M.Sc., PLANT BIOTECHNOLOGY

PROGRAMME

(UNDER CSS)

MODEL QUESTION PAPERS

PBT1MOO1PC1: GENERAL BIOCHEMISTRY

Total Credits: 30

Short Answer Questions
Answer any **five**

- Fat soluble vitamins.
- Membrane proteins.
- ATP Synthase.
- Structure of transfer RNA
- Carbiondioxide fixation in plants.
- Biochemical functions of nucleic acids.
- Chemistry and function of L- ascorbic acid.
- Classification of compound lipids. Credits : 1×5=5

Short essays
Answer any **five**

- Carbiondioxide fixation in plants.
- Secondary structure of DNA
- Chemical and function of chlorophyll.
- Digestion of carbohydrates.
- Explain membrane transport.
- Essential fatty acids.
- Mechanism of oxidative phosphorylation.
- Secondary structure of proteins. Credits: 2×5=10

Essays
Answer any **three**

- Tabulate the difference between cyclic and non cyclic photophosphorylation in plants.

Outline the reactions of the Calvin cycle.

- How are amino acids classified on the basis of chemical structure? Write the chemical structure of one member of each class. Discuss the different levels of structural organisation in proteins. What are biochemical functions of proteins?
- Ultra structure of typical plant cell. What are the biochemical functions and markers of sub cellular organelles?
- What are polysaccharides? How are they classified? Explain in detail.
- Give detail account on digestion and adsorption of protein, carbohydrates and lipids.
- Discuss in detail the molecular aspects of the three main cytoskeleton elements and their functions. Add a note on the environment of accessory proteins. Credits: 5×3=15

PBT1MOO1PC2: Microbiology and Immunology

Total Credits: 30

Short Answer Questions

Answer any **five**

- Heat sterilization
- Actinomycets
- RNA virus
- Radiation on microbial growth
- Epitope
- Mast cell
- Liquid Media
- Haptens

Credits: 1x5=5

Short essays

Answer any **five**

- Algae Classification
- Lytic cycle
- Antifungal drugs
- B Cell
- Microbial Growth
- Nitrogen Cycle
- Gram Staining
- ELISA

Credits: 2x5=10

Essays

Answer any **three**

- Structure of Bacterial Cell with the diagram.
- Different Types of hypersensitivity
- Explain Different types of media
- Clonal selection theory
- Explain nitrogen fixation
- Different types of Precipitation Reactions

Credits: 3x5=15

PBT1MOO1PC3: Bioanalytical Techniques

Total Credits: 30

Short Answer Questions

Answer any **five**

- Beer-Lamberts law
- Affinity chromatography

- FPLC
- Nomogram
- 2D gel electrophoresis
- Resolving power
- AFM
- Objective lens

Credits: 1x5=5

Short essays

Answer any **five**

- UV-VIS spectrophotometer
- Confocal Microscopy
- NMR
- MALDI-TOEF
- TEM
- Density gradient centrifugation
- Numerical Aperture
- X-ray diffraction

Credits: 2x5=10

Essays

Answer any **three**

- Different types of centrifuges
- Explain various types of electron microscopes
- Explain the different stages in tissue processing of light microscope specimens
- Explain the functioning of Pulse Field Gel Electrophoresis

- Explain ion exchange chromatography
- Explain micrometry

Credits: 3x5=15

PBT1MOO1PC4: Plant Developmental Biology

Total Credits: 30

Short Answer Questions

Answer any **five**

- Male gametophyte
- Female gametophyte
- Anemophily
- Double fertilization
- Torpedo stage
- Epigeal germination
- Hypogeal germination
- Scutellum

Credits: 1x5=5

Short essays

Answer any **five**

- ABC model
- Organization of SAM
- Organization of RAM
- Trichome
- Endosperm

- Juvenility
- Polarity in embryo development
- Vernalization

Credits: 2x5=10

Essays

Answer any **three**

- Lateral and adventitious root development
- Structure and development of monocot flowers
- Hormonal Regulation of embryo development
- Shoot branching in angiosperms
- Development of vascular tissues
- Abaxial and adaxial identity of leaf cells

Credits: 3x5=15

PBT2MOO2PC5: BASICS OF PLANT TISSUE CULTURE

Total Credits: 30

Short Answer Questions
Answer any **five**

1. Selection of explants.
2. Surface sterilisation
3. Inorganic nutrients.
4. Artificial seed technology.
5. Methods of subculture.
6. Dedifferentiation and redifferentiation.
7. Growth room conditions.
8. Cell viability test.

Credits : 1×5= 5

Short essays

Answer any **five**

9. Cryopreservation.
10. Problems in tissue culture of woody plants.
11. Meristem culture
12. Somatic embryogenesis.
13. Factors influencing the survival of plantlets in the field.
14. Laminar air flow.
15. Sterilisation in tissue culture.
16. Slow growth cultures. Credits: 2×5=10

Essays

Answer any **three**

17 What is anther culture? Briefly explain the factors influencing anther culture and its applications.

18. Describe the application of biotechnology in agriculture and forestry.
19. Describe the prospects and protocol of cryopreservation of plant cell culture.
20. Describe the basic facilities for a plant tissue culture laboratory.
21. Describe different methods of micropropagation.
22. Write a brief account of the media components and culture conditions required for plant tissue culture. Credits: 5×3=15

PBT2MOO2PC6: Principles of Genetic Engineering and Recombinant DNA Technology

Total Credits: 30

Short Answer Questions

Answer any **five**

1. Alkaline phosphatase
2. Linkers
3. Liposomes
4. YAC
5. Si RNA

6. Northern Blotting

7. Primer

8. Terminal deoxynucleotidyl transferase Credits: 1x5=5

Short essays

Answer any **five**

- DNA Ligase
- Bacteriophage λ
- Binary vector
- Caulimoviruses vectors
- cDNA library
- Reporter gene
- DNA fingerprinting
- Transposon mutagenesis Credits: 2x5=10

Essays

Answer any **three**

- Write an essay on type II restriction enzyme
- Explain Ti Plasmid Mediated cloning
- Explain Elctroporation and microinjection
- Explain the concept of gene knock out technique
- Sanger's DNA sequencing
- Site Directed Mutagenesis Credits: 3x5=15

PBT2MOO2PC7: Plant Pathology

Total Credits: 30

Short Answer Questions

Answer any **five**

- Causative organism of Citrus canker
- Disease traingle
- Solarisation
- Whip smut of sugar Cane
- Tikka Disease of Ground nut
- Epidemics
- Composition of Bordeaux mixtures
- Azolla Credits: 1x5=5

Short essays

Answer any **five**

- Quarantines
- Botanical pesticides
- Toxins in relation to plant diseases
- Plant disease forecasting
- enzymes in plant diseases
- Biofertilizer
- Physical control measures
- Chemical control Credits :2x5=10

Essays

Answer any **three**

- Common diseases affecting coconut palms

- Plant responses to post infectional agents
- Genetics of plant microbial interaction
- Explain the role of environment in the development of diseases
- Alleopathy
- Explain three diseases caused by viruses Credits: 3x5=15

PBT2MOO2PC8: BIOMASS AND BIOENERGY

Total Credits: 30

Short Answer Questions
Answer any **five**

1. Cellulase.
2. Petro pants.
3. Pyrolisis.
4. Biodiesel.
5. Fuel cells.
6. Sources and composition of solid wastes.
7. Asetoclastic methanogens.
8. Fermentor. Credits: 1×5=5

Short essays
Answer any **five**

9. Hog fuel.

10. Refused derived fuel.

11. Aerobic and anaerobic digestion.

12. Bioethanol

13. Hydrogen as a fuel and explain its production

14. Bio refinery

15. Biomass conversion using *Salvinia* and *Eichornia.*

16. Ecotechnology and biotechnology. Credits: 2×5=10

Essays

Answer any **three**

17. Differentiate between renewable and non renewable source of energy with example. Explain how organic wastes can be exploited as a source of energy.

18. Describe the structure and component of a biogas plant. Explain the production of biogas from organic waste.

19. Describe non biological method for biomass conversion explains the treatment methods utilized for solid waste management.

20. Describe major application of Bioenergy.

21. Give detail on ethanol production fermentation and recovery of ethanol.

22. Explain some application of biotechnology with reference to Bioenergy and biomass conservation.

Credits: 5×3=15

PBT3MOO3PC9: Plant Metabolism

Total Credits: 30

Short Answer Questions

Answer any **five**

- Free energy
- Endergonic reaction
- Redox potential
- Photosystem
- Polyamines
- Brassinosteroids
- Appressed region
- Cyanogenic glucosides

Credits :1x5=5

Short essays

Answer any **five**

- Alkaloids
- Isoprenoids
- Phenols
- Elicitors
- C3 metabolism
- Photorespiration
- Non-cyclic photophosphorylation

- Nitrogen fixation Credits :2x5=10

Essays

Answer any **three**

- Role of Phytochromes and cryptochromes in photo-morphogenesis
- Optimisation of culture conditions for invitro production of secondary metabolites
- Explain the synthesis and transport of auxins
- Plant responses to abiotic and biotic stresses
- Explain the pathways by which alkaloids are synthesized
- Explain different in vitro techniques by which secondary metabolites are synthesized

Credits: 3x5=15

PBT3MOO3PC10: TISSUE CULTURE TECHNIQUES FOR CROP IMPROVEMENT

Total Credits: 30

Short Answer Questions

Answer any **five**

1. Selection of somaclonal variants.
2. EPSP Gene
3. Stability in *in vitro* mutagenesis
4. Cybrids.
5. Endosperm culture.
6. Exploitation of recessive mutants.
7. Epigenetic variation.
8. Somatic hybridisation and crop improvement. Credits: 1×5=5

Short essays

Answer any **five**

9. Molecular farming.

10. Polyploidy breeding.

11. Protoplast culture.

12. Analytical breeding.

13. Haploid culture and production of homodiploids.

14. Applications of tissue culture in crop improvement.

15. Mentor pollen technique.

16. PCR based virus indexing Credits: 2×5=10

Essays

Answer any **three**

17. . Describe the various methods employed in crop improvement between distant hybridisations.

18. What are BT Cotton it produced an? How is it produced and what is is its significance?

19. What is in vitro pollination and what is its significance? Give the different techniques and narrate any one success story.

20. Why is virus indexing so important in *in vitro* culture system? What are the methods for indexing? How is virus free plant is produced *in vitro*? Cite few examples.

21. Give detailed account on transgenics for herbicide tolerance in crop plants.

22. Write the scope of commercial exploitation of plant tissue culture in India, Credits: 5×3= 15

PBT3MOO3PC11: Biotechnology, Environment and Intellectual Property Rights and Patenting

Total Credits: 30

Short Answer Questions

Answer any **five**

- IPR
- CITES
- GATT
- Alpha diversity

- IUCN
- TRIPS
- Red Data Book
- Sea weeds Credits: 1x5=5

Short essays

Answer any **five**

- In situ conservation strategies
- Patenting life forms
- Gene banks and Cryopreservation
- Stress tolerant plants
- Protection of plant varieties and farmers right act
- Role of Mycorrhiza in restoration of degraded land
- Plant Breeders Right
- Copy right and trade marks Credits: 2x5=10

Essays

Answer any **three**

- Discuss the problems and remedies involved in the heavy metal contamination of soil
- Explain the use of sea weeds and its mass cultivation
- Discuss IPR and Patenting in the light of GATT,TRIPS and WIPO
- patenting of genes and DNA sequences
- Genetic engineering of seaweeds
- Explain the role of mycorhiza in restoration of degraded land Credits: 3x5=15

PBT3MOO3PC12: Bioprocess Technology and Engineering

Total Credits: 30

Short Answer Questions

Answer any **five**

- Microbial biomass
- Mineral sources in Media
- Steam sterilization
- Fluid rheology
- Importance of Aeration
- Microbial Enzyme
- Principles of Agitation
- Baffles

Credits: 1x5=5

Short essays

Answer any **five**

- Batch culture microbial growth kinetics
- Isolation of industrially important microorganisms
- Theory of fibrous Filters
- Development of preparation of yeast inoculums in fermentation
- Oxygen demand of a industrial fermentation process
- Online analysis of process parameter

- Explain Fed batch culture
- Determination of KLa, factors affecting KLa Credits: 2x5=10

Essays

Answer any **three**

- Microbial growth kinetics for continous culture and its industrial application
- Explain the typical media composition for fermentation
- Explain the sterilization process of a fermenter
- Inoculation of the fermenters
- Development of incula for actinomycets
- Write the importance of biotechnological tools in strain improvement

Credits: 3x5=15

PBT4MOO4PE1: Research Methodology and Biostatistics

Total Credits: 30

Short Answer Questions

Answer any **five**

- ANOVA
- Standard deviation
- Mean
- Micrometer
- Karyotype
- CSE system
- Card catalogue

- Student t-test Credits:1x5=5

Short essays

Answer any **five**

- Histochemical localization
- Microphotography
- Components of bright field microscope
- Fixative agents
- ANOVA
- Presentation of data
- Hypothesis testing
- Correlation Credits: 2x5=10

Essays

Answer any **three**

- Explain the steps involved in the tissue processing for light microscopy?
- Explain the various measures of dispersion?
- Explain the importance of literature review?
- Staining in electron microscopy
- Structure of a scientific paper
- Explain scientific methodology Credits: 3x5=15

PBT4MOO4PE2: Genomics and Proteomics

Total Credits: 30

Short Answer Questions

Answer any **five**

- SAGE
- ORF scanning
- Negative staining
- Density gradients
- BLAST
- Hydrophobic protein
- 2D gel electrophoresis
- MPSS

Credits: 1x5=5

Short essays

Answer any **five**

- Chain termination
- Gene Inactivation by antisense RNA
- EST
- Combined Fractional Diagonal Chromatography (COFRADIC)
- Application of Metagenomics in biology
- X-ray crystallography
- Principles of MALDITOF
- Microfluidics

Credits: 2x5=10

Essays

Answer any **three**

- Gene over expression
- Explain the process of isolating novel genes from metagenome
- Explain Stable Isotope Labeling with Aminoacids in Culture (SILAC) and write the application and advantage of SILAC
- Explain NMR
- Describe Protein Microarray and its application
- Protein Biomarker Discovery and validation on nervous system and Alzheimer

Credits: 3x5=15

PBT4MOO4PE3: Transgenic Techniques for Crop Improvement

Total Credits: 30

Short Answer Questions

Answer any **five**

- T DNA
- Infection pattern of *A. tumefaciense*
- Resolution Gap
- In- situ hybridisation (ISH)
- RNA interference
- Concept of gene bank
- Possible dangers of GEO's
- Define QTLs

Credits: 1x5=5

Short essays

Answer any **five**

- Co-integrated Vector system

- RFLP
- RAPD
- Insect resistance plant
- Fungus resistant plant
- Biological containments
- cDNA libraries
- Explain the Bio safety handling of hazardous chemicals

Credits: 2x5=10

Essays

Answer any **three**

- Cloning strategies by using Ti Plasmid
- Explain the chloroplast transformation and write down its advantages
- Molecular Maps of Yeasts
- Herbicide resistant plant
- Describe the techniques by which you can improve the storage proteins in the plant
- Explain Physical laboratory containments

Credits: 3x5=15