Total No. of Questions :3]

SEAT No. :

P1839

[Total No. of Pages :2

[5232] - 101

M.Sc.

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

a) Explain role of chaperons in protein folding.

b) Elaborate on Inborn errors of amino acid metabolism.

c) Distinguish between α - heux & β - sheet at proteins structure.

d) Explain the term metabolic engineering with suitable example.

e) Give structure & functions of lipoproteins.

f) Explain any one chromatography technique used in analysis of phytochemicals.

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

a) Use of enzymes in diagnostics Explain.

b) Write a short note on metabolic flux analysis.

c) Give therapeutic applications of phenolics

P.T.O.

d) Give significance of phosphorylation & lipid attachment in protein modifications.

e) Explain structure & functions of peptidoglycon.

f) 'Polyketicles are an attractive model for metabolic engineering'. Explain.

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

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

b) What are various types of Diabetes? What is biochemical basis for complication of diabetes mellitus.

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Total No. of Questions : 3]

SEAT No. :

P1840

[Total No. of Pages : 2

[5232]-102

M.Sc.

BIOTECHNOLOGY

BT-102 : Molecular Biology

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

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of colour pencil restricted to diagrams.***

Q1) Write self explanatory note on <u>any four</u> of the following: **[20]**

a) C value paradox.

b) Plasmid replication.

c) Nucleotide excision repair.

d) Holliday model of DNA recombination.

e) Mobile DNA elements.

f) Nuclear transport of mRNA.

Q2) Explain <u>any four</u> of the following with suitable illustrations in 10-15 sentences: **[20]**

a) Gene families.

b) RNase A and RNase H.

c) Chromatin remodeling and gene expression.

d) Characters of Genetic code.

e) DNA dependent RNA polymerase.

f) Enhancers and Silencers.

P.T.O.

Q3) Explain <u>any one</u> of the following in detail with suitable illustrations: **[10]**

a) Post translational modifications.

b) Transcription of r RNA genes and its processing.

Total No. of Questions :3]

SEAT No. :

P1841

[Total No. of Pages :2

[5232] - 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 & labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

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

a) Explain: how thermal inversion affects disperssion of air pollutants.

b) Discuss various sources of soil pollution.

c) Elaborate advantages & limitations of phytoremediation.

d) What is bioremediation? Explain role of bioremediation in removal of pollutants.

e) Discuss important outcomes of Rio - conference.

f) What is EIA? Give general guidelines of EIA.

Q2) Write notes on: (Any Four) **[4 × 5 = 20]**

a) Sustainable use of bio - resources.

b) Trickling filter.

c) G I S.

d) Ecostandards.

e) Effect of pesticide on human health.

f) Solid waste recovery method.

P.T.O.

Q3) Answer <u>any one</u> of the following:

a) Describe methods used for removal of nitrogen & phosphorus from waste water. **[8]**

b) Enlist ex-situ & in-situ methods of bioremediation. **[2]**

OR

a) Give sources & types of solid waste.Discuss impact of solid waste disposal on environment. **[8]**

b) Write water quality standards in India. **[2]**

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Total No. of Questions : 3]

SEAT No. :

P1842

[Total No. of Pages : 2

[5232] - 104

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 compuslory.***
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) Give an account on Asymmetry of lipid bilayer of plasmamembrane.

b) Discuss the role of microfilaments in non-dividing cell.

c) Write a note on biogenesis of plastids.

d) Describe briefly the role of glyoxysomes in plant cells.

e) Write the role of KDEL receptors in retrograde transport.

f) Explain the principle and working of TEM.

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

a) Describe the mechanism of protein targeting to thylakoid lumen.

b) What are desmosomes? Add a note on the protein components of desmosomes.

c) Discuss extrinsic pathway of apoptosis in animals.

d) Write a note on role of cyclins and cdks on cell cycle regulation.

P.T.O.

e) Give an account on characteristics of cancer cells.

f) What is terminal cell differentiation. Explain with an example in plants.

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

a) Give a detail account of C_3 pathway of carbon fixation.

b) Elaborate the JAK-STAT pathway of signal transduction.

Total No. of Questions :3]

SEAT No. :

P1843

[Total No. of Pages : 2

[5232]-201
M.Sc.
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 short notes on (any four) **[20]**

a) DNA fingerprinting.

b) Cosmid as a cloning vector.

c) Primer designing

d) Microinfection.

e) In site hybridization technique.

f) Manam- yilbert method of DNA sequencing.

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

a) Explain the use of gene therapy to overcome the genetic diseases.

b) Discuss the AFLP technique as a genetic marker system.

c) Explain with an appropriate example, the expression of industrially important products.

d) Describe the genetic elements required for construction of expression vector.

P.T.O.

e) Explain the chemistry used in quantitative PCR.

f) Comment on selectable markers used for selection of genetically modified organisms.

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

a) Compare and contrast between genomic and cDNA library.

b) What are the different methods used for physical mapping of genomes? How is it different from genetic mapping?

Total No. of Questions :2]

SEAT No. :

P1844

[Total No. of Pages :1

[5232] - 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 antigen presentation and functioning of Spleen as a secondary lymphoid organ.

b) Compare and contrast Radioimmuno assay and Rocket electrophoresis.

c) What are Bence John's protein? How are these useful in diagnosis of multiple myeloma?

d) Name the cells participating in delayed type of Hypersensitivity and write a note on its mechanism.

e) Enlist any two theories that trigger Autoimmunity.

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

a) Explain the Phage display technique used for generation of Antibody medicine.

b) Describe the classical, alternate and lectin induced activation of compliment.

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Total No. of Questions : 3]

SEAT No. :

P1845

[Total No. of Pages : 2

[5232]-203

M.Sc.

BIOTECHNOLOGY

BT-203 : Principles of Bacteriology and Virology

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

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

Instructions to the candidates:

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

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

a) What is interferon induced antiviral therapy.

b) Plasmids confer special properties to bacteria. Comment.

c) Compare and contrast between replication of DNA and RNA viruses.

d) Discuss the procaryotic cell structures which aid in formation of Biofilms.

e) What factors should be taken into consideration while designing viral vaccines.

f) Compare and contrast between protozoal and bacterial dyssentry.

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

a) Bengey's manual is an effective tool for bacterial classification. Justify.

b) Compare and contrast mode of infection in animal and plant viruses.

c) Comment on the cell wall and cell membrane structures in archaebacteria.

d) State the WHO standards for handling of pathogens.

e) Herpes virus causes latent infections. Explain.

f) Explain the terms epidemic, pandemic, sporadic transmission, aetiology, morbidity.

P.T.O.

Q3) Answer any <u>one</u> of the following: **[10]**

a) Give an account of the immunopathogenesis of emerging influenza viral infections.

b) Discuss the different methods used to control microbial growth in food and dairy industries.

Total No. of Questions : 3]

SEAT No. :

P1846

[Total No. of Pages : 2

[5232]-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 diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

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

a) What do you understand by herbicide tolerant and herbicide resistant transgenic plant?

b) Why hardening is necessary for in vitro developed plants?

c) Discuss neutraceutical potential of fungi.

d) Write note on Landmarks in plant Biotechnology.

e) Comment on somatic embryogenesis.

f) With suitable example explain micropropogation of ornamental plants.

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

a) What are pure lines? Generation of pure lines is easier and less time consuming by plant tissue culture techniques - Justify.

b) Write note on molecular farming.

c) Explain significance on horizantal gene transfer with suitable example.

d) Discuss approaches used for development of insect resistant plants.

e) Describe various methods used for isolation & fusion of protoplast.

f) Manipulation of nitrogen fixation is used to increase production. Justify.

P.T.O.

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

a) With suitable example explain the role of biotechnology for qualitative and quantitative improvement in economically important algae.

b) What is oxidative stress? Discuss various approaches used to produce transgenic plants resistant to oxidative stress.

Total No. of Questions :3]

SEAT No. :

P1847

[Total No. of Pages :2

[5232] - 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 wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following (any four) : **[4×5=20]**

a) Write in detail the principle and significance of sterilization in ATC.

b) Give the composition and applications of Basic salt solution.

c) Write a note on cell transformation.

d) Write a note on Embryo transfer technology.

e) Write a note on molecular markers and their application in Animal Biotechnology.

f) Importance of biosafety and bioethics in animal biotechnology.

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

a) Cell cloning.

b) Advantages of histotypic culture over organ culture.

c) Non-enzymatic methods of tissue disaggregation.

P.T.O.

d) Methods of stem cell purification.

e) Any one method of semen collection from bulls.

f) Application of ATC in production of recombinant proteins.

Q3) Answer any one : **[1×10=10]**

a) Describe in detail any one method to generate transgenic mouse.

b) Write a note on long term maintenance and characterization of embryonic stem cells.

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Total No. of Questions : 3]

SEAT No. :

P1848

[Total No. of Pages : 2

[5232]-302

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) Comment on different flow patterns in fermentor depending upon impellar design.

b) Write a note on use of various carbon sources in fermentation media.

c) Explain the mechanism and advantages of using cross flow filteration.

d) Explain the appropriate methods used for the measurement and control of Dissolved oxygen.

e) Describe downstream processing for the production of any one organic acid.

f) Describe methods used for screening of:

i) Auxotropic mutants

ii) Analogue resistant mutants

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

a) Explain various spargers used in fermentor with their significances.

b) Mention reasons for the foam formation in submerged fermentation. What are the consequences of excessive foaming?

c) Describe the process of filteration for the sterilization of media.

d) Discuss methods applied for drying of industrial products.

e) What is film theory? Add a note on convective mass transfer.

f) Explain effluent disposal strategies for textile industry.

P.T.O.

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

a) Describe the control of the pathways for the production of primary metabolites.

b) What is KLa? Mention its significance and add a note on any one method of determining KLa.

Total No. of Questions :2]

SEAT No. :

P1849

[Total No. of Pages :1

[5232] - 303

M.Sc.

BIOTECHNOLOGY

BT - 303 : Database Management and IPR in Biotechnology

(2013 Pattern) (Semester - III) (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 neat and labelled diagrams wherever necessary.***

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

a) What is the impact of IPR in context of Biotechnology industry.

b) Discuss protection of plant variety and farmer's right act 2001.

c) Describe in brief the importance and applications of OMIM.

d) What is database? Write note on characteristics and design of databases.

e) Write short note on-

i) Budapest Treaty.

ii) Provisions of compulsory licences.

Q2) Answer any one: **[1 × 10 = 10]**

a) Explain in detail on recording and reporting of adverse events and serious adverse events.

b) Write in detail the procedure for applying and granting patent. Write a note on biotechnology patent.

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Total No. of Questions : 3]

SEAT No. :

P1850

[Total No. of Pages : 2

[5232] - 304

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) What are somaclonal variations? Explain various genetic and epigenetic factors involved in production of somaclonal variants.

b) Write a note on oncogenes.

c) Elaborate on significance of haploid plants in genetic studies.

d) Write a note on post-zygotic incompatibility in plants.

Q2) Answer any four: **[4 × 5 = 20]**

a) Define inbreeding. How it is estimated?

b) Explain any two lysosomal storage disorders. Add a note on methodologies used to detect them.

c) Write a note on genotype and allele frequencies.

d) Discuss significance of using zebrafish as a model system in genetics.

P.T.O.

e) The S - s antigen system in humans is controlled by two Co-dominant alleles - S and s. In a group of 3146 individuals, the following genotypic frequencies were found - 188 SS, 717 Ss & 2241 ss. Calculate the frequencies of S and s alleles.

f) Describe any two methods for prenatal detection of aneuploidy in humans.

Q3) Answer any one: **[1 × 8 = 8]**

a) Discuss in detail, inheritance of traits through mitochondria.

b) Explain the methodology for production of linkage maps using QTLs.

Total No. of Questions :2]

SEAT No. :

P1851

[Total No. of Pages :1

[5232] - 305
M.Sc.
BIOTECHNOLOGY
BT - 305 : Bioinformatics
(2013 Pattern) (Semester - III)

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) Solve any three questions of the following: **[3 × 5 = 15]**

a) Write a short note on CATH.

b) What is bioinformatics? Write its applications.

c) Explain multiple sequence alignment. Write its applications.

d) What are protein motifs? How they are used for protein classification?

e) What is gene annotation? Add a note on its significance.

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

a) Explain in detail about bioinformatics tools used for microarray based gene expression analysis.

b) Explain Ramchandran Plot comment about the structure & physicochemical properties of the proteins.

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Total No. of Questions :3]

SEAT No. :

P1852

[Total No. of Pages : 2

[5232]-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 questions 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 a note on concept of omics.

b) Explain the Principle and application of DNA micro array.

c) Write a note on SAGE.

d) Explain the role of pharmacogenomics in development in personalised medicines.

e) Discuss the need and importance of model organisms of genomic studies.

f) Discuss tools used in Functional genomics.

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

a) What is Proteomics? Compare it with genomics.

b) Explain any two techniques used in proteomics based on m/z ratios for protein characterisation.

c) Write a note on peptidomics.

P.T.O.

d) Explain the working, principle and applications of MALDI - TOF in proteomics.

e) Explain how phage display technique is used in proteomics.

f) Write a note on Expressional proteomics.

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

a) Explain various Genome sequencing methods, elaborating on any one in detail.

b) Describe the principle and working of 2-D PAGE and justify its vital role in proteome analysis.

Total No. of Questions :3]

SEAT No. :

P1853

[Total No. of Pages :2

[5232] - 402

M.Sc. - II

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) ***Neat Labelled diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

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

a) Write a note on freeze-fracture methods for electron microscopy.

b) Explain the process of antibody generation.

c) What is uv/visible spectrophotometry? Give its applications.

d) Explain the principle of HPLC and its applications.

e) Write a short note on different types of radioactive decay.

f) What is in situ hybridisation? Explain its use as an immunological tool.

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

a) Explain the principle of Infrared spectroscopy.

b) What is X-ray diffraction? Give its applications.

c) What is Electromagnetic Radiation? Explain the interactions of EM with matter.

d) Explain the Western Blotting technique and add a note on its applications.

P.T.O.

e) Write a note on confocal microscopy.

f) What is iso electric focussing (IEF)? Give its applications in protein biochemistry.

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

a) What is mass spectrometry? Explain the principle of mass spectrometry. Add a note on the use of this technique in structural analysis of biological samples.

b) What is affinity chromatography? Give its principle and types of affinity chromatography. Add a note on its applications.

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Total No. of Questions : 2]

SEAT No. :

P1854

[Total No. of Pages : 1

[5232]-403

M.Sc. - II

BIOTECHNOLOGY

BT-404 : Nanobiotechnology

(2013 Pattern) (Semester-IV) (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 neat labelled diagram wherever necessary.***

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

a) Describe the application of nanoparticles in Drug delivery.

b) Explain the characterisation of nanomaterial using X-ray Diffraction.

c) Describe synthesis of nanomaterial using Chemical vapour deposition (CVD) method.

d) Explain application of nanoparticles in cancer therapy.

e) Write a note on synthesis of nanoparticles using plant extracts and give its advantages.

Q2) Discuss with suitable examples the functionalization of nanoparticles for biological applications. **[10]**

OR

Compare and contrast between biological and chemical methods of nanoparticle synthesis.

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Total No. of Questions : 3]

SEAT No. :

P1855

[Total No. of Pages : 2

[5232]-404

M.Sc. - II

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 labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Write short notes on (Any 4): **[4×5=20]**

a) Acrosomal reaction in mammals.

b) Egg activation.

c) Stem cell lineage tracking.

d) Bioethics in stem cell technology.

e) Blastulation in sea urchia.

f) Genetic manipulation of stem cells (any two methods).

Q2) Answer the following (Any 4): **[4×5=20]**

a) Write the concept of induced pluripotent stem cells.

b) Give the therapeutic applications of stem cells.

c) Write notes on differentiation and trans differentiation.

d) Explain fate map in frog embryo.

e) Give an account on post fertilization changes in egg.

f) Describe hormonel control during oogenesis.

P.T.O.

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

a) Write the role of maternal effect genes in early development of drosophila.

b) What are knock out mice. Give its applications in gene therapy.

Total No. of Questions : 3]

SEAT No. :

P1856

[Total No. of Pages :2

[5232] - 405

M.Sc.

BIOTECHNOLOGY

BT- 406: Agricultural Biotechnology

(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) ***Draw neat labelled diagram wherever necessary.***

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

a) What is agribusiness? Give its significance.

b) What is virus indexing? Explain any one method used for virus indexing of micropropagated plants.

c) Discuss advantages and limitations of microsattelite markors.

d) Explain the role of biotechnological interventions for improvement of ornamental plants.

e) Discuss how polyembryony can be induced, add a note on significance of polyembryony in crop improvement.

f) Explain how gametoclonal variations can be useful for crop improvement.

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

a) Discuss how chloroplast engineering can be used for production of therapeutic proteins.

b) Discuss the risk assessment methods used during production and release of transgenic high impact crops.

P.T.O.

c) Describe various types of bioreactors used for the large scale plant production.

d) Explain how biotechnological methods can be used for the production of homozygous plants.

e) Describe the construction of QTL maps and their use in MAS.

f) Enlist various advantages and limitations of edible vaccines against conventional vaccines.

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

a) Discuss in detail various methods used for production of transgenic plants, elaborating on advantages and limitations of each of them.

b) Explain in detail with appropriate case studies how transgenic technology is being used for production of biotic stress tolerant crop plants of global importance.

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