Total No. of Questions : 3]

SEAT No. :

P3153

[Total No. of Pages : 1

[5539]-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 should be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

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

a) Explain structure and role of Glycolipids.

b) Discuss the molten globule model for protein folding.

c) Write a short note on Diabetes.

d) Give significance of phosphorylation in protein modification and regulation.

e) Give pharmacological application of alkaloid.

f) Write a note on Metabolic flux analysis.

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

a) Explain protein folding with help of Chaperons.

b) What are Lipoproteins? State their significance.

c) State principle of Thin layer chromatography and its application in analysis of secondary metabolitic.

d) Write a note on sickle cell anaemia.

e) How is metabolic engineering used for polyketide synthesis?

f) Write a note on allosteric mechanism of enzymes.

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

a) Enumerate different methods for extraction of secondary metabolites and in detail discuss any two methods.

b) Discuss in detail how covalent bonds and non-covalent interaction help in stabilization of protein structure.

Total No. of Questions : 3]

SEAT No. :

P3154

[Total No. of Pages : 1

[5539]-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 short notes on any four of the following: **[20]**

a) CEN and TEL region.

b) m-RNA transport of nucleus.

c) Protein disulphide isomerase.

d) Retro transposons.

e) Rot curve.

f) Homologous recombination.

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

a) Describe 'SOS repair' in detail.

b) Explain initiation of replication in eukaryotes.

c) Justify - Base analogs cause transition mutations.

d) Elaborate wobble hypothesis with illustration.

e) Write a note on promoters of RNA pol I, II and III.

f) Discuss polyaclenylation and its significance.

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

a) Explain Gene regulation in prokaryotes.

b) Describe translation regulation in eukaryotes.

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Total No. of Questions :3]

SEAT No. :

P3155

[Total No. of Pages :1

[5539]-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 diagram wherever necessary.***
3) ***Figures to the right indicate full marks.***

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

a) Describe control devices for gaseous air pollutants.
b) Comment on role of GIS in sustainable development.
c) What are the objectives of environment protection act1986.
d) Explain importance of international standards of environment management systems.
e) Comment on role of central government in environment protection and improvement.
f) Discuss impact of soil pollution on microbial disversity of soil.

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

a) Applications of remote sensing
b) Anaerobic digestion
c) Earth summit and its objectives
d) Major global threats to the environment.
e) Types of bioremediation
f) Preliminary treatment of waste water.

Q3) Answer any one of the following.

a) Give an account of sludge treatment and disposal. **[8]**
b) Compare BOD and COD. **[2]**

OR

a) What is environmental audit? Describe different types and the process involved in under taking an environmental audit. **[8]**
b) Sources of soil pollution. **[2]**

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Total No. of Questions :3]

SEAT No. :

P3156

[Total No. of Pages : 1

[5539]-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 carbohydrate components of plasma membrane.

b) Describe the mechanism of antiport with suitable example.

c) Give an account on the different types of plastids. Add a note on their function.

d) What are gap junctions? Add a note on their structure.

e) Give a brief description of Applications and Working of phase contrast microscope.

f) Briefly describe biogenesis of Golgi Aparatus.

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

a) Explain the Structure and Composition of primary cell wall.

b) What are microfilaments? Describe the structure of microfilaments.

c) Give an account on the role of caspases in apoptotic pathway.

d) Briefly describe the role of microtubules in cell division.

e) Discuss molecular events of cell cycle.

f) Write a note on clathrin-coated vesicles.

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

a) Give a detailed account of Non-Cyclic photophosphyration in plants.

b) Describe in detail Structure and Function of G-protein coupled receptors with suitable examples.

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Total No. of Questions : 3]

SEAT No. : ____

P3157

[Total No. of Pages : 2

[5539]-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.***
3) ***Draw neat and labelled diagram wherever necessary.***

Q1) Write short notes on (any Four): **[20]**

a) DNA modifying enzymes.

b) Expression vector.

c) Transfection.

d) DNA finger printing.

e) Biosafety regulations.

f) Biotherapentics.

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

a) Explain in detail - CDNA library construction.

b) Give an account of primer designing in PCR.

c) Explain in brief - Genetic mapping.

d) Compare In-vivo and Ex-vivo gene therapy.

e) How is insertional inactivation used for selection of recombinant clones?

f) Write notes on Automated DNA sequencing.

P.T.O.

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

a) Explain the principle and describe the phases of a typical polymerase chain reaction. Discuss the factors affecting PCR.

b) Explain in detail the viral & non-viral methods of Gene delivery.

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Total No. of Questions : 3]

SEAT No. :

P3159

[Total No. of Pages : 1

[5539]-203
M.Sc. - I
BIOTECHNOLOGY
BT-203 : Principles of Bacteriology and Virology
(2013 Pattern) (Semester - II) (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) Describe cell wall structure of typical Gram negative bacteria.
b) Justify : Blood agar is enriched and differential media.
c) Describe in detail structure of H_1N_1 virus.
d) Explain an Icosahedral symmetry of viruses.
e) Write a note on adaptations in halophilic bacteria.
f) Epidemiology studies are important in disease control : Justify.

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

a) Explain in brief Baltimore classification of animal viruses.
b) What are biofertilizers? Explain role of Nitrogen fixing bacteria in soil.
c) How electron microscopes are useful in study of virus morphology?
d) Write a note on Bergy's manual of systematic bacteriology.
e) Explain principle and application of acid fast staining.
f) Describe various strategies for viral genome replication.

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

a) What is polyphasic approach in identification of unknown bacteria?
b) Explain molecular and immunological methods for viral diagnosis.

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Total No. of Questions : 3]

SEAT No. :

P3160

[Total No. of Pages : 2

[5539]-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) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figure to right indicate full marks.***

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

a) Explain in brief Horizontal gene transfer methods in plants.

b) Describe strain improvement methods of algae for SCP (single cell protein) Production.

c) Explain the transgenic approach for the drought resistant plants.

d) Gene manipulation can be done to enhance photosynthetic efficiency. Justify.

e) Discuss advantages and limitation of micropropagation of vegetable crops.

f) Write the applications of haploid plants with respect to Agriculture crops.

P.T.O.

Q2) Write notes on following (Any four) **[4×5=20]**

a) Somatic embryogenesis

b) Herbicide resistant plants

c) Molecular Farming

d) Biopesticides

e) Acclimatization of micropropagated plants

f) Methods of somatic hybridization production.

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

a) Explain in detail strategies adopted to produce transgenic plants to combat biotic stress. With suitable examples.

OR

b) Discuss in detail strain improvement of industrially important fungi for various products.

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Total No. of Questions : 3]

SEAT No. :

P3161

[Total No. of Pages : 1

[5539]-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) What is cross contamination? Comment on measures to be taken to prevent cross contamination.

b) Write a note on carbonate bicarbonate buffering system in tissue culture medium.

c) Explain in vitro fertilization.

d) Give an account on concept of tissue engineering.

e) Write a note on biosafety issue related to animal biotechnology.

f) Write about the advantages of monolayer culture over organ culture.

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

a) Embryo transfer technique.

b) Markers used in selection of hybridoma heterokaryon over homokaryon.

c) Any one method of artificial insemination.

d) Characterization of cultured animal cell.

e) Cryopreservation of embryo.

f) Serum free media.

Q3) Explain in detail how a transgenic mouse model can be used to study cancer. **[10]**

OR

Explain the concept of plasticity of stem cells. Add a note on lineage specific markers and explain any one method to purify stem cell.

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Total No. of Questions : 3]

SEAT No. :

P3162

[Total No. of Pages : 2

[5539]-302

M.Sc. - II

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 indicates full marks.***

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

a) With neat labelled diagram describe stirred tank reactor and its applications in fermentation industry.

b) Mention importance of preservation of industrially important organisms. Explain a method of long term preservation of microorganisms.

c) Justify: Animal tissue culture media sterilization requires use of multiple filters.

d) Plant and animal cells can be used in large scale production of economically important product: Explain.

e) Explain measurement and control of pressure in bioprocess.

f) What is scale up and scale down? Explain use of scale up and scale down techniques in Fermentation industry.

P.T.O.

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

a) What is Two film theory? Give its significance in mass transfer.

b) Explain use of microbial consortium in effluent treatment.

c) Explain consequences of excessive foaming in fermentation? How can we control it?

d) Describe Tubuler bonel centrifuge with respect to construction, working and application in downstream processing of Fermentation product.

e) What is kLa? Explain any one method for determination of kLa.

f) Why Bacillus Stereothermophilus is considered as design organism for sterilization? Explain design of batch sterilization process.

Q3) a) Discuss production and processing of cheese in detail. **[10]**

OR

b) Describe in detail effluent disposal strategy used for paper pulp industry.

Total No. of Questions :2]

SEAT No. :

P3163

[Total No. of Pages :1

[5539]-303
M.Sc.-II
BIOTECHNOLOGY
BT-303 : Database Management And Intellectual Property Rights in Biotechnology
(2013 Pattern) (Credit System) (Semester - III)

Time : 1½Hour] *[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) Explain the procedure for obtaining a patent for an invention.

b) What is the impact of IPR in context of Biotechnology Industry.

c) Define data and database. Explain the concept of hierarchical data management.

d) Give a comparative account of patentable and non-patentable inventions.

e) Write a note on OMIM database and state its importance in field of genetics.

Q2) Answer any one: **[1×10=10]**

a) Why is it necessary to protect industrial designs? State and explain the procedure for registration of industrial design.

b) State the procedure for recording and reporting of non-serious and serious Adverse Events.

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Total No. of Questions :3]

SEAT No. :

P3164

[Total No. of Pages : 1

[5539]-304
M. Sc. - II
BIOTECHNOLOGY
BT - 304 : Advanced Genetics
(2013 Pattern) (Semester - III) (Credit System)

Time : 2 ½ Hours] *[Max. Marks : 38*

Instructions to the candidates:

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

Q1) Answer any two. **[2×5=10]**

a) Write a note on genetic basis of Post-Zygotic incompatability.

b) Write a note on Klinefelter and Turner syndromes.

c) Explain FISH as a diagnostic tool to detect genetic disorders.

d) Write a note on oncogenes.

Q2) Answer any four. **[4×5=20]**

a) Arabidopsis is a model system in genetics. Elaborate.

b) Write an account on the significance of inbreeding coefficient.

c) Explain cytoplasmic male sterility with an example.

d) Explain genetic inheritance of a x-linked recessive disorder in humans.

e) Define QTL. State the significance of QTL mapping.

f) Write a note on genetic basis of somaclonal variations.

Q3) Answer any one. **[1×8=8]**

a) i) What are the features of an idealised population as per the Hardy Weinberg law?

ii) Consider a locus with two alleles ‘A’ and ‘a’. If the frequency of ‘AA’ is 0.25, then calculate the frequencies of ‘A’, ‘a’, ‘Aa’ and ‘aa’.

b) Write a note on the different types of apomixis. Explain the genetic basis underlying apomixis.

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Total No. of Questions : 2]

SEAT No. :

P3165

[Total No. of Pages : 1

[5539]-305
M.Sc. - II
BIOTECHNOLOGY
BT-305 : Bioinformatics
(2013 Pattern) (Semester - III) (Credit System)

Time : 1½ Hour] *[Max. Marks : 25*

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

a) Define database. Explain any one protein family database in detail.

b) Explain homology searching tools and its applications.

c) What is bioinformatics? Explain its role in molecular analysis of nucleic acid sequences.

d) Write an explanatory note on any one energy optimization method.

e) Explain any one distance based method in phylogenetic tree construction.

Q2) Solve any 1 out of 2 of the following : **[1 × 10 = 10]**

a) Enlist applications of bioinformatics in human health and medicine. Elaborate on current developments in vaccinology supported by immuno informatics.

b) Write a note on sequence alignment algorithms and emphasize on multiple sequence alignment.

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Total No. of Questions : 3]

SEAT No. :

P3166

[Total No. of Pages : 2

[5539]-401
M.Sc. - II
BIOTECHNOLOGY
BT - 401 : Genomics & Proteomics
(2013 Pattern) (Semester - IV) (Credit System)

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

Instructions to the candidates:

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

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

a) Explain how next generation sequencing have made large scale DNA sequencing possible.

b) Write a note on comparative genomics.

c) Explain with example the concept and applications of metagenomics in investigating environmental samples.

d) What is transcriptomics? Explain its role in expression profiling to create a cellular function understanding.

e) Write a note on Genome Annotation with the help of a model organism as example.

f) Explain with the help of diagram :

i) SAGE or

ii) RNA microarray.

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

a) Explain the concept of Expressional proteomics with an example.

b) What is protein Microarray? Give its applications in proteomics.

P.T.O.

c) Write a note on yeast two hybrid system in protein interaction studies.

d) Give applications of peptidomics with appropriate examples.

e) Write a note an principle and working of tandem Mass Spectrometry (Ms/Ms).

f) Write principle of 2D gel electrophoresis and enlist its applications.

Q3) Answer any one: **[1×10=10]**

a) Describe the principle and working of DNA Microarray. Add a note on application of Microarray in medical genetics and diagnostics.

b) Explain the principle and applications of HPLC - MS. and MALDI - TOF.

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Total No. of Questions : 2]

SEAT No. :

P3168

[Total No. of Pages : 1

[5539]-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.***

Q1) Answer the following (Any 3) : **[15]**

a) Explain use of lipids as nanoparticles to be used as drug delivery system.

b) Describe the chemical bath deposition technique for synthesis of nanoparticles.

c) Discuss the use of optical spectroscopy for the characterization of nanoparticles.

d) Explain the effect of size of nanoparticles with respect to their electrical and magnetic properites.

e) Enlist the methods for surface characterization of nanoparticles. Explain any one.

Q2) Answer the following (Any 1) : **[10]**

a) Compare and contrast between the physical and biological methods for synthesis of nanoparticles.

b) What is biofunctionalization? How the functionalized nanoparticles to be used in separation of cells?

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Total No. of Questions : 3]

SEAT No. :

P3169

[Total No. of Pages : 2

[5539]-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 indicates full marks.***

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

a) Compare and contrast oogenesis and spermatogenesis.

b) Give the significance of cortical rotation.

c) Describe molecular mechanism of pleuripotent stem cells.

d) Write a note on Induced pleuripotent stem cells.

e) Explain formation of syncytial blastoderm and give its significance during early embryogenesis.

f) Elaborate on Hematopoietic stem cell linkage.

P.T.O.

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

a) Give applications of Tissue engineering.

b) Describe sea urchin gastrulation.

c) Explain cellular basis of metaplasia.

d) Describe fertilization in mammals.

e) What are bioethical considerations for human cloning.

f) Comment on neuralation. Explain the steps of neuralation.

Q3) Answer any one: **[1×10=10]**

a) Explain the need for stem cell characterization and different methods of characterization. Add a note on cell cycle regulation in stem cell.

b) Describe the molecular mechanism for establishment of anterior-posterior axis/signaling centre in Drosophila.

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Total No. of Questions : 3]

SEAT No. :

P3170

[Total No. of Pages : 2

[5539]-405
M.Sc.
BIOTECHNOLOGY
BT - 406 : Agricultural Biotechnology
(2013 Course) (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 neccessary.***

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

a) What is virus indexing? Briefly explain the methodology for virus indexing.

b) Write a note on 'how DNA markers can be used for crop improvement.

c) Define the term apomixis. Explain its use in agricultural biotechnology.

d) Compare and contrast between Somatoclonal and gametoclonal variations.

e) Discuss the concept of future crops.

f) Explain Agrobacterium-mediated transformation.

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

a) Explain QTL and discuss the construction of genetic maps using QTL for MAS.

b) What is embryo rescue? How it helps in crop improvement?

c) Write a note on risk assessments with respect to high and low impact crops.

P.T.O.

d) Explain how biotechnological tools can be used for improvement of oil seeds.

e) What is transplastomics? Explain how it is used in gene expression studies in plants.

f) Define polyembryony. How it can be induced?

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

a) Discuss in detail how transgenic technology can be used for production of abiotic stress tolerant plants.

b) Explain in detail the use of bioreactors for production of plant secondary metabolities and scaling-up. Cite suitable examples.

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