanophyta.

c) Biosystematics.

***P.T.O.***

## SECTION - II

***Q5)*** Give general account of Deuteromycotina.

***Q6)*** Give an outline classification of Fungi as described by smith and add a note on sporangial evolution in Mucorales.

***Q7)*** a) Comment on present status of Fungi.

b) Describe apothecial and perithecial ascocarp.

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

a) Takakiales.

b) Sporophyte of funaria.

c) Necrotrophs.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P 662** **[3827] - 102**

**M.Sc. - I**

**BOTANY**

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

**(2008 Pattern) ( New Course) (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 labelled diagrams must be drawn wherever necessary.***

## SECTION - I

***Q1)*** Give an account of $C_4$ Cycle and add a note on significance of $C_4$ plants.

***Q2)*** Explain the mechanism of mitochondrial respiration and add a note on it's net gain in terms of ATP.

***Q3)*** a) Explain transduction in guard cells.

b) Discuss the mechanism of uniport and symport of ions.

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

a) Metabolic changes during flower initiation.

b) Abiotic stress.

c) Biosynthesis of cytokinins.

***P.T.O.***

## SECTION - II

***Q5)*** What are enzymes? Explain competitive, uncompetitive and noncompetitive inhibition with examples.

***Q6)*** What are carbohydrates? Describe the mechanism of biosynthesis and degradation of pectin.

***Q7)*** a) Discuss steps involved in biosynthesis of alkaloids.

b) Classify amino acids based on R- group and polarity.

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

a) Concept of free energy.

b) Nitrogen uptake.

c) Biosynthesis of phospholipids.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P 663** **[3827] - 103**

**M.Sc. - I**

**BOTANY**

**BO - 1.3: Genetics and Plant Breeding**

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

***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)*** What is quantitative inheritance? Describe inheritance of a quantitative trait in zea mays.

***Q2)*** Define cytoplasmic inheritance. Explain its mechanism involving mitochondrial genome in Yeast.

***Q3)*** Give brief account of.

a) Three point test cross.

b) Complementary gene interaction.

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

a) Epistasis.

b) Hardy - Weinberg equilibrium.

c) Gene maps and physical maps.

***P.T.O.***

## SECTION - II

***Q5)*** What is polyploidy? Give its role in crop improvement.

***Q6)*** What are mutations? Give an account of physical and chemical mutagens.

***Q7)*** Give brief account of.

a) Translocation heterozygotes.

b) Plant breeding in India.

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

a) Heterosis.

b) Male sterility.

c) Chromosome markers.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P 664**

# [3827] - 201

## M.Sc.

## BOTANY

## 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) ***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)*** Give comparative account of sporophyte and gametophyte of coniferales.

***Q2)*** Comment on morphological and anatomical features of gametophyte and sporophyte of Equisetales.

***Q3)*** a) Apogamy and apospory in pteridophytes.

b) Describe life cycle pattern in Gymnosperms.

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

a) Gymnosperms as prospective ancestors of Angiosperms.

b) Comparative account of two systems of classification of pteridophytes.

c) Gametophytes of psilotales.

***P.T.O.***

## SECTION - II

***Q5)*** Discuss systematics as synthetic subject taking two examples from palynology, phytochemistry and genome analysis.

***Q6)*** Give merits and demerits of any two systems of Angiosperm classification studied by you.

***Q7)*** a) Discuss various tools of taxonomy.

b) Describe various taxonomic categories.

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

a) Cladistics in taxonomy.

b) Taxonomic hierarchy.

c) Population and Environment.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P 665** **[3827] - 202**

**M.Sc. - I**

**BOTANY**

**BO - 2.2: Cell Biology and Instrumentation**

**(2008 Pattern) (Sem. - II) (New)**

***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 is cell signaling in plants? Add a note on concept, ethylene activated two component signaling path way.

***Q2)*** a) Biogensis and ultra structure Golgi complex.

b) Principles and working of visible spectroscopy.

***Q3)*** a) Ultrastructure and functions of Endoplasmic reticulum.

b) What is sub cellular organization of plan cell? Add a note on cytoplasmic matrix.

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

a) Gaint chromosome

b) Cell wall.

c) Biogensis and functions of Ribosomes.

***P.T.O.***

## SECTION - II

***Q5)*** a) Principles and working of paper chromatography.

b) Structure and functions of Nucleus.

***Q6)*** a) GM Counting.

b) Structure and functions of Lysosomes.

***Q7)*** What is cell cycle and apoptosis? Explain the mechanism of cell division mitosis.

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

a) Plasmodesmata.

b) Plant vacoule.

c) Mitochondria.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

# P 666 [3827] - 203

## M.Sc. - I

## BOTANY

## BO - 2.3 : Molecular Biology and Genetic Engineering

## (New Course) (Sem. - II) (2008 Pattern)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

1) ***Answer any five questions, taking atleast 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)*** Define 'Cot' curve. How is it obtained? Discuss in detail the significance of $Cot_{1/2}$ value in determining genome sequences.

***Q2)*** Describe in detail the structure of eukaryotic genes.

***Q3)*** a) With the help of diagrams explain DNA replication in eukaryotes.

b) Explain the operon concept in bacteria with the help of suitable example.

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

a) Structure of tRNA.

b) Post translational control.

c) DNA repair mechanism.

***P.T.O.***

## SECTION - II

***Q5)*** Describe in detail the process of DNA cloning.

***Q6)*** Explain Agrobacterium mediated genetic transformation in plants.

***Q7)*** a) Discuss the steps involved in DNA sequencing.

b) Describe the method of Southern blotting.

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

a) RAPD.

b) Ti plasmid.

c) Applications of transgenic plants.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P 667** **[3827] - 301**

# M.Sc. - II

# BOTANY

## BO - 3.1: Developmental Botany and Tissue Culture

## (New) (Sem. - III)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

1) ***Attempt any five questions, taking atleast 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) ***Draw neat labelled diagrams wherever necessary.***

## SECTION - I

***Q1)*** Enlist the processes basics to plant development . Explain any two processes at cellular level. **[16]**

***Q2)*** a) Explain histo - chemical changes at the shoot apex during transition from vegetative to flowering phase. **[8]**

b) Describe the structure of tetrasporangiate anther. **[8]**

***Q3)*** a) What is double fertilisation? Describe the process of syngamy and triple fusion. **[8]**

b) Comment on pollen - stigma interaction. **[8]**

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

a) Parthenogenesis.

b) Expression of homeotic genes during flowering.

c) Histological changes during transition of vegetative shoot apex to reproductive shoot apex.

***P.T.O.***

## SECTION - II

***Q5)*** Explain in brief. **[16]**

a) Pleuripotency.

b) Direct organogenesis.

c) Indirect embryogenesis.

d) Somatic hybrids.

***Q6)*** a) Enlist the types of culture system and explain any one. **[8]**

b) Explain the procedures for isolation and culture of protoplast. **[8]**

***Q7)*** a) Define micropropagation. Mention its stages. Explain any one stage. **[8]**

b) With the help of appropriate examples explain the advantages of tissue culture technique over conventional methods of crop improvement. **[8]**

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

a) Role of PGRS in tissue culture.

b) Applications of plant tissue culture for germplasm conservation.

c) Synthetic seeds.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P668** **[3827] - 302**

# M.Sc. - II

# BOTANY

## BO - 3.2: Environmental Botany & Plant Diversity

## (New Course) (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) ***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)*** What are Biogeochemical Cycles? Explain Phosphorous and Carbon cycle in detail.

***Q2)*** a) Explain the Environmental protection Act in detail.

b) Explain factors responsible for Natality, Mortality and Age structure.

***Q3)*** a) What is Heavy Metal pollution? Enlist heavy metal pollutants. Explain ecological effects of heavy metals on environment.

b) Explain impact of acid rain on aqueous & terrestrial ecosystem.

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

a) Concept of Biosphere.

b) EMP.

c) Structure of Community.

***P.T.O.***

## SECTION - II

***Q5)*** Define Biodiversity. Enlist it's types. Explain in detail species diversity.

***Q6)*** a) What is phytogeography? Enlist major phytogeographic regions of India. Add a note on Endemism.

b) Explain natural factors affecting loss of Biodiversity.

***Q7)*** a) Explain concept of phytoremediation with suitable examples.

b) Give a brief account of Ramsar Convention.

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

a) Medicinal value of Biodiversity.

b) CITES.

c) Selection of plants and microbes in Restoration Ecology.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P 669** **[3827] - 303**

**M.Sc. - II**

**BOTANY**

**BO - 3.31: Phycology Special Paper - I**

**(New Pattern) (Sem. - 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 labelled diagrams must be drawn wherever necessary.***

## SECTION - I

***Q1)*** Describe classification of blue green algae upto order level.

***Q2)*** Comment on interrelationship in various orders of green algae.

***Q3)*** a) Describe ultrastructure of typical blue green algal cell.

b) Give an account on cell division patterns in green algae.

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

a) Endosymbiotic origin of chloroplast in eukaryotic algae.

b) Applications of molecular systematics studies in algae.

c) Tools in algal taxonomy.

***P.T.O.***

## SECTION - II

***Q5)*** Explain how recent studies in red algae lead in the revision of Schmitz - Kylin system of classification.

***Q6)*** Describe classification of brown algae upto order level.

***Q7)*** a) Give ecological classification of algae.

b) Zonation of algae in intertidal region.

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

a) Physical features of water.

b) Addaptations in phytoplankton.

c) Succession of algae in a pond.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P670** **[3827] - 304**

**M.Sc. - II**

**BOTANY**

**BO - 3.32: Mycology and Plant Pathology (Special Paper - I)**

**(Sem. - III)**

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

1) ***Attempt 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 should be drawn wherever necessary.***

## SECTION - I

***Q1)*** Describe outline of the system of classification proposed by Alexopoulos. Give its merits.

***Q2)*** Give general characters & classification of ascomycetes and add a note on its economic importance.

***Q3)*** Write short answers of the following:

a) Sexual reproduction in Mucorales.

b) Thallus organization in different groups of lichens.

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

a) Xylaria type of centrum.

b) Cyathus.

c) Hulle cells

d) Aspergillus.

***P.T.O.***

## SECTION - II

***Q5)*** What are Fungal habitats? Discuss colonization strategies among Fungi.

***Q6)*** Explain carbon and nitrogen nutrition in fungi. Add a note on fungal growth.

***Q7)*** a) Write in brief the concept of rhizosphere.

b) Explain phenomenon of heterothallism in fungi.

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

a) Air borne fungi.

b) Algal ancestry of Fungi.

c) Mycotoxins.

d) Fungal sex hormones.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P671**

# [3827] - 305
## M.Sc. - II
## BOTANY
## BO - 3.33: Angiosperms Special Paper - I
## (New Course) (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) ***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 the floristic composition of the world with special reference to Biodiversity of Angiosperms.

***Q2)*** a) Explain effective and valid publications.

b) Comment on primitive features of Ranunculaceae.

***Q3)*** a) Describe the multidisciplinary approach of systematics.

b) Give aims and objectives of biosystematic investigation.

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

a) Typification.

b) Santalaceae.

c) Effective and valid publication.

***P.T.O.***

## SECTION - II

***Q5)*** Describe the method for biosystematic investigation.

***Q6)*** Explain:

a) Role of herbarium in research.

b) Botanical gardens as multipurpose institute.

***Q7)*** Give an account of any two botanical gardens of the world.

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

a) Utility of anatomical data in systematics.

b) Major herbaria in the world.

c) Digital herbarium.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P672**

# [3827] - 306

## M.Sc. - II

## BOTANY

## BO - 3.34: Plant Physiology (Special paper - I)

## (New) (Sem. - III)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

1) ***Answer any five questions, taking atleast 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)*** What is salt stress? Explain the consequences and reclaimation measures.

***Q2)*** What is flooding stress? Explain the mechanism of flooding tolerance.

***Q3)*** a) Explain the role of proline and glycine betaine in water stress.

b) Comment on research carried out on abiotic stress in India.

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

a) Transgenics in stress tolerance.

b) Stress induced proteins.

c) Importance of water stress.

***P.T.O.***

## SECTION - II

***Q5)*** What is radiation stress? Explain mechanism of uv tolerance.

***Q6)*** Explain mechanism of ion toxicity w.r.t A1 and Zn.

***Q7)*** a) Comment on photoinhibition.

b) Explain pollution stress.

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

a) Scavenging of free radicals.

b) Effect of ROS on plants.

c) Concept of ion toxicity.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P673**

# [3827] - 307
## M.Sc. - II
## BOTANY
## BO - 3.35: Genetics, Molecular Biology and Plant Breeding - I
## (Sem. - III) (New) (2008 Pattern)
## (Special paper - I)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

1) ***Answer any five questions, selecting atleast 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 various morphological markers of eukaryotic chromosomes and compare if with bacterial chromosomes.

***Q2)*** a) Explain mechanism of homologous recombination.

b) Describe production of autopolyploids.

***Q3)*** a) Explain non - homologous recombination.

b) Describe meiotic behaviour of autopolyploids.

***Q4)*** Give a brief account of any two:

a) Extranuclear inheritance.

b) Production of alien substitution lines

c) Chromosome banding techniques.

***P.T.O.***

## SECTION - II

***Q5)*** Explain the relationship of genetics to other areas of biology.

***Q6)*** a) Describe the breeding methodology for Vegetatively propagating crops.

b) What are linkage maps? How are they derived?

***Q7)*** a) Give an account of the field evaluation technique of a crop.

b) Describe the importance of somaclonal variations in the crop improvement.

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

a) t - Test of significance.

b) Applications of cytoplasmic - genetic male sterile lines.

c) Merits and demerits of hybrid varieties.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P674**

# [3827] - 308
## M.Sc. II
## BOTANY
## BO - 3.36: Plant Biotechnology (Special Paper - I)
## (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) ***Answers to the 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 micropropagation? Mention the stages of micropropagation. Explain the advantages of tissue culture techniques over conventional methods of crop improvement. **[16]**

***Q2)*** a) Enlist the factors in fluencing morphogenesis in vitro. Explain the role of any two factors. **[8]**

b) What is organogenesis? Mention the differences between direct and indirect organogenesis. **[8]**

***Q3)*** a) Draw a layout of a plant tissue culture laboratory. Mention the precautions necessary for effective management of equipment and biological materials. **[8]**

b) What is somaclonal variation? Explain any one method of selection of a somaclone, with the help of an appropriate example. **[8]**

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

a) Landmarks in the development of plant Biotechnology.

b) Advantages of somatic embrogenesis.

c) Applications of cell suspension culture

***P.T.O.***

## SECTION - II

***Q5)*** What are transgenic plants? Explain their applications in producing abiotic stress tolerant plants. **[16]**

***Q6)*** a) What is somatic hybridization? Mention the main steps in the process Explain with an appropriate example, its application in plant biotechnology. **[8]**

b) How are haploids obtained in Vitro? Mention their significance in plant breeding. **[8]**

***Q7)*** a) How is a green house managed? How is it maintained? Explain its utility in plant conservation. **[8]**

b) What is cryopreservation? Mention important steps involved in it. Explain the application of cryopreservation in plant biotechnology. **[8]**

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

a) Biotechnological applications of mycorrhiza.

b) Single cell proteins.

c) Phytoremediation.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P675**

# [3827] - 309

## M.Sc.

## BOTANY

## BO - 3.37: Plant Diversity Special Paper - I

## (2008 Pattern) (New) (Sem. - III)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidate:***

1) ***Answer any five questions, selecting atleast 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)*** Define biodiversity. How it is classified? Add a note on its scope.

***Q2)*** Comment on:

a) Macro and microevolution.

b) Endemism.

***Q3)*** Explain:

a) Methods of assessing and measuring biodiversity.

b) Factors affecting species distribution.

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

a) Plant diversity hot spot.

b) Determinant of Genetic diversity.

c) Diversity indices.

***P.T.O.***

## SECTION - II

***Q5)*** What is taxonomic diversity? Explain fungal diversity of India with suitable examples.

***Q6)*** Explain:

a) Act of domestication.

b) Classification of ecosystem.

***Q7)*** Comment on:

a) Gymnosperm diversity.

b) Species diversity in Urban habitat.

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

a) Species inventory.

b) Marine ecosystem.

c) Dispersal diversification.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P676** **[3827] - 310**

**M.Sc. - II**

**BOTANY**

**BO - 3.38: Seed Technology (Special Paper - I)**

**(New Course) (Sem. - III)**

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

1) ***Answer any five questions, selecting atleast 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 methods employed for testing of seed health.

***Q2)*** What is dormancy? Explain the methods for breaking dormancy.

***Q3)*** a) What is quarantine for seed? Explain the importance of quarantine.

b) Give the concept of seed technology and comment on the opportunities.

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

a) Significance of seed transmission.

b) Types of seed germination.

c) Seed industries in India.

***P.T.O.***

## SECTION - II

***Q5)*** Explain the relation of insects and plants and comment on insects as vectors of plant diseases.

***Q6)*** Discuss the various measures adopted for preventing seed deterioration.

***Q7)*** a) Explain the control measures for pests of fiber crops.

b) Give the life cycle of sugarcane pests.

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

a) Dehumidification.

b) Causes of seed deterioration.

c) Seed borne nematodes.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P677**

# [3827] - 401

## M.Sc. - II

## BOTANY

## BO - 4.1: Plant Resources & Evolution

## (2008 Pattern) (New Course) (Sem. - IV)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates***

1) ***Answer any five questions taking atleast any two questions from each section.***
2) ***Answers to the questions 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)*** Describe two latex and two cellulose yielding crops with respect to Botanical name, common name, plant part used and its uses.

***Q2)*** a) Give a brief account of types of secondary metabolites present in medicinal plants with one example each.

b) Explain methods of qualitative and quantitative analysis of proteins.

***Q3)*** Give an comparative account of cycadeoidales and pentoxylales with suitable examples.

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

a) Darwin's concept of evolution.

b) Sympatric evolution.

c) Gene duplication and divergence.

***P.T.O.***

## SECTION - II

***Q5)*** Give monographic account of drugs obtained from stem and seed.

***Q6)*** a) Discuss any one concept of origin and evolution of eukaryotes.

b) Explain the mechanism of gene duplication.

***Q7)*** a) Explain the concept of change in gene frequency through migration and random genetic drift with respect to origin of life.

b) Describe Millers experiment.

***Q8)*** Write notes on <u>any two</u> of the following:

a) Vavilovs centres of origin.

b) Energy Plantation.

c) Organoleptic evolution of crude drugs.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P678**

# [3827] - 402

## M.Sc. - II

## BOTANY

## BO - 4.2 : Applied Botany

## (2008 Pattern) (New Course) (Sem. - IV)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

1) ***Answer any five questions, taking atleast 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)*** Describe mass production technology of Spirulina. Add a note on it's chemical composition and nutritive value.

***Q2)*** a) Comment on necessity and applications of seaweed farming.

b) What is chi-square test? Give its assumptions and conditions. Add a note on it's applications.

***Q3)*** a) What is protein sequence database? Explain any one method of data mining.

b) What are Internet search engines? Explain with any one example.

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

a) Algae in sewage treatment.

b) Enlist algae involved in Biofertilizers.

c) ANOVA.

***P.T.O.***

## SECTION - II

***Q5)*** What is fungal allergy? Give symptoms, diagnosis and control measures for mycetoma.

***Q6)*** a) Comment on role of Fungi in fungal biotechnology.

b) What are Ergot alkaloids? Enlist its applications.

***Q7)*** a) Give an account of Enzyme production.

b) What is mycorrhizae? Give its role in agriculture.

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

a) Fungal vitamins.

b) Particulate absorption by fungi.

c) Conifidence interval.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P679**

# [3827] - 403

## M.Sc. - II (Sem. - IV)

## BOTANY

## BO - 4.41: Phycology Special Paper - II

## (2008 Pattern) (New Course)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

1) ***Answer any five questions, taking atleast two questions from each sections.***
2) ***Answers to the questions 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 synchronous cultures? Describe methods to obtaining synchrony in chlorella.

***Q2)*** a) Discuss the necessity and requirements for marine algae cultivation.

b) What is monoline culture method? Add a note on its merits and demerits.

***Q3)*** Give an account of out door cultivation of spirulina and add a note on factors affecting cultivation.

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

a) Growth Curve.

b) Continous cultures.

c) Nori.

***P.T.O.***

## SECTION - II

***Q5)*** Give an account of various techniques involved in tissue culture of marine macroalgae.

***Q6)*** What is phycoremediation? Enlist algae involved in it and explain it role for wastewater treatment.

***Q7)*** a) What are biofule? Add a note on algae in biofudel production.

b) Explain pharmaceutical and nutracutical value of algae.

***Q8)*** Write short notes on <u>any two</u> of the following:

a) Phycocolloides.

b) Seaweed liquid fertilizers.

c) Seaweed resources of world and India.

*****

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P1185** **[3827 - B] - 71**

# M.Sc.

# BIOTECHNOLOGY

## BT - 31 : Tissue Culture (Plant and Animal)

**(Old)**

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates :***

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

## SECTION - I

***Q1)*** What is meant by defined medium? How is it different from undefined medium? Explain obligatory and optional components of a plant tissue culture medium. **[16]**

***Q2)*** Mention the landmarks in development of Plant Tissue Culture. Explain the latest one. **[16]**

***Q3)*** What are somaclonal variations? Explain the causes and consequences of somaclonal variations. How are these variations exploited? **[16]**

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

a) Commercial application of micropropagation.

b) Transgenic plants.

c) Elicitor induced secondary metabolite production in vitro.

## SECTION - II

***Q5)*** What are animal cell lines? How are these established and maintained in vitro? **[16]**

***Q6)*** Mention characteristics of animal cells in culture. Explain any two characteristics. **[16]**

***P.T.O.***

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

a) Organ transplants.

b) Nuclear transplantation.

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

a) Commercial application of animal tissue culture.

b) Propagation of viruses in vitro.

c) Mamalian cloning.

**Total No. of Questions : 6]** **[Total No. of Pages : 1**

**P1186** **[3827 - B] - 72**

# M.Sc.

# BIOTECHNOLOGY

## BT - 32 : Fundamentals of Genetic Engineering

**(Old)**

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates :***

1) ***Attempt a total of four questions selecting at least two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION - I

***Q1)*** What is genetic engineering? Explain the concept of GE and mention the land marks in development of the subject. **[10]**

***Q2)*** What is cloning in the context of Genetic engineering? Enlist the strategies for cloning and explain any one. **[10]**

***Q3)*** Write notes on : **[10]**

a) Transformation and Transfection.

b) DNA sequencing techniques.

## SECTION - II

***Q4)*** Enlist the expression vectors and explain application of any one. **[10]**

***Q5)*** What is meant by induced expression? How is it carried out? Cite suitable example. **[10]**

***Q6)*** Write notes on : **[10]**

a) Chimeric constructs.

b) Over expression of biological products.

**Total No. of Questions : 6]** **[Total No. of Pages : 1**

**P1187** **[3827 - B] - 73**

# M.Sc.

# BIOTECHNOLOGY

## BT - 33 : Biological Chemistry - II

## (Old)

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates :***

1) ***Attempt a total of four questions selecting atleast two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION - I

***Q1)*** What is electrophoresis? Mention the types of electrophoresis and explain application of any one. **[10]**

***Q2)*** What is micro array? Explain the method and application of micro array analysis. **[10]**

***Q3)*** Write explanatory notes on : **[10]**

a) Ion exchange chromatography.

b) Western blot.

## SECTION - II

***Q4)*** State the principle, working and application of NMR in biological chemistry. **[10]**

***Q5)*** Give a concise account of structure of protein as a biomolecule. Add a note on structure - function relationship. **[10]**

***Q6)*** Write explanatory notes on : **[10]**

a) Amino acid sequencing.

b) MALDI - TOF.

**Total No. of Questions : 6]** **[Total No. of Pages : 1**

**P1188** **[3827 - B] - 74**

# M.Sc.

# BIOTECHNOLOGY

## BT - 34 : Biochemical Engineering

## (Old)

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates :***

1) ***Attempt a total of four questions selecting atleast two questions from each section.***
2) ***Answers to the two sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION - I

***Q1)*** What is a bioreactor? Why is it called so? Explain the construction of any one type of bioreactor. **[10]**

***Q2)*** Explain mathematical principles that govern functioning of a bioreactor. **[10]**

***Q3)*** Write notes on **[10]**

a) Reaction Kinetics.

b) Applications of biochemical engineering.

## SECTION - II

***Q4)*** Enlist the transport phenomena in biochemical engineering and explain any one. **[10]**

***Q5)*** What are control systems in biochemical engineering w.r.t bioprocesses? Explain any one. **[10]**

***Q6)*** Write notes on **[10]**

a) Rheology.

b) Heat transfer during bioprocesses.

**Total No. of Questions : 6]** **[Total No. of Pages : 1**

**P1189** **[3827 - B] - 75**

# M.Sc.

# BIOTECHNOLOGY

## BT - 35 : Pleuripotent Cell Technologies and Reproduction

## (Old)

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates :***

1) ***Attempt a total of four questions selecting atleast two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION - I

***Q1)*** Define polyspermy. Explain the fast block of polyspermy. **[10]**

***Q2)*** Explain in detail the cytoplasmic rearrangements in Ovum after the entry of sperm. **[10]**

***Q3)*** a) Mention different cell lineages and explain their significance. **[5]**

b) Describe ultrastructure of sperm. **[5]**

## SECTION - II

***Q4)*** a) What are embryonic stem cells? How do they differ from adult stem cells? **[5]**

b) What are the applications of stem cell technology? **[5]**

***Q5)*** Explain the method of reproductive cloning. Discuss ethical issues involved in human cloning. **[10]**

***Q6)*** Describe in detail the techniques involved in gene therapy. **[10]**

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**Total No. of Questions : 6]** **[Total No. of Pages : 1**

**P1190** **[3827 - B] - 81**

# M.Sc.

# BIOTECHNOLOGY

## BT - 41 : Structural Biology

## (Old)

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates :***

1) ***Attempt a total of four questions selecting atleast two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION - I

***Q1)*** What is Crystallography? Explain in context of proteins. Mention the parameters. **[10]**

***Q2)*** Explain **[10]**

a) Ewald's sphere and reciprocal lattice.

b) Fibre diffraction.

***Q3)*** Write notes on : **[10]**

a) Protein structure validation.

b) Mathew's Number.

## SECTION - II

***Q4)*** Explain the application of NMR spectroscopy for determination of structure of nucleic acids. **[10]**

***Q5)*** What is fluorescence spectroscopy? Explain how it is applied in structural biology. **[10]**

***Q6)*** Write notes on **[10]**

a) NOSEY Technique.

b) SECSY Technique.

✦✦✦✦

**Total No. of Questions : 6]** **[Total No. of Pages : 1**

**P1191** **[3827 - B] - 82**

# M.Sc.

# BIOTECHNOLOGY

## BT - 42 : Industrial Biotechnology

**(Old)**

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates :***

1) ***Attempt a total of four questions selecting atleast two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION - I

***Q1)*** What are enzymes? Explain structure - activity relationship. Add a note on applications of enzymes. **[10]**

***Q2)*** a) What are immobilised enzymes? Explain their applications. **[5]**

b) What are therapeutic proteins? Cite suitable examples. **[5]**

***Q3)*** Write notes on : **[10]**

a) Fermentation technology for production of industrial enzymes.

b) Importance of Pilot scale production.

## SECTION - II

***Q4)*** What is bioremediation? Explain with special reference to microbial systems. **[10]**

***Q5)*** Explain the conversion of any one waste material into industrially useful product. **[10]**

***Q6)*** Write notes on **[10]**

a) Economics of waste management.

b) Need for waste management.

✦✦✦✦

**Total No. of Questions : 6]** **[Total No. of Pages : 1**

**P1192** **[3827 - B] - 83**

# M.Sc.

# BIOTECHNOLOGY

## BT - 43 : Applications of Genetic Engineering

## (Old)

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates :***

1) ***Attempt a total of four questions selecting at least two questions from each section.***
2) ***Answers to the two sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION - I

***Q1)*** Explain the application of DNA analysis in diagnosis of genetic diseases. **[10]**

***Q2)*** What are transgenic plants? Explain their applications in any one agricultural practice. **[10]**

***Q3)*** Write notes on : **[10]**

a) Biopharming.

b) Application of DNA finger printing in forensic analysis.

## SECTION - II

***Q4)*** What is a database in the context of Bioinformatics? Mention the essential fields of information in Protein database. **[10]**

***Q5)*** What are IPRs? Explain patent as one of important IPR in biotechnology. **[10]**

***Q6)*** Write explanatory notes on **[10]**

a) Molecular modeling.

b) Biosafety regulations for genetic engineering.

**Total No. of Questions : 6]** **[Total No. of Pages : 1**

**P1193** **[3827 - B] - 84**

# M.Sc.

# BIOTECHNOLOGY

## BT - 44 : Plant Biotechnology

## (Old)

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates :***

1) ***Attempt a total of four questions selecting at least two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION - I

***Q1)*** Mention the problems encountered during clonal multiplication of Woody plants in vitro. Explain the strategies to overcome them. **[10]**

***Q2)*** Discuss the advantages and disadvantages of somaclonal variation. Cite suitable examples. **[10]**

***Q3)*** Write explanatory notes on : **[10]**

a) Micropropagation of medicinal plants.

b) Micropropagation for disease elimination.

## SECTION - II

***Q4)*** Explain the advantages of tissue culture based methods of crop improvement over conventional methods. **[10]**

***Q5)*** a) How are somatic hybrids obtained? Explain their importance in agriculture. **[5]**

b) How is IVF important for crop biotechnology? **[5]**

***Q6)*** Write explanatory notes on **[10]**

a) Cryopreservation.

b) Biotransformation.

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**Total No. of Questions :8]** **[Total No. of Pages 2**

**P1184**

# [3827]-410
# M.Sc.
# BOTANY
## BO - 4.48 : Seed Technology
## (Sem - IV) (Special paper - II) (New) (2008 Pattern)

***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)*** Describe the process of seed production of wheat.

***Q2)*** Explain :

a) Stages of seed multiplication.

b) Stages of vegetable seed production.

***Q3)*** Comment on :

a) Seed certification.

b) DNA finger printing.

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

a) Genetic purity,

b) Seed protection,

c) Roll mill and magnetic separator.

## SECTION - II

***Q5)*** Give an account of seed production of onion.

***Q6)*** Explain :

a) Concept and objectives of seed processing.

b) Importance of seed treatment.

***P.T.O.***

***Q7)*** Describe :

a) Central seed committee and their functions.

b) Concept and procedure of artificial seed production.

***Q8)*** Write short notes on <u>any two</u> of the following :

a) GOT.

b) Screw conveyor.

c) Seed pelleting.

⌘⌘⌘⌘

**Total No. of Questions : 6]** **[Total No. of Pages : 1**

**P1194**

# [3827-B]-86
# M.Sc.
# BIOTECHNOLOGY
# BT - 46 : Genomics and Proteomics
# (Old)

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***Attempt a total of four questions selecting at least two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION - I

***Q1)*** Explain the concept of genomics with special reference to biotechnology. **[10]**

***Q2)*** Explain the method of sequencing whole genome. **[10]**

***Q3)*** Write notes on : **[10]**

a) Functional Genomics.

b) Micro array.

## SECTION - II

***Q4)*** Explain proteomics in the context of biotechnology. **[10]**

***Q5)*** Mention the methodologies of proteomics and explain any one. **[10]**

***Q6)*** Write notes on : **[10]**

a) Application of proteomics in drug development.

b) Analysis of protein-protein interactions.

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**Total No. of Questions : 6]** **[Total No. of Pages : 1**

**P1195**

# [3827-B]-87
# M.Sc.
# BIOTECHNOLOGY
# BT - 47 : Immunotechnology
# (Old)

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***Attempt a total of four questions selecting at least two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION - I

***Q1)*** What is Immunology? What is molecular immunology? Add a note on its relevance to biotechnology. **[10]**

***Q2)*** Enlist the techniques of molecular immunology and explain any one. **[10]**

***Q3)*** Write notes on : **[10]**

a) Signal transduction.

b) Transplant immunology.

## SECTION - II

***Q4)*** What is experimental immunology? How are transgenic animals used in immunology? **[10]**

***Q5)*** Give a concise account of stem cell technology with reference to immunology. **[10]**

***Q6)*** Write notes on : **[10]**

a) Immuno diagnostics.

b) Recombinant vaccines.

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**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P1196**

# [3827-B]-501
# M.Sc.
# BIOTECHNOLOGY
## BT - 11 : Advanced Biological Chemistry
## (2008 Pattern) (New)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

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

## SECTION - I

***Q1)*** a) Explain principle and working of Gas Liquid chromatography as a separation technique. **[8]**

b) How is acid base balance maintained in a living cell? **[8]**

***Q2)*** a) Explain how amino acid sequence affects stability of $\alpha$ helix. **[8]**

b) How do protein molecules form complexes with other molecules? Explain with at least two appropriate examples. **[8]**

***Q3)*** Explain :

a) Electrophoresis as a separation technique. **[8]**

b) Protein arrays and their applications. **[8]**

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

a) Centrifugation as a separation technique.

b) Steps in protein engineering.

c) Membrane proteins.

## SECTION - II

***Q5)*** a) What are secondary metabolites? Enlist the types of secondary metabolites of plant origin. **[8]**

b) Enlist the methods for phytochemical investigation of natural products. **[8]**

***P.T.O.***

***Q6)*** a) Mention the major pathways of cellular metabolism. Explain any one pathway of primary metabolism. **[8]**

b) Why secondary metabolites have medicinal importance? Explain with at least two examples. **[8]**

***Q7)*** Explain :

a) Phytochemical variation in species. **[8]**

b) Applications of metabolic pathway manipulation (s). **[8]**

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

a) Applications of UV-Visible spectroscopy.

b) Regulations for production and/or consumtion of herbal medicines.

c) Site directed mutagenesis.

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P1197**

# [3827-B]-502
# M.Sc.
# BIOTECHNOLOGY
# BT - 12 : Molecular and Cell Biology
# (2008 Pattern) (New)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

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

## SECTION - I

***Q1)*** a) Describe cell signalling pathway for mobilization of glucose by glucagons. **[8]**

b) How is primary cell wall formed? Mention its components. **[8]**

***Q2)*** a) What is photorespiration? Explain its significance. **[8]**

b) Explain the co translational pathway for targeting secretory proteins to endoplasmic reticulum. **[8]**

***Q3)*** Mention various mechanisms of transport in plants. Explain any two in detail. **[16]**

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

a) ATP synthase.

b) Mechanisms to overcome temperature stress.

c) Regulation of cell cycle.

## SECTION - II

***Q5)*** Explain the molecular mechanism of nuclear pre mRNA processing in eukaryotes. **[16]**

***Q6)*** a) Describe differential gene expression during any one developmental process in plants or animals. **[8]**

b) Discuss the significance of human genome project. Add a note on its limitations. **[8]**

***P.T.O.***

***Q7)*** Explain with suitable examples positive and negative control of gene expression. **[16]**

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

a) Eukaryotic ribosome assembly.

b) Pharmacogenomics.

c) X-linked immunodefficiency.

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**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P1198**

# [3827-B]-503
# M.Sc.
# BIOTECHNOLOGY
# BT - 13 : Environmental Biotechnology
# (2008 Pattern) (New)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

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

## SECTION - I

***Q1)*** Enlist the nonconventional sources of energy. Explain use of any two sources as better alternative to conventional sources. **[16]**

***Q2)*** a) Define pollution. Mention its types and explain the effect of any one on biological systems. **[8]**

b) Give a concise account of methods of physicochemical analysis of soil. **[8]**

***Q3)*** a) Explain the pathways of biodegradation of insecticides in soil. **[8]**

b) Give a concise account of biological treatment of waste water. **[8]**

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

a) Application of remote sensing in environmental hazard prediction

b) Reuse and disposal of biosolids.

c) Guidelines and methods of EIA.

## SECTION - II

***Q5)*** What is bioremediation? Mention its types and explain any two methods. **[16]**

***Q6)*** a) Explain any one technology for production of biomaterials as substitutes for nondegradable material. **[8]**

b) What are bioindicators? How are they used to detect pollution? **[8]**

***P.T.O.***

***Q7)*** What is conservation biotechnology? Enlist the technologies for conservation of bioresources and explain any two such technologies. **[16]**

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

a) Biosensors and their application.

b) Ecomarks.

c) Sustainable development.

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P1199**

# [3827-B]-701
# M.Sc.
# BIOTECHNOLOGY
# BT - 31 : Animal Biotechnology
# (2008 Pattern) (New)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

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

## SECTION - I

***Q1)*** a) Mention the types of animal cell cultures. Explain the procedure for maintenance and growth kinetics of any one type. **[8]**

b) Explain the concept of live stock breed. Add a note on the productivity of such breed. **[8]**

***Q2)*** a) Explain the advantages, limitations and application of artificial breeding in animals. **[8]**

b) What is meant by gene banking? Mention the types of gene banks and their use in animal biotechnology. **[8]**

***Q3)*** a) How are stem cells maintained in undifferentiated status? How does one ensure their undifferentiated status? **[8]**

b) Explain growth curve of finite cell line. What is Hay Flick's limit crisis period? **[8]**

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

a) Long term maintenance and application of stem cells.

b) Applications of animal cell culture.

c) Heterogeneity of stem cells.

***P.T.O.***

## SECTION - II

***Q5)*** Explain in detail the procedure of in vitro fertilization in animals. **[16]**

***Q6)*** What are transgenic animals? Explain the methods of genetic modifications. **[16]**

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

a) Germ cell storage and its application.

b) Knock out mice and knock in mice.

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

a) Application of embryo transfer.

b) Artificial insemination.

c) Factors affecting artificial breeding.

☒☒☒☒

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P1200**

# [3827-B]-702
# M.Sc.
# BIOTECHNOLOGY
# BT - 32 : Fermentation Technology
# (2008 Pattern) (New)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

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

## SECTION - I

***Q1)*** What is mass transfer? Explain. **[16]**

a) Liquid - liquid mass transfer and

b) Gas - liquid mass transfer.

Explain their application in bioprocessing.

***Q2)*** a) What is the importance of non mechanically agitated fermenters? Explain the principle and working of any two such fermenters. **[8]**

b) A fermentation process requires measuring and control of **[8]**

i) Microbial biomass and

ii) Weight of the fermenter.

Explain the methods used for these parameters.

***Q3)*** a) Explain with the help of an equation. How growth rate is related to formation of products in primary metabolism. How is it different from that in secondary metabolism? **[8]**

b) Describe different designs of reactors appropriate for using immobilized enzymes on larger scale. **[8]**

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

a) Role of mixed cultures in fermentation industry.

b) Aseptic operations and containment.

c) Scale down.

***P.T.O.***

## SECTION - II

***Q5)*** What is strain improvement? Explain how auxotrophic mutants, analogue resistant mutants and revertants are used for strain improvement. **[16]**

***Q6)*** a) Explain the recovery of an endocellular enzyme from fermented broth. Add a note on dust free enzyme. **[8]**

b) What are advanced biomethanation systems? Give their applications **[8]**

***Q7)*** a) Why is biotransformation preferred over chemical transformation? Explain with appropriate example. **[8]**

b) What is the role of inhibitors, precursors and inducers in fermentation? Explain giving examples. **[8]**

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

a) Supercritical fluid extraction.

b) Ion exchange chromatography and adsorption chromatography in recovery of antibiotics.

c) Recombinant DNA technology for strain improvement.

**Total No. of Questions : 6]** **[Total No. of Pages : 1**

**P1201**

# [3827-B]-703
# M.Sc.
# BIOTECHNOLOGY
## BT - 33 a : Principles of Virology
## (2008 Pattern) (New)

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***Attempt a total of four questions selecting at least two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION - I

***Q1)*** a) Comment on plague assay method of diagnosis of viral disease. **[5]**
b) Explain the mode of action of antiviral agent for HIV. **[5]**

***Q2)*** Justify the following : **[10]**

a) Vaccines can be used both for prevention and treatment of viral diseases.
b) Marburg virus is an agent of new emerging infection.

***Q3)*** a) Explain the replication of SV 40 virus. **[5]**
b) Describe the morphology and ultrastructure of Pox virus. **[5]**

## SECTION - II

***Q4)*** a) Discuss the epidemiology of HIV. **[5]**
b) Describe morphology and ultrastructure of TMV. **[5]**

***Q5)*** Explain the following : **[10]**

a) Persistent infections.
b) Diseases caused by poultry viruses. (any one)

***Q6)*** Write explanatory notes on : **[10]**

a) Foot and mouth disease.
b) New emerging infections.

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**Total No. of Questions : 6]** **[Total No. of Pages : 1**

**P1202**

# [3827-B]-704
# M.Sc.
# BIOTECHNOLOGY
# BT - 33 b : Advanced Immunology
# (2008 Pattern) (New)

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***Attempt a total of four questions selecting at least two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION - I

***Q1)*** a) Describe the structure and role of mucous associated lymphoid tissue. **[5]**
b) Explain the role of B cells in antigen presentation. **[5]**

***Q2)*** a) Describe immunity mechanisms that exist in lower phyla of animals. **[5]**
b) Explain how innate immunity forms an important line of defense for the body. **[5]**

***Q3)*** Write explanatory notes on : **[10]**
a) Factors responsible for development of autoimmunity.
b) HAT medium for production of hybridomas.

## SECTION - II

***Q4)*** a) Explain the types of therapeutic antibodies and their importance in medical field. **[5]**
b) Explain with appropriate example, the use of animal model in immunology. **[5]**

***Q5)*** a) Mention the formats of ELISA and their use in disease diagnosis. **[5]**
b) Explain advantages of recombinant vaccines over normal vaccines. **[5]**

***Q6)*** Write explanatory notes on : **[10]**
a) Use of bioreactor (any one type) for large scale production of antibodies.
b) Phage display technology in immunology.

☒☒☒☒

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P462**

# [3827-B] - 601

## M.Sc. (Sem - II)

## BIOTECHNOLOGY

## BT-21: Genetic Engineering

## (New Course) (2008 Pattern)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

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

## SECTION-I

***Q1)*** a) What are cosmids? Explain how they can be used as vectors in genetic engineering. **[8]**

b) Explain with examples the significance of DNA dependent DNA polymerases in genetic engineering. **[8]**

***Q2)*** a) Write comparative account of R-M (Restriction Methylation) systems I, II and III. **[8]**

b) What is gene augmentation therapy? Explain with appropriate examples. **[8]**

***Q3)*** a) Explain the procedure of DNA finger printing. **[8]**

b) What are peptide vaccines? Compare them with DNA vaccines. **[8]**

***Q4)*** a) What are retroviruses? How are they employed in gene therapy? **[8]**

b) What is homopolymeric tailing? Explain with a diagram. Comment on its significance in genetic engineering. **[8]**

***P.T.O.***

## SECTION-II

***Q5)*** a) Explain sanger's method of DNA sequencing. **[8]**

b) What is PCR? Explain the important parameters in carrying out PCR? **[8]**

***Q6)*** a) Enlist various expression vectors. Describe the structure and use of any one vector. **[8]**

b) Give a concise account of the outcome of human genome project. **[8]**

***Q7)*** a) Compare the physical mapping and genetic mapping. **[8]**

b) Explain with an example induction of expression of an industrially important product. **[8]**

***Q8)*** Write explanatory notes on: **[16]**

a) Chimeric constructs

b) Maxam-Gilbert method of gene sequencing.

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P463**

# [3827-B] - 602

## M.Sc.

## BIOTECHNOLOGY

### BT-22: Bioinformatics

### (New) (2008 Pattern) (Sem. - II)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

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

## SECTION - I

***Q1)*** a) Define Bioinformatics and mention its scope. What is its relevance to Biotechnology? **[8]**

b) Enlist publicly available databases and explain salient features of any one. **[8]**

***Q2)*** a) How database search can be carried out using sequence as a probe? **[8]**

b) Mention similarities and differences between BLAST and FASTA. **[8]**

***Q3)*** Explain in brief: **[16]**

a) Structure based drug designing.

b) Energy optimization technique.

***Q4)*** Write explanatory notes on:

a) Global and local alignment tools. **[8]**

b) Molecular modelling. **[8]**

***P.T.O.***

## SECTION-II

***Q5)*** a) Which tools are recommended for obtaining primary structure of a protein? Why? **[8]**

b) Explain any one method used for prediction of secondary structure. **[8]**

***Q6)*** Enlist the current research areas in Bioinformatics. Explain with appropriate example any one. **[16]**

***Q7)*** Explain:

a) CATH as a tool to determine the structure of a protein. **[8]**

b) Epitope prediction. **[8]**

***Q8)*** Write explanatory notes on: **[16]**

a) Bioinformatics business model.

b) Research funding for Bioinformatics.

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P464**

# [3827-B] - 603

## M.Sc.-I (Sem - II)

## BIOTECHNOLOGY

### BT - 23 : Plant Biotechnology

### (New Course) (2008 Pattern)

***Time : 3 Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

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

## SECTION-I

***Q1)*** a) Mention the landmarks of plant biotechnology as on today. **[8]**

b) Enlist economically important algae. Explain with appropriate example, qualitative improvement for economically important product in any one of them. **[8]**

***Q2)*** Name at least four economically important fungi. Mention the product obtained from each. Explain the technology to improve quantity of the product in any two fungi. **[16]**

***Q3)*** Discuss with the help of appropriate examples, the advantages of plant tissue culture technique over conventional methods of plant propagation. **[16]**

***P.T.O.***

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

a) Anther culture as Agrobiotechnology

b) Plant growth regulators for induction of in vitro caulogenesis.

## SECTION-II

***Q5)*** What is somatic embryogenesis? Describe the protocol for rearing somatic embryos in vitro. Mention the advantages and application of somatic embryogenesis in plants. **[16]**

***Q6)*** What are transgenics? Enlist the methods of obtaining transgenic plants. Explain the advantages and application of one food plant and one nonfood plant obtained thr' transgenic technology. **[16]**

***Q7)*** What is somatic hybridization? Mention major steps involved in it. Enlist the advantages of somatic hybridization over conventional hybridization. Cite at least two examples. **[16]**

***Q8)*** Write explanatory notes on: **[16]**

a) Plantibodies

b) Engineering plants for better phytoremediation.

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P465**

# [3827-B] - 801

## M.Sc.

## BIOTECHNOLOGY

### BT-41: Genomics and Proteomics

### (New) (2008 Pattern) (Sem - IV)

***Time : 3 Hours]*** ***[Max. Marks : 60***

***Instructions to the candidates:***

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

## SECTION-I

***Q1)*** Explain the key steps in whole genome sequencing. **[12]**

***Q2)*** Elaborate the concept of comparative genomics. **[12]**

***Q3)*** Explain the principles and applications of

a) Functional genomics.

b) Transcriptomics. **[12]**

***Q4)*** Write explanatory notes on:

a) Toxicogenomics.

b) Pharmacogenomics. **[12]**

***P.T.O.***

## SECTION-II

***Q5)*** What is proteomics? Elaborate the concept of structural proteomics. **[12]**

***Q6)*** Explain the method to study protein-protein interactions. **[12]**

***Q7)*** Explain the application of proteomics: **[12]**

a) Drug development.

b) Screening of diagnostic markers.

***Q8)*** Write explanatory notes on: **[12]**

a) Characterization of novel proteins.

b) Functional proteomics.

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P466**

# [3827-B] - 802

## M.Sc. (Sem. - IV)

## BIOTECHNOLOGY

### BT-42 : Legal and Ethical Aspects in Biotechnology and IPR

### (New) (2008 Pattern)

***Time : 3 Hours]*** ***[Max. Marks : 60***

***Instructions to the candidates:***

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

## SECTION-I

***Q1)*** What is intellectual property? How is it different from other types of properties? Enlist the intellectual property rights. **[12]**

***Q2)*** What is a patent? Mention the conditions for patentability. Outline the procedure for obtaining a patent. **[12]**

***Q3)*** What is a copy right? Explain it with reference to assignment, transfer and infringement. **[12]**

***Q4)*** Write explanatory notes on: **[12]**

a) Industrial designs, registration and piracy.

b) Registration of copyright.

***P.T.O.***

## SECTION-II

***Q5)*** Explain Indian Patent Act 1970 with special reference to important definitions and interpretations. **[12]**

***Q6)*** What are TRIPS? In what way these brought changes in the Indian Patent system? **[12]**

***Q7)*** a) What is WTO? Enlist at least six agreements signed by the contracting parties. **[12]**

b) What is meant by Geographical indication? How is it protected? Explain with an appropriate example.

***Q8)*** Write explanatory notes on: **[12]**

a) Plant breeder's and farmer's rights.

b) Haldi Patent / Neem Patent / Basmati Patent.

**Total No. of Questions : 6]** **[Total No. of Pages : 1**

**P467**

# [3827-B] - 803

## M.Sc. (Sem - IV)

## BIOTECHNOLOGY

### BT - 43 : Clinical Research and Database Management

### (New Course) (2008 Pattern)

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***Attempt a total of four questions selecting atleast two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION-I

***Q1)*** Mention important legislations and regulations that control the scope and procedures of clinical research. **[10]**

***Q2)*** Justify the role of pre clinical trials in pharmaceutical industry mention the principles of preclinical trials. **[10]**

***Q3)*** Out line the process of research, development and marketing of a biological product as a therapeutically active compound. **[10]**

## SECTION-II

***Q4)*** Explain the protocol of clinical trial. Mention significance of any one step.**[10]**

***Q5)*** State the principles of data management and query resolution with reference to clinical research. **[10]**

***Q6)*** a) Write a standard format of a case report form for clinical research. **[5]**

b) Mention the method of reporting serious adverse events. **[5]**

**Total No. of Questions : 6]** **[Total No. of Pages : 2**

**P468**

# [3827-B] - 804

## M.Sc.

## BIOTECHNOLOGY

### BT - 44a: Nanobiotechnology

### (New) (2008 Pattern) (Sem. - IV)

***Time : 1½ Hours]*** ***[Max. Marks : 40***

***Instructions to the candidates:***

1) ***Attempt a total of four questions selecting at least two questions from each section.***
2) ***Answers to the two sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

## SECTION - I

***Q1)*** What does the prefix 'nano' in the word nanoscience indicate? Trace the land marks in the development of nanotechnology with reference to living systems. **[10]**

***Q2)*** Explain the applications of nanotechnology in life science. Mention appropriate examples. **[10]**

***Q3)*** Write notes on: **[10]**

a) Functionalization of nanoparticles.

b) Scope of nanobiotechnology.

***P.T.O.***

## SECTION - II

***Q4)*** Explain the use of biomolecule as a nanostructure in gene therapy and separation of cell organelles. Cite appropriate examples. **[10]**

***Q5)*** a) How are nanoparticles used for targeted drug delivery?

b) What are biosensors? Explain schematically, function of a biosensor.

**[10]**

***Q6)*** Write notes on: **[10]**

a) Bio-based protocol for synthesis of nanostructures.

b) Chemical methods for synthesis of nanoparticles.

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P469**

# [3827-B] - 805

## M.Sc.

## BIOTECHNOLOGY

### BT-44b: Stem cell Technology and Regenerative Medicines

### (NEW COURSE) (2008 Pattern)

***Time : 3 Hours]*** ***[Max. Marks : 60***

***Instructions to the candidates:***

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

## SECTION-I

***Q1)*** Illustrate the structure of a female gamete of a mammal and state the immidiate changes induced by fertilization. **[12]**

***Q2)*** Enlist the developmental processes associated with embryogenesis and explain any one in detail. **[12]**

***Q3)*** What a stem cells? Mention their peculiarities. Add a note on embryonic stem cells. **[12]**

***Q4)*** Write notes on: **[12]**

a) Adult stem cells.

b) Cell differentiation.

***P.T.O.***

## SECTION-II

***Q5)*** Mention stem cell technologies and explain their applications. **[12]**

***Q6)*** What are transgenics? How are these obtained? What are their applications? **[12]**

***Q7)*** What is meant by gene therapy? What are advantages applications and limitations of gene therapy? **[12]**

***Q8)*** Write notes on: **[12]**

a) Koock outs.

b) Bioethics.

**Total No. of Questions : 8]** **[Total No. of Pages : 2**

**P470**

# [3827-B] - 806

## M.Sc.

## BIOTECHNOLOGY

## BT-44C: Agricultural Biotechnology

## (New) (2008 Pattern)

***Time : 3 Hours]*** ***[Max. Marks : 60***

***Instructions to the candidates:***

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

## SECTION-I

***Q1)*** What are homozygous plants? How are such plants produced? Explain any one method. Add a note on their significance. **[12]**

***Q2)*** Why some hybrid embryos need special treatment to remain viable? Mention the methods to rear viable hybrid embryos. Explain any one method. Cite appropriate examples. **[12]**

***Q3)*** Explain: **[12]**

a) Apomixis as a developmental phenomenon and its exploitation in agricultural biotechnology.

b) Application of experimental poly embryony in agricultural biotechnology.

***Q4)*** Write notes on: **[12]**

a) Micropropagation of oil seed crop.

b) Production of triploids in vitro.

***P.T.O.***

## SECTION-II

***Q5)*** Explain the methods of use of bioreactor to scale up the production of plants. Cite appropriate examples. **[12]**

***Q6)*** Explain: **[12]**

a) Use of marker assisted technology for testing fidelity of regenerents.

b) Virus indexing as an important step in commercial micro propagation.

***Q7)*** Explain with appropriate examples, development and application of transgenic plants for production of secondary metabolites of commercial importance. **[12]**

***Q8)*** Write notes on: **[12]**

a) Application of somaclonal variation in crop improvement.

b) Importance of Biofertilizers in crop biotechnology.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P681**

# [3827] - 405
# M.Sc. - II
## BOTANY
## BO - 4.43 : Angiosperms (Special paper - II)
## (2008 Pattern) (Sem. - IV) (New Course)

***Time : 3 Hours]*** ***[Max. Marks :80***

***Instructions to the candidates:***

1) ***Answer any five questions, selecting atleast 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)*** What is arboriculture? Describe general criteria for selection of trees for plantation. Add a note on features for an arborescent form.

***Q2)*** a) What is somatic embryogenesis? Give the requirements and various processes involved in it.

b) Describe ultrastructure and biochemistry of any one wood element studied by you.

***Q3)*** Describe the structure and organization of wood. Add a note on properties of wood.

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

a) VAM application.

b) Tracheary elements of wood.

c) Trees suitable for agroforestry and forestation.

***P.T.O.***

## SECTION - II

***Q5)*** Explain in detail pollen ultrastructure and its biochemistry.

***Q6)*** "Comment on".

a) Pollen storage and viability.

b) Embryo rescue.

***Q7)*** Describe the major phases of embryogenesis and procedures of experimental embryogenesis.

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

a) Pollen culture.

b) Cytology of endosperm.

c) Pollen based industries.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P682**

# [3827] - 407

## M.Sc.

## BOTANY

## BO - 4.45 : Genetics, Molecular Biology and Plant Breeding

## (2008 Pattern) (Sem. - 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)*** What is population genetics? Describe factors responsible for genetic variability.

***Q2)*** a) Describe the technique of PCR.

b) Explain various types of draught environments.

***Q3)*** a) Give applications of Southern and Northern blotting.

b) Describe the role of mutagenesis in crop improvement.

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

a) Nucleic acid purification.

b) Reverse transcription.

c) Legume protein improvement.

***P.T.O.***

## SECTION - II

***Q5)*** Explain strategies of breeding for resistance to abiotic stresses.

***Q6)*** a) Describe gene-environmental interactions.

b) Explain in brief the concept of polygenic inheritance.

***Q7)*** a) Explain biotechnological procedures used for breeding oil yielding crops.

b) Briefly outline the mechanisms of genetic control of nutritional traits.

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

a) Genome libraries.

b) Chromosome walking.

c) Mitochondrial genome.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P683**

# [3827] - 408
# M.Sc.
## BOTANY
## BO - 4.46 : Plant Biotechnology
## (2008 Pattern) (New) (Sem. - IV) (Special paper - II)

***Time : 3 Hours]*** ***[Max. Marks :80***

***Instructions to the candidates:***

1) ***Answer any five questions, selecting atleast 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 diagram must be drawn wherever necessary.***

## SECTION - I

***Q1)*** What is gene amplification? Briefly explain any two PCR based markers.

***Q2)*** a) Explain the importance of structural and functional genomics.

b) Give outline of sequencing stratigies for whole genome analysis.

***Q3)*** a) Write the principal and method of southern blotting.

b) Describe the role of proteomics in screening of diagnostic markers.

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

a) Vectors in gene cloning.

b) Stratigies in proteomics.

c) Genome annotation.

***P.T.O.***

## SECTION - II

***Q5)*** What are genomic libraries? Explain the construction and use of gene library.

***Q6)*** a) Describe the techniques of restriction mapping with their importance.

b) Explain the principal and method of RFLP. Comment on its applications.

***Q7)*** a) Describe the role of Biotechnology in waste water treatment.

b) Give the applications of micropropagation in agriculture.

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

a) Role of Biotechnology in improving biological nitrogen fixation.

b) Ethical concernes of GM crops.

c) Nod genes.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P684**

# [3827] - 409
# M.Sc. - II
## BOTANY
## BO - 4.47 : Plant Biodiversity
## (2008 Pattern) (New) (Sem. - 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)*** Give concise account of species diversity and process responsible for species extinction.

***Q2)*** Explain indetail Ex-situ conservation of Bio-diversity.

***Q3)*** Explain :

a) Role of bio-technology in utilization of Bio-diversity.

b) Ecological and Economic impacts on biological invasions.

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

a) Loss of Bio-diversity as an economic process.

b) Concept of sustainable development.

c) Inland wetlands.

***P.T.O.***

## SECTION - II

***Q5)*** Give concise account on organizations involved in Bio-diversity management.

***Q6)*** Discuss in detail uses of bio-diversity as food, fodder, Forage and Timber.

***Q7)*** Explain :

a) Economics of biodiversity Exploitation.

b) Biodiversity Act.

***Q8)*** Write notes on <u>any two</u> :

a) Indigenous knowledge system.

b) Valuation of bio-diversity.

c) Wildlife Act.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P685**

# [3827] - 31
# M.Sc. - II
## BOTANY
## BO - 331 : Plant Development and Reproduction
## (Old) (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) ***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)*** What are plant hormones? Enlist them and describe their effects on plant development.

***Q2)*** Classify meristem. Explain the organization and activity of lateral meristem.

***Q3)*** Comment on :

a) Hormonal control of seedling growth.

b) Growth at cell and organ level.

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

a) RAM.

b) Growth and differentiation of stomata.

c) Sexual versus vegetative reproductive growth.

***P.T.O.***

## SECTION - II

***Q5)*** Discuss pollen stigma interaction. Add a note on post pollination changes in embryosac.

***Q6)*** Describe male gametophyte and comment on pollen deviation from normal development.

***Q7)*** Comment on :

a) Endosperm developmental patterns.

b) Biochemistry and molecular biology of fruit maturation.

***Q8)*** Write notes on <u>any</u> <u>two</u> of the following:

a) Apomixis.

b) Development of tapetum and it's role.

c) Dynamics of fruit growth.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P686**

# [3827] - 32
# M.Sc. - II
## BOTANY
## BO - 332 : Plant Ecology
## (Old Course) (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) ***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)*** What is succession? Describe the different stages in hydrosere.

***Q2)*** What is community analysis? Describe the analytical and synthetic characters of a community.

***Q3)*** a) Define energy dynamics. Discuss the trophic organisation in different ecosystems.

b) Describe in detail the methods for biodiversity measurements.

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

a) Primary productivity.

b) Carbon cycle.

c) Endemism.

d) Hotspots in India.

***P.T.O.***

## SECTION - II

***Q5)*** What is soil pollution? Enlist different sources and explain it's effects on plants and ecosystems.

***Q6)*** What are the consequences of climate change? Discuss it with respect to global warming.

***Q7)*** a) Explain concept of EIA.

b) What is ecosystem stability? Explain it with respect to resistance and resilience.

***Q8)*** Write notes on <u>any</u> <u>two</u> of the following:

a) Rise in sea level.

b) Ozone layer and Ozone hole.

c) Effects of water pollution.

d) Sustainable development.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P687**

# [3827] - 33
# M.Sc. - II
## BOTANY
## BO - 333 : Taxonomy and Diversity of Seed Plants
## (Old) (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) ***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 male and female cones of coniferales and comment on their affinities.

***Q2)*** Comment on :

a) Salient features of pentoxylales.

b) Valid publication and priority.

***Q3)*** a) Explain phenetic versus phytogenetic systems.

b) Comment on merits and demerits of Takhtajan's system of classification of Angiosperms.

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

a) Affinities of Gnetales.

b) Molecular taxonomy.

c) Procedure for describing new genus.

***P.T.O.***

## SECTION - II

***Q5)*** Give salient features of Gentianales. Give an account of comparative treatment by Hutchinson and Cronquist.

***Q6)*** Explain the role of embryology and phytochemistry in modern taxonomy with suitable examples.

***Q7)*** a) Comment on Gametophyte of Cycadales.

b) Explain general characters of gymnosperms and their distribution in India.

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

a) Numerical taxonomy.

b) Magnoliales.

c) Local plant diversity and its socio-economic importance.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P688**

# [3827] - 41
# M.Sc. - II
## BOTANY
## BO - 441 : Applied Mycology and Applied Phycology
## (Sem. - IV)

***Time : 3 Hours]*** ***[Max. Marks :80***

***Instructions to the candidates:***

1) ***Attempt any five questions, selecting at least two questions from each section.***
2) ***Answers 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)*** Describe mass production technology of spirulina. Add a note on its factors affecting, cultivation, processing, yield and nutritional studies.

***Q2)*** a) Sea weeds and its application.

b) Comment on status of marine algae in India.

***Q3)*** a) Algal blooms and its effects.

b) Algal stabilization ponds.

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

a) Biogas energy and algae.

b) Necessity of sewage treatment.

c) Algalization and its impact on crop yield.

***P.T.O.***

## SECTION - II

***Q5)*** Describe in detail the production of industrial alcohol and vitamins by fermentation technology.

***Q6)*** a) Fungi as biological control agents.

b) Antitumour and antiviral agents from fungi.

***Q7)*** a) Role of fungi in biotechnology.

b) Fungal transformation of steroids.

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

a) Fungal biofertilizers and their use in waste land development.

b) Fungal single-cell protein.

c) Fungi in coal solubilization.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P689**

# [3827] - 42
# M.Sc. - II
## BOTANY
## BO - 442 : Plant Resources Utilization and Conservation
## (2005 Pattern) (Old Course 2004) (Sem. - IV)

***Time : 3 Hours]*** ***[Max. Marks :80***

***Instructions to the candidates:***

1) ***Answer any five questions, selecting atleast 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 any two vegetable oil yielding crops with respect to origin, evolution and cultivation.

***Q2)*** a) Give a brief account of plant diversity of western ghats and Himalayan region.

b) Mention diagnostic characters and uses of Teak.

***Q3)*** a) Explain the Indo-Burmese region as a centre of plant diversity.

b) Comment on gums and resins as non wood forest products.

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

a) Green revolution in India.

b) Sources and uses of tannins and dyes.

c) Origin and cultivation of any one aromatic crop.

***P.T.O.***

## SECTION - II

***Q5)*** What are National parks? Enlist the national parks in India and comment on their role in plant conservation.

***Q6)*** Give an account of ICAR and BSI with reference to conservation of plants.

***Q7)*** Comment on :

a) Ex-situ conservation.

b) Wet lands.

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

a) Criteria for selection of plants for avenues.

b) Mangrove diversity of Maharashtra.

c) DBT and ICAR.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P690**

# [3827] - 43
## M.Sc. (Sem. - IV)
## BOTANY
## BO - 443 (a) : Angiosperms (Elective Course)
## (2004 Pattern) (Old Course)

***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 with suitable examples the role of phytochemistry and palynology in systematics of Angiosperms.

***Q2)*** a) Describe the major centres of floristic studies in India.

b) Describe in brief the procedure in preparing the regional flora.

***Q3)*** Comment on :

a) Insectivorous and aquatic plants of botanical interest.

b) Fossil angiosperm flowers.

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

a) Clausen's experiments.

b) Monophyletic and polyphyletic origin of Angiosperms.

c) Micromorphology.

***P.T.O.***

## SECTION - II

***Q5)*** Explain the evolutionary trends in placentation and flower of Angiosperms.

***Q6)*** a) Describe bee forage plants and floral calender.

b) What is polyembryony? Give its different types. Add a note on its importance.

***Q7)*** Comment on :

a) Pollen ultrastructure and biochemistry.

b) Selection of trees in arboriculture.

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

a) Distant hybridization.

b) Apomixis.

c) Units of pollen dispersal.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P691**

# [3827] - 44
# M.Sc. - II
## BOTANY
## BO - 443 (b) : Cytogenetics and Plant Breeding
## (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) ***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 morphology of metaphase chromosomes. Explain the role of different molecular markers in chromosome morphology.

***Q2)*** Explain the principle and method of RAPD. Add a note on its applications.

***Q3)*** a) Explain the meiotic behaviour in primary trisomics.

b) Discuss the evolution of allotetraploid wheat.

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

a) Banding technique and its applications.

b) Meiotic behaviour of dicentric chromosomes.

c) Reciprocal translocation.

***P.T.O.***

## SECTION - II

***Q5)*** Describe the primary centres of origin for crop plants according to vavilor.

***Q6)*** Explain in detail any two methods of breeding for self-pollivated crops. Add a note on their merits and demerits.

***Q7)*** a) Discuss the role of cytoplasmic male sterility in production of hybrid seeds.

b) Explain the method of clonal selection employed for vegetatively propagated crops.

***Q8)*** Write short notes on <u>any</u> <u>two</u> :

a) Physical mutagens.

b) Limitations of mutation breeding.

c) Applications of haploidy

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P692**

# [3827] - 45
# M.Sc. - II
## BOTANY
## BO - 443 (c) :Mycology
## (Sem. - IV) (Elective Paper)

***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 book.***
3) ***All questions carry equal marks.***
4) ***Neat labelled diagrams should be drawn wherever necessary.***

## SECTION - I

***Q1)*** Give an account of classification of fungi proposed by Alexopoulos, Mims and Blackwell (1996).

***Q2)*** a) Describe different types of fossil fungi.

b) Give brief account of fungi as Necrotrophs.

***Q3)*** Comment on :

a) Air borne fungi.

b) Rhizosphere.

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

a) Fungal sex hormones.

b) Vitamins.

c) Contribution of B.B. Mundkur.

***P.T.O.***

## SECTION - II

***Q5)*** Describe the types of ascocarpus and add a note on their significance.

***Q6)*** a) Describe asexual reproductive structure in Saproleginales.

b) Give an account of fruiting bodies in Deuteromycotina.

***Q7)*** Comment on :

a) Lycoperdales.

b) Loculoascomycetes.

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

a) Pathogenecity.

b) Strain improvement.

c) Hypomycetes.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P693**

# [3827] - 47
# M.Sc.
## BOTANY
## BO - 443 (e) : Plant Physiology
## (2004 Pattern) (Old) (Sem. - IV)

***Time : 3 Hours]*** ***[Max. Marks :80***

***Instructions to the candidates:***

1) ***Answer any five questions, selecting atleast 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 the role of growth regulators with reference to crop productivity.

***Q2)*** Describe physiological basis of productivity in sugar cane.

***Q3)*** Explain :

a) Role of trace elements.

b) Biochemical changes during genescence.

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

a) Emerging trends in improvement of crop productivity.

b) NAR and its dependence on temperature.

c) Relevance of photoperiodism on plant productivity.

***P.T.O.***

## SECTION - II

***Q5)*** Explain mechanism of defence in plants against pathogenic attack.

***Q6)*** Give a concise account on effects and mechanism of tolerance with reference to high light intensity.

***Q7)*** Explain :

a) Effect of salt stress on plant metabolism.

b) Water stress and plant metabolism.

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

a) Green revolution.

b) Genes for stress tolerance.

c) Salt tolerant halophytes.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P694**

# [3827] - 48
# M.Sc. - II
## BOTANY
## BO - 443 (f) : Pharmacognosy
## (2004 Pattern) (Old) (Sem. - IV)

***Time : 3 Hours]*** ***[Max. Marks :80***

***Instructions to the candidates:***

1) ***Attempt 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 question carry equal marks.***
4) ***Neat diagrams must be drawn wherever necessary.***

## SECTION - I

***Q1)*** What is adulteration? Explain various methods of adulteration.

***Q2)*** a) Explain ash and fluorescence analysis.

b) Give macroscopic and microscopic characters of Ephedra.

***Q3)*** a) What are carbohydrates? Give its physical and chemical properties.

b) What is chemotaxonomy? Explain its role in pharmacognosy.

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

a) Clinical studies of crude drugs.

b) Chemical assay of ergot.

c) IPR.

***P.T.O.***

## SECTION - II

***Q5)*** What is efhnobotany? Give its concepts and relevance. Add a note on its contribution in modern medicine.

***Q6)*** a) Describe the pharmacognosy of Plantago ovata.

b) Give pharmacognostic account of Rauvolfia serpentina.

***Q7)*** a) Describe scope and importance of pharmacognosy.

b) Describe biological assay of Ephedrine.

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

a) Biotransformation technique.

b) Immobilization.

c) Volatile oils.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P695**

# [3827] - 49
# M.Sc. - II
## BOTANY
## BO - 443 g : Seed Technology
## (2004 Pattern) (Old Course) (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) ***Answers to the two sections should be written in separate answer books.***
3) ***All question carry equal marks.***
4) ***Neat diagrams must be drawn wherever necessary.***

## SECTION - I

***Q1)*** What is seed certification? Explain various steps involved it.

***Q2)*** a) Describe the seed multiplication ratio

b) Explain the procedure of seed production of bulb crop.

***Q3)*** a) Explain the criteria for seed storage.

b) Explain the genetic purity and quality seed testing.

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

a) Dormancy of seed.

b) Seed chemistry.

c) RAPD.

***P.T.O.***

## SECTION - II

***Q5)*** Describe in detail the procedure of seed production of any one pulse crop.

***Q6)*** a) Describe the procedure for seed processing and handling.

b) Explain the physiological changes occuring during seed germination.

***Q7)*** a) Describe the steps involved in marketing of seeds.

b) Explain the physiological procedure for seed development.

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

a) Farm management.

b) DNA finger printing.

c) Quarantine for seeds.

**Total No. of Questions : 8]** **[Total No. of Pages :2**

**P696**

# [3827] - 50
# M.Sc. - II
## BOTANY
## BO - 443 (h) : Plant Bio-diversity (Elective Paper)
## (2004 Pattern) (Old) (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)*** What is species diversity? Give concise account of species diversity indices.

***Q2)*** What is Agrobiodiversity? Give detailed account of diversity in domesticated species.

***Q3)*** Explain :

a) Determinants of genetic diversity.

b) Bio-diversity values.

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

a) Arid and Semiarid Ecosystem.

b) Species diversity in urban habitats.

c) Centers of diversity.

***P.T.O.***

## SECTION - II

***Q5)*** Give concise account of loss of genetic diversity with respect to founder effects. Demographic Bottlenecks and Inbreeding Depression.

***Q6)*** Explain in detail Ex-situ conservation of Bio-diversity.

***Q7)*** Explain :

a) Role of bio-technology in Bio-diversity conservation.

b) Impact of Ecotourism in Biodiversity conservation.

***Q8)*** Write notes on <u>any</u> <u>two</u> :

a) Eco-tourism and Bio-piracy.

b) Conservation of Ecosystem diversity.

c) Organizations associated in biodiversity management.