Total No. of Questions : 3]

SEAT No : ____

P 2241

[Total No. of Pages :2

[5332]-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 whenever necessary.***
3) ***Figures to the right indicate full marks.***

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

a) Write a short note on growth hormone.

b) Give therapeutic applications at phenotic.

c) Explain: Enzymes in diagnotics.

d) Describe Applications at Metabolic engineering.

e) Write a note on Phenyl ketone urea.

f) Explain any one technique used in Phytochemical Analysis.

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

a) Describe in detail protein Misfolding.

b) Elaborate on Integration of Metabolism.

c) Explain - Diabeter.

d) With suitable example explain proteolytic cleavage.

e) Explain classification at Terpenes with examples.

f) Comment on - Non covalent interactions which stabilize protein structure.

P.T.O.

Q3) Answer any one of the following: **[10]**

a) Explain in detail Mevalonate pathway in systhesis of secondary metabolites.

b) Describe in detail post translational modification of protein.

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Total No. of Questions : 3]

SEAT No. :

P2242

[Total No. of Pages : 2

[5332]-102

M.Sc. - I

BIOTECHNOLOGY

BT - 102 : Molecular Biology

(2013 Pattern) (Semester - I) (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 self explainatory notes on any four of the following- **[20]**

a) SINES, LINES, satellite DNA.

b) Holliday Model of recombination.

c) m-RNA editing

d) Ubiquitinylation.

e) Tn A and Tn 10

f) Tap I and Tap II in translocation of proteins.

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

a) Explain in short 'Base excission repair'.

b) Compare and contrast the translation factors of prokaryotes& eukaryotes.

c) Describe acridine dyes cause frame shift mutations.

d) Genetic code is universal - justify.

e) Explain initiation of replication of prokaryotic system.

f) Describe the DNA packaging in eukaryotic system.

P.T.O.

Q3) Attempt any one of the following. **[10]**

a) Explain in detail the transcription carried out by RNA pol I. Add a note on r-RNA processing.

b) Write distinguishing characters of DNA pol - III with refence to -

i) De-novo synthesis

ii) 5'→3' polymerisation

iii) 3'→5' exonuclease proof reading activity

iv) Mechanism of polymerisation

Total No. of Questions : 3]

SEAT No : ____

P 2243

[Total No. of Pages :2

[5332]-103

M.Sc.-I

BIOTECHNOLOGY

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

Time : 3 Hours] ***[Max. Marks : 50***

Instructions to the candidates:

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

Q1) Attempt any four of the following : **[4×5=20]**

a) Comment on bioassays in environmental monitoring

b) Describe sludge thickening methods.

c) Discuss control devices for particulate air pollutants.

d) Comment on need & factors affecting use of genetically modified microorganisms in bioremediation.

e) Justify the need of sustainable use of bioresources.

f) Discuss advantages and disadvantages of phytoremediation.

Q2) Write notes on (any four): **[4×5=20]**

a) Composting

b) Objectives of EIA

c) Eutrophication

d) Environment management system

e) Stockholm convention

f) Soil bioremediation

P.T.O.

Q3) Answer any one of the following :

a) Elaborate methods and applications of biological treatment of waste water. **[8]**

b) Explain recalcitrant xenobiotics. **[2]**

OR

a) Describe principle and process of remote sensing. Comment on different types of remote sensing systems. **[8]**

b) Explain biostimulation and bioaugmentation. **[2]**

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Total No. of Questions : 3]

SEAT No. :

P2244

[Total No. of Pages : 1

[5332]-104
M.Sc. - I
BIOTECHNOLOGY
BT - 104 : Cell Biology
(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 questions: **[4 × 5 = 20]**

a) Write a note on Lipid composition of plasma membrane.
b) Discuss the structure and function of ion-channels in lipid bilayer.
c) Give an account on structure and function of lysosomes.
d) Describe briefly the function of tight junctions. Add a note on the structure of tight junctions.
e) Give a brief description of applications of SEM.
f) Explain briefly biogenesis of plastids.

Q2) Answer any four questions: **[4 × 5 = 20]**

a) Explain the structure and function of vacuoles.
b) What are Intermediate filaments? Describe the structure of Intermediate filaments.
c) Give an account on the process of programmed cell death in plants.
d) Briefly describe Prophase I of meiosis.
e) Discuss cell cycle checkpoints.
f) Explain anterograde transport.

Q3) Answer any one question: **[1 × 10 = 10]**

a) Give a detailed account of mitochondrial electron transport chain.
b) Describe the MAP kinase pathway of cell signalling with suitable examples.

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Total No. of Questions : 3]

SEAT No. :

P2245

[Total No. of Pages : 2

[5332]-201

M.Sc.

BIOTECHNOLOGY

BT - 201: Genetic Engineering

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

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 self explanatory notes on any four. **[20]**

a) Insertion and replacement vector

b) Hot start PCR

c) Ex-vivo gene therapy

d) Microsatellites

e) CDNA library

f) Restriction modification system.

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

a) Compare and contrast between cosmid and phagmids.

b) Explain the significance of inducible expression.

c) Comment on insertional inactivation used for selection of recombinant clones.

d) Explain electroporation method of gene transfer.

P.T.O.

e) Describe genetically engineered biotherapeutics.

f) With reference to Indian scenario why BT - brinjal was not approved white BT - cotton occupies majority or farmfield.

Q3) Answer any one of the following. **[10]**

a) Explain how automated DNA sequencing has been revolutionarised the study of human genome project.

b) Explain the mechanism and applications of yeast expression system for industrially important products.

Total No. of Questions : 2]

SEAT No. :

P2346

[Total No. of Pages : 1

[5332]-202

M.Sc.

BIOTECHNOLOGY

BT - 202 : Immunology

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

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 T cell activation and maturation.

b) Elaborate the steps involved in production of Monoclonal antibody.

c) Comment on affinity, avidity, sensitivity, specificity of antigen antibody interaction.

d) Oxygen dependent and independent killing of pathogen after phagocytosis.

e) Compare host verses graft and graft versus host transplant rejection.

Q2) Attempt any one of the following. **[10]**

a) Explain in detail the agglutination and precipitation reactions of antigen and antibody.

b) Describe subunit, conjugated and DNA vaccines.

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Total No. of Questions : 3]

SEAT No. : ____

P2247

[Total No. of Pages : 2

[5332] - 203

M.Sc.

BIOTECHNOLOGY

BT-203: Principles of Bacteriology and Virology

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

Time : 3 Hours] ***[Max. Marks : 50***

Instructions to the candidates:

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

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

a) Explain the concept of pure culture, coculture and consortium.

b) Molecular characterization is an important tool in microbial taxonomy. Explain.

c) State the objectives and guidelines set by ICTV for viral classification.

d) Gram positive and Gram negative bacterial do not respond equally to cell wall antibiotics. Justify.

e) Describe in detail structure of TMV.

f) Explain the action of nucleoside analogues as antiviral agents.

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

a) Explain the morphological features of actinomycetes. Add a note on their applications.

b) Epidemiology studies are pointers for disease trends. Justify.

P.T.O.

c) Discuss the ecological and practical importance of methanogens.

d) Explain the pathogenesis of Foot and Mouth disease.

e) Discuss the chemical and physical attributes which confer virulence to bacteria.

f) Compare lysogeny and lytic cycle of bacteriophages.

Q3) Attempt any one of the following: **[10]**

a) Agrobacterium is a valuable tool in the field of Biotechnology. Discuss.

b) Discuss in details immunodiagnosis of viral infections.

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Total No. of Questions :3]

SEAT No. : ____

P2248

[Total No. of Pages :2

[5332] - 204

M.Sc. - I

BIOTECHNOLOGY

BT - 204 : Plant Biotechnology

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

Time : 3 Hours] ***[Max. Marks :50***

Instructions to the candidates:

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

Q1) Answer any four questions. **[4 × 5 = 20]**

a) What are transgenic plants? Give significance of transgenic plants in modern era.

b) There is great success for transgenic plant production for biotic stress over abiotic stress Justify.

c) Write note on Tiplasmid

d) citing suitable example discuss metabolic engineering for production of secondary metabolites in plants.

e) Comment on production of single cell protein using algae and fungi.

f) Discuss various stages of micropropogation.

Q2) Answer any four questions. **[4 × 5 = 20]**

a) Discuss qualitative and quantitative improvement in Agaricus

b) Explain with suitable example use of micropropogation for mass multiplication of fruit plants.

c) Discuss vector less method for gene transfer.

d) With suitable example explain quality improvement in crop plants

e) Write note on hormonal regulation of in vitro organogenesis.

P.T.O.

f) Give an account of the genetic engineering of plants for production of vaccines.

Q3) Answer any one question: **[1 × 10 = 10]**

a) Give an account of various stratagies used for manipulation of photosynthesis to increase yield. Add note on its advantages.

b) Somatic hybridization is a tool to overcome barriers of sexual incompatibility.

Total No. of Questions : 3]

SEAT No : ____

P 2249

[Total No. of Pages :2

[5332]-301
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 whenever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt any four questions: **[4×5=20]**

a) Explain in detail any two methods for detection of mycoplasma.

b) Comment on role of serum in animal tissue culture media.

c) Write in brief about routine maintenance of cultured animal cells.

d) Define artificial insemination. Explain any one method of artificial insemination.

e) Describe how SNP & STR can be used for characterising animal genome.

f) Write a note on bioethical considerations in animal biotechnology.

Q2) Write short note on (Any four): **[4×5=20]**

a) Hybridoma technology.

b) Histotypic & organotypic cultures.

c) Cryopreservation of animal cells.

d) Adult stem cells.

e) Oestrous cycle in mammals.

f) Applications of animal tissue culture in drug testing.

P.T.O.

Q3) Answer any one questions: **[1×10=10]**

a) Describe any one knock out mouse model related to human disease.

b) Write a note on embryonic stem cells. Give a comparative account of embryonic stem cells & induced pluripotent stem cells.

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Total No. of Questions : 3]

SEAT No. :

P2250

[Total No. of Pages : 2

[5332]-302

M.Sc.

BIOTECHNOLOGY

BT - 302 : Bioprocess Engineering and Fermentation Technology

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

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

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

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

a) Enlist non - mechanically agitated bioreactors and explain any one.

b) Explain the role of molecular diffusion in mass transfer.

c) Describe the downstream processing for production of vaccine.

d) Comment on types of heat exchangers used in continuous sterilization.

e) Explain Auxotropic mutants with example.

f) Define power number & Reynold's number and explain their significance in fermentation.

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

a) Explain appropriate methods used for the measurement and control of temperature in bioprocessing.

b) Write a note on concept of scale up in fermentation.

c) What is solvent extraction? Add a note on its types.

P.T.O.

d) Discuss giving examples role of inducer in fermentation.

e) Comment on methods of preservation of industrially important microorganisms.

f) Describe in brief the process of cheese production.

Q3) Answer the following (Any one): **[10]**

a) What is KLa? Describe factors affecting it?

b) What is film theory? Explain the concept of liquid - gas mass transfer between liquid - gas phases.

Total No. of Questions : 2]

SEAT No : ____

P 2251

[Total No. of Pages :1

[5332]-303

M.Sc.

BIOTECHNOLOGY

BT - 303 : Database Management and Intellectual Property Rights in Biotechnology

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

Time : 1 1/2 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 diagram wherever necessary.***

Q1) Answer any three : **[3 × 5 = 15]**

a) Write a note on Patent co-operation Treaty.

b) Why is it important to protect industrial designs? What are the requirements for registration of industrial design.

c) Write in brief on recording and reporting of Serious Adverse Events.

d) Why database management is important. Write note on organization of DBMS.

e) Give an account on protection of plant variety and farmer's right act.

Q2) Answer any one : **[1 × 10 = 10]**

a) What are the basic requirements of patenting an invention. Discuss in detail the procedure for filing product patent and process patent.

b) Give the chracteristics of databases. State applications and importance of data bases relevant to biotechnology.

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Total No. of Questions : 3]

SEAT No. :

P2252

[Total No. of Pages : 2

[5332]-304
M.Sc. - II
BIOTECHNOLOGY
BT - 304 : Advanced Genetics
(2013 Pattern) (Semester - III) (Credit System)

Time : 2½ Hours] *[Max. Marks : 38*

Instructions to the candidates:

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

Q1) Answer any two: **[2 × 5 = 10]**

a) Enlist various genes involved in depicting self in compatibility in plants. Add a note on their mechanism.

b) C. elegans is used as a model system to study genetics - Justify.

c) Discuss the role of morphogenic markers in identifying apomictic development.

d) Explain various methods of detecting somaclonal variants.

Q2) Answer any four: **[4 × 5 = 20]**

a) Write a note on tumour suppressor genes.

b) Describe any two molecular methods for diagnosis of various human genetic disorders.

c) Write a brief account of broad sense and narrow sense heritability.

d) Explain significance of Robertsonian translocations in human clinical genetics.

e) A selectively neutral, recessive character appears in 40% of males & 16% of females in large, randomly interbreeding population. What is the frequency of the allele? What proportion of females are heterozygous for it? What proportion of males are heterozygous for it?

f) Elaborate on any two diseases caused by autosomal recessive mutations. Add a note on methods of their detection.

P.T.O.

Q3) Answer any one: **[1 × 8 = 8]**

a) State Hardy weinberg's law. Prove that the law holds true if the population is in Hardy weinberg equilibrium.

b) Discuss in detail, inheritance of traits through chloroplasts.

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Total No. of Questions :2]

SEAT No. : ____

P2253

[Total No. of Pages : 1

[5332]-305
M.Sc. (Biotechnology)
BT-305 : BIOINFORMATICS
(2013 Pattern) (Semester-III) (Credit System)

Time : 1½ 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 scop.

b) Discuss structure-function relationship in proteins

c) Discuss energy optimization methods.

d) What is chemoinformatics. Add a note on its key applications.

e) Molecular modelling and its applications.

Q2) Answer the following (any one) : **[1×10=10]**

a) Give a comparative account of different phylogenetic methods.

b) Discuss in detail bioinformatic tools used for structure prediction of proteins.

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Total No. of Questions : 3]

SEAT No. :

P2254

[Total No. of Pages : 2

[5332]-401

M.Sc.

BIOTECHNOLOGY

BT - 401 : Genomics and Proteomics

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

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

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

Q1) Answer any four of the following. **[4 × 5 = 20]**

a) Write the role of whole genome analysis in completion of human genome project.

b) Discuss methods used in Genetic mapping.

c) Describe the role of Bioinformatic tools and databases in Genomics.

d) Justify the role of model organisms in Genomic studies.

e) What is comparative genomics. Add a note on is significance.

f) What is EST? Explain the methodology in generating EST'S.

Q2) Attempt any four of the following. **[4 × 5 = 20]**

a) Explain the concept of structural proteomics.

b) Discuss the experimental methods used to study protein interactions.

c) Write a note on mass spectrometry.

d) Explain the concept of expressional proteomics.

e) Describe the applications of proteomics in drug discovery.

f) Explain how proteomics can be used to identify and characterise novel proteins.

P.T.O.

Q3) Attempt the following (any one). **[10]**

a) What are DNA micro array's? How they are constructed and write their applications.

b) Discuss in detail the various strategies for protein analysis.

Total No. of Questions :2]

SEAT No. :

P2255

[Total No. of Pages : 2

[5332]-402
M.Sc. - II
BIOTECHNOLOGY
BT - 402 : Advanced Biochemical and Biophysical Techniques
(2013 Pattern) (Semester-IV) (Credit System)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

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

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

a) What is surface plasmon resonance? Give its applications.

b) Explain the process of generation of monoclonal antibodies.

c) What is affinity chromatography? Give its types.

d) Write a short note on circular dichroism.

e) What is confocal microscopy? Give its applications.

f) What is electromagnetic radiation? Explain its one use in spectroscopy of various types.

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

a) What are radioactive isotopes? Give the various uses of radio isotopes?

b) Write a short note on flow cytometry.

c) Explain the principle of High Performance Thin Layer Chromatography (HPTLC). Add a note on its applications.

d) What is electron spin resonance? Give the principle of electron spin resonance spectroscopy.

e) Describe the various types of microscopic techniques used to observe living cells.

f) Write a note on Genome In Site Hyhridisation (GISH) and give its applications.

P.T.O.

Q3) Answer any **one** of the following : **[10]**

a) What is scanning electron microscopy? Explain the working principle and methods of sample preparation for this microscopy.

b) What is ELISA? On what principle does this analytical method work? Give the different types of ELISA. Add a note on the use of this assay as an immunodiagnostic tool.

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Total No. of Questions : 2]

SEAT No. : [ ]

P2256

[Total No. of Pages : 1

[5332] - 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 indicate full marks.***
3) ***Draw neat labelled diagram wherever necessary.***

Q1) Attempt any three of the following: **[15]**

a) Discuss Biological synthesis of nanoparticles.

b) Explain the application of nanoparticles in Biosensors.

c) Describe functionalization of nanoparticles with suitable examples.

d) Describe application of electron microscopy in characterisation of nano material.

e) What are the methods used to characterise the surface and composition of nano materials?

Q2) Enlist the different chemical methods of synthesis of nanoparticles. Explain Sol - gel method in detail. **[10]**

OR

Discuss the applications of nanoparticles in Biological sciences.

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Total No. of Questions :3]

SEAT No. : ____

P2257

[Total No. of Pages :2

[5332] - 404

M.Sc.

BIOTECHNOLOGY

BT - 405 : Animal Development and Stem Cell Technology

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

Time : 3 Hours] ***[Max. Marks :50***

Instructions to the candidates:

1) ***All Questions are compulsory***
2) ***Draw neat and labeled diagrams wherever necessary***
3) ***Figures to the right indicate full marks***

Q1) Write short notes on (any four) **[4 × 5 = 20]**

a) Slow and fast blocks to polyspermy.

b) Neuronal stem cells.

c) Molecular Mechanism in stem cells to maintain pluripotency.

d) Blastulation in mammals.

e) Bioethical considerations for human cloning.

f) Primary embryonic induction.

Q2) Answer the following (any four) **[4 × 5 = 20]**

a) Explain the concept of stem cell riche with any one suitable example.

b) Give the applications of adult stem cells.

c) Give an account on the process of spermeiogenesis.

d) Write a note on metaplasia & regeneration in any one vertebrate system.

e) Describe role of segment polarity genes in pattern formation in Drosophila

f) Define cell lineage Explain any one cell lineage in detail.

P.T.O.

Q3) Answer the following (Any one) **[1 × 10 = 10]**

a) Explain the process of gastrulation in case of frog embryo development.

b) Describe different methods for characterization of stem cells. Add a note on cell cycle regulation in stem cells.

Total No. of Questions :3]

SEAT No. : ____

P2258

[Total No. of Pages :2

[5332] - 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 and labeled diagrams wherever necessary.***

Q1) Attempt any four of the following. **[4 × 5 = 20]**

a) Discuss with Suitable examples, the role of biotechnological tools for improvement of vegetable crops.

b) Discuss various risks associated with production and release of transgenic crop plants.

c) Write a note on use of bioreactors for large scale plant production.

d) Compare and contrast between somaclonal and gametoclonal variations.

e) What is virus indexing? Explain how it is important for commercial or large -scale plant propagation.

f) What are edible vaccines? Discuss how they are produced in plants.

Q2) Attempt any four of the following. **[4 × 5 = 20]**

a) Elaborate on the importance of endosperm culture in crop improvement.

b) What is apornixis? discuss its significance in agricultural biotechnology.

c) Discuss the concept of future crops, giving suitable examples discuss their importance.

d) Write a note on agribusiness.

e) What is QTL? Explain the construction of genetic maps using QTL for MAS.

f) Explain how homoygous plants can be produced through another cultures.

P.T.O.

Q3) Attempt any one of the following **[1 × 10 = 10]**

a) What are molecular markers? Discuss in detail how they can be used for crop improvement

b) Describe in detail the use of transgenic technology for production of herbicide resistant crop plants. cite suitable examples.