Model Question Paper

M.Sc. Botany – Semester I

Core Paper 101: Biology and Diversity of Algae and Bryophytes

Time: Three Hours Maximum Marks: 85

Answer any **Five** of the Following
Choosing at least two from each Section
All Questions carry equal Marks

SECTION – A (**ALGAE**)

1. Briefly discuss about the trends of classification of the Algae
2. Explain the Cultural practices of Porphyra
3. Discuss in brief the utilization of Algae in Industry
4. Write critical notes on **Four** of the following
    a. Diplontic life cycle.
    b. Methods of reproduction in Vaucheria
    c. Similarities between Bacteria and Cyanobacteria
    d. Post fertilization changes in the life history of Sargassum
    e. Use of Blue green Algae in Agriculture
5. Discuss in brief the Indian Pioneer Work in the Field of Phycology

SECTION – B (**BRYOPHYTES**)

6. Give a brief account of the life history of Polytichum
7. Describe the development of Antheridium and Archegonium in Marchantia
8. Answer any **Four** of the following
    a. Sporophyte of Anthoceros
    b. Life cycle of Funaria
    c. Apospory and Apogamy
    d. Homologons theory
    e. Sphagnum.

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Model Question Paper

M.Sc. Botany – Semester I

Core Paper 102: Biology and Diversity of Viruses, Bacteria and Fungi

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks: 85

Answer any **FIVE** of the following

1. Explain the general characteristics of archaebacteria and cyanobacteria.

2. Give an account on transmission of viruses.

3. What are mycoplasmas? Write any three plant diseases caused by them with control measures.

4. Write critical notes on any **FOUR** of the following

   a. Plant pathogenic bacteria.
   b. Isolation of viruses.
   c. Structure and chemistry of viruses.
   d. Conjugation in bacteria
   e. Diseases caused by fungi in human beings.

5. What are the criteria for fungal classification? Write a brief account of Ainsworth classification.

6. Give a detailed account on mushroom cultivation

7. What is heterothallism? Explain it with reference to the forms studied by you, in different classes of fungi.

8. Write critical notes on any **FOUR** of the following

   a. Phylogenic trends in fungi
   b. Important characteristics of Basidiomycotina
   c. Saprophytic nutrition of fungi
   d. Fungi as biocontrol agents
   e. Ectomycorrhiza

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Model Question Paper

M.Sc. Botany – Semester I

Core Paper 103: Cell Biology of Plants

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Answer any FIVE questions . All questions carry equal marks.

1. Explain with suitable examples the special cell types in plants.

2. Give an account of different models of plasma membrane , which model is more appropriate and why?

3. What is the role of microtubules in cell division?

4. Write short notes on any **four** of the following:
   a. Kinetic energy b. non- covalent interactions c. Protein structure d. Free energy e. Entropy

5. Explain the role of structural organization of mitochondria in relation to its function.

6. Give an account on structure and function of Golgi apparatus.

7. What are plasmodesmata? Explain their role in plants.

8. Write short notes on any **four** of the following:

   a. Light microscopy b. NMR c. Freeze fracture technique d. centrifugation e. ESR

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Model Question Paper

M.Sc. Botany – Semester I

Core Paper 104: Cytology and Cytogenetics

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Answer any FIVE questions . All questions carry equal marks.

1. Explain with molecular organization of centromeres and telomeres.

2. Give an account of chromosome banding and its applications.

3. What are chromosomal structural aberrations ? Describe meiosis in heterozygotes for such aberrations.

4. Write short notes on any **four** of the following:
   a. Robertsonian translocation b. Confocal microscopy c. chromosome microdissection d. Polytene chromosomes e. Nucleosome

5. Describe meiotic behaviour of monosomics. How are they useful in assigning genes to chromosomes ?

6. Describe meiosis in an autotetraploid.

7. Describe the molecular model of genome organization.

8. Write short notes on any **four** of the following:

   a. Uses of allopolyploids b. Hyperchromicity of DNA c. Primary and secondary trisomics d. complex structural heterozygotes e. Allotetraploid and amphidiploid

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Model Question Paper

M.Sc. Botany – Semester II

Core Paper 201: Genetics

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Answer any FIVE questions . All questions carry equal marks.

1. Explain multiple allelic inheritance and its significance

2. Give an account of three-point testcross method of gene maping.

3. Describe the molecular basis of DNA damage and the repair mechanisms.

4. Write short notes on any **four** of the following:
   a. Correlation of genetic and physical maps. b. Chi-square test for goodness of fit
   c. Hollidays model d. Penetrance and expressivity e. sex-influenced characters

5. Describe the organization and importance of Multigene families.

6. Describe the methods of gene mapping in bacteriophages.

7. With the help of one suitable example for each, describe the genetic basis of mitochondrial and chloroplast related characters.

8. Write short notes on any **four** of the following:

   a. site-directed mutagenesis b. Mechanism of transposition c. Genetic complementation d. Deletion mapping e. Distinction between cytoplasmic and nuclear types of inheritance.

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Model Question Paper

M.Sc. Botany – Semester II

Core Paper 202: Molecular Biology of Plants

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Answer any FIVE questions . All questions carry equal marks.

1. How are carbohydrates classified ? Describe the salient features of their major categories.

2. Describe the enzymology of DNA replication.

3. Give an account of signal transduction.

4. Write short notes on any **four** of the following:
   a. protein domains and motifs b. types of RNAs c. experimental proof of Okazaki fragments d. Rolling circle model of replication e. X-ray diffraction technique.

5. Describe the process of RNA maturation in eukaryotes.

6. Explain how are proteins targeted to various organelles.

7. Describe the mechanism of genetic regulation underlying Lytic and Lysogenic life cycles.

8. Write short notes on any **four** of the following:
   a. Britten and Davidson's model b. Gene silencing c. attenuation at trp operon d. gene imprinting e. translation inhibitors

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Model Question Paper

M.Sc. Botany – Semester II

Core paper 203: Biology and Diversity of Pteridophytes and Gymnosperms

(Effective from the Admitted Batch of 2009-2010)

Time: Three Hours Maximum Marks: 85

Answer any **Five** of the Following
Choosing at least two from each Section
All Questions carry equal Marks

SECTION – A (**Pteridophytes**)

1. Give details of classification of Pteridophytes along with salient features of each group
2. Describe the morphology and internal structure of reproductive organs in Ophioglossum
3. Describe the structure and reproduction in Isoetes
4. Write short notes on any FOUR of the following
    a. Siphonostele
    b. Sporangia of Gleichenia
    c. Sporocarp of Azolla
    d. Lepidocarpon
    e. Sphenophyllum

SECTION – B (**Gymnosperms**)

5. Describe the structure and reproduction in Coniferales
6. Write an essay on evolution of Gymnosperms
7. Discuss the variation in the structure of female gametophyte in Gymnosperms
8. Write short notes on any FOUR of the following
    a. Cordaitales
    b. Lyginopteris
    c. Classification of Gymnosperms
    d. Endosperm in Gymnosperms
    e. Vessel containing Gymnosperm

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Model Question Paper

M.Sc. Botany – Semester II

Core Paper 204: Plant Development and Plant Cell, Tissue Culture

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Answer FIVE questions.

All questions carry equal marks.

1. Give an account of the organization and development of shoot apex in different plant groups and the theories associated with them.

2. Describe the structure and development of Vascular cambium.

3. Describe the structural variations met within the secondary phloem in dicots.

4. Write short notes on any FOUR of the following:
   (a) Trichomes.
   (b) Laticifers
   (c) Lateral roots
   (d) Root-microbe interactions
   (e) Sieve elements.

5. Write in detail about Plant tissue culture media and add a note on sterilization techniques.

6. Describe the methods of production of secondary metabolites through tissue culture.

7. Describe methods employed for protoplast isolation and fusion. What are the merits and demerits of protoplast utilization?

8. Write short notes on any FOUR of the following.
   (a) Somatic embryogenesis
   (b) Plating efficiency
   (c) Cybrids
   (d) Cryopreservation
   (e) Bioreactors

Model Question Paper

M.Sc. Botany – Semester II

Core Paper 205: Medicinal Plants and Ethnobotany

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Answer FIVE questions.
All questions carry equal marks.

1. Give a concise account on concept, scope and objectives of ethnobotany.

2. Write an account on major and minor ethnic groups of Andhra Pradesh and add a note on their life styles.

3. Explain the importance of *Costus speciosus, Gloriosa superba, Curculigo orchioides and Pongamia pinnata* in ethnomedicinal practices.

4. Write critical notes on any THREE of the following:
   (a) Archaeological findings in ethnobotany.
   (b) Plants from sacred groves.
   (c) Importance of *Butea monosperma*.
   (d) Siddha system of medicine.
   (e) Drugs of alkaloids.

5. Write an essay on ethnomedicobotanical research in Andhra Pradesh.

6. Give in detail the classification of drugs and explain the analytical methods of drugs.

7. What is IPR ? Explain the mode of patenting of active principles.

8. Write short notes on any THREE of the following:
   (a) Forests of Andhra Pradesh.
   (b) Medicine importance of *Wrightia tinctoria*.
   (c) Unani system of medicine.
   (d) Biological evaluation of drugs.
   (e) Natural pesticides.

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Model Question Paper

M.Sc. Botany – Semester III

Core Paper 301: Taxonomy of Angiosperms and Plant Resources Utilization and Conservation

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Answer any Five Questions

1. Give an account of International Code of Botanical Nomenclature.
2. Discuss Embryological evidences in relation to Taxonomy.
3. Give an out line of Cronquist system of classification. Discuss merits and demerits.
4. Write short notes on any Two of the following:
   A) Sub species
   B) Amentiferae
   C) Cladistic analysis
   D) GIS
5. Write an essay on plant biodiversity and give its significance.
6. Write an essay on the origin of agriculture.
7. Describe the origin, evolution, cultivation practices and use of sugarcane.
8. Write a short notes on any four of the following:
   a) HYV's of wheat
   b) Plant introduction
   c) Cytogenetics of Sorghum
   d) Indian cotton
   e) Benefits of Green revolution
   f) Medicinal importance of Catheranthus

Model Question Paper

M.Sc. Botany – Semester III

Core Paper 302: Plant Reproduction

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Answer FIVE questions.
All questions carry equal marks.

1. Write an essay on the ultra structure of tapetum and its functions.

2. Describe the process of male gametophyte development.

3. Give an illustrated account of the different types of tetrasporic embryo sacs you have studied.

4. Write short notes on FOUR of the following:

   (a) Pollen pistil interaction.

   (b) Embryo sac haustoria

   (c) Ultra structure of synergid.

   (d) Obturator.

   (e) Pollen embryo sacs.

5. Describe the different methods used to overcome incompatability.

6. Describe the endosperm haustoria you have studied and add a brief note on the functions of the endosperm.

7. Write a critical essay on Apomixis with suitable examples and give the significance of apomixis.

8. Write short notes on FOUR of the following:

   (a) Polyspermy.

   (b) Endosperm in *Cocos nucifera*

   (c) Double fertilization.

   (d) Embryo development in monocots.

   (e) Adventive embryony

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Model Question Paper

M.Sc. Botany – Semester III

Core Paper 303: Plant Ecology
(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Each question carries equal marks

Answer any Five of the following questions

1. Describe the synthetic characters of Plant communities.
2. Give a detailed account of structure and functions of Indian forest ecosystem.
3. Write an essay on major vegetational types of India with suitable examples.
4. Write short notes on any three
   a) Ecological niche
   b) Growth curves
   c) Age distribution
   d) Autogenic and allogenic succession
   e) Climax communities
5. Define pollution and discuss the details of water pollution
6. Illustrate the Global biodiversity status monitoring different and documentation.
7. Write an account of different Natural resources and through a light on conservation.
8. Write short notes on any three
   a) Green house gases and global environmental changes
   b) Phosphorous cycle
   c) Solid state pollination
   d) Index of dominance
   e) Trophism and standing state

Model Question Paper

M.Sc. Botany – Semester III

Core Paper 304: Plant Physiology
(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Answer any Five Questions
All questions Carry equal marks

1. Define water potential? Describe its components and their interrelationships in plant cells.
2. What is Brassinonolid? Discuss the biosynthetic pathway of Brassinosteroids.
3. Differentiate biotic and abiotic stress and explain the effects of various stresses on morphological, anatomical and biochemical changes in plants.
4. Write short notes on any **FOUR** of the following.
    a) Heat shock Proteins
    b) SPAC concept
    c) Root microbe interactions
    d) Zinc deficiency in plants
    e) Photomorphogenesis
5. Describe the mechanisms of electron and proton transport structure, synthesis and function of ATP.
6. Describe the mechanism of mineral ion uptake by plants.
7. Write a detailed account on C_3, C_4 and CAM plants in relation to physiological and ecological considerations.
8. Write short notes on any **FOUR** of the following.
    a) C_4 Varients
    b) Photorespiration
    c) Isozymes
    d) Water oxidizing complex
    e) β-Oxidation

Model Question Paper

M.Sc. Botany – Semester III

Core Paper 305: Principles of Genetic Analysis
(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Answer any FIVE questions . All questions carry equal marks.

1. Explain multiple allelic inheritance and its significance

2. Give an account of three-point testcross method of gene maping.

3. With the help of suitable examples explain the pattern of inheritance of quantitative characters..

4. Write short notes on any **four** of the following:
   a. Correlation of genetic and physical maps. b. Chi-square test for goodness of fit
   c. Pedigree chart d. Penetrance and expressivity e. LOD score

5. What is DNA fingerprinting ? How is it done ? What are its applications ?

6. Describe the methods of gene mapping in bacteriophages.

7. What is eugenics ? Explain with suitable examples how genetic analysis can help to improve human population?

8. Write short notes on any **four** of the following:

   a. Selection media b. Tetrad analysis c. Hardy-Weinberg Law d. Genetic complementation e. sex-influenced characters

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Model Question Paper

M.Sc. Botany – Semester IV

Core Paper 401: Genetic Engineering of Plants and Microbes
(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Answer any Five questions. All questions carry equal marks.

1. What are restriction enzymes? What is their role in rDNA technology?

2. Distinguish between Northern and Southern blot techniques.

3. Give an account on applications of rDNA technology to Agriculture with success stories.

4. Write short notes on any two of the following:

   a.) YACS b.) cDNA library c.) RAPD d) Isoschizomers e) non-radioactive labeling

5. What is Microarray technique? Explain the principles and applications.

6. What are genome projects? Explain the advantages of genomic projects
.
7. Explain the genetic basis of nitrogen fixation as revealed through rDNA technology.

8. Write short notes on any three of the following:

   a.) Patents b.) Phylogenic trees c.) Expression vectors d.) Blue white selection of recombinants e) Proteomics

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Model Question Paper

M.Sc. Botany – Semester IV

Core Paper 402: Evolution and Plant Breeding
(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Answer any FIVE questions . All questions carry equal marks.

1. What is molecular evolution ? Explain.

2. Describe the various types of natural selection.

3. Give an account of the origin of cultivated plants

4. Write short notes on any **four** of the following:
a. Miller's experiment b. Industrial melanism c. QTL analysis d. Conditions for Hardy-Weinberg equilibrium e. Synthetic theory.

5. Describe the methods of breeding self-pollinated crops.

6. Describe the properties of Binomial distribution. Explain the steps in fitting binomial distribution to a sample data.

7. Distinguish between Regression and Correlation. Explain the steps in arriving at the regression equation.

8. Write short notes on any **four** of the following:
a. 2 X 2 contingency table b. Types of errors c. Introgressive segregation d. Heterosis e. Standard deviation.

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Model Question Paper

M.Sc. Botany – Semester IV

Elective Paper: Advanced Cytogenetics.
(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Maximum Marks : 85

Answer any FIVE questions . All questions carry equal marks.

1. Draw neat labeled diagrams to indicate the consequences of crossing overs in different positions of inversion heterozygotes.

2. Explain how are the chromosomes involved in translocation heterozygotes and their break points identified ?

3. Describe the methods of production of haploids . What is the importance of haploids ?

4. Write short notes on any **four** of the following :

   a) Interchromosomal effects b) Role of inversions in evolution
   c) A-B translocations d) Preferential fertilization e) Effects of b-chromosomes on chiasma frequency

5. Distinguish between autotetraploids and amphidiploids. How is homeologous chromosome pairing regulated ?

6. Explain the mechanisms of sex determination.

7. Describe the major steps involved in chromosome walking and jumping.

8. Write short notes on any **four** of the following:

   a) RIL b) YACS c) Genetic basis of Apomixix d) gene segregation in ta duplex plant e) Drosera – type pairing.

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Model Question Paper

M.Sc. Botany - Semester IV

Elective Paper: Applied Phycology

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Max. Marks: 85

Answer any FIVE Questions
All Questions carry equal marks

1. Describe the structure, reproduction and life cycle of Gelidium.

2. Give detailed cultivation of Algae which are used for production of Agar-Agar and Algin.

3. Discuss the role of Algae in water pollution.

4. Write short notes on any FOUR of the following:
   a) Algae as Biofertilizers
   b) Terrestrial Algae
   c) Chlorella
   d) Cyclotella
   e) Dunaliella

5. Give a detailed account of the economic importance of Algae.

6. Desscribe the composition, distribution and phytoplankton of Indian waters. Add a note on sampling techniques of phytoplankton.

7. Discuss the role of Algae in sewage disposal and waste land reclamation.

8. Write short notes on any FOUR of the following:
   a) Culture of Spirulina
   b) Algae and Aquaculture industry
   c) Agar-Agar
   d) Nostoc
   e) Toxic Algae

Model Question Paper

M.Sc. Botany - Semester IV

Elective Paper: Plant Pathology

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Max. Marks: 85

Answer any FIVE Questions
All Questions carry equal marks

1. Describe the infection phenomena of plant pathogens. Also discuss the factors affecting the infections.

2. Discuss different methods of control of plant diseases.

3. Discuss the role of enzymes in plant diseases.

4. Write short notes on any FOUR of the following:
   a) Damping off of seedling
   b) Powdery mildew of cucurbits
   c) Tikka disease of ground nut
   d) Dispersal of plant pathogens
   e) Post harvest diseases

5. Give symptoms, etiology, epidemiology of blast disease of Rice, Citrus canker and Brown rot of Potatoes.

6. Write an essay on viral plant diseases, pathogens involved, their diagnosis and control.

7. Discuss the defence mechanism against plant pathogens in plants.

8. Write short notes on any FOUR of the following:
   a) Phytotoxins
   b) Development of resistant varieties
   c) Host resistance against plant pathogens
   d) Ergot of Bajra
   e) Whip smut of Sugarcane

Model Question Paper

M.Sc. Botany - Semester IV

Elective Paper: Plant Biosystematics

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Max. Marks: 85

Answer any FIVE Questions
All Questions carry equal marks

1. Give an account of the history, scope, importance and objectives of Plant Biosystematics.

2. Give a critical account of the aims and scope of transplant experiments in Biosystematics.

3. Write an account of the advantages of self and cross pollination mechanisms in breeding programmes.

4. Write short notes on any FOUR of the following:
   a) Geographical and regional variation
   b) Coenospecies
   c) Isolating mechanisms
   d) Phenotypic plasticity
   e) Significance of protogyny

5. Discuss the role of cytological findings and comment on their significance in the field of Plant Biosystematics.

6. Write critically on the contribution of Phytochemistry in Biosystematics.

7. Present a critical account of 'Biological concept' of a species.

8. Write short notes on any FOUR of the following:
   a) Taximetrics
   b) Leaky isolation barriers
   c) Catastrophic selection
   d) Polyploidy
   e) Seratotaxonomy

Model Question Paper

M.Sc. Botany - Semester IV

Elective Paper: Agricultural Biotechnology

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Max. Marks: 85

Answer any FIVE Questions
All Questions carry equal marks

1. What are artificial seeds? Describe the method of their production and uses.

2. Write a detailed account on anther culture and discuss its significance in crop improvement.

3. Describe the technique of embryo culture and explain its usage in plant breeding programmes.

4. Explain the molecular basis of plant breeding.

5. What are biopesticides? Discuss their role in present day context.

6. Give an account of specific integrated pest management practices followed for Cotton.

7. What are Mutagens? Describe their mode of action at the Molecular level.

8. Write short notes on any FOUR of the following:
   a) Transversions
   b) Protoplast fusion
   c) Clones
   d) Biological control of pests
   e) Terminator gene technology

Model Question Paper

M.Sc. Botany - Semester IV

Elective Paper: Experimental Embryology of Angiosperms

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Max. Marks: 85

Answer any FIVE Questions
All Questions carry equal marks

1. Write an account on the basic techniques in tissue culture.

2. Discuss the various expeimental methods for the production of haploids. Add a note on the cytology of androgenesis.

3. Write short notes on any FOUR of the following:
   a) Media for pollen germination
   b) Intra ovarian pollination
   c) Nucellus culture
   d) De-differentiation
   e) HEPA filters

4. Describe the events involved in pollen-pistil interaction. Add a note on the role of in vitro fertilization in overcoming incompatibility.

5. What is parthenocarpy? Describe the methods of induction of parthenocarpy and indicate its significance in horticulture.

6. What physiological aspects are involved in the development of endosperm and embryo? Indicate the role of endosperm in embryo development.

7. What is meant by cell hybridization and protoplast fusion? Describe the methods used in sorting the fused products.

8. Write short notes on any FOUR of the following:
   a) Nucellar polyembryony
   b) Casein hydrolysate
   c) Pellicle
   d) Nurse endosperm
   e) Totipotency

Model Question Paper

M.Sc. Botany - Semester IV

Elective Paper: Crop Physiology and Biotechnology

(Effective from the Admitted Batch of 2009-2010)

Time: 3 Hours Max. Marks: 85

Answer any FIVE Questions
All Questions carry equal marks

1. Describe different components, their nature and organization of Photosystem I and Photosystem II in plants.

2. Explain the molecular biology of water stress tolerance in plants.

3. Write short notes on any FOUR of the following:
   a) C4 plants
   b) Photorespiration
   c) Source-sink relationships
   d) Succulence under salt stress
   e) Heat shock proteins

4. Discuss the techniques of gene transfer in plants.

5. Give an account of genetic manipulation of crops for insect resistance.

6. Briefly describe the genetic engineering of seed proteins and oils.

7. What is polymerase chain reaction? Discuss its applications.

8. Write short notes on any FOUR of the following:
   a) Micropropagation
   b) Protoplast isolation
   c) Pathogen-derived resistance
   d) Herbicide resistance
   e) DNA microarray technology
