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

P1178

[3927] - 403

M.Sc. (Sem. - IV)

BOTANY

BO - 4.41: Phycology Special Paper - II

(New Course) (2008 Pattern)

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) ***Figures to the right indicate full marks.***
4) ***Neat labelled diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Justify the Necessity of culture of algae. Mention the types of culture. Explain the initiation and maintenance of any one type of algal culture. **[16]**

Q2) Explain the scale up of algal culture of any two economically important species from Cyanophyta. **[16]**

Q3) a) Explain the parameters to assess algal growth in culture. **[8]**

b) What are the quality standards for the algal biomass produced on large scale. **[8]**

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

a) Phycocolloides.

b) Seaweed liquid fertilizers.

c) Cryopreservation of algae.

P.T.O.

SECTION - II

Q5) Explain with appropriate examples how Phycoremediation is a major process of Bioremediation. **[16]**

Q6) Give a flow chart for *in vitro* culture of marine macroalgae. Add a note on the application of *in vitro* culture of marine macroalgae. **[16]**

Q7) Define Biotechnology. Explain appropriate examples the scope and application of algal biotechnology. **[16]**

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

a) Seaweed resources of India.

b) Algae as resources for production of Biofuel.

c) Nutritional value of algae.

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

P737

[3927] - 101

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

BOTANY

BO - 1.1 : Systematics of Non Vascular Plants

(New Course) (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.***
4) ***Neat labelled diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Give an outline classification of algae with reason proposed by Bold and Wyne.

Q2) a) Describe the range of thallus organization in Chlorophyta with suitable examples.

b) Discuss various methods of reproduction in phaeophyta.

Q3) a) Give an account of order Sphagnales.

b) Give characteristic features of Chrysophyta.

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

a) Ecological Significance of Bryophyta.

b) Spores in Cyanophyta.

c) Molecular systematics.

P.T.O.

SECTION - II

Q5) Explain in detail different modes of nutrition in fungi. Give appropriate example for each.

Q6) Give an account on evolution of sex in fungi.

Q7) a) Comment on Agaricales and Polyporales.

b) Comment on Fractification in Ascomycotina.

Q8) Write notes on any two of the following :

a) Spherocarpales.

b) Lycoperdon.

c) Principles and procedures of plant systematics.

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

P738

[3927] - 102

M.Sc. - I

BOTANY

BO - 1.2 : Plant Physiology and Biochemistry

(New Course) (2008 Pattern) (Semester - 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) What is photorespiration? Explain the mechanism of photorespiration and add a note on its significance. **[16]**

Q2) Give an account of Pentose Phosphate Pathway. State its significance. **[16]**

Q3) a) Discuss the recent concept in stomatal physiology. **[8]**

b) Explain mechanism of ATP driven active solute transport. **[8]**

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

a) Metabolic changes during seed germination.

b) Biotic stress.

c) Biosynthesis of Auxins.

P.T.O.

SECTION - II

Q5) Explain the types of enzyme inhibition with examples. **[16]**

Q6) What are carbohydrates? Discuss the mechanism of biosynthesis and degradation of glycogen. **[16]**

Q7) a) Describe the shikimic acid pathway. **[8]**

b) Differentiate between α-helix and β pleat structures of proteins. **[8]**

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

a) Principles of Physical Chemistry.

b) NOD Factor.

c) Oxidation of glycolipids.

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

P739

[3927] - 103
M.Sc. (Part - I)
BOTANY
BO - 1.3 : Genetics and Plant Breeding
(Sem. - I) (New Course) (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.***
4) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Define quantitative inheritance. Describe inheritance of a quantitative trait in Nicotiana.

Q2) What is cytoplasmic inheritance? Explain with two suitable examples cytoplasmic inheritance involving chloroplast genome.

Q3) Give brief account of :

a) Hardy-Weinberg law.

b) C-value paradox.

Q4) Write notes on any two of the following :

a) Complementary genes.

b) Gene maps and physical maps.

c) Genetic drift.

P.T.O.

SECTION - II

Q5) What is allopolyploidy? Explain with suitable examples its importance in crop improvement.

Q6) What is incompatibility? Explain self incompatibility with respect to types and mechanisms.

Q7) Give brief account of :

a) Chromosome markers.

b) Genetic basis of breeding.

Q8) Write notes on any two of the following :

a) Inversion heterozygotes.

b) Inbreeding depression.

c) Classification of mutations.

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

P747

[3927] - 309

M.Sc. (Semester - III)

BOTANY

BO - 3.37 : Plant Diversity

(New Course) (2008 Pattern) (Paper - I)

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

Instructions to the candidates:

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

SECTION - I

Q1) What is biodiversity? Give its scope and importance.

Q2) Comment on :

a) The origin of species.

b) Plant diversity Hot-Spots.

Q3) Explain :

a) Role of landscape in diversity.

b) The techniques for monitoring plant diversity.

Q4) Write short notes on (any two) :

a) Endemism.

b) Molecular - marker technique.

c) Diversity indices.

P.T.O.

SECTION - II

Q5) Define agro-biodiversity. Explain its role in origin and evolution of cultivated species.

Q6) Explain :

a) Importance of urban diversity.

b) Bryophyte diversity of western Ghats of Maharashtra.

Q7) Comment on :

a) Species diversity in Urban-habitat.

b) Wet land ecosystem.

Q8) Write notes on (any two) :

a) Centres of diversity.

b) Arid and semiarid ecosystems.

c) Species inventory.

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

P748

[3927] - 41
M.Sc. - II (Sem. - IV)
BOTANY
BO - 441: Applied Mycology and Applied Phycology
(Old) (2005 Pattern)

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) Explain the mechanism of nitrogen fixation by free living forms and comment on structure and Factors controlling heterocyst formation.

Q2) a) Explain how algae are utilized in hydrocarbon production.

b) Explain the role of algae in sewage treatment.

Q3) a) Describe indoor and outdoor cultivation and factors affecting cultivation of spirulina. Comment on its use as animal feed.

b) Explain mass production technology of spirulina Add a note on contamination and toxicology.

Q4) Write notes on any two of the following :

a) Algae as an indicator of water quality.

b) Bioenergy and hydrocarbon production from algae.

c) Mass production technology of Spirulina.

P.T.O.

SECTION - II

Q5) What is fermentation. Describe the types of fermentation.

Q6) a) Give an account of any two plant pathogenic fungi.

b) Give the symptoms, causal organism and control measures of Ringworm and Mycetoma.

Q7) a) Explain the role of yeast in Biotechnology.

b) Write about the metabolic diversity in fungi.

Q8) Write short notes on any two :

a) Fungi as biocontrol agents.

b) Fungal production of flavours and aroma.

c) Fungal Nutrition.

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

P1179

[3927] - 410

M.Sc. (Sem. - IV)

BOTANY

BO - 4.48: Seed Technology Special Paper - II

(New Course) (2008 Pattern)

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) ***Figures to the right indicate full marks.***
4) ***Neat labelled diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Give a brief account of seed production of groundnut. Add a note on seed village concept. **[16]**

Q2) a) Explain the seed production in Onion. **[8]**

b) Describe the production and maintenance of foundation seeds in self and cross pollinated vegetable crops. **[8]**

Q3) a) Explain the concept and objectives of seed processing. Add a note on preparation of seed for processing. **[8]**

b) Give an account of packaging and handling of sees. Add a note on screw conveyor. **[8]**

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

a) True Potato Seed (TPS).

b) Self incompatibility and gametocides.

c) Grading and separation of seeds.

P.T.O.

SECTION - II

Q5) Explain the general procedure for seed certification. Add a note on specific seed certification standards. **[16]**

Q6) a) Explain the various sampling methods used and the procedure of sampling. **[8]**

b) Describe briefly ELISA test. **[8]**

Q7) a) Give a brief account of functions of seed certification board. **[8]**

b) Write briefly on testing genetic purity and quality. **[8]**

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

a) DNA finger printing.

b) Powers and duties of seed inspector.

c) Southern hybridization.

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

P749

[3927] - 42
M.Sc.
BOTANY
BO - 442 : Plant Resources Utilization and Conservation
(Sem. - IV) (Old) (2005 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.***
4) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Discuss timber yielding plants with reference to processing of wood, diagnostic characters and uses.

Q2) a) Comment on Aromatic plants with any two suitable examples.

b) Give brief account on sources and cultivation of vegetable oil yielding crop.

Q3) Comment on Green Revolution in India. Give its benefits and adverse consequence.

Q4) Write notes on any two of the following :

a) Status of Biodiversity in Himalayan regions.

b) Plant Introduction.

c) Tannins and dyes.

P.T.O.

SECTION - II

Q5) What is Ex-situ conservation? Explain with suitable examples studied by you.

Q6) Comment on :

a) Need of coral reefs and Mangrove conservation.

b) Biosphere Reserves.

Q7) What are different strategies of plant conservation? Add a note on status of plants based on IUCN.

Q8) Write notes on any two of the following :

a) National Parks.

b) Botanical Gardens.

c) Plants used as pollution control.

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

P750

[3927] - 43
M.Sc. - II
BOTANY
BO - 443 (a) : Angiosperms
(Sem. - IV) (Elective Course) (Old) (2005 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.***
4) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Explain the evolutionary trends in placentation, fruit and seed of angiosperms.

Q2) Describe the role of micromorphology and embryology in systematics of angiosperms.

Q3) Explain :

a) Role of fossils in phylogeny of angiosperms.

b) Types of keys.

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

a) Contributions of P. Maheshwari and Linnaeus to Angiosperm taxonomy.

b) Marine angiosperms.

c) Procedure in preparing district flora.

P.T.O.

SECTION - II

Q5) What is melittopalynology? Enlist bee forage plants and explain foraging behaviour of bees.

Q6) a) Describe procedure of biosystematic investigation.

b) Polyembryony in angiosperms.

Q7) a) Write an account on NPC.

b) Give an account of cavity repair.

Q8) Write short note on any two of the following :

a) Cyclantho dendron.

b) Androgenesis.

c) Botanical gardens and Herbaria.

■ ■ ■

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

P751

[3927] - 44
M.Sc.
BOTANY
BO - 443 (b) : Cytogenetics and plant Breeding
(Sem. - IV) (Elective) (2005 Pattern) (Old)

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) With the help of diagrams explain chromosome pairing and the products of crossing over in pericentric inversion heterozygote. Discuss the consequences of crossing over in pericentric inversion.

Q2) Define polyploidy. Give the different types of auto and allopolyploids. Explain in detail the origin and phenotypic effects of autotriploids and autotetraploids.

Q3) Give brief account of :

a) Types of chromosomes based on centromere position.

b) Nucleosome concept.

Q4) Write notes on any two of the following :

a) Peroxidase isozyme markers.

b) Difference between RAPD and RFLP technique.

c) Principle and applications of C-banding.

P.T.O.

SECTION - II

Q5) Write the technique of hybridization. Add a note on varietal release and seed multiplication programme.

Q6) What is mutation breeding? Write in brief the procedure of mutation breeding. Mention its merits and limitations.

Q7) Give brief account of :

a) Randomized block designs and factorial experimental designs.

b) Population improvement through progeny and recurrent selection.

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

a) Merits and limitations of pure line selection.

b) Applications of tissue culture in crop improvement.

c) Lattice and Latin square designs.

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

P752

[3927] - 45
M.Sc. - II
BOTANY
BO - 443 (c) : Mycology
(Sem. - IV) (Elective) (2005 Pattern) (Old)

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 should be drawn wherever necessary.***

SECTION - I

Q1) Write an account on aquatic and terrestrial habitats of fungi.

Q2) a) Comment on dormancy in fungi.

b) Give an outline classification of fungi as proposed by Bessey (1950).

Q3) a) Describe the metabolism of Trehalose in fungi.

b) Give an account of nematophagus fungi with significance.

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

a) Rhizosphere.

b) Fungi as tools in Genetics.

c) Contributions in fungi by C.V. Subramaniam.

P.T.O.

SECTION - II

Q5) Describe the life cycle patterns, interrelationships and phylogenic aspects in Oomycetes.

Q6) a) Discuss the parasexual life cycle in Deuteromycotina.

b) Describe the basidiocarp in Nidulariales.

Q7) a) Describe the reproductive structures in Discomycetes.

b) Comment on types of centrum in Ascomycotina.

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

a) Teliospores in uredinales.

b) Eurotiales.

c) Mucorales.

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

P753

[3927] - 46

M.Sc. (Sem. - IV)

BOTANY

BO - 443 (d): Phycology

(Elective Paper) (2005 Pattern) (Old)

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) Enumerate systems of classification and give an outline of any one of them.

Q2) a) Write an account of pigments and light harvesting in algae.
b) Describe genetics of Cladophora.

Q3) a) Describe cell organization in algae.
b) Comment on phylogeny in algae.

Q4) Write notes on any two of the following:
a) Measurement of productivity.
b) Algal cultures.
c) Mineral nutrition in algae.

SECTION - II

Q5) Explain the process of carbon fixation in algae.

Q6) a) Describe Karyological features of any one of the orders of algae studied by you.
b) Write an account on habitats of algae.

P.T.O.

Q7) Describe the materials, methods and isolation techniques in algae.

Q8) Write notes on any two of the following:

a) Paddy field algal ecology.

b) Algal communities.

c) Cryopreservation of algae.

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

P754

[3927] - 47

M.Sc.

BOTANY

BO - 443 (e): Plant Physiology

(Elective Course) (Old) (2005 Pattern) (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 physiological basis of crop productivity in sugar cane and any one pulse crop.

Q2) a) What is the role of Mg and Fe with respect to improvement in crop productivity.

b) Comment on the recent research work in crop physiology at any one centre.

Q3) Answer any two of the following:

a) Biochemical changes during senescence.

b) NAR at its dependence on light intensity.

c) Define photoperiodism and explain its significance in crop productivity.

Q4) Write short notes on (any two):

a) Improvement in uptake of P and N through symbiosis.

b) Physiology of plant growth in polyhouse.

c) Role of auxins in crop productivity.

d) Weed-crop interaction.

P.T.O.

SECTION - II

Q5) Explain the metabolic alterations induced by water stress. Add a note on mechanism of drought tolerance.

Q6) a) Write a note on importance of salt tolerant crops.

b) Describe the influence of high light intensity on plant metabolism.

Q7) Illustrate the structural and functional alterations during pathogenesis.

Q8) Write short notes on (any two):

a) Genetic engineering for resistance to fungal diseases.

b) Heat stress proteins.

c) Xenobiotic stress.

d) Antioxidant enzymes and ROS scavenging.

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

P755

[3927] - 48

M.Sc. (Sem. - IV)

BOTANY

BO - 443 (f): Pharmacognosy

(Old) (Elective Course) (2005 Pattern)

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 should be drawn.***

SECTION - I

Q1) What is adulteration? Explain it in detail by citing suitable examples.

Q2) Give an account of detailed monograph of the drug Mucuna pruriens Benth.

Q3) Explain:

a) Scope of pharmacognosy.

b) Role of botanical characters in criminology.

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

a) Proteins.

b) Biological assay of drugs.

c) Alkaloids.

SECTION - II

Q5) Explain in detail the methods used in ethnobotanical study.

P.T.O.

Q6) Give an account of phytochemical investigations for secondary metabolites.

Q7) Explain:

a) Criteria for import and export of drug.

b) Methods of chemical assay of drugs.

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

a) DNA finger printing.

b) Cacoa butter.

c) Chemofaxonomy.

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

P756

[3927] - 49

M.Sc. (Sem. - IV)

BOTANY

BO - 443 (g): Seed Technology

(Old) (Elective Course) (2005 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.***
4) ***Neat labelled diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Give an account of seed production of hybrid and parental lines of a pulse crop studied by you.

Q2) Explain:

a) Production of orthodox and recalcitrant seeds.

b) Seed acts and seed rules.

Q3) Comment on:

a) Need and types of storage structures.

b) Maintenance of genetic purity of a variety.

Q4) Write notes on any two of the following:

a) Seed handling systems and equipments.

b) Role of seed technology in crop improvement.

c) Plant breeders rights.

P.T.O.

SECTION - II

Q5) Describe Physiological and Metabolic changes during seed germination.

Q6) Explain:

a) Endogenous and exogenous factors governing seed dormancy.

b) Storage losses due to storage pests.

Q7) Comment on:

a) Demand forecasting and seed pricing.

b) Farm records and their use.

Q8) Write notes on any two of the following:

a) Electrophoresis and image analysis.

b) Chemical composition of seeds.

c) Quarantine for seeds.

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

P757

[3927] - 50

M.Sc. (Sem. - IV)

BOTANY

BO - 443 (h): Plant Bio-Diversity

(Elective) (Old Course) (2005 Pattern)

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

Instructions to the candidates:

1) ***Answer in all Five questions. Selecting at least two questions from each section.***
2) ***Answers to the questions from 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) Mention the methods of assessment of plant diversity. Explain any two methods.

Q2) Explain with the help of suitable examples, the concept of ecosystem biodiversity.

Q3) Explain:

a) Utilisation of medicinal plant diversity.

b) Agrobiodiversity.

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

a) Alpha diversity.

b) Biodiversity Hot Spots.

c) Eco terrorism.

P.T.O.

SECTION - II

Q5) Mention the causes of increase in plant diversity. Explain with suitable examples any two of them.

Q6) Mention the statements of the Biodiversity Act. What are the advantages of enforcement of this act?

Q7) Explain:

a) Ex situ, in vitro methods of conservation of plant diversity.

b) Approaches to Bioprospecting.

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

a) Ex situ ex vitro methods of conservation of plant diversity.

b) Natural causes of the loss of plant.

c) Biopiracy.

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

P1040

[3927] - 201
M.Sc.
BOTANY
BO - 2.1 : Systematics of Vascular Plants
(New) (2008 Pattern) (Sem. - II)

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

Instructions to the candidates:

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

SECTION - I

Q1) Give a comparative account of spore bearing organs of Filicales. **[16]**

Q2) Describe the megasporophylls and female cones in cycadales. **[16]**

Q3) a) Write notes on : **[8]**

i) Apogamy in pteridophytes.

ii) Heterosporous pteridophytes.

b) Describe the distribution of Gymnosperms in India. **[8]**

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

a) Vegetative propagation in pteridophytes.

b) Male cones of Gnetales.

c) Primitive characters of Ginkgo.

P.T.O.

SECTION - II

Q5) Explain the merits and limitations of Takhtajan's system of classification of angiosperms. **[16]**

Q6) a) Enlist salient features of Magnoliopsida state the key characters for subclasses. **[8]**

b) Explain, with suitable examples, the role of phytochemistry in angiosperm systematics. **[8]**

Q7) a) What are ecotypes? How do they originate? **[8]**

b) Explain Darwinian concept of evolution of species w.r.t. angiosperms. **[8]**

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

a) Cladistics in taxonomy.

b) Assessment of relationships between species.

c) Modern information tools and their application in systematics.

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

P1041

[3927] - 202

M.Sc.

BOTANY

BO - 2.2 : Cell Biology and Instrumentation

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

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

Instructions to the candidates:

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

SECTION - I

Q1) Describe biogenesis, ultrastructure and functions of chloroplast. **[16]**

Q2) a) Describe structural organisation of plant cell. Add a note on totipotency. **[8]**

b) Describe the structure and function of lysosomes. **[8]**

Q3) a) Explain the packing of DNA in to chromatin. **[8]**

b) Describe the role of cyclin dependent kinases in regulation of cell cycle. **[8]**

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

a) Polytene chromosomes.

b) Ultrastructure and function of ER.

c) Glyoxysomes.

P.T.O.

SECTION - II

Q5) a) Explain ethylene activated two component signalling pathway. **[8]**

b) Explain the role of threonine kinase in cell signalling pathway. **[8]**

Q6) Mention the steps involved in terminal differentiation of plant cell. Explain any one. **[16]**

Q7) a) Explain the principles and applications of affinity chromatography. **[8]**

b) Explain the assembly and working of liquid scintillation counter. **[8]**

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

a) Rotors.

b) ELISA.

c) Working of SEM.

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

P1042

[3927] - 203

M.Sc. (Sem. - II)

BOTANY

BO - 2.3 : Molecular Biology and Genetic Engineering

(New) (2008 Pattern)

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

Instructions to the candidates:

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

SECTION - I

Q1) Discuss dissociation and reassociation kinetics of DNA. Comment on its significance. **[16]**

Q2) a) Explain organisation of eukaryotic gene. **[8]**

b) Explain the molecular mechanism of eukaryotic replication. **[8]**

Q3) a) Explain the mechanism of initiation of transcription in eukaryotes. **[8]**

b) Describe the mechanism of positive and negative regulation of gene in E. Coli. **[8]**

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

a) Excision repair of DNA damage.

b) Spectroscopic and thermal properties of DNA.

c) Mechanism of transcription termination.

P.T.O.

SECTION - II

Q5) Explain, with suitable example and diagram, the mechanism of protein synthesis in prokaryotes. **[16]**

Q6) a) Describe salient features of plasmid and cosmid vectors with suitable example. **[8]**

b) Enlist the enzymes used in cloning techniques. Explain use of any one in detail. **[8]**

Q7) a) Describe at least five potential genes useful for development of disease resistant transgenic plants. **[8]**

b) Explain any two methods of DNA sequencing. **[8]**

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

a) Application of Agrobacterium in genetic engineering.

b) Mechanism of PCR and its application.

c) Southern blotting.

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

P1043

[3927] - 401

M.Sc.

BOTANY

BO - 4.1 : Plant Resources and Evolution

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

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

Instructions to the candidates:

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

SECTION - I

Q1) Justify plant resources as the important natural resources. Support the justification with suitable examples. **[16]**

Q2) a) What is ethnobotany? Add a note on its significance? **[8]**

b) Enlist the therapeutically active secondary metabolites. Describe the plant resource and pharmacological action of any one secondary metabolite. **[8]**

Q3) a) Mention the methods of phytochemical investigation w.r.t. secondary metabolites. **[8]**

b) Explain contribution of botany in forensic sciences. **[8]**

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

a) Microscopic methods of standardization of crude drug.

b) Importance of monographic work w.r.t. drug plants.

c) Energy plantation.

P.T.O.

SECTION - II

Q5) Explain major evolutionary events leading to development of multicellular land plants. **[16]**

Q6) a) Explain the concept of natural selection. **[8]**

b) How basic biomolecules have evolved? **[8]**

Q7) a) Explain any one molecular tool used to understand phylogeny. **[8]**

b) Comment on evolutionary significance of Pentoxylales. **[8]**

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

a) Population genetics.

b) Events preceeding speciation.

c) Convergent evolution.

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

P1044

[3927] - 402

M.Sc.

BOTANY

BO - 4.2 : Applied Botany

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

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

Instructions to the candidates:

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

SECTION - I

Q1) What is sea farming? Justify its necessity. Explain any one method. **[16]**

Q2) Explain : **[16]**

a) Pharmaceutical and nutraceutical value of Spirulina.

b) Use of algae as indicators of water quality.

Q3) a) Explain, with suitable examples the use of fungi in bioremediation. **[8]**

b) Enlist the primary metabolites of commercial importance obtained from fungi add a note on production of any one. **[8]**

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

a) Fungi as mycoweedicides.

b) Fungal transformation of steriods.

c) Mycetoma.

P.T.O.

SECTION - II

Q5) Explain : **[16]**

a) Application of AM fungi in agriculture.

b) Application of fungi in paper industry.

Q6) What are the measures of central tendency? Explain any two with suitable examples. **[16]**

Q7) a) What is ANOVA? Explain its significance. **[8]**

b) What is parametric statistics? Explain with an example. **[8]**

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

a) Protein sequence data bases.

b) Web based tools for sequence searches.

c) Scope of bioinformatics.

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

P1045

[3927]-404
M.Sc.
BOTANY
BO - 4.42 : Mycology and Plant Pathology - II
(2008 Pattern) (New) (Sem.-IV)

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

Instructions to the candidates:

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

SECTION - I

Q1) What is fermentation? Enlist at least six fermentation products. Mention the fungal species for each. Explain in detail methodology for any one product. **[16]**

Q2) a) Mention antiviral and antitumor compounds obtained from Fungi indicating the Species of fungal resource. **[8]**

b) What are novel fungal textiles? How are these prepared? **[8]**

Q3) a) Explain mechanism of particulate absorption by fungi. Mention its applications. **[8]**

b) Mention the steps involved in mushroom cultivation. Explain any one. **[8]**

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

a) Fungal transformation of steroids.

b) Fungal treatment of industrial effluent.

c) Fungi in food industry.

P.T.O.

SECTION - II

Q5) Give a comparative account of different clinical types of super ficial mycosis. Add a note on major differences between superficial and subcutaneous mycosis. **[16]**

Q6) a) Explain the steps involved in pathogenesis. **[8]**

b) Mention the symptoms of fungal diseases and explain any one. **[8]**

Q7) a) Explain the scope of seed pathology. **[8]**

b) How do environmental factors affect the disease incidence and spread? **[8]**

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

a) Plant defence against fungal infection.

b) Powdery mildews.

c) Economic aspects of fungal diseases.

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

P1046

[3927]-405
M.Sc.
BOTANY
BO - 4.43 : Angiosperms
(2008 Pattern) (New) (Sem.-IV) (Paper - II)

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

Instructions to the candidates:

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

SECTION - I

Q1) What is arboriculture? Mention various methods of arboriculture and explain post plantation care of trees. **[16]**

Q2) a) What is somatic embryogenesis? Explain any one application. **[8]**

b) Enlist major Indian timber trees. Describe uses of any three trees. **[8]**

Q3) Enlist the elements of wood. Explain their structure and distribution of the elements. **[16]**

Q4) Write explanatory notes on any three of the following. **[16]**

a) Stages of micropropagation.

b) Properties of wood in relation to structure.

c) Advantages and limitations of Arborescent form.

SECTION - II

Q5) Describe with the help of an appropriate diagram, ultrastructure of a mature pollen grain of an angiosperm. Add a note on gross chemical composition of pollen. **[16]**

Q6) What is Mellitopalynology? Explain its procedures scope and applications. **[16]**

P.T.O.

Q7) Define androgenesis. Explain the events that lead to androgenesis in vivo. Comment on the significance of androgenesis. **[16]**

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

a) Routes to apomixis.

b) Applications of artificial Pollination.

c) Causes of polyembryony.

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

P1047

[3927]-407
M.Sc.
BOTANY
BO - 4.45 : Genetics Molecular Biology & Plant Breeding -II
(Sem. - IV) (2008 Pattern) (New)

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

Instructions to the candidates:

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

SECTION - I

Q1) What are molecular markers? Describe such markers linked to disease resistance. **[16]**

Q2) a) Describe applications of nucleic acid (DNA) amplification. **[8]**

b) Describe the methods of breeding for drought resistance. **[8]**

Q3) a) Describe procedure and applications of southern blotting. **[8]**

b) Give a flow chart for DNA sequencing. **[8]**

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

a) Genome project.

b) Application of PCR.

c) Chloroplast genome.

SECTION - II

Q5) Give an account on breeding for nutritive quality with reference to edible oils. **[16]**

Q6) a) Describe with suitable example genetic polymorphism. **[8]**

b) Explain biotechnological approach for breeding pulse crops. **[8]**

P.T.O.

Q7) a) Discuss genetic control of nutritional traits. **[8]**

b) Give a brief account on genetics of drought resistance. **[8]**

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

a) Colony hybridization.

b) QTL

c) Somaclonal variants.

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

P1048

[3927]-408
M.Sc.
BOTANY
BO - 4.46 : Plant Biotechnology
(Sem. - IV) (2008 Pattern) (New) (Paper - II)

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

Instructions to the candidates:

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

SECTION - I

Q1) Explain the principle of PCR method. Describe functioning of PCR machine. Add a note on application of PCR. **[16]**

Q2) a) Describe any one method of DNA sequencing. **[8]**

b) Explain the technique of restriction mapping. **[8]**

Q3) a) Describe with suitable examples any two vectors used in gene cloning. **[8]**

b) What are applications of proteomics in drug development? **[8]**

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

a) Western blotting technique.

b) Chromosome walking.

c) Pharmacogenomics.

SECTION - II

Q5) Enlist various enzymes used in recombinant DNA technology. Explain the use and mode of action of any four such enzymes. **[16]**

Q6) Explain **[16]**

a) Method of identification and characterization of novel proteins.

b) Structural and functional proteomics.

P.T.O.

Q7) What is agricultural biotechnology? What are its methods? Explain any one method .Comment on acceptance of agrobioproduct. **[16]**

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

a) Bioethical principles of agricultural biotechnology.

b) Environmental biotechnology.

c) Bioleaching of metals.

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

P1049

[3927]-409
M.Sc.
BOTANY
BO - 4.47 : Plant Diversity - II
(2008 Pattern) (New) (Sem.-IV)

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

Instructions to the candidates:

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

SECTION - I

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

Q2) Mention the organizations responsible for framing the policies and developing methodologies for management of biodiversity. **[16]**

Q3) Explain: **[16]**

a) Biodiversity legislation and convention.

b) Loss of Agrobiodiversity causes and consequences.

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

a) Factors affecting ecosystem degradation.

b) In situ conservation.

c) Ecological and evolutionary impacts on biological invasions.

SECTION - II

Q5) What is meant by ex situ conservation of plant diversity? Enlist the methods for the same. Explain with suitable examples any one method. **[16]**

P.T.O.

Q6) Explain with suitable examples the advantages and limitations of use of biotechnologies in plant conservation. **[16]**

Q7) a) Explain the concept of biodiversity prospecting and Indegenous Knowledge system. **[8]**

b) Comment on ethical and aesthetic values of biodiversity. **[8]**

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

a) Economic value of biodiversity.

b) People's participation in management of plant diversity.

c) Agroforestry.

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

P739

[3927]-103
M.Sc. - I
BOTANY
BO - 1.3 : Genetics and Plant Breeding
(New Course) (2008 Pattern) (Semester - I)

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 must be drawn wherever necessary.***

SECTION - I

Q1) Define quantitative inheritance. Describe inheritance of a quantitative trait in Nicotiana.

Q2) What is cytoplasmic inheritance? Explain with two suitable examples cytoplasmic inheritance involving chloroplast gename.

Q3) Give brief account of :

a) Hardy-Weinberg law.

b) Parasexuality in fungi imperfecti.

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

a) Lycoperdon.

b) Ergot disease.

c) Taphrinales.

d) Ultra structure of a fungal cell.

SECTION - II

Q5) What is heterothallism? Add a note on phylogeny in fungi. **[16]**

P.T.O.

Q6) What is fungal growth? Explain fungal sex hormones.

Q7) a) Comment on mycorrhizae. **[8]**

b) Why fungi are tools of genentical studies? **[8]**

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

a) Phylloplane fungi.

b) Soil fungi.

c) Fungal growth.

d) Pathogenicity, resistance and virulence.

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

P740

[3927]-301
M.Sc. - II
BOTANY
BO - 3.1 : Developmental Botany and Tissue Culture
(New) (2008 Pattern) (Semester - III)

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

Instructions to the candidates:

1) ***Attempt 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) ***Draw neat labelled diagrams wherever necessary.***

SECTION - I

Q1) Which processes are basic to plant development. Explain any two processes at organ level. **[16]**

Q2) a) What is embryogenesis in vivo? Describe patterns of embryogenesis. **[8]**

b) Give an account of post pollination changes in the embryosac upto zygote formation. **[8]**

Q3) a) Define androgenesis. Explain it with appropriate examples. **[8]**

b) Mention routes to polyembryony. Explain any one. **[8]**

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

a) Male germ unit.

b) Apomixis.

c) Photocontrol of reproductive development.

SECTION - II

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

a) Totipotency.

b) Indirect organogenesis.

c) Somatic embryogenesis.

d) Synthetic seeds.

P.T.O.

Q6) a) What is callus? How is it raised? Mention the characteristics of callus cells. **[8]**

b) Explain the procedures for culture and fusion of plant protoplasts. **[8]**

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

b) With the help of appropriate examples explain the applications of PTC in Agriculture and Horticulture. **[8]**

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

a) GM crops.

b) Applications of micropropagation to develop disease free plants.

c) Somaclonal variations.

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

P741

[3927]-302
M.Sc. - II
BOTANY
BO - 3.2 : Environmental Botany & Plant Diversity
(New Course) (2008 Pattern) (Semester - 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) Explain energy flow in ecosystem with suitable energy models.

Q2) a) Define population. Enlist characters of it. Explain in detail any two characters.

b) "Environmental Science is an interdisciplinary subject" - Justify.

Q3) a) Define Water pollution. Enlist its sources. Explain impact of Eutrophication on water quality.

b) Enlist green house gases. Explain their possible effects on global warming.

Q4) Write notes on any two :

a) Physiognomy.

b) Air Pollution Act.

c) EIA.

SECTION - II

Q5) Define Biodiversity. Enlist it's types. Explain in detail ecosystem diversity with respect to any one major ecosystem.

Q6) a) What is phytogeography? Enlist major phytogeographic regions of India. Describe any one with suitable examples.

b) Explain anthropogenic factors affecting loss of biodiversity.

P.T.O.

Q7) a) Explain role of myco-fertilizers in restoration ecology.

b) Explain value and use of biodiversity with reference to food and fodder.

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

a) Red Data Book.

b) CBD.

c) Indian Biodiversity Act.

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

P742

[3927]-304
M.Sc. - II
BOTANY
BO - 3.32 : Mycology and Plant Pathology - I
(New) (2008 Pattern) (Semester - 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) Enumerate Ainsworth's system of classification in fungi. State its merits. **[16]**

Q2) What are slime molds? State various characters by explaining life cycle pattern. **[16]**

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

a) Economic importance of the order peronosporales.

b) Parasexuality in fungi imperfecti.

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

a) Lycoperdon.

b) Ergot disease.

c) Taphrinales.

d) Ultra structure of a fungal cell.

SECTION - II

Q5) What is heterothallism? Add a note on phylogeny in fungi. **[16]**

Q6) What is fungal growth? Explain fungal sex hormones. **[16]**

P.T.O.

Q7) a) Comment on mycorrhizae. **[8]**

b) Why fungi are tools of genentical studies? **[8]**

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

a) Phylloplane fungi.

b) Soil fungi.

c) Fungal growth.

d) Pathogenicity, resistance and virulence.

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

P743

[3927]-305
M.Sc. - II
BOTANY
BO - 3.33 : Angiosperms
(2008 Pattern) (New Course) (Semester - III) (Paper - I)

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

Instructions to the candidates:

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

SECTION - I

Q1) Describe the angiosperm diversity of Western Ghats.

Q2) a) Explain in brief the centrospermae as heterogenous assemblage.

b) Explain the procedure for typification.

Q3) a) 'Systematics as a synthetic subject'. Explain.

b) Give a comparative account of Biosystematic categories and systematic categories.

Q4) Write short notes on (any two) :

a) Effective and valid publication.

b) Numerical taxonomy.

c) ICBN principles – Rules and recommendations.

SECTION - II

Q5) Give objectives and functions of botanical garden.

Q6) Explain :

a) Role of herbarium in systematics.

b) Herbarium as multipurpose institute.

P.T.O.

Q7) Give an account of any two botanical gardens of India.

Q8) Write short notes on (any two) :

a) Digital herbarium.

b) Utility of embryological data in systematics.

c) Amentiferae.

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

P744

[3927]-306
M.Sc. - II
BOTANY
BO - 3.34 : Plant Physiology
(2008 Pattern) (New) (Paper - I) (Semester - III)

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

Instructions to the candidates:

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

SECTION - I

Q1) Define salt stress. Explain the mechanism of salt stress.

Q2) What is abiotic stress? Add a note on research carried out in India and abroad.

Q3) a) Give role of proline and polyols in water stress.

b) Explain reclaimation of saline and sodic soils.

Q4) Write notes on any two of the following :

a) Flooding tolerance.

b) Water logging injury.

c) Importance of stress physiology in plants.

SECTION - II

Q5) What is pollution stress? Explain effect of air pollutants on plant metabolism.

Q6) Explain the mechanism of ion toxicity w.r.t. Fe and Mn.

P.T.O.

Q7) a) Explain the effect of uv-A radiation on plant metabolism.

b) Comment on scavenging of free radicals.

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

a) ROS.

b) Photoinhibition.

c) Xenobiotic.

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

P745

[3927]-307
M.Sc. - II
BOTANY
BO - 3.35 : Genetics, Molecular Biology and Plant Breeding - I
(New) (2008 Pattern) (Special Paper - I) (Semester - 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) Define Karyotype, comment on its evolution and add a note on banding techniques. **[16]**

Q2) a) Explain S. Benzer's concept of gene. **[8]**

b) Explain production of haploid. **[8]**

Q3) a) Explain gene mapping with respect to *r*–II locus in T_4 phage. **[8]**

b) Explain meiotic behaviour of haploids. **[8]**

Q4) Give brief account of any two of the following : **[16]**

a) C-value paradox.

b) Artificial chromosomes.

c) Production and utility of alien addition lines.

SECTION - II

Q5) Describe different steps in hybridization and add a note on varietal release. **[16]**

Q6) a) Describe method of gene mapping using Trisomics. **[8]**

b) Screening of mutants. **[8]**

P.T.O.

Q7) a) Enlist different mutagens used in mutation breeding. **[8]**

b) Explain mass selection method of breeding. **[8]**

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

a) Describe different field evaluation techniques.

b) Recombination by conjugation in bacteria.

c) Correlation of genetic and physical maps.

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

P746

[3927]-308
M.Sc. - II
BOTANY
BO - 3.36 : Plant Biotechnology - I
(New) (2008 Pattern) (Semester - 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) Enlist the types of cultures. Compare the callus culture and meristem culture with reference to the procedure, products and applications. **[16]**

Q2) a) Draw a layout of a plant tissue culture laboratory. Indicate important units and sites of installation of the major equipment. **[8]**

b) Compare organogenesis and somatic embryogenesis with reference to advantages and applications. **[8]**

Q3) a) Mention the stages of micropropagation. Explain the importance of any one stage. **[8]**

b) How are somaclones produced and selected? Mention the importance of somaclones in plant biotechnology. **[8]**

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

a) Applications of cell suspension culture in plant biotechnology.

b) Plant biotechnology in crop improvement.

c) Factors affecting in vitro morphogenesis.

SECTION - II

Q5) What are transgenics? Enlist the methods of production of transgenics. Mention any two applications in quality improvement of primary metabolites. **[16]**

P.T.O.

Q6) a) How are transgenics useful for manipulation of secondary metabolism? Explain with a suitable examples. **[8]**

b) What is a somatic hybrid? How do the somatic hybrids differ from sexual hybrids? Mention the advantages of somatic hybridization. **[8]**

Q7) a) What is cryopreservation? Explain its applications in plant biotechnology. **[8]**

b) What are different types of phytoremediation? Explain any one with the help of an appropriate example. **[8]**

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

a) Plant derived vaccines.

b) Green house technology.

c) Single cell proteins.

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