

Total No. of Questions :3]

SEAT No. :

[Total No. of Pages :2

P1735

[5132] - 101

M.Sc. -I

BIOTECHNOLOGY

**BT-101: Advanced Biological Chemistry
(2013 Pattern) (Semester - I) (Credit System)**

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*

Q1) Answer any four of the following:

[20]

- a) Enlist the storage carbohydrates. Explain any one.
- b) Explain 'Lesch-Nyhan syndrome' as a metabolic disorder.
- c) Give importance of non covalent interactions in stabilization of protein structure.
- d) Write a short note on metabolic flux.
- e) Describe the therapeutic applications of terpenoids.
- f) Comment on 'cytokine receptors'.

Q2) Answer any four of the following:

[20]

- a) Enlist the extraction methods used for isolation of secondary metabolites. Explain soxhlet method of extraction.
- b) Explain the term metabolic engineering with representative example.

P.T.O.

- c) Describe Michaelis - Menten equation for single substrate enzyme catalysed reaction.
- d) Comment on temporal and special variations of secondary metabolites.
- e) Explain the mechanism how chaperon mediate proten folding.
- f) Discuss the integration of metabolism.

Q3) Answer any one of the following:

[10]

- a) Describe in detail shikimic acid is a key intermediate in the synthesis of both aromatic aminoacids and phenylpropanoids.
- b) Why post translational modification of protein is essential for the functioning of protein? Elaborate any two types of protein modification

EEE

Total No. of Questions :3]

SEAT No :

P1736

[5132]-102

[Total No. of Pages :1

M.Sc.

BIOTECHNOLOGY

BT-102: Molecular Biology

(2013 Pattern) (New) (Semester-I) (Credit System)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) Answer to the sections must be written on separate answer sheets.*
- 2) All questions are compulsory.*
- 3) Figures to the right indicate full marks.*
- 4) Use of color pencil restricted to diagrams.*

Q1) Write self explanatory note on any four of the following:

[20]

- a) DNA melting and its implication
- b) Rolling circle model of DNA replication
- c) Mismatch repair
- d) NHEJ recombination
- e) Transposable elements in bacteria
- f) Post translational modification

Q2) Explain any four of the following with suitable illustrations in 10-15 sentences:

[20]

- a) Sumoylation and ubiquitinyaltion
- b) Nucleosome
- c) DNA polymerase III
- d) Protein folding
- e) Inhibitors of translation and its significance in research
- f) Pseudogenes and truncated genes

Q3) Explain any one of the following in detail with suitable illustrations:

[10]

- a) Protein trafficking
- b) Prokaryotic transcription



Total No. of Questions : 3]

SEAT No. :

P1737

[5132]-103

[Total No. of Pages : 2

M.Sc. - I

BIOTECHNOLOGY

**BT-103: Environmental Biotechnology
(2013 Pattern) (Semester - I) (Credit System)**

Time : 3 Hours]

[Max. Marks : 50

Instruction to the candidates:

- 1) *All questions are compulsory.*
- 2) *Draw neat & labelled diagram wherever necessary.*
- 3) *Figures to the right indicate full marks.*

Q1) Attempt any four of the following:

[4×5=20]

- a) Give overview of environment protection act 1986.
- b) Explain various methods of waste water disposal on land.
- c) Explain - Rio conference become milestone in the view of global environmental concerns.
- d) Elaborate role of sustainable use of bioresources & ecoplaning in environmental protection.
- e) write on significance of ISO 14000 series.
- f) What are global & regional threats to the environment

Q2) Write notes on (any four):

[4 × 5 = 20]

- a) Air & water quality standards
- b) Solid waste management.
- c) Use of genetically modified organisms in bioremediation.
- d) EIA guidelines
- e) Environmental audit
- f) International Ecostandard

P.T.O.

Q3) Answer any one of the following:

- a) Explain the principal & objectives of remote sensing. Add a note on its applications. [8]
- b) Mention various biological methods used for waste water treatment. [2]

OR

- a) What is phytoremediation? Describe different modes of Phytoremediation. [8]
- b) Enlist various strategies used for biodegradation of pollutants. [2]



Total No. of Questions : 3]

SEAT No :

P1738

[5132]-104

[Total No. of Pages :2

M.Sc.

BIOTECHNOLOGY

BT - 104: Cell Biology

(2013 Pattern) (Credit System) (Semester-I)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*

Q1) Answer any four questions:

[4×5=20]

- a) Lipid bilayer is a 2-D fluid. Jusify.
- b) Discuss the role of microtubule cytoskeleton in non-dividing cells.
- c) Write a note on structure and functions of different types of plastids.
- d) Give an account on structure and function of vacuoles.
- e) Give the structure and function of signal recognition particle (SRP).
- f) Explain the principle of fluorescence microscopy.

Q2) Answer any four questions:

[4×5=20]

- a) Describe the mechanism of import of proteins into the nucleus.
- b) What are gap junctions? Add a note on the structure and function.
- c) Explain cell senescence in plants.
- d) Write a note on activation of cyclin dependent kinases.
- e) Give an account on the role of proto-oncogens and anti-oncogens in the etiology of cancer.
- f) Explain differentiation of blood cells from hematopoietic stem cells.

P.T.O.

Q3) Answer any one question:

[1×10=10]

- a) Give a detailed account of photorespiration in plants. Add a note on its disadvantages.
- b) Elaborate the GPCR pathway of signal transduction.



Total No. of Questions :3]

SEAT No. :

[Total No. of Pages :2

P1739

[5132] - 201

M.Sc. -I

BIOTECHNOLOGY

BT-201: Genetic Engineering

(2013 Pattern) (Semester - II) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicate full marks.*

Q1) Write a short notes on any Four of the following:

[20]

- a) Transfection.
- b) Inverse PCR.
- c) Blue-White screening method.
- d) Genomic library.
- e) DNA ligase enzyme.
- f) Biopharming.

Q2) Attempt any four of the following:

[20]

- a) Yeast artificial chromosome as a vector.
- b) Compare between the insertion and replacement vector.
- c) Explain the automation of sanger DNA sequencing method.

P.T.O.

- d) Comment on biosafety regulations for release of GMO.
- e) Discuss the uses of viral vector in gene therapy.
- f) Explain the techniques used for physical mapping.

Q3) Answer any one of the following:

[10]

- a) Discuss the criteria used to decide, if a particular protein should be expressed in prokaryotic system.
- b) What are molecular markers? Explain the marker assisted selection of plant genotypes.

EEE

Total No. of Questions : 2]

SEAT No. :

P1740

[5132]-202

[Total No. of Pages : 1

M.Sc.

BIOTECHNOLOGY

BT - 202 : Immunology

(2013 Pattern) (Semester - II) (Credit System)

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw the sketches wherever necessary.*

Q1) Attempt any three of the following:

[15]

- a) Write a note on antigen presentation and functioning of lymph node as a lymphoid organ.
- b) Compare and contrast Ouchterlony's and Mancini method of immunodiffusion.
- c) Draw a neat labeled diagram of MHC-I and MHC - II proteins.
- d) Write a note on Asthama as a prolonged allergic reaction.
- e) Justify giving reasons why Systemic lupus erythromatosus and Thrombocytopenic purpura make use of Antibody medicine.

Q2) Attempt any one of the following:

[10]

- a) Explain the co-stimulation signal cascade in Clonal selection theory.
- b) Describe the class switching from IgM to IgG in secondary infection.

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Total No. of Questions :3]

SEAT No. :

[Total No. of Pages :2

P1741

[5132] - 203

M.Sc.

BIOTECHNOLOGY

BT-203: Principles of Bacteriology & Virology

(2013 Pattern) (Semester - II) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Neat labelled diagrams to be drawn where ever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Attempt any four of the following:

[20]

- a) What are prions? How do they differ from virions & viroids.
- b) State the mechanisms of viral cell interactions in persistent infections.
- c) What adaptations cause extremophiles to survive in harsh conditions.
- d) Discuss the mechanism of antigenic shift & antigenic drift.
- e) Explain the process of binary fission. Add a note on the proteins involved in it.
- f) Enlist the different cell inclusions in prokaryotes. Elaborate on any two.

Q2) Answer any four of the following:

[20]

- a) Detection of endospore employ special staining procedures. Explain the statement.

P.T.O.

- b) Emergence of new viral diseases are favoured by multiple factors. Justify.
- c) Discuss applications of cyanobacteria in agriculture citing example.
- d) Discuss the importance of enrichment as a tool for obtaining pure culture.
- e) What are infectivity assays. Define the terms - pock, plaque, cytopathic effect & necrotic lesion.
- f) Write about Baltimore classification of viruses with example.

Q3) Answer any one:

[10]

- a) Explain in detail, different methods used for viral cultivation.
- b) Discuss the different methods used in bacterial identification.

EEE

Total No. of Questions :3]

SEAT No. :

[Total No. of Pages :2

P1742

[5132] - 204

M.Sc. -I

BIOTECHNOLOGY

BT-204: Plant Biotechnology

(2013 Pattern) (Semester - II) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Draw neat labelled diagram wherever neccessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer any four questions:

[4×5=20]

- a) How variation are produced during micropropogation? Add note on its applications.
- b) Elaborate the role of Biotechnology in algal strain improvement.
- c) What is somatic embryogenesis? Give an account of production of somatic embryos.
- d) Discuss strategies used for development of virus resistant plants.
- e) Write note on in vitro and rogenesis.
- f) Explain virus mediated gene transfer in plants.

Q2) Answer any four questions:

[4×5=20]

- a) Discuss qualitative and quantitative strain improvement of yeast.
- b) Explain transgenic approach for development of salt resistant plants.

P.T.O.

- c) Comment on barriers to horizontal gene transfer.
- d) Write note on plant derived vaccines and therapeutic proteins.
- e) Citing suitable example explain micropropagation of timber yielding plant.
- f) Agrobacterium is natural genetic engineer - Justify.

Q3) Answer any one question:

[1×10=10]

- a) What are somatic hybrids? Give an account of methodology used for somatic hybridization. Add note on its application in crop improvement.
- b) Why secondary metabolites are so valuable? How metabolic engineering approach can be used to increase secondary metabolite production explain with suitable example.

EEE

Total No. of Questions : 3]

SEAT No :

P1743

[5132]-301

[Total No. of Pages :2

M.Sc. - II

BIOTECHNOLOGY

BT-301: Animal Biotechnology

(2013 Pattern) (Semester-III) (Credit System)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *All questions are compulsory*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*

Q1) Answer any four questions.

[4×5=20]

- a) What is cross contamination? Explain the measures taken to prevent cross contamination.
- b) Write about the advantages and limitations of serum free media.
- c) What do you understand by the term transformed cells? Describe any one method to characterized transformed cells.
- d) Explain invitrofertilization.
- e) Describe any two methods for characterising animal genome.
- f) Write a note on biosafety issues related to animal biotechnology.

Q2) Write short notes on (any four)

[4×5=20]

- a) Scale up animal cell cultures.
- b) Organ culture.
- c) Methods for cell sorting.
- d) Embryonic stem cells.

P.T.O.

- e) Applications of animal tissue culture in vaccine production.
- f) Hybrid vigour.

Q3) Answer any one question.

[1×10=10]

- a) Describe any one mouse model for studying human genetic disorder.
- b) Write a note on induced pluripotent stem cells and its applications.



Total No. of Questions : 3]

SEAT No. :

P1744

[5132]-302

[Total No. of Pages : 2

M.Sc.

BIOTECHNOLOGY

**BT - 302: Bioprocess Engineering and Fermentation Technology
(2013 Pattern) (Semester - III) (Credit System)**

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*

Q1) Answer the following: (any four)

[20]

- a) Explain how flow pattern affects choice of impellers in fermentor.
- b) Describe analogue resistant mutants with suitable example.
- c) Describe counter current system for solvent solvent extraction with example.
- d) Comment on different methods of cell disruption used on downstream processing.
- e) What is the significance of Del factor in medium sterilization? Add a note on kinetics of distruction of micro organisms during sterilization.
- f) Enlist methods for determination of kLa and explain any one.

Q2) Answer the following: (any four)

[20]

- a) Explain any one design of reactor used for immobilization of enzymes.
- b) Explain the process of continuous sterilization for media sterilization.
- c) What is the effect of cell permeability on glutamate production?
- d) Comment on applications of mixed culture in food industry.
- e) Write a note on concept of scale down in fermentation.
- f) Write a note on concept of Aseptic operation and containment in Bioprocessing.

P.T.O.

Q3) Answer the following: (any one)

[10]

- a) Explain the steps involved in oxygen transfer from fermentation broth to the microbial cells. Add a note on role of diffusion in bioprocessing.
- b) Explain the relationship between power consumption and operating variables in baffled, agitated bioreactor.

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Total No. of Questions : 2]

SEAT No. :

P1745

[5132]-303

[Total No. of Pages : 01

M.Sc.

BIOTECHNOLOGY

**BT - 303 : Database Management and IPR in Biotechnology
(2013 Pattern) (Credit System) (Semester - III)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat and labelled diagrams wherever necessary.*

Q1) Answer any three:

[3 × 5 = 15]

- a) Write provisions of Paris convention and Berne convention.
- b) Discuss essential bioethical considerations in genetically modified foods and crops.
- c) Describe in brief the importance and applications of PubMed.
- d) Write a note on the recording and reporting of adverse events.
- e) Discuss in brief:
 - i) Patent of addition.
 - ii) National Treatment.

Q2) Answer any one:

[1 × 10 = 10]

- a) With the help of example, discuss essentials and maintenance of source documentation.
- b) Explain the procedure for registration of industrial design. State provisions regarding the terms of design.



Total No. of Questions : 3]

SEAT No. :

P1746

[5132]-304

[Total No. of Pages : 2

M.Sc.-II

BIOTECHNOLOGY

BT-304: Advanced Genetics

(2013 Pattern) (Credit System) (Semester-III)

Time : 2½ Hours]

[Max. Marks : 38

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat and labelled diagram wherever necessary.*

Q1) Answer any two:

[2 × 5 = 10]

- a) Explain in brief, how pre-existing genetic variation contributes to induction of somaclonal variations.
- b) What is heritability? Explain advantages and limitations of broad sense and narrow sense heritability.
- c) Write a note on hallmarks of cancer.
- d) Define apomixis. Discuss various genetic mechanisms involved in apomictic development of plants.

Q2) Answer any four:

[4 × 5 = 20]

- a) What is Philadelphia chromosome? How it is formed? Explain its consequences.
- b) Discuss significance of using Arabidopsis as a model system in studying genetics.
- c) Write a brief account of pre-zygotic self incompatibility in plants.
- d) Explain assumptions of Hardy-weinberg principle.
- e) With a suitable example, discuss multistep nature of cancer.
- f) Red green colourblindness is caused by an x-linked recessive gene. About 64 women out of 10,000 are colourblind. What proportion of men would be expected to show the trait if mating is random.

P.T.O.

Q3) Answer any one:

[1 × 8 = 8]

- a) Write a detailed account of autosomal dominant disorders with appropriate examples.
- b) Give a detailed account of cytoplasmic inheritance with suitable examples.



Total No. of Questions : 2]

SEAT No. :

P1747

[5132]-305

[Total No. of Pages : 1

M.Sc.

BIOTECHNOLOGY

BT - 305 : Bioinformatics

(2013 Pattern) (Semester - III)

Time : 1 ½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Draw neat diagrams wherever necessary.*
- 3) *Figures to the right indicate full marks.*

Q1) Answer the following (any three)

[3×5=15]

- a) Write a note on DBMS.
- b) Explain the significance of Ramchandran plot in structural bioinformatics.
- c) Write a note on immunoinformatics and immunoinformatic databases.
- d) Explain BLAST and FASTA with reference to nucleic acid and protein sequencing.
- e) Describe a protein classification system giving appropriate examples.

Q2) Answer any one of the following.

[1×10=10]

- a) What is phylogenetic analysis. Discuss any one method of phylogenetic analysis in detail.
- b) Explain in detail local and global alignments with appropriate illustrations.

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Total No. of Questions : 3]

SEAT No. :

P1748

[5132]-401

[Total No. of Pages : 2

M.Sc.

BIOTECHNOLOGY

BT-401: Genomics and Proteomics

(2013 Pattern) (Credit System) (Semester-IV)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Neat labelled diagrams must be drawn wherever necessary.*

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

- a) With a representative example of model organism. Explain the concept of genome at chromosome level.
- b) Explain any one next generation sequencing method for analysis of whole genome.
- c) Give the strategic method for cDNA library construction. Does it differ in prokaryotes & Eukaryotes?
- d) Explain the principle and working of RNA Microarray.
- e) Write notes on:
 - i) Zenicogenomis.
 - ii) Gene annotation.

Q2) Attempt any four of the following: **[20]**

- a) Discuss the advantages and limitations of expressional Proteomics.
- b) Explain the application of MALDI-TOF in proteomic study.
- c) Describe the Bait approach to study the protein-protein interaction.
- d) Give the principle and working of protein microarray.
- e) Explain how 2D electrophoresis is helpful in comparative proteomic study.

P.T.O

Q3) Attempt any one of the following:

[10]

- a) What are the strategies needed to integrate genomic and proteomic studies aiming to understand health and diseased states in humans? Explain with examples.
- b) Give the importance of databases in-omic studies. Explain important tools with appropriate examples.



Total No. of Questions : 3]

SEAT No. :

P1749

[5132]-402

[Total No. of Pages : 2

M.Sc.

BIOTECHNOLOGY

**BT-402: Advanced Biochemical and Biophysical Techniques
(2013 Pattern) (Credit System) (Semester-IV)**

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicates full marks.*
- 3) *Neat labelled diagrams must be drawn wherever necessary.*

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

- a) Comment on the method of separation based on pI value of protein.
- b) Give the principle and schematic diagrammatical representation of fluorescence spectroscopy.
- c) Explain the detection and measurement of radioactivity by liquid scintillation counting.
- d) Discuss immunoprecipitation with its significance.
- e) What is the principle of NMR spectroscopy? Explain the term spin-spin coupling.
- f) Write a short notes on freeze-etch and freeze fracture method.

Q2) Answer the following (any four): **[20]**

- a) Describe RIA with its applications.
- b) How you will separate the protein by using two dimensional gel electrophoresis?
- c) Give the principle and applications of HPTLC.
- d) Describe the principle and applications of flow cytometry.
- e) Write a short note on immunoblotting technique.
- f) Discuss GISH with its application.

P.T.O

Q3) Answer the following (any one):

[10]

- a) Give the basic principle of mass spectroscopy. Explain how a TOF works?
- b) Explain the principle, working and applications of Transmission electron microscopy (TEM).



Total No. of Questions : 2]

SEAT No. :

[Total No. of Pages : 1

P1750

[5132]-403

M.Sc. - II

BIOTECHNOLOGY

BT - 404 : Nanobiotechnology

(2013 Pattern) (Credit System) (Semester - IV)

Time : 2½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicates full marks.*

Q1) Answer the following (any 3):

[15]

- a) Explain the uses of SEM and TEM in the study of nanoparticles.
- b) Discuss why (surface area / volume) ratio is very large for nanoparticles as compared to bulk materials.
- c) Explain the targeted drug delivery using nanoparticles in cancer therapy.
- d) Write a note on ethical and commercial aspects of nanotechnology.
- e) Discuss the applications of nanoparticles in physical sciences.

Q2) Answer the following (any 1):

[10]

- a) Enlist the chemical methods used to synthesize nanoparticles. Explain any one.
- b) Explain how biomolecules can be utilized as nanostructures.



Total No. of Questions : 3]

SEAT No. :

P1751

[5132]-404

[Total No. of Pages : 1

M.Sc.

BIOTECHNOLOGY

BT - 405 : Animal Development and Stem Cell Technology

(2013 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Draw neat labelled diagrams wherever necessary.*
- 3) *Figures to the right indicate full marks.*

Q1) Answer the following (any 4):

[4 × 5 = 20]

- a) Write a note on “Primary Induction”.
- b) Explain the role of Ca^{2+} in early development.
- c) Describe the development of embryo till mid-blastula stage.
- d) Give Key features of gastrulation in human embryo.
- e) Elaborate the involvement of Zygotic genes during pattern formation.
- f) Write a note on model of “Limb regeneration”.

Q2) Answer the following (any 4)

[4 × 5 = 20]

- a) Give a comparative account of embryonic stem cells and embryonic carcinoma cells.
- b) Explain, how stem cells are used to generate transgenic animals.
- c) Elaborate any one method to isolate and purify stem cells.
- d) Give various therapeutic applications of stem cells.
- e) Write a note on bioethics in stem cell technology.
- f) Define myeloid lineage. Add a note on myeloid lineage identification.

Q3) Answer any one:

[1 × 10 = 10]

- a) Elaborate in detail sperm capacitation and hyper activation.
- b) Write a note on application of stem cell technology to study/to treat neurodegenerative disorder.



Total No. of Questions :3]

SEAT No. :

[Total No. of Pages :2

P1752

[5132] - 405

M.Sc.

BIOTECHNOLOGY

BT-406: Agricultural Biotechnology

(2013 Pattern) (Semester - IV) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat labelled diagrams wherever necessary.*

Q1) Answer any four of the following:

[4×5=20]

- a) Discuss with suitable examples, the role of biotechnological manipulations in improvement of cereal crops.
- b) Explain the term virus indexing. Briefly describe the methodology involved in virus indexing.
- c) Write a note on the use of bioreactors in large-scale plant production in vitro.
- d) Explain the technique of embryo rescue.
- e) Discuss the limitations and advantages of RAPD markers in crop biotechnology.
- f) Explain how gametoclonal variations are used for crop improvement.

Q2) Answer any four of the following:

[4×5=20]

- a) Discuss the risks associated with production and release of transgenic crops.

P.T.O.

- b) Explain the concept of future crops. Add a note on their importance.
- c) Discuss with suitable examples, the role of metabolic engineering in the production of edible vaccines.
- d) What is agribusiness? Explain its significance in agroeconomics.
- e) Explain how polyembryony can be induced. Add a note on its role in crop improvement.
- f) Discuss various methods used for selection of transformants.

Q3) Answer any one of the following:

[1×10=10]

- a) What are molecular markers? Explain the methodology involved in generation of maps using molecular markers.
- b) Discuss in detail production of abiotic stress tolerant transgenic plants.

EEE