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

P703

[3627]-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 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) Discuss the status of algae in eight kingdom system and add a note on algal habitats and pigments.

Q2) a) Explain the life cycle pattern with respect to orders in charophyta.

b) Enumerate the interrelationship between Phaeophyta and Rhodophyta.

Q3) a) Give the characters of Chrysophyta.

b) Give an account of cell organisation and thallus types in Cyanophyta.

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

a) Gametophytes of Bryophytes.

b) Morphology of thallus in Marchantiales.

c) Plant Systematics.

P.T.O.

SECTION - II

Q5) Give an account of thallus structure, spore producing structures and life cycle patterns in Basidiomycotina.

Q6) a) Describe parasexuality and compatibility in fungi.

b) Explain the life cycle pattern and spore producing structures in Mastigomycotina.

Q7) a) Discuss the structure of thallus organisation and mode of nutrition in Necrotrophs.

b) Give an outline classification of fungi with reasons proposed by Alexopoulous; Mims and Blackwell upto class level.

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

a) Sphagnales as synthetic group.

b) Vegetative reproduction in Bryophyta.

c) Difference in systematics and taxonomy.

❐❐❐

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

P704

[3627]-102

M.Sc. - I

BOTANY

BO-1.2 : Plant Physiology and Biochemistry

(Sem. - I) (New Course) (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) Outline the reactions of TCA cycle and give its net gain in terms of ATP.

Q2) Draw an outline of Calvin cycle. How is the cycle regulated?

Q3) a) Write in brief on uniport and symport of ions.

b) Describe the major metabolic changes during maturity and fruiting.

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

a) Impact of biotic stress on plant metabolism.

b) Concept of SPAC.

c) Biosynthesis and mechanism of action of ethylene.

P.T.O.

SECTION - II

Q5) What are Isozymes? Explain any four factors affecting enzyme activity.

Q6) What are secondary metabolites? Enlist the major pathways of their biosynthesis. Add a note on biosynthesis of terpenoids.

Q7) a) Outline the steps involved in the synthesis of aspartate.

b) Give in brief the synthesis and breakdown of glucose.

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

a) Redox potential.

b) NOD factors.

c) Biosynthesis of glycolipids.

❐❐❐

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

P705

[3627]-103

M.Sc. - I

BOTANY

BO-1.3 : Principles of Genetics and Plant Breeding

(Sem. - I) (New) (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) ***All questions carry equal marks.***
4) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Explain how unordered tetrad data are used for gene mapping in yeast.

Q2) What is cytoplasmic inheritance? Explain its mechanism involving mitochondrial genome.

Q3) Give brief account of:

a) Male sterility.

b) C-value paradox.

Q4) Write notes on any two of the following:

a) Concept of karyotype.

b) Lethal genes.

c) Hary-Weinberg law.

P.T.O.

SECTION - II

Q5) What is polyploidy? Explain its role in plant breeding.

Q6) Give an account of physical and chemical mutagens. Add a note on their mechanism of action.

Q7) Give brief account of:

a) Chromosome markers.

b) Heterosis.

Q8) Write notes on any two of the following:

a) Cytological consequences of inversion.

b) Genetic drift.

c) Plant breeding in India.

❐❐❐

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

P718

[3627]-301

M.Sc. - II

BOTANY

BO-3.1 : Developmental Botany and Plant Tissue Culture

(Sem. - III) (New Course)

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) ***Neat labelled diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Enlist the processes, at cellular level, basic to plant development and explain any two.

Q2) a) Enlist the morphological and histological changes at shoot apex during transition from vegetative to reproductive phase in flowering plants.

b) Mention the stages of anther development and explain any one in detail.

Q3) a) What is female germ unit? Describe the structure of a typical female germ unit.

b) With the help of a suitable example, explain the role of hormones in control of vegetative development (any one).

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

a) Gene expression during flower development.

b) Light mediated control of development.

c) Gynogenesis.

P.T.O.

SECTION - II

Q5) Explain in brief (any two):

a) Totipotency.

b) Cytodifferentiation.

c) Somatic embryogenesis.

d) Indirect organogenesis.

Q6) a) Compare callus culture and cell suspension culture.

b) Give a flow chart of process of isolation and culture of protoplasts.

Q7) a) Mention the causes for somaclonal variation.

b) Distinguish between somatic hybrid and cybrid.

c) Enlist the stages of micropropagation.

d) Mention any four applications of plant tissue culture in agriculture.

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

a) Application of plant tissue culture in conservation of germplasm.

b) Synthetic seed.

c) Cryopreservation.

❐❐❐

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

P706

[3627]-302

M.Sc. - II

BOTANY

BO-3.2 : Environmental Botany & Plant Diversity

(Sem. - III) (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 book.***
3) ***All questions carry equal marks.***
4) ***Neat labelled diagrams must be drawn wherever necessary.***

SECTION - I

Q1) What is succession? Enlist its types. Explain various stages of succession.

Q2) a) Define community. Classify and explain any three functional aspects of it.

b) "Environmental Science is an interdesciplinary subject." Justify.

Q3) a) Give types and sources of water pollution. Add a note on it's control measures.

b) Comment on green house gases and their effects on Global Warming.

Q4) Write notes on any two of the following:

a) Aerial photography as a modern tool in Environmental Science.

b) Carbon Sink.

c) Density & Natality.

d) EMP.

P.T.O.

SECTION - II

Q5) What is Phytogeography? Enlist major phytogeographical regions of India. Describe any three with suitable examples.

Q6) a) Give detailed account of species diversity.

b) Describe the uses of Biodiversity.

Q7) a) Explain consequences of loss of Biodiversity on human life.

b) Discuss Indian Biodiversity Act.

Q8) Write notes on any two of the following:

a) Diversity indices.

b) CITIES.

c) Principles of Ecological Succession in restoration Ecology.

d) Phytoextraction.

❐❐❐

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

P707

[3627]-303

M.Sc. - II

BOTANY

BO-3.31 : Phycology Special Paper - I

(Sem. - III) (New 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) Comment on modern approaches in the classification of green algae.

Q2) Describe affinities of Cyanophyceae with algae and bacteria.

Q3) a) Give an account of biotic associations of algae.

b) Explain endosymbiotic theory of the origin of eukaryotic algal cell.

Q4) Write notes on any two of the following:

a) Phycoplast.

b) Modern tools in studies of algal systematics.

c) Flagella architecture in motile green algae.

P.T.O.

SECTION - II

Q5) Give an account of revision of classification of red algae in light of recent studies.

Q6) Describe interrelationship among various orders of brown algae.

Q7) a) Describe CO_2 cycle in water.

b) What is paleolimnology? Describe significance of paleolimnological studies.

Q8) Write notes on any two of the following:

a) Temperature - Density relationship in standing water.

b) Life forms of algae.

c) Adaptations in colonial phytoplankton.

❐❐❐

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

P708

[3627]-304

M.Sc. - II

BOTANY

BO-3.32 : Mycology and Plant Pathology - I

(Special Paper - I)

(Sem. - III) (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) Describe the various types of ascocarps and comment on their significance in taxonomy.

Q2) Give an outline of classification of fungi upto order as proposed by Bessey (1950).

Q3) a) Give an account of the types of zoospores in Mastigomycotina.

b) Comment on relationship of partners in Lichens.

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

a) Plasmodia in Myxomycotina.

b) Contributions of any two Indian Mycologists.

c) Types of teliospores in Uredinales.

P.T.O.

SECTION - II

Q5) What is heterothallism? Explain it in Oomycetes.

Q6) Discuss the associations of fungi in higher plants.

Q7) a) Comment on the algal and protozoan ancestry of fungi.

b) Write an account on air-borne fungi and their importance.

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

a) Mycotoxins.

b) Virulance in fungi.

c) Seed borne fungi.

❐❐❐

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

P709

[3627]-305

M.Sc. - II

BOTANY

BO-3.33 : Angiosperms Special Paper - I

(Sem. - III) (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 ICBN ? Add a note on its review and principles.

Q2) a) Explain 'typification'.

b) Describe the use of modern data in systematics of Amentiferae.

Q3) a) What is author citation? Describe different types of author citation with suitable examples.

b) Explain primitive features of Ranunculaceae.

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

a) Angiosperm diversity of Western Ghats.

b) Explain use of cytological data in systematics.

c) Key elements in floristic composition of India.

P.T.O.

SECTION - II

Q5) Give aims and objectives of Biosystematics. Explain Clausen's experiment.

Q6) a) Comment on the role of herbarium in botanical studies.

b) Botanical Gardens as multipurpose research institutes; Discuss.

Q7) Explain Biosystematic categories, compare them with taxonomic categories.

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

a) Numerical taxonomy.

b) Advantages and limitations of digital herbarium.

c) Major features of any one botanical garden of the world.

❐❐❐

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

P710

[3627]-306

M.Sc. - II

BOTANY

BO-3.34 : Plant Physiology (Special Paper-I)

(Sem. - III) (New Course)

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) Give a critical account of drought resistance mechanisms in higher plants.

Q2) Describe the nature of waterlogging stress and explain how plant growth and metabolism is affected by such stress.

Q3) a) Give an account of the impact of salt stress on plant metabolism.

b) Describe the mechanism of salt tolerance in higher plants.

Q4) Write notes on any two of the following:

a) Transgenics for drought stress tolerance.

b) Mechanism of flooding tolerance in wetland species.

c) Recent research on abiotic stress in India.

P.T.O.

SECTION - II

Q5) Describe the effects of UV-A and UV-B radiations on the metabolism of plants.

Q6) How are free radicals generated? What are their effects on plant cells? Explain the mechanism of free radical scavenging.

Q7) a) Describe the effects of SO_2 and Ozone on plant metabolism.

b) Explain the mechanism of ion toxicity tolerance.

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

a) Toxicity of Aluminium and Zinc on plant metabolism.

b) Mechanism of UV tolerance.

c) Mechanism of ion toxicity tolerance.

❐❐❐

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

P711

[3627]-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 mechanisms of genetic recombination in bacteria.

Q2) Describe morphology of eukaryotic chromosome. Add a note on chromosomal theory of inheritance.

Q3) What are monosomics? Describe their origin and meiotic behavior.

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

a) t - test

b) Karyotype evolution.

c) Transmission genetics.

P.T.O.

SECTION - II

Q5) What is randomised block design? Describe its uses and importance in field evaluation techniques.

Q6) Describe the method of mass selection for breeding cross pollinated crops.

Q7) a) Explain objectives of plant breeding.

b) Describe origin of trisomics.

Q8) Write notes on any two of the following:

a) Germplasm and its types.

b) C - value paradox.

c) r II locus.

❐❐❐

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

P712

[3627]-308

M.Sc.

BOTANY

BO-3.36 : Plant Biotechnology

(Sem. - III) (New Course)

(Special Paper - I)

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

Instructions to the candidates :

1) ***Attempt any five questions, selecting atleast two questions from each section.***
2) ***Answers to the two sections must be written in separate answer books.***
3) ***All questions carry equal marks.***

SECTION - I

Q1) Mention important components/units of a plant tissue culture laboratory. Draw the design of a PTC laboratory. Explain importance of any two units of the laboratory.

Q2) a) What are somaclonal variations? How are they induced? Mention their applications.

b) Explain the application of anther/pollen culture in Agriculture.

Q3) a) How are transgenics for biotic stress tolerance developed? Cite at least two examples.

b) Explain the method of quantitative and qualitative improvement of lipids by using transgenics.

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

a) Application of plant growth regulators in micropropagation.

b) Application of somatic embryogenesis.

c) Methods of selection of somaclonal variants.

P.T.O.

SECTION - II

Q5) a) Describe the protocol for developing transgenics for tolerance to abiotic stresses. Cite two examples.

b) How are cell suspension cultures initiated and maintained? Mention the applications of cell suspension cultures.

Q6) How are plant tissue culture media designed? Explain the precautions required for preparation and handling of plant tissue culture media. Mention the obligatory and optional components of such media.

Q7) a) Explain the management and operation of green house.

b) Describe the importance of cryopreservation in plant biotechnology.

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

a) Phytoremediation.

b) Plant derived vaccines.

c) Single cell proteins.

❐❐❐

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

P713

[3627]-309

M.Sc.

BOTANY

BO-3.37 : Plant Diversity : Special Paper-I

(Sem. - III) (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) ***All questions carry equal marks.***
4) ***Neat labelled diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Define biodiversity. Comment on the role of species in diversity.

Q2) a) Differentiate between micro and macro evolution.

b) Describe the scope and importance of biodiversity.

Q3) Explain:

a) Methods of assessment and measurement of diversity.

b) DNA based Marker Techniques.

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

a) Hot-spot biodiversity in India.

b) Factors affecting the species distribution.

c) Taxic diversity.

P.T.O.

SECTION - II

Q5) Give classification of ecosystems. Describe any two major ecosystems of the world.

Q6) Explain:

a) Role of landscape in diversity.

b) Act of domestication.

Q7) Describe the following:

a) Nature of urban diversity.

b) Pteridophyte diversity.

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

a) Fresh water wet land.

b) Lichen diversity.

c) Centres of diversity.

❐❐❐

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

P714

[3627]-310

M.Sc. - II

BOTANY

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

(Sem. - III) (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) Explain the physiological and biochemical changes during seed germination.

Q2) Comment on various factors influencing seed germination.

Q3) a) Describe fertilization and development of embryo.

b) Discuss the role of seed industries in India.

Q4) Write notes on any two of the following:

a) Seed Vigour.

b) Endosperm and seed coat.

c) Opportunities in seed technology.

P.T.O.

SECTION - II

Q5) Write an account of life cycle, infestation and control measures of sugarcane pests.

Q6) What is seed deterioration? Write an account on manifestation, causes and preventive measures of seed deterioration.

Q7) a) Comment on the factors affecting seed longevity in storage.

b) Write about impact of seed infection on seed and planting value.

Q8) Write notes on any two of the following:

a) Fumigation.

b) Cold storage.

c) Seed transmission.

❐❐❐

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

P715

[3627]-31

M.Sc. - II

BOTANY

BO-331 : Plant Development and Reproduction

(Sem. - III) (Old Course)

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 diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Enumerate various types of meristems. Explain the organization and activity of any one of them.

Q2) Enlist plant hormones. Describe their effects on development of plants.

Q3) Comment on:

a) Pollen-stigma interaction.

b) Plant development under control of light.

Q4) Write notes on any two of the following:

a) Sexual versus vegetative reproduction.

b) Process of stomatal development.

c) Unique features of plant development.

P.T.O.

SECTION - II

Q5) Describe the major events occurring during microsporogenesis. Add a note on role of tapetum in pollen development.

Q6) Describe self incompatibility. Add a note on barriers of fertilization.

Q7) Comment on:

a) Dynamics of fruit growth.

b) Endosperm and its development.

Q8) Write notes on any two of the following:

a) Methods to overcome incompatibility.

b) M.G.U.

c) Artificial seeds.

❐❐❐

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

P716

[3627]-32

M.Sc. - II

BOTANY

BO-332 : Plant Ecology

(Sem. - III) (Old 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 labelled diagrams must be drawn wherever necessary.***

SECTION - I

Q1) What are Biomes? Describe major biomes of the world with examples.

Q2) What is Biodiversity? Explain methods of Biodiversity measurement. Add a note on Hot Spots in India.

Q3) a) Describe IUCN categories of threat, distribution and global patterns.

b) Define Biogeochemical cycle and describe any one of the biogeochemical cycles.

Q4) Write notes on any two of the following:

a) Soil types of the world.

b) Speciation and extinction.

c) Energy flow models.

d) Primary Productivity.

P.T.O.

SECTION - II

Q5) What is water pollution? Describe different sources and control measures of it.

Q6) Define Ecological management. Explain how it is useful in conservation of endangered genetic resources.

Q7) a) Explain concept of resistance and resilence.

b) Give an account of ecosystem restoration.

Q8) Write notes on any two of the following:

a) Global warming.

b) Plant invasion.

c) Green house effect.

d) EIA.

❐❐❐

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

P717

[3627]-33

M.Sc. - II

BOTANY

BO-333 : Taxonomy and Diversity of Seed Plants

(Sem. - III) (Old 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) Describe morphological and anatomical features of Pentoxylates and discuss its affinities.

Q2) a) Give morphological peculiarities of Welwitschiales.

b) Write an account on Hot Spots in India.

Q3) Comment on:

a) Merits and demerits of Engler and Prantal's system of classification of Angiosperms.

b) Principles and main divisions of ICBN.

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

a) Female strobilus of Ginkgo.

b) Rejection of names and epithets.

c) Numerical taxonomy.

P.T.O.

SECTION - II

Q5) Give salient features of Magnoliales. Explain the treatment given to it by various taxonomists.

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

Q7) Give a concise account of embryology in Coniferales.

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

a) Phases of classification.

b) Salient features of Cyperales.

c) Endemism.

❐❐❐

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

P1248

[3627]-1
M.Sc.
BOTANY
BO - 111 : CELL AND MOLECULAR BIOLOGY
(2004 Pattern) (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 diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Describe the molecular organization of the plasma membrane. Add a note on channels and pumps receptors.

Q2) Briefly explain genome organization in chloroplast. Add a note on nucleo-cytoplasmic interactions.

Q3) Give brief account of

a) Packaging of DNA in eukaryotic organisms.

b) Cyclin and cyclin dependent kinases.

Q4) Write notes on any two of the following :

a) Microbodies and their functions.

b) Ribosomes-site of protein synthesis.

c) Biogenesis of cell wall.

SECTION - II

Q5) What are the different types of repetative DNA? How repetative DNA is differentiated from unique sequence DNA?

Q6) Explain the difference in the process of initiation of protein synthesis in prokaryotes and eukaryotes.

P.T.O.

Q7) a) Explain the organisation of the Ac/Ds type of transposable elements and the mechanism of transposition.

b) Give an account on SOS repair system for DNA damage.

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

a) Wobble hypothesis.

b) Lac operon.

c) Rolling circle model of DNA replication.

☒☒☒☒

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

P1249

[3627] - 2
M.Sc. - I
BOTANY
BO - 112 : Biology and Diversity of Higher Cryptogams
(2004 Pattern) (Sem. - I)

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

Instructions to the candidates:

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

SECTION - I

Q1) Describe in detail the structure of the sporogonium of Pellia. In what respect do you consider it to be more advanced than that of Riccia and Marchantia?

Q2) Comment on the morphological and anatomical peculiarities of thallus in Anthocerotales.

Q3) Comment on Jungermanniales with reference to their habit, external and internal morphology.

Q4) Write notes on any two of the following :

a) Economic and ecological importance of Sphagnum.

b) Protonemal stage in moss.

c) Origin of bryophytes.

SECTION - II

Q5) Describe briefly gametophytes of homosporous pteridophytes.

Q6) Describe evolution of stele in pteridophytes.

Q7) Comment on :

a) T.S. of Sphenophyllum stem.

b) Calamites.

P.T.O.

Q8) Write notes on any two of the following :

a) Sporocorp of Salvinia.

b) Glossopteris.

c) Lepidodendron.

☒☒☒☒

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

P1250

[3627]-3
M.Sc.
BOTANY
BO - 113 : Genetics and Cytogenetics
(2004 Pattern) (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) ***Answer to the two sections should be written in separate answer books.***
3) ***All questions carry equal marks.***
4) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Explain briefly the molecular basis of gene mutations. Add a note on transposable elements in prokaryotes.

Q2) a) Give an account on construction of molecular maps.

b) Comment on various factors which affect gene and genotypic frequencies in population.

Q3) a) Explain albinism and sickle cell anemia as a genetic disorder.

b) Comment on extra-chromosomal inheritance with reference to chloroplast.

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

a) Transduction in bacteria.

b) Genetic markers.

c) Cytoplasmic male sterility.

SECTION - II

Q5) Explain the origin and meiotic behaviour of deficiency and duplication.

Q6) a) How monosomics are used in chromosome mapping? Explain it with the help of suitable example.

b) Explain the complex translocation with the help of suitable example.

P.T.O.

Q7) Give an account on :

a) Confocal microscopy.

b) C-value paradox and its determination.

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

a) Alien gene transfer.

b) Multigene families.

c) Genetic basis of inbreeding.

Total No. of Questions : 7] **[Total No. of Pages : 2**

P1251

[3627 - B] - 12
M.Sc.
BIOTECHNOLOGY
BT - 12 : Cell Biology
(Old)

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

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any four questions from question No. 2 to 7.***
3) ***Figures to the right indicate full marks for respective questions.***
4) ***Neat diagrams are expected drawn wherever necessary.***

Q1) Answer any four of the following : **[20]**

a) Explain the limits of magnification and resolution in optical/light microscopy.

b) With the help of appropriate example explain the role of secondary messengers in signal transduction.

c) What are cell lineages? How can these be traced back and followed up during development?

d) What are the functions of plasmodesmata?

e) Mention the key processes of plant cell differentiation.

f) Describe the composition and organisation of microfilaments.

Q2) Ellucidate the following :

a) RTKase pathway of signal transduction. **[7]**

b) Role of cyclins in cell cycle. **[8]**

Q3) Write explanatory notes on :

a) Extracellular matrix. **[7]**

b) Role of cell wall in growth and development of plants. **[8]**

P.T.O.

Q4) a) Explain the molecular mechanism of apoptosis. **[7]**

b) How oxidative phosphorylation occurs in mitochondria? **[8]**

Q5) Explain with suitable examples cell-cell interactions in plants. **[15]**

Q6) Write notes on : **[15]**

a) Cell motility.

b) Biogenesis of plastids.

c) Passive transport across membranes.

Q7) Explain in brief : **[15]**

a) Advantages and limitations of micrometry.

b) Applications of morphometry.

c) Subcellular fractionation.

❖ ❖ ❖ ❖

Total No. of Questions : 7] **[Total No. of Pages : 2**

P1252

[3627 - B] - 21
M.Sc.
BIOTECHNOLOGY
BT - 21 : Molecular Biology

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

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Answer any four from question 2 to 7.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) Answer any four from the following : **[20]**

a) Describe the characteristic features of type II restriction enzymes.

b) Why λ lysogen is immune to the infection by another λ virus?

c) Plasmid P^{Bk} has molecular weight of 5.2 kb. Calculate the no. of molecules in 1 µg of DNA.

d) What % agarose gel should be used for resolving the fragments of DNA in the range 100 bp - 1000 bp? Explain.

e) Draw the transcription unit of RNA polymerase - I.

f) What are the basic differences between replication of nuclear DNA and mitochondrial DNA?

Q2) Write short notes on : **[15]**

a) Melting temperature of DNA.

b) Origin of replication in E-coli.

c) σ independent termination of transcription in E-coli.

Q3) Justify the statements : **[15]**

a) GTP is extensively used in translation in E-coli.

b) RNA polymerase II can not initiate transcription without transcription factors.

P.T.O.

Q4) Write briefly on : **[15]**

a) Rolling circle model of replication.

b) Mis-match repair system of E-coli.

Q5) a) Justify the statement "several cancers are associated with P^{53} inactivation.

b) Explain diagrammatically Hox gene in Drosophila. **[15]**

Q6) Describe : **[15]**

a) Holiday model of recombination.

b) Genome imprinting. Explain the role of DNA methylation in genome imprinting.

Q7) a) Describe the posttranslational modifications of proteins. **[15]**

b) Write briefly on hnRNA splicing.

❖ ❖ ❖ ❖

Total No. of Questions : 4] **[Total No. of Pages : 1**

P1253

[3627 - B] - 24
M.Sc. (Sem. - I)
BIOTECHNOLOGY
BT - 23 b : Virology

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

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***From questions 2-4, answer any two questions.***

Q1) Attempt any two of the following :

a) What are different antiviral agents useful in control of HIV infection? **[5]**

b) What are different types of viral vaccines; give suitable examples. **[5]**

c) Explain the rolling circle replication of lambda DNA. **[5]**

Q2) Explain with suitable examples the concept of antiviral drug designing. **[15]**

Q3) Describe the ultrastructure of polio virus; add a note on control of polio cases. **[15]**

Q4) Write short essay on Virus classification. **[15]**

❖❖❖❖

Total No. of Questions : 4] **[Total No. of Pages : 1**

P1254

[3627 - B] - 25
M.Sc. (Sem. - II)
BIOTECHNOLOGY
BT - 24 : Immunology

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

Instructions to the candidates:

1) ***Question number 1 is compulsory.***
2) ***Attempt any two questions from Section - II.***

SECTION - I

Q1) Attempt any two questions :

a) Immunogenicity versus antigenicity. **[5]**

b) Epitopes, Paratopes, Adjuvants and Haptens. **[5]**

c) Major events in the inflammatory responses. **[5]**

SECTION - II

Q2) Describe T cell receptor, its types and role in generation of immune response. **[15]**

Q3) Events in the B-cell maturation, activation and differentiation. **[15]**

Q4) Explain the underlying mechanism and cause of rheumatoid arthritis and myasthenia gravis. **[15]**

❖❖❖❖

Total No. of Questions : 7] **[Total No. of Pages : 2**

P1255

[3627 - B] - 31
M.Sc.
BIOTECHNOLOGY
BT - 31 : Tissue Culture (Plant & Animal)

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

Instructions to the candidates:

1) ***Question No.1 is compulsory.***
2) ***Attempt any four questions from question No. 2 to 7.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams are expected wherever necessary.***

Q1) Attempt any four of the following : **[20]**

a) Mention the advantages, limitations and applications of continuous culture systems in PTC.

b) What is the role played by the buffers in animal cell culture media?

c) Describe the key processes of cyto differentiation in PTC.

d) What is cytotoxicity assay in the context of ATC? What are its applications?

e) Mention the parameters to assess growth and development of plant cultures.

f) What is organotypic culture? Mention its advantages over organ culture.

Q2) a) Explain with example the role of extracellular matrix and cell adhesion molecules in growth of animal cells cultured in vitro. **[8]**

b) How do in vitro culture conditions influence the growth and development of explants in plant tissue culture? **[7]**

Q3) a) What is hybridoma cell technology? Describe monoclonal antibody production. **[8]**

b) Explain the role of plant growth regulators in induction of multiple shoots and somatic embryos. **[7]**

P.T.O.

Q4) a) Enlist the methods of cell separation. Explain advantages and limitations of these methods. **[8]**

b) Compare callus and cell culture systems in PTC. **[7]**

Q5) a) What is cryopreservation? Explain the procedure of cryopreservation of animal cells with the help of a flow chart. **[8]**

b) How the totipotency of plant cells is realised in vitro? **[7]**

Q6) a) Explain with an example the application of viral propagation in animal cell lines. **[8]**

b) How plant tissue culture is employed for commercial production of secondary metabolites? **[7]**

Q7) Write explanatory notes on :

a) Types of contamination in animal cell lines. **[8]**

b) Mass propagation of plants by tissue culture methods. **[7]**

❖ ❖ ❖ ❖

Total No. of Questions : 4] **[Total No. of Pages : 2**

P1256

[3627 - B] - 32
M.Sc. (Sem. - III)
BIOTECHNOLOGY
BT - 32 : Fundamentals of Genetic Engineering

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) Question No.1 is compulsory attempt any two of the remaining questions.

Q1) Attempt any two of the following : **[10]**

a) The restriction enzyme EcoRI cleaves double stranded DNA at sequence 5' - GAATTC - 3' and Hind III cleaves at 5' - AAGCTT - 3'. A 20 kb circular plasmid is digested with each enzyme individually and then in combination, and resulting fragment sizes are determined by means of electrophoresis. The results are -

EcoRI alone - Fragments of 6kb and 14kb

Hind III alone - Fragments of 7kb and 13kb

Both EcoRI and Hind III - Fragments of 2kb, 4kb, 5kb and 9kb.

How many possible restriction maps are compatible with this data? For each possible restriction map, make a diagram of circular molecule & indicate the relative positions of EcoRI and Hind III restriction sites.

b) Write a note on-DEAE-Dextran, high efficiency method of DNA transfiction.

c) What strategy will you propose for radio chemical screening of expression library constructed in plasmid vector? Add a note on validation of clones.

Q2) Write short notes on : **[15]**

a) Method of Gene transfer : biolistics.

b) S1 Nuclease.

c) Site directed mutagenesis by USE [unique restriction site mutations].

P.T.O.

Q3) Explain how will you perform the following : **[15]**

a) Affinity purification of fusion proteins using Histidine tags.

b) Cycle sequencing of DNA.

c) Purification of inclusion bodies.

Q4) Attempt the following : **[15]**

a) Dot slot hybridization.

b) Pharming - recombinant proteins from live animals.

c) Compare & contrast between YACs and BACs.

❖ ❖ ❖ ❖

Total No. of Questions : 4] **[Total No. of Pages : 1**

P1257

[3627 - B] - 35

M.Sc.

BIOTECHNOLOGY

BT - 35 : Pleuripotent Cell Technologies and Reproduction (Theory) (Non-Credit System) (Sem. - III)

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

Instructions to the candidates:

1) ***Question No.1 is compulsory.***
2) ***Attempt any 2 questions out of the remaining 3.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat labelled diagrams wherever necessary.***

Q1) Write short notes on (any 2) : **[10]**

a) Egg membranes.

b) Determination & Differentiation.

c) Fatemaps.

Q2) Answer the following :

a) Describe the mechanisms to prevent polyspermy. **[8]**

b) Describe the role of organizers in early embryonic development of frog. **[7]**

Q3) Answer the following :

a) What are Homeotic selector genes? Explain the role of homeotic genes in pattern formation in Drosophila sp. **[8]**

b) Explain the principle of 'Transgenic' technology and add a note on the applications of transgenics. **[7]**

Q4) 'Limb regeneration system can be a source of stem cells'. Justify. **[15]**

❖ ❖ ❖ ❖

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

P1288

[3627-B] - 101
M.Sc.
BIOTECHNOLOGY
BT - 11 : Advanced Biological Chemistry
(2008 Pattern) (New) (Sem. - I)

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) Explain, with the help of a schematic diagram, the components and working of spectrophotometer. **[8]**

b) For enzyme assay, microsomal fraction was isolated from soybean seed homogenate by ultracentrifugation at 42, 000 rpm. Calculate centrifugal field applied at a point equivalent to 7cm from the axis of rotation. **[8]**

Q2) a) 'Polyketides are an attractive model for metabolic engineering' explain. **[8]**

b) Compare HPLC with GLC in analysis of metabolites. **[8]**

Q3) a) Explain the significance of phosphorylation of intermediates in glycolytic pathway. **[5]**

b) Explain the use of NMR in determination of the structure of biomolecules. **[6]**

c) Which properties make triacylglycerois ideal storage compounds? **[5]**

Q4) a) Enlist the differences between A, B and Z forms of DNA. **[5]**

b) Explain the principle of spectroflourimetry (Fluorescence Spectrometry). **[6]**

c) Mention the types of secondary metabolites of plant origin. State the use of any one type in agriculture. **[5]**

P.T.O.

SECTION - II

Q5) a) Explain the principle and applications of gel filtration chromatography for proteins. **[8]**

b) State the functions of protein microarrays. Add a note on their advantages over ELISA technique. **[8]**

Q6) a) Enlist the methods of extraction and phytochemical analysis of herbal product. Explain any one. **[8]**

b) Why 'Phytochemistry' is an integral component of pharmacognosy? **[8]**

Q7) a) A solution containing (pI = 4.6) lactoglobulin (pI 5.2) and chymotrypsinogen (pI 9.5) was loaded onto a column of DEAE cellulose at pH 5.4. The column was then eluted with buffer (pH 5.4) with increasing gradient of salt concentration predict the elution pattern. (DEAE cellulose carries a +ve charge at pH 5.4). **[6]**

b) Write a note on Hydrophobic collapse model. **[5]**

c) Enlist the types of phenolics. State medicinal (therapeutic properties) of any one type. **[5]**

Q8) a) Explain the heterotrophic modulation of allosteric proteins. **[5]**

b) How do conformational changes in haemoglobin alter the oxygen binding? **[6]**

c) What are glycosides? Enlist the types of glycoside. **[5]**

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

P1289

[3627-B] - 102
M.Sc.
BIOTECHNOLOGY
BT - 12 : Molecular and Cell Biology
(New 2008 Pattern) (Sem. - I)

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, with the help of a diagram, the functional importance of lipid bilayer. **[8]**

b) Describe the assembly of clathrin coated vesicles. Add a note on their role in protein transport. **[8]**

Q2) a) Explain the phenomenon of protein folding in endoplasmic reticulum. **[8]**

b) Illustrate with an appropriate diagram the structure of nuclear pore complex. **[8]**

Q3) a) Explain MAP kinase pathway. **[8]**

b) Distinguish between paracrine and autocrine cell signalling. **[8]**

Q4) a) Why lysosomes are most abundant in leukocytes? **[8]**

b) Differentiate between cell membrane of a bacterial cell and animal cell. **[8]**

SECTION - II

Q5) a) Explain the process of regulation of translation. **[8]**

b) Illustrate the suborganelle organisation of mitochondrian. Add a note on oxidative phosphorylation. **[8]**

Q6) a) Describe the mechanism of transport through symplast in plants. **[8]**

b) Illustrate the ultrastructure of egg cell or sperm cell in plants. **[8]**

P.T.O.

Q7) a) Enlist the different types of mutations. Explain any one of them in detail. **[8]**

b) Explain the role of cyclins in cell cycle. **[8]**

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

a) Transcriptional activators.

b) X-linked disorders.

c) Import of proteins in chloroplast.

☒☒☒☒

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

P1290

[3627-B] - 103
M.Sc.
BIOTECHNOLOGY
BT - 13 : Environmental Biotechnology
(2008 Pattern) (New) (Sem. - I)

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) Discuss the wind and ocean tides as nonconventional energy sources. Mention advantages, limitations and applications of both. **[16]**

Q2) a) What is remote sensing? Mention the principles of remote sensing. **[8]**

b) Explain the applications of remote sensing in ecological mapping. **[8]**

Q3) What is the scope of conservation biotechnology? Explain with suitable examples the use of biotechnologies for ex situ conservation of plants.**[16]**

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

a) Significance of Agenda 21.

b) Ex situ conservation of microbes.

SECTION - II

Q5) a) What is bioenergy? Mention its advantages, applications and limitations. Name at least two sources of bioenergy. **[8]**

b) What are biosensors? How are the pollutants sensed by them? **[8]**

Q6) a) What is bioremediation? Citing appropriate examples explain any one bioremediation technology. **[8]**

b) Explain the importance of flow and loading rate in biological waste water treatment. **[8]**

P.T.O.

Q7) a) Explain the kinetics of attached growth anaerobic waste water treatment. **[8]**

b) Explain with the help of suitable examples the phenomena of bioaccumulation and biomagnification. **[8]**

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

a) Gaussian Plume model for dispersion of air pollutants.

b) Different strategies for disposal of solid wastes.

c) Minas for Industries and Ecomarks.

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

P1291

[3627-B] - 201
M.Sc.
BIOTECHNOLOGY
BT - 21 :Genetic Engineering
(2008 Pattern) (New) (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 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? How are they used in genetic engineering? **[8]**

b) What are RNA polymerases? Mention their application in genetic engineering. **[8]**

Q2) a) What are genetically engineered biotherapeutics? Describe the method of their production and use. Cite one example. **[8]**

b) Compare RM (restriction modification) Systems I, II and III. **[8]**

Q3) a) What is colony hybridization technique? Mention its uses. **[8]**

b) Explain RFLP technique as a DNA finger printing technique. **[8]**

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

a) In vivo gene therapy.

b) Genetically engineered crops.

c) Bacterial DNA transformation.

SECTION - II

Q5) a) Enlist at least two promoters used in genetic engineering. Describe their important features. **[8]**

b) What are shuttle vectors? Explain with suitable examples. **[8]**

P.T.O.

Q6) a) Explain how Sanger's method of dideoxy sequencing is automated. Draw a schematic diagram. **[8]**

b) Explain hybrid arrested and hybrid selected translation. **[8]**

Q7) a) How is TK/HAT system used for screening the recombinant clones? **[8]**

b) How are maxicells and minicells used for studying the expression of cloned genes? **[8]**

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

a) Hierarchial shot gun cloning strategy.

b) Nested PCR.

c) Physical mapping in human genome sequencing.

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

P1292

[3627-B] - 202
M.Sc.
BIOTECHNOLOGY
BT - 22 :Bioinformatics
(2008 Pattern) (New) (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 in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) How are two protein sequences aligned using BLAST? **[8]**

b) Enlist different databases available for bioinformatics. Explain any one of them in detail. **[8]**

Q2) a) How simulation of molecular interactions is carried out for drug designing? **[8]**

b) Explain the role of databases for aquisition of chemical information. **[8]**

Q3) Give a brief account of : **[16]**

a) Gene expression informatics.

b) SMILEs.

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

a) Structure based drug designing.

b) Homology search.

c) Golden section method.

SECTION - II

Q5) a) With the help of suitable example, explain the protein folding structure relationship. **[8]**

b) Give a brief account of bioinformatics business model. **[8]**

P.T.O.

Q6) Explain in brief : **[16]**

a) Protein structure prediction.

b) Epitope prediction.

Q7) Elaborate on any two areas of current bioinformatics research with the help of suitable case studies. **[16]**

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

a) Ram Chandran Plot.

b) Conformational energy calculations.

c) Routes to research funding in Bioinform.

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

P1293

[3627-B] - 203
M.Sc.
BIOTECHNOLOGY
BT - 23 : Plant Biotechnology
(2008 Pattern) (New) (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 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 various Plant Biotechnologies currently being employed. Trace the development of any two such technologies. **[16]**

Q2) a) Enlist economically important algae. Explain the technology employed for qualitative improvement in any one of them. **[8]**

b) Name economically important higher fungi. Explain the technology for mass cultivation of any one of them. **[8]**

Q3) What is micropropagation? Mention its stages and explain the most crucial stage. **[16]**

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

a) Biofuels.

b) Biofertilizers.

SECTION - II

Q5) Give an account of target genes and their manipulation for production of transgenic plants with increased resistance to biotic stresses. **[16]**

Q6) a) With the help of suitable example explain the use of antisense technology in alteration of biosynthetic path way. **[8]**

b) What are plantibodies? Explain their advantages over use of animal system. **[8]**

P.T.O.

Q7) a) Explain any one plant biotechnology for commercial production of SCP. **[8]**

b) How are transgenic plants for improved nitrogen fixation produced? **[8]**

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

a) Phytoremediation.

b) Biopesticides.

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

P1294

[3627 - B] - 301

M.Sc.

BIOTECHNOLOGY

BT - 31 : Animal Biotechnology

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

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 in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Explain in vitro neoplastic transformation. **[8]**

b) Enlist the methods of artificial breeding. Explain any one. **[8]**

Q2) a) Compare and contrast between embryonic and adult stem cells. **[8]**

b) Explain the modern methods of conservation of like stock breed. **[8]**

Q3) a) What are defined media and enriched media? What are the advantages and limitations of use of serum in media (culture). **[8]**

b) How are cell lines characterized? Explain the biochemical and molecular methods. **[8]**

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

a) Pedigree selection.

b) Gene banking.

P.T.O.

SECTION - II

Q5) Explain three different methods for developing transgenic mice. Add a note on importance of transgenic animals. **[16]**

Q6) a) What is artificial insemination? Outline the process. Add a note on its limitations. **[8]**

b) Explain the potential applications of transgenic animals in clinical research. **[8]**

Q7) a) Explain the methodology to develop a 'knockout' animal. Mention applications of such animals. **[8]**

b) Compare chimeric and transgenic animals. **[8]**

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

a) Production of Insulin in milk.

b) Environmental, biological and ethical issues arising out of transgenic animals.

❖ ❖ ❖ ❖

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

P1295

[3627 - B] - 303
M.Sc.
BIOTECHNOLOGY
BT - 33 a : Principles of Virology
(New) (2008 Pattern) (Sem. - III)

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 replication cycle of polio virus. **[10]**

Q2) Discuss the methods of detecting viral growth in tissue culture. **[10]**

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

a) Structure of TMV.

b) DNA Vaccines.

SECTION - II

Q4) Explain the inflammatory response to viral infections. **[10]**

Q5) What are persistent infections? Explain any one such infection. **[10]**

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

a) Foot and Mouth disease.

b) Transmission of human viral infection.

❖ ❖ ❖ ❖

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

P1296

[3627 - B] - 304
M.Sc.
BIOTECHNOLOGY
BT - 33 b : Advanced Immunology
(New) (2008 Pattern) (Sem. - III)

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 should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Distinguish between innate immunity and acquired immunity. **[10]**

Q2) Explain the evolution of immune response in plants and mammals. **[10]**

Q3) Illustrate the cell-cell interaction and signal transduction during immune response in insects. **[10]**

SECTION - II

Q4) Explain the use of transgenic animals in immunological studies. **[10]**

Q5) How is stem cell technology is employed in experimental immunology? Explain with suitable example. **[10]**

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

a) Chimeric antibodies.
b) Immuno-diagnostics.

❖❖❖❖

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

P1297

[3627 - B] - 402
M.Sc.
BIOTECHNOLOGY
BT - 42 : Industrial Biotechnology
(Old) (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 sections must be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Explain the scope of enzyme technology. How does it contribute to industrial biotechnology. **[10]**

Q2) a) Elaborate structure-activity-function relationship of enzymes. Cite at least two examples. **[5]**

b) Mention the steps involved in immobilization of enzymes. **[5]**

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

a) R & D and pilot scale production.

b) Large scale production of therapeutic proteins.

SECTION - II

Q4) Explain the issues of waste management in industrial biotechnology. Explain the role of microbes in treating the waste cite at least one example. **[10]**

Q5) a) Explain bioconversion of agricultural waste into useful product. cite one example. **[5]**

b) How are petrochemical wastes converted into industrially useful products? Explain with the help of one example. **[5]**

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

a) Biocomposting.

b) Economics of biological treatment of municipal waste.

❖ ❖ ❖ ❖

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

P1298

[3627 - B] - 403
M.Sc.
BIOTECHNOLOGY
BT - 43 : Applications of Genetic Engineering
(Old) (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 sections must be written in 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? How is it applied to medicine and agriculture? Explain with the help of one example for each. **[10]**

Q2) a) Enlist the methods of analysis of DNA for diagnostics. **[5]**

b) What is gene therapy? Enlist the methods and explain any one. **[5]**

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

a) Transgenic plants for resistance to pests.

b) Plantibodies.

SECTION - II

Q4) What is a data base? Explain the concept with special reference to nucleic acids and proteins. **[10]**

Q5) a) State the major achievements of human genome sequencing project. **[5]**

b) What is molecular modelling? Explain structure-activity function of any one biomolecule. **[5]**

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

a) Process patent.

b) Biosafety regulations for research in genetic engineering.

❖ ❖ ❖ ❖

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

P1299

[3627-B]-404
M.Sc.
BIOTECHNOLOGY
BT - 44 : Plant Biotechnology
(Semester - IV) (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) What is Micropropagation? How is it employed for large scale multiplication of plants? Mention its application in agriculture and horticulture. **[10]**

Q2) a) State the problems in propagating tree species by micropropagation. Mention the methods to overcome any one problem. **[5]**

b) What is hardening? Outline the procedure for hardening. **[5]**

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

a) Advantages and limitations of somaclonal variation.

b) Somaclones for increased production of secondary metabolites.

SECTION - II

Q4) Enlist the issues involved in commercialization of plant production through tissue culture. Explain any one. **[10]**

Q5) a) What is artificial seed? How is it produced? Cite two examples. **[5]**

b) Explain any one method of developing a transgenic plant. Mention applications of transgenic plants. Cite two examples. **[5]**

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

a) In vitro fertilization in plants.

b) Cybrids in agriculture.

✷✷✷

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

P1300

[3627-B]-406
M.Sc.
BIOTECHNOLOGY
BT - 46 : Genomics and Proteomics
(Semester - IV) (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 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 genomics? Explain the scope of genomics and mention the aims and objective of genomics. **[10]**

Q2) a) What is pharmacogenomics? Explain in brief the procedure of identification of biomarkers. **[5]**

b) Mention the main features of structural and functional genomics. **[5]**

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

a) Transcriptomics.

b) Role of monochromosomal hybrid in genome mapping.

SECTION - II

Q4) What is Proteomics? Explain its strategies. Enlist the methodologies of proteomics. **[10]**

Q5) a) Mention the main tool in proteomics. Justify your answer. **[5]**

b) Explain with suitable examples, computational approach for studying protein protein interaction. **[5]**

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

a) Application of proteomics in drug development.

b) Characterization of novel proteins.

✷✷✷

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

P1301

[3627-B]-407
M.Sc.
BIOTECHNOLOGY
BT - 47 : Immunotechnology
(Semester - IV) (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) What is molecular immunology? Enlist the techniques of molecular immunology and explain any one. **[10]**

Q2) a) Mention Cell-cell interactions during immune response. Explain any one. **[5]**

b) Explain the mechanism of development of tolerance during immune response. **[5]**

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

a) Auto immunity.

b) Molecular mimicry.

SECTION - II

Q4) Describe any one animal model and explain how is it useful in immunology. **[10]**

Q5) a) What is stem cell technology? Explain its role in immunology. **[5]**

b) Explain the role of Bioinformatics in immunological investigations. **[5]**

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

a) Manufacture of immunodiagnostics.

b) Antibody engineering.

✷✷✷

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

P1302

[3627-B]-11
M.Sc.
BIOTECHNOLOGY
BT - 11 : Biological Chemistry - I
(Sem. - I) (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 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 basic structure of an amino acid. How are polypeptides synthesized? **[16]**

Q2) a) Mention with suitable examples at least four polysaccharides and the corresponding monosaccharide units. Add a note on the glycosidic linkage. **[8]**

b) Enlist at least four vitamins. Explain biochemistry of any one. **[8]**

Q3) What are enzymes. Mention their peculiar features. State various schemes of classification of enzymes. **[16]**

Q4) a) Explain the biochemistry and oxidation of fatty acids. **[8]**

b) Explain with a suitable example, thermodynamics of a biochemical reaction. **[8]**

SECTION - II

Q5) What is spectroscopy? Mention different spectroscopies and explain any one. **[16]**

Q6) a) Mention the principles basic to chromatography. Add a note on procedure of TLC. **[8]**

b) State the principles basic to electrophoresis. Mention the types of electrophoresis. Explain any one. **[8]**

P.T.O.

Q7) Explain the structure and organisation of the units of a eukaryotic genome. Add a note on Functional significance of the organisation. **[16]**

Q8) a) 'Post translational modifications of proteins is a must' Justify. **[8]**

b) 'Prokaryotic genome and eukaryotic genome are almost similar in structure & function' Justify or Refute. **[8]**

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

P1303

[3627-B]-22
M.Sc.
BIOTECHNOLOGY
BT - 22 : Genetics
(Sem. - II) (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) a) Define quantitative traits with examples. What are the features of polygenic inheritance? **[5]**

b) Discuss the significance of heterosis for improvement of a plant. **[5]**

Q2) a) Discuss in brief the consequence of chromosomal aberration. **[5]**

b) Explain one example of genotoxicity detection assay. **[5]**

Q3) Write notes on any two of the following : **[10]**

a) Advantages of Caenorhabditis as model for genetic studies.

b) Pleiotropy.

c) Penetrance.

SECTION - II

Q4) Explain Operon concept using Arabinose operon as a model. **[10]**

Q5) a) What is positive regulation of lac operon? Explain diagrammatically. **[5]**

b) State the procedure of gene mapping in phages. **[5]**

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

a) Specialised transduction.

b) Transposons in prokaryotes.

✷✷✷

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

P1304

[3627-B]-33
M.Sc.
BIOTECHNOLOGY
BT - 33 : Biological Chemistry - II
(Semester - III) (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) ***Draw neat diagrams wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) What is chromatography? Enlist the types of chromatography you have studied. Explain any one. **[10]**

Q2) a) Justify 2D PAGE as a central tool in proteomics. **[5]**

b) Explain the principle of electrophoresis. Describe special features of Agarose gel electrophoresis. **[5]**

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

a) Microarray analysis.

b) Blotting techniques.

SECTION - II

Q4) Enlist the techniques for elucidating macromolecular structures of biomolecules. Explain any one. **[10]**

Q5) a) Describe a method of sequencing of proteins. **[5]**

b) Explain with the help of at least two examples, structure-activity-function relationship in biomolecules. **[5]**

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

a) Anatomy of a macromolecule.

b) Sequencing of nucleic acids.

✷✷✷

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

P1333

[3627-B]-302
M.Sc.
BIOTECHNOLOGY
BT - 32 : Fermentation Technology
(Sem. - III) (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) State the reasons for foam formation in a submerged fermentation process. Why is it necessary to control foam formation during fermentation? What are the antifoam agents used? **[8]**

b) Which strategy, viz., random mutagenesis, site directed mutagenesis, metabolic pathway engineering would you select for the production of the anticancer plant product taxol from E. Coli? State reasons for your selection. **[8]**

Q2) a) Explain the use of Galvanic electrodes, Dielectric spectroscopy and thermal mass flow meter in fermentation process. **[8]**

b) Choose a product 'X'. Suggest a strategy for overproduction of 'X' involving metabolic pathway engineering. **[8]**

Q3) a) What is mass transfer coefficient? Explain gas-liquid mass transfer in aerobic fermentation. **[8]**

b) Mention the types of immobilized cell reactors. Explain any one of them. **[8]**

Q4) a) Explain the kinetics of product formation by microbial culture in terms of growth linked products in batch and fed batch cultures. **[8]**

b) Comment on Effect of dissolved oxygen concentration on secondary metabolism. **[8]**

P.T.O.

SECTION - II

Q5) a) Enlist the major feed back control systems used in regulation of levels of primary metabolites. Explain any one. **[8]**

b) Explain the method of strain improvement by using techniques of mutation. **[8]**

Q6) What is biomethanation? Describe the substrate used, micro organisms involved and factors controlling biomethanation. **[16]**

Q7) What is down stream processing? Explain in brief (:) down stream processing in vitamin B 12, Riboflavin, Penicillin and streptomycin fermentation. **[16]**

Q8) What is biotransformation? Explain with suitable examples. **[16]**

a) Isolation of products of biotransformation.

b) Steroid transformation.

✷ ✷ ✷

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

P1334

[3627-B]-401
M.Sc.
BIOTECHNOLOGY
BT - 41 : Structural Biology
(Sem. - IV) (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) a) State Bragg's law and its significance in X ray crystallography of proteins. **[5]**

b) What is a phase problem? Highlight methods used for initial phase estimation. **[5]**

Q2) a) Explain the principle and application of Fibre diffraction method. **[5]**

b) Describe Fourier transformation and its application in crystal structure determination. **[5]**

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

a) Structure of Haemoglobin.

b) Crystallographic point group.

SECTION - II

Q4) Explain the principle of NMR spectroscopy. How is it used to determine structure of proteins? **[10]**

Q5) What is Fluorescence spectroscopy? Add a note on its application in determination of the structure of a biopolymer. **[10]**

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

a) 2D NMR.

b) Nuclear Overhousser.

✷ ✷ ✷

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

P1335

[3627-B]-405
M.Sc.
BIOTECHNOLOGY
BT - 45 : Chemical Synthesis and Screening in Biotechnology
(Sem. - IV) (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

Important Note : Draw the chemical structures and write mechanisms wherever possible.

Q1) Write down all steps (from attachment to final product) for the solid phase synthesis of Oligonucleotide A 3'-A-G-5' by phosphoramidite method. **[10]**

Q2) Differentiate between : **[10]**

a) Oxidation in phosphoramidite and phosphonate method.

b) Merrifield Resin and PAM resin.

Q3) How would you remove **[10]**

a) Fmoc group in peptide synthesis?

b) Oxygen (of the phosphate group) protecting group in triester chemistry in oligonucleotide synthesis?

SECTION - II

Q4) Draw the structures and mention use of following compounds in peptide or oligonucleotide synthesis. **[10]**

a) Tetrazole.

b) MSNT.

c) TPS chloride.

d) Piperdine

e) Trifluoroacetic acid.

P.T.O.

Q5) Describe **[10]**

a) Essential criteria for the development of protocol for HTS?

b) Uses of HOBT in peptide synthesis.

Q6) How would you construct a combinatorial library AB from 4 'A' components and 4 'B' components? **[10]**

a) How many subsets you will have?

b) How many biological activity experiments you will have to perform?

c) What is the best deconvolution method you will use for its biological activity?

✷ ✷ ✷

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

P322

[3627]- 21
M.Sc. - I
BOTANY
BO - 221 : Biology and Diversity of Lower Cryptogams
(Sem.- II) (Old Course)

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

Instructions to the candidates:

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

SECTION - I

Q1) Write salient features, range of thallus structure and life history of Sargassum. Mention its economic importance.

Q2) a) Give systematic position of Batrachospermum as per Bold and Wyne's system. Describe thallus and life cycle pattern of the same.

b) Give structure of thallus and mode of reproduction in Oedogoniales.

Q3) a) Describe criteria for classification of algae based on pigment, reserve food and flagella.

b) Describe in detail about algae in diversified habitat.

Q4) Attempt any two :

a) Give economic importance of phaeophyta and Rhodophyta.

b) Salient features of Bacillariophyta.

c) Outline classification of algae Bold and Wyne.

SECTION - II

Q5) Give an account of deuteromycotina with reference to reproductive structures. Add a note on it's phylogeny.

Q6) a) Give an account of fungal diseases in human beings.

b) Explain ultrastructure of fungal cell.

P.T.O.

Q7) a) Comment on symbiotic and biotrophic mode of nutrition in fungi.

b) Enlist general characteristics of zygomycotina.

Q8) Write short notes on any two :

a) Heterothallism.

b) Asexual reproduction in Ascomycotina.

c) Fungal substrates.

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

P323

[3627]- 22

M.Sc.

BOTANY

BO - 222 : Plant Physiology and Metabolism

(Sem.- II) (2004 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 diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Explain C_4 pathway of photosynthesis. Add a note on its physiological and ecological significance.

Q2) Outline the reactions of TCA cycle. Add a note on energy release during TCA cycle.

Q3) Comment on :

a) Photo-oxidation of water.

b) Pentose phosphate pathway.

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

a) Storage lipids.

b) Calcium calmodulin cascade.

c) Plant response to abiotic stress.

SECTION - II

Q5) Explain physiological effects and mechanism of action of gibberellins.

Q6) Explain uptake, transport and assimilation of sulphate in plants.

Q7) Comment on :

a) Role of vernalization in induction of flowering.

b) Photochemical and biochemical properties of phytochromes.

P.T.O.

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

a) Phloem loading and unloading.

b) CAM pathway.

c) Principles of thermodynamics.

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

P324

[3627]- 23

M.Sc.

BOTANY

BO - 223 : Biotechnology and Genetic Engineering of Plants and Microbes

(Sem.- II) (Old Course) (Theory)

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 morphogenesis? Give detailed account of the fundamental aspects of morphogenesis.

Q2) Write in brief the history, scope and the concept of cellular differentiation.

Q3) a) Explain the method of production of artificial seed.

b) Give an account of the methods of hybrid selection in somatic hybridization.

Q4) Write notes on any two of the following :

a) Any two methods of germplasm storage.

b) Totipotency.

c) Limitations of protoplast research.

SECTION - II

Q5) Write on protein profiling and its significance.

Q6) What is cloning? Write on principles and techniques of gene cloning.

Q7) a) Explain the chloroplast transformation. Add a note on its utility.

b) Briefly describe the genetic improvement of industrial microbes and nitrogen fixers.

P.T.O.

Q8) Write notes on any two of the following :

a) Artificial chromosome.

b) Technique of western blotting.

c) Transposon mediated gene tagging.

☒☒☒☒

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

P325

[3627]- 201

M.Sc.

BOTANY

BO - 2.1 : Systematics of Vascular Plants

(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) ***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) Compare any two systems of gymnosperm classification with suitable examples.

Q2) Comment on morphological and anatomical features of Isoetes.

Q3) a) Give morphological and anatomical pecularities of Welwitschiales.

b) Comment on evolutionary significance of heterosporous pteridophytes.

Q4) Write notes on any two of the following :

a) Alternation of generation in pteridophytes.

b) Distribution of gymnosperms in India.

c) Anatomical features in filicales.

SECTION - II

Q5) Write an account on role of phytochemistry and palynology in systematics of angiosperms.

Q6) Enlist orders included in subclass magnoliopsida by cronquist. Give salient features of order magnoliidae.

Q7) a) Give merits and limitations of cronquist's system of Angiosperms Classification.

b) Describe ecades and ecotypes.

P.T.O.

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

a) Field tools of taxonomy.

b) Concept of family and genus.

c) Phenetics in taxonomy.

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

P326

[3627]- 202

M.Sc.

BOTANY

BO - 2.2 : Cell Biology and Instrumentation

(Sem.- II) (2008 Pattern) (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) ***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 mechanism of cell-cycle with suitable outline. Add a note on role of cyclins and cyclin dependent kinase.

Q2) a) Biogenesis and ultra structure of mitochondria.
b) Principle and working of SEM.

Q3) a) Ultra structure and functions of plastids.
b) Evolution of eukaryotic cell from prokaryotic cell.

Q4) Write notes on any two of the following :

a) Glyoxysomes.
b) Plant vacuole.
c) Properties and organization of cytoplasmic matrix.

SECTION - II

Q5) a) Principles and application of column chromatography.
b) Structure and functions of plasma membrane.

Q6) a) Principle and working of mass spectro photometer.
b) Give structure and functions of endoplasmic reticulum.

Q7) Describe nucleosome organization in eukaryotic chromosome. Add a note on molecular organization of centromere.

P.T.O.

Q8) Write notes on any two of the following :

a) Photo proteins.

b) Structure and functions of nucleus.

c) Plasmodesmata.

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

P327

[3627]- 203

M.Sc.

BOTANY

BO - 2.3 : Molecular Biology and Genetic Engineering

(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) ***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) Briefly explain the positive and negative regulation of transcription. Add a note on lactose induce transcription of the ZYA genes.

Q2) Write mechanism of DNA replication in eukaryotic cell. Mentioning its differences from that of prokaryotic cell.

Q3) a) Explain the spectroscopic and thermal properties of DNA.
b) Describe the mechanism of m-RNA and t - RNA processing in eukaryotes.

Q4) Write notes on any two of the following :

a) Enzymes involved in repring of DNA.
b) Organization and structure of prokaryotic gene.
c) Targetting of organelle proteins.

SECTION - II

Q5) Write about different enzymes and their roles involved in genetic engineering.

Q6) What is DNA fingerprint? Explain the methodology used in DNA fingerprinting. Add a note on its applications.

Q7) a) Explain the role of Ti and Ri plasmids in gene transfer.
b) Write on transformation and analysis of recombinants.

P.T.O.

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

a) Transgenics for production of useful products.

b) Any five applications of genetic engineering.

c) Genomics.

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

P328

[3627]- 401

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 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 mass production technology of Spirulina. Give chemical composition and nutritive values of Spirulina.

Q2) a) Give detailed account of commercial production of BGA biofertilizers, algalization and its impact on crop field.
b) Write about biogas energy and hydrocarbon production from algae.

Q3) a) Explain biological methods in sewage treatment and algal stabilization ponds.
b) Describe nitrogen metabolism in BGA. Enlist different algae involved in it.

Q4) Write notes on any two of the following :
a) Nuisance causing algae.
b) Status of marine utilization in India.
c) Algalization and crop field.

SECTION - II

Q5) Describe in detail the production of any one organic acid by fermentation technology.

Q6) a) Explain the technology for the production of any one edible mushroom.
b) Give the symptoms, causal organism and control measures of deep mycoses and mycomycoses.

P.T.O.

Q7) a) Explain the particulate adsorption and bioabsorption in fungi.
b) Give an account of ergot alkaloids.

Q8) Write short notes on any two :
a) Applications of fungi in Biotechnology.
b) Plant pathogenic fungi (any four).
c) Fungal transformation of steroids.

☒☒☒☒

Total No. of Questions : 8] **[Total No. of Pages : 1**

P329

[3627]- 402
M.Sc. (Sem.- IV)
BOTANY
BO - 442 : Plant Resources Utilization and Conservation

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) Comment on green revolution in India. Give its benefits and adverse effects.

Q2) a) What is plant biodiversity? Give its status in Western ghats and Himalayan region.
b) Give diagnostic characters and uses of Teak.

Q3) Discuss origin, evolution and cultivation of any one vegetable and one oil yielding crop.

Q4) Write notes on any two of the following :
a) Indo-Burmese center.
b) Gums and Resins.
c) Innovations to meet world food demand.

SECTION - II

Q5) Give general account of ICAR and BSI. Add a note on their role in plant conservation.

Q6) Explain with suitable examples, the criteria for selecting plants to control pollution and for avenue plantation.

Q7) a) Explain principles of plant conservation.
b) What is in-situ conservation? Add a note on Biosphere reserve.

Q8) Write short notes on any two of the following :
a) Wetlands.
b) Seed banks.
c) National Parks.

☒☒☒☒

Total No. of Questions : 8] **[Total No. of Pages : 1**

P330

[3627]- 403
M.Sc. - II
BOTANY
BO - 443 (a) : Angiosperms
(Elective 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 questions carry equal marks.***
4) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Explain the evolutionary trends in gynoecium and placentation in angiosperms.

Q2) Write an account on the role of micromorphology and phytochemistry in systematics of angiosperms.

Q3) a) Describe Clausen's experiment and biosystematic categories.
b) Write an account on Red Data Book of Indian plants.

Q4) Write notes on any two of the following :

a) Contributions of H.Santapau and Naik V.N to angiosperm taxonomy.
b) Epiphytic and parasitic angiosperms.
c) Role of herbaria in botanical research.

SECTION - II

Q5) Describe androgenesis in angiosperms.

Q6) Give an account of pollen wall stratification and ornamentation.

Q7) a) Describe cavity repair.
b) Write an account of foraging behaviour of bees.

Q8) Write notes on any two of the following :

a) Sahnianthes and Sahnipushpam.
b) Types of keys.
c) Apomixis.

☒☒☒☒

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

P331

[3627]- 404

M.Sc.

BOTANY

BO - 443 (b) : Cytogenetics and Plant Breeding

(Elective) (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. How are chromosomes classified on the basis of centromere position? Add a note on utility of any two chromosome markers in cytological analysis.

Q2) Explain in brief the different types of structural changes in chromosomes. Write in detail the origin and meiotic behaviour of paracentric inversion.

Q3) Give brief account of :

a) Evolution in allohexaploid wheat.
b) Use of monosomics in gene mapping.

Q4) Write notes on any two of the following :

a) Fluorescence in situ hybridization (FISH).
b) RAPD and its applications.
c) VNTR and its applications.

SECTION - II

Q5) Give an account of the methods of breeding in vegetatively propagated crops.

Q6) Write an account of the procedure for mutation breeding, commenting on the radiation dose and the mechanism of action of physical mutagens.

P.T.O.

Q7) Give brief account of :

a) Use of molecular markers in the crop improvement.
b) Germplasm and its types.

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

a) Bulk method.
b) Merits and limitations of hybrid varieties.
c) Factorial experimental designs.

☒☒☒☒

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

P332

[3627]- 405

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

BOTANY

BO - 443 (c) : Mycology

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

SECTION - I

Q1) Describe any four types of fungal associations with examples.

Q2) a) Comment on mineral nutrition in fungi.
b) Discuss the criteria used by Alexopolous, Mims and Blackwell in 1996 for fungal classification.

Q3) a) Comment on wood rotting fungi.
b) Describe the colonization strategies among fungi.

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

a) Deterioration of cellulosic and noncellulosic materials by fungi.
b) Mycotoxins.
c) Contributions in fungi by Bessey.

SECTION - II

Q5) Describe the types of ascocurps and add a note on their significance in classification.

Q6) a) Describe the asexual reproductive structures in saproleginales.
b) Describe the types of plasmodia in Myxomycotina.

Q7) a) Describe asexual reproductive bodies in plasmodiophorales.
b) Describe reproductive structures in Gasteromycetes.

P.T.O.

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

a) Apothecium.

b) Pycnidium in deuteromycotina.

c) Bird's Nest Fungi.

☒☒☒☒

Total No. of Questions : 8] **[Total No. of Pages : 1**

P333

[3627]- 406
M.Sc.
BOTANY
BO - 443 (d) : Phycology
(Elective Paper) (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 labelled diagrams must be drawn wherever necessary.***

SECTION - I

Q1) Write an account on evolution and phylogeny in algae.

Q2) a) Explain mechanism of carbon fixation in algae.
b) Describe genetics of Acetabularia.

Q3) a) Describe ecology of paddy field algae.
b) Comment on recent advances in life history studies.

Q4) Write notes on any two of the following :
a) Habitats and communities of algae.
b) Thallus morphogenesis.
c) Nutritional types in algae.

SECTION - II

Q5) Describe karyological features of any one of the algal orders studied by you.

Q6) a) Write an account on cell organisation in algae.
b) Explain the mechanism of light harvesting in algae.

Q7) Describe materials, methods, maintenance and growth of algal cultures.

Q8) Write short notes on any two of the following :
a) Wound healing in algae.
b) Energy flow in algae.
c) Necessity of cryopreservation in algae.

☒☒☒☒

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

P334

[3627]- 407

M.Sc.

BOTANY

BO - 443 (e) : Plant Physiology

(Elective Course) (Sem.- IV) (New)

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 whenever necessary.***

SECTION - I

Q1) Explain the physiological basis of crop productivity in any one pulse and cereal crop.

Q2) a) Explain the different emerging trends in improvement of crop productivity.
b) Explain effect of soil pH on availability of mineral nutrients to the plants.

Q3) Answer any two of the following :

a) Explain phytochrome in reproductive development.
b) Explain NAR and its dependence on leaf canopy.
c) Explain biochemical changes during senescence.

Q4) Write short notes on any two :

a) Impact of elevated levels of CO_2 on photosynthesis.
b) Water use efficiency.
c) Role of vernalization in crop productivity.
d) Crop-weed interaction.

SECTION - II

Q5) Explain the effects of temperature stress on plants and comment on its mechanism of tolerance.

Q6) a) Comment on effect of water stress on plant-metabolism.
b) Mechanism of salt tolerance in halophytes.

P.T.O.

Q7) Explain the alterations in water relations, translocation and carbon fixation in host plant during disease development.

Q8) Write short notes on any two :

a) Defence mechanism against pathogen attack.
b) Metabolic changes during anaerobiosis.
c) Role of antioxidant enzymes in biotic stress tolerance.
d) Physiological basis of drought tolerance.

☒☒☒☒

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

P335

[3627]- 408

M.Sc.

BOTANY

BO - 443 (f) : Pharmacognosy

(Elective 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) ***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.***

SECTION - I

Q1) What is evaluation of drugs? Explain with suitable examples botanical evaluation of drugs.

Q2) Enlist various root and rhizome drugs. Describe detailed pharmacognostic account of Aconitum Napellus Linn.

Q3) Explain the following :

a) Scope and importance of pharmacognosy.
b) Role of botanical characters in criminology.

Q4) Write notes on any two of the following :

a) Alkaloids.
b) Essential oils.
c) Lipids.

SECTION - II

Q5) Explain the in-vitro production of secondary metabolite. Add a note on immobilization.

Q6) Describe the scope for medicinal plants in future drug development.

Q7) Explain :

a) Chemical assay of ergot.
b) Biological assay of ephedrine.

P.T.O.

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

a) DNA finger printing.

b) IPR.

c) Forensic botany.

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

P336

[3627]- 409
M.Sc.
BOTANY
BO - 443 (g) : Seed Technology
(Elective 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 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 cereal crop studied by you.

Q2) Explain :

a) General procedure of seed certification with reference to field inspection, observations and field count.

b) Seed handling systems and equipments.

Q3) Comment on :

a) Role of seed technology in crop improvement.

b) Plant breeder's rights in variety development and release.

Q4) Write notes on any two of the following :

a) Sanitation of seed stores and fumigation.

b) Preparing seed for processing.

c) Types of storage structures.

SECTION - II

Q5) Give chemical composition of seeds. Add a note on ecological factors influencing seed composition.

Q6) Explain :

a) Farm records and their use.

b) Integrated pest management.

Q7) Comment on :

a) Seed development and maturation.

b) Methods for breaking of seed dormancy.

P.T.O.

Q8) Write notes on any two of the following :

a) Physiological and metabolic changes during seed germination.

b) RFLP and RAPD.

c) Seed marketing.

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

P337

[3627]- 410

M.Sc.

BOTANY

BO - 443 (h) : Plant Biodiversity

(Elective Course) (New) (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 wherver necessary.***

SECTION - I

Q1) What are biodiversity indices? Explain their application in evaluation of plant diversity.

Q2) Enlist the molecular markers used in the assessment of plant diversity. Explain with suitable examples, use of any two markers.

Q3) Explain :

a) Causes for increase in plant diversity.
b) Agrobiodiversity.

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

a) Ecosystem diversity.
b) Patterns of spatial distribution of species.
c) Plant diversity Hot Spots in India.

SECTION - II

Q5) Mention the causes of loss of plant diversity. Explain with suitable examples, any two causes.

Q6) Explain any two legislations effective in protection of environment.

Q7) Explain :

a) Any two methods of in situ conservation of plant diversity.
b) Sustainable utilization of plant diversity.

P.T.O.

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

a) Bioprospecting.

b) Conservation biotechnology.

c) Eco terrorism.