Total No. of Questions : 8]

SEAT No. :

P558

[Total No. of Pages : 2

[4238] - 101
M.Sc.
BIOTECHNOLOGY
BT-11 : Advanced Biological Chemistry
(2008 Pattern) (Semester-I)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***All questions carry equal marks.***

SECTION - I

Q1) a) Give the principle, working and application of UV spectrophotometers. **[8]**

b) What is zone electrophoresis? Distinguish between continuous and discontinuous electrophoresis. **[8]**

Q2) a) What is metabolic flun analysis. Give its applications. **[8]**

b) Enlist analytical techniques used for analysis of secondary metabolites. Explain any one. **[8]**

Q3) a) Comment on the mechanism of functional group determination of biomolecules using IR spectroscopy. **[8]**

b) Explain how acid-base balance is maintained in living cells. **[8]**

P.T.O.

Q4) Write short notes on : **[16]**

a) Column packing in gel permeation chromatography

b) High energy compounds

c) Secondary metabolites in medicine

d) Density gradient centrifugation

SECTION - II

Q5) Explain the heirarchy and mechanism of protein folding. **[16]**

Q6) a) Give the mechanism of site directed mutagenesis. State its importance. **[8]**

b) Discuss the role of coenzyme A in biosynthetic pathways of primary & secondary metabolites. **[8]**

Q7) a) Explain the techniques of hairy root culture for enhanced production of secondary metabolites. **[8]**

b) Peptide bond is rigid and planar. Justify. **[8]**

Q8) Write short notes on: **[16]**

a) Ramchandran Plot

b) Protein microarray

c) Arkaloids

d) Phenyl Ammonia Lyase(PAL)

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Total No. of Questions : 8]

P559

SEAT No. :

[Total No. of Pages : 2

[4238] - 102
M.Sc.
BIOTECHNOLOGY
BT-12 : Molecular and Cell Biology
(2008 Pattern) (Semester-I)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***All questions carry equal marks.***

SECTION - I

Q1) a) Why is the plasma membrane referred to as "Fluid Mosaic".? **[8]**

b) Explain Na^+–K^+ ATPase system and its role in nerve impulse transmission. **[8]**

Q2) a) Describe in detail the endocrine role of pancrease. **[8]**

b) Explain the regulation pathway of Glycogen synthase. **[8]**

Q3) a) Enlist the uncouplers involved in mitochondrial respiration and explain their mechanism of action. **[8]**

b) What is exocytosis? Explain regulated and continuous pathway of exocytosis. **[8]**

P.T.O

Q4) Write short notes on the following **[16]**

a) Homeostasis.

b) Metabolic effects of nor-epinephrine.

c) Photophosphorylation.

d) Uptake of water and solutes in plant.

SECTION - II

Q5) a) What are exons and what is their function in chromosome? **[8]**

b) What happens to introns when DNA is transcribed to mRNA. **[8]**

Q6) a) Explain natural selection with suitable example. **[4]**

b) Define the term immunological memory. **[4]**

c) Justify the statement, "immune system can distinguish between self and non-self". **[4]**

d) Explain the cell-cycle check-points. **[4]**

Q7) a) Why DNA polymerase cannot replicate the ends of chromosome? **[8]**

b) Explain the role of telomerase in replicating ends of chromosome. **[8]**

Q8) a) Explain the regulation of tryptophan operon. **[8]**

b) Describe the structure of tRNA and its role in protein synthesis. **[8]**

Total No. of Questions : 8]

P560

SEAT No. :

[Total No. of Pages : 2

[4238] - 103
M.Sc. - I
BIOTECHNOLOGY
BT-13 : Environmental Biotechnology
(Semester-I) (2008 Pattern)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Attempt a total of five questions selecting at least two questions from each section.***
2) ***Answers to the sections must be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Enlist various non-conventional energy sources. Explain with suitable examples any two sources as better alternatives to the conventional energy sources. **[16]**

Q2) Write Explanatory notes on the following: **[16]**

a) Guassian plume model for dispersion of air pollutants.

b) Effects of noise pollution on human health.

Q3) Describe various strategies for municipal solid waste treatment with special emphasis on biological treatment. **[16]**

Q4) Explain physicochemical analysis of soil. Discuss any one method in detail. **[16]**

P.T.O.

SECTION - II

Q5) Explain the principle of remote sensing. Mention the applications of remote sensing in ecological mapping. **[16]**

Q6) Enlist various methods of environmental impact assessment (EIA). Explain any one method in detail. **[16]**

Q7) Discuss the design and working of ETP for sugar industry waste water treatment. **[16]**

Q8) Write explanatory notes on:

a) Agenda 21 **[8]**

b) Reuse and disposal of biosolids. **[8]**

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Total No. of Questions : 8]

SEAT No. :

P561

[Total No. of Pages : 3

[4238] - 201
M.Sc.
BIOTECHNOLOGY
BT-21 : Genetic Engineering
(2008 Pattern) (Semester-II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Attempt a total of Five questions selecting atleast Two questions from each section.***
2) ***Answers to the two sections must be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Write short notes on: **[16]**

a) Selective marker genes in vectors

b) Insertion and replacement vector

c) Reverse Transcriptase

d) Transformation and Transfection

Q2) a) What criteria is used to decide if a particular recombinant protein should be expressed in a bacteria, yeast, insect and mammalian cell system.**[8]**

b) Give the salient features of a BAC vector with suitable example. **[8]**

Q3) Illustrate the structure of Ti plasmid from Agrobacterium tumefaciens as a best suited vector to transfer foreign genes into plant chromosomal DNA. **[16]**

P.T.O.

Q4) a) What is the difference between a genomic versus CDNA library? When would you use each type. **[8]**

b) i) Give the importance of restriction enzymes in genetic engineering. Comment on star activity **[4]**

ii) A plasmid was digested with 3 restriction enzymes SmaI, EcoRI and Hae III singly & in pairwise combination. The size of fragments are listed in order of size. Determine correct order of restriction size & draw the map with intervals bet^{n} sites labelled. **[4]**

SmaI - 11kb, 6kb & 5kb

EcoRI - 14kb & 8kb

Hae III - 16 kb & 6kb

SmaI + EcoRI - 8kb, 6kb, 5kb & 3kb

SmaI + HaeIII - 11kb, 5kb, 5kb & 1kb

EcoRI + HaeIII - 8kb, 8kb, 6kb

SECTION - II

Q5) a) Explain how automated DNA sequencing methods helped in the completion of human genome project. Give the applications of HGP. **[8]**

b) With reference to Indian scenario, express your view why transgenic BT cotton get wide acceplance and commercialization, While transgenic brinjal was banned. **[8]**

Q6) a) AFLPs have stable amplification and good repeatability. While RAPD have unstable amplification and poor repeatability. Justify. **[8]**

b) Compare between genetic mapping and physical mapping with respect to their strength and weaknesses. Add a note on its usefulness in genome sequencing. **[8]**

Q7) a) Define in vivo and in vivo gene therapy? With a suitable example explain how viral and non-viral gene delivery systems used in gene therapy. **[8]**

b) i) Why is the enzyme Faq polymerase preffered over the klenow fragment of DNA Pol I in polymerase chain reaction.

ii) What parameters has to be taken into consideration.While designing primers for sequence specific amplification of gene using PCR.

[8]

Q8) Short notes: **[16]**

a) Microsatellites

b) Knockout mice

c) Micro injection method for gene transfer

d) Fluorescence in situ hybridization

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Total No. of Questions : 8]

P562

SEAT No. :

[Total No. of Pages : 2

[4238] - 202
M.Sc.
BIOTECHNOLOGY
BT-22 : Bioinformatics
(2008 Pattern) (Semester-II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Write short notes on: **[16]**

a) PSI BLAST

b) Energy optimization techniques.

c) Ramchandran plot

d) Clustal W

Q2) a) FASTA is the global alignment tool for finding homology between the closely related organisms. Justify. **[8]**

b) Enlist the pair-wise methods used for comparing protein sequences. Explain any one method. **[8]**

Q3) a) Explain the role of chemoinformatics in drug discovery. **[8]**

b) What resources are used in finding chemical information? Explain SMILE notation with a representative example. **[8]**

P.T.O.

Q4) What are the approaches used in the gene prediction using bioinformatics? Explain any one with its algorithm. **[16]**

SECTION - II

Q5) a) Define immunoinformatics? Explain its approach to find a vaccine candidate. **[8]**

b) Describe the Indian scenario with respect to the bioinformatics research. **[8]**

Q6) a) Elaborate on the biological significance of structural comparison of proteins and its use in structural classification of protein. **[8]**

b) Discuss the models used in bioinformatics business. **[8]**

Q7) a) Discuss a case study related to protein sequence analysis using bioinformatics **[8]**

b) Secondary structure prediction of protein is useful in the full length 3D prediction. Justify **[8]**

Q8) Write short notes on: **[16]**

a) PDB file format.

b) Tools in Homology modelling

c) Gene annotation

d) Conformation energy in proteins.

Total No. of Questions : 8]

SEAT No. :

P563

[Total No. of Pages : 2

[4238] - 203
M.Sc.
BIOTECHNOLOGY
BT-23 : Plant Biotechnology
(2008 Pattern) (Sem.-II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Attempt a total of Five questions selecting at least Two questions from each section.***
2) ***Answers to the two sections should be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) What is somatic hybridization and cybridization. Explain its relationship with modern crop improvement programmes. **[8]**

b) Describe the cultural conditions and factors influencing the regeneration potential of in vitro produced triploids. **[8]**

Q2) Define micropropogation? With suitable example of commercially important plant species explain the steps involved and factors influencing micropropogation. Add a note on limitations of the technique. **[16]**

Q3) a) Explain the qualitative and quantitative parameters used to identify different types of improved seeds. **[8]**

b) Describe at least two selectable marker systems that are used with plant expression vectors. **[8]**

P.T.O.

Q4) Write short notes on: **[16]**

a) Qualitative and Quantitative improvement in fungi.

b) Economically important algae.

c) in vitro production of secondary metabolites

d) Plant growth regulators.

SECTION - II

Q5) a) Explain the approach used in transgenic plant production improved for increase in production by manipulation of photosynthetic process or nitrogen fination capacity. **[8]**

b) Define Elicitor. Explain its role in the production of industrially important products using plant tissue culture technique. **[8]**

Q6) a) Give a comparative account on the gene transfer method using microinjection and Biolistic gene gun approach for transgenic production. **[8]**

b) With an illustrative example of 'Golden Rice' explain the quality improvement in crop plants. **[8]**

Q7) Write short notes on: **[16]**

a) Protoplast fusion

b) Regeneration of plants using organogenesis

c) Biosafety guidelines for release of transgenic crops.

d) Plant derived vaccines

Q8) a) Explain the use of Agrobacterium tumifician and Agrobacterium Rhizogenes as the efficient means for gene transfer in plants. **[8]**

b) Define plant Biotechnology. Explain how the transgenic technology has evolved with respect to the trails and the timeline. **[8]**

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Total No. of Questions : 8]

SEAT No. :

P564

[Total No. of Pages : 2

[4238] - 301
M.Sc.
BIOTECHNOLOGY
BT-31 : Animal Biotechnology
(Semester-III) (2008 Pattern)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Attempt five questions selecting at least two from each section.***
2) ***Answers to the sections must be written on separate answer sheets.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Write short notes **[16]**

a) Hormones used in female fertility.

b) In vitro spermatogenesis.

Q2) Write briefly about : **[16]**

a) Cryopreservation of embryos

b) Monitoring ovarian activity in animals

Q3) a) How a finite life span cell line is established and characterized?

b) How seasonal variations affect animal breeding? **[16]**

Q4) a) How pedigree or lineage analysis is carried out using molecular techniques?

b) How embryonic stem cells are utilized for creating transgenic animals? **[16]**

P.T.O.

SECTION - II

Q5) Explain different methods for developing knock out mice? Mention applications of such animals. **[16]**

Q6) Write notes on: **[16]**

a) Production of human growth factor in milk.

b) Problems associated with "Dolly" sheep.

Q7) a) Factors affecting artificial breeding.

b) Compare chimeric and transgenic animals. **[16]**

Q8) Write notes on : **[16]**

a) Transgenic animals in cancer research.

b) Targeted gene insertion.

Total No. of Questions : 8]

SEAT No. :

P565

[Total No. of Pages : 2

[4238] - 302
M.Sc.
BIOTECHNOLOGY
BT-32 : Fermentation Technology
(Semester-III) (2008 Pattern)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Attempt a total of five questions selecting at least 2 questions from each section.***
2) ***Answers to the two sections must be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Describe application of cells in the followings: **[8]**

i) Agriculture biotechnology

ii) Industrial biotechnology

b) Justify mutagenesis as method for strain improvement. Describe the difference between random and site directed mutagenesis. **[8]**

Q2) a) Discuss various factors that drive the economics of downstream processing of biotech products.

b) Discuss application of biotransformation in medicine and agriculture industry and waste management.

[16]

Q3) a) Describe applications of physical and chemical sensors in process control in fermenter.

b) What is steroid biotransformation? What are limiting factors in the same?

[16]

P.T.O.

Q4) a) Outline downstream processing steps in the recovery of viral vaccines. What are limitations of alkylating agents?

b) Discuss rheological properties of fermentation broths. Elaborate factors contributing to broth viscosity.

[16]

SECTION - II

Q5) a) Discuss oxygen requirement and supply in fermenters. Explain how it differs in mechanically agitated and non-agitated bioreactors.

b) What are the reasons for the foam formation in submerged fermentation? What factors need to be taken in an account during application of various antifoam agents?

[16]

Q6) What is $K_L a$? How it is determined? What are the factors that affect $K_L a$ in a fermenter. **[16]**

Q7) Enlist various factors that drive the economics of downstream processing of fermentation products. Discuss application of different protein affinity tags in affinity chromatography. **[16]**

Q8) What is biomethanation? Describe various substrates, microorganism involved in the same. Explain various factors that control biomethanation. **[16]**

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Total No. of Questions : 6]

P566

SEAT No. :

[Total No. of Pages : 2

[4238] - 303

M.Sc.

BIOTECHNOLOGY

BT-33a : Principles of Virology

(Semester-III) (2008 Pattern)

Time : **1½** *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Attempt four questions selecting at least two from each section.***
2) ***Answers to the sections must be written on separate answer sheets.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Write short notes **[10]**

a) 50% TCID (Tissue Culture Infective Does).

b) Role of Long terminal repeats in HIV replication.

Q2) a) Sandwich ELISA for virus quantitation.

b) What is mode of action of Oseltmivir?

[10]

Q3) Give details of life cycle of Lambda bacteriophage **[10]**

P.T.O.

SECTION - II

Q4) Write notes on **[10]**

a) New emerging viral infections.

b) H1N1 virus.

Q5) How change in viral coat protein affects epidemiology of influenza infection? How it leads to pandemic situations? **[10]**

Q6) a) What are different viral vaccines available for human diseases and what is its impact on some important disease?

b) Avian New Castle disease.

[10]

Total No. of Questions : 6]

P567

SEAT No. :

[Total No. of Pages : 2

[4238] - 304

M.Sc.

BIOTECHNOLOGY

BT-33b : Advanced Immunology

(2008 Pattern) (Semester-III)

Time : $1\frac{1}{2}$ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Attempt four questions selecting at least two from each section.***
2) ***Answers to the sections must be written on separate answer sheets.***
3) ***Neat diagrams must be drawn wherever necessary***
4) ***Figures to the right indicate full marks***

SECTION - I

Q1) a) How spleen colony forming assay is performed? **[10]**

b) Give detailed information of structure and function of B cells including its surface markers.

Q2) a) Give cytological details of macrophages and explain how it kills invading bacteria? **[10]**

b) Give structural details of Thymus.

Q3) a) Describe immunity in lower phyla of animals. **[10]**

b) Give concise account of classical pathway of compliment fixation.

P.T.O.

SECTION - II

Q4) Write notes on: **[10]**

a) HAT selections in hybridoma technology.

b) Disease mediated by auto antibodies.

Q5) Give detailed account how chirmeric antibodies are made. **[10]**

Q6) a) How antibodies are effectively used as tools in disease diagnosis? **[10]**

b) With suitable examples describe passive immunization.

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Total No. of Questions : 8]

SEAT No. :

P568

[Total No. of Pages : 2

[4238] - 401
M.Sc.
BIOTECHNOLOGY
BT-41 : Genomics and Proteomics
(2008 Pattern) (Semester-IV)

Time : 3 Hours] *[Max. Marks :60*

Instructions to the candidates:

1) ***Attempt a total of five questions selecting atleast 2 questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) How is automated DNA sequencing used for whole genome analysis? Explain. **[12]**

Q2) Explain ab initio modeling technique, used in structural genomics, with the help of suitable example. **[12]**

Q3) Give a brief account of any one **[12]**

a) Use of micro arrays in functional genomics

b) Genome annotation

Q4) Write notes on any two of the following **[12]**

a) Use of microarrays in pharmacogenomics

b) Toxicogenomics

c) Applications of comparative genomics

P.T.O.

SECTION - II

Q5) Explain how sequence based modeling can be used in structural proteomics with the help of an appropriate example. **[12]**

Q6) What are different computational approaches used in protein-protein interactions? **[12]**

Q7) How are micro arrays useful in functional proteomics? **[12]**

Q8) Write notes on any two of the following **[12]**

a) Proteomics and drug development.

b) Yeast 2-hybrid system

c) Protein structure databases

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Total No. of Questions : 8]

P569

SEAT No. :

[Total No. of Pages : 2

[4238] - 402
M.Sc.
BIOTECHNOLOGY
BT-42:Legal and Ethical Aspects in Biotechnology and IPR
(2008 Pattern) (Semester-IV)

Time : 3 Hours] *[Max. Marks :60*

Instructions to the candidates:

1) ***Attempt a total of Five question selecting at least Two Questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Mention the conditions for patentability. Explain with the help of an appropriate example from biotechnology. **[12]**

Q2) a) What are the rights of a patentee? How are they protected? **[6]**

b) How are computer programs patented? **[6]**

Q3) Explain:

a) Validity of a biotechnology patent **[6]**

b) Copy right as a type of IPR **[6]**

Q4) Write notes on: **[12]**

a) Registration of industrial Design

b) Transfer of copyright

P.T.O

SECTION - II

Q5) Mention important ammendments to Indian Patent Act 1970 with reference to biotechnology. Explain with the help of an appropriate example any one ammendment **[12]**

Q6) Explain the significance of Budapest Treaty in Biotechnology related inventions. **[12]**

Q7) State

a) Contents of specification of any one Biotechnology patent **[6]**

b) Plant breeders' rights **[6]**

Q8) Write notes on: **[12]**

a) WTO and its functions

b) Patenting Bioproduct

Total No. of Questions : 6]

P570

SEAT No. :

[Total No. of Pages : 2

[4238] - 403

M.Sc.

BIOTECHNOLOGY

BT-43 : Clinical Research and Database Management

(2008 Pattern) (Semester-IV)

Time : $1\frac{1}{2}$ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Attempt a total of four questions selecting atleast two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks***

SECTION - I

Q1) What is FDA? In what way it contributes to clinical research? **[10]**

Q2) Enlist various medical devices. Explain research and development activities before launching of the device in market. **[10]**

Q3) Write notes on any two of the following. **[10]**

a) Drug approval

b) Safety of human subjects

c) Preclinical trials

P.T.O

SECTION - II

Q4) Write the draft of case report form of a patient. **[10]**

Q5) What is meant by a database in the context of clinical research? State the principles of data management. **[10]**

Q6) Write notes on any two of the following. **[10]**

a) Managing essential documents

b) Recording serious adverse events

c) Clinical information products

Total No. of Questions : 6]

P571

SEAT No. :

[Total No. of Pages : 2

[4238] - 404

M.Sc.

BIOTECHNOLOGY

BT-44a : Nanobiotechnology

(2008 Pattern) (Semester-IV)

Time : **1½** *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Attempt a total of Four questions selecting at least Two Questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Explain the physico chemical characteristics of nanomaterials. **[10]**

Q2) a) How are inorganic nanostructures used to understand functions of a biological system? **[5]**

b) Compare and contrast green synthesis and chemical synthesis. **[5]**

Q3) Write notes on **[10]**

a) Nanoparticles and drug delivery

b) Functional nano-biomaterials

P.T.O

SECTION - II

Q4) What are various physico-chemical methods of obtaining nano-biomaterials? Explain any one. **[10]**

Q5) How are nanomaterials characterized? Explain any one method. **[10]**

Q6) Write notes on **[10]**

a) Advances in nanobiotechnology.

b) Nanosensors.

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Total No. of Questions : 8]

SEAT No. :

P572

[Total No. of Pages : 2

[4238] - 405
M.Sc.
BIOTECHNOLOGY
BT-44b:Stem Cell Technology and Regenerative Medicines
(2008 Pattern) (Semester-IV)

Time : 3 Hours] *[Max. Marks :60*

Instructions to the candidates:

1) ***Attempt a total of Five questions selecting at least Two Questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Explain the subcellular changes that lead to the differentiation of an Ovum. Add a note on its structure. **[12]**

Q2) Mention major post fertilization changes leading to the development of an animal. Explain any one. **[12]**

Q3) What factors control successful fertilization of gametes in animals? Explain any two factors. **[12]**

Q4) Write notes on **[12]**

a) Ultrastructure of sperm cell

b) Cell differentiation

P.T.O.

SECTION - II

Q5) What are stem cells? Mention their characteristics and types. **[12]**

Q6) How are transgenics obtained? Explain the method with the help of an appropriate example. **[12]**

Q7) What is cloning? Comment on the bioethical issues arising out of the idea of human cloning. **[12]**

Q8) Write notes on **[12]**

a) Knock outs

b) Applications of stem cell technology.

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Total No. of Questions : 8]

SEAT No. :

P573

[Total No. of Pages : 2

[4238] - 406
M.Sc.
BIOTECHNOLOGY
BT-44c : Agricultural Biotechnology
(2008 Pattern) (Semester-IV)

Time : 3 Hours] *[Max. Marks :60*

Instructions to the candidates:

1) ***Attempt a total of Five questions selecting at least Two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Explain the role of induced apomixis in agricultural biotechnology. **[12]**

Q2) Explain, with the help of appropriate examples, advantages of micropropagation of elite horticultural crops. **[12]**

Q3) What is induced androgenesis? How are androgenic plants useful in agriculture? Explain with two examples. **[12]**

Q4) Write notes on **[12]**

a) Application of embryo rescue technique

b) Somaclonal variants.

P.T.O.

SECTION - II

Q5) Enlist the methods of developing transgenic plants. Explain any one method with reference to a crop plant. Add a note on advantages of GM crops. **[12]**

Q6) What is metabolic engineering? Explain with reference to a medicinal plant and active principle. **[12]**

Q7) Explain the process of megascale multiplication of plants using a bioreactor type assembly. **[12]**

Q8) Write notes on **[12]**

a) Biopesticides

b) Edible vaccines

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Total No. of Questions : 8]

SEAT No. :

P574

[Total No. of Pages : 3

[4238] - 11
M.Sc.
BIOTECHNOLOGY (Off Campus)
BT-11 : Biological Chemistry-I
(2005 Pattern) (Sem.-I) (Theory)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Question No. 1 (20 marks) is compulsory.***
2) ***Attempt any two questions (15 marks each) from the 2nd, 3rd and 4th questions.***
3) ***Attempt any three questions (10 marks each) from the remaining 5th, 6th, 7th and 8th questions.***

Q1) Attempt any four of the following questions, all carries equal marks. **[20]**

a) In a Lineweaver-Burke plot, does the presence of a competitive, inhibitor increase or decrease the slope of the line? Explain your reasoning.

b) What is gluconeogenesis and why is this metabolic pathway considered important during prolonged exercise.

c) Protein Z has an isoelectric point of (pI) of 5.7. When dissolved in a buffer of pH 8.2, is it more likely to stick to an anion exchange or cation exchange resin? Give reasons for your answer.

d) Molecular cloning can be used to isolate genomic DNA as well as cDNA clones, List the types of vector systems that can be used to clone either type of DNA and briefly describe any one.

e) A researcher plans to make a synthetic pentapeptide containing one acidic, one basic, one aromatic, one long chain aliphatic residue, and one residue which would allow formation of a disulphide bond. Using the single letter nomenclature provide an example of the peptide primary structure and draw the structure which would meet this requirement.

f) Name and draw the structure of anyone ketone body that functions in metabolism. What is its role and where are they formed?

P.T.O.

Q2) a) Describe the sequence of biochemical events between the release of epinephrine into the blood stream and the activation of enzyme glycogen phosphorylase. **[5]**

b) What is the effect of pH on the binding of oxygen to hemoglobin (the Bohr effect) and briefly describe this mechanism. **[5]**

c) What is linking number and state its importance in DNA structure? Explain the role of topoisomerases in altering the twist of DNA. **[5]**

Q3) a) Show how an enzyme like PFK-1 can be controlled by both covalent and allosteric mechanisms. **[5]**

b) List five different types of spectroscopic or spectrometric analysis techniques. For each technique, give an example of one chemical/ compound that can be measure using that technique. **[5]**

c) If a boundary moves half way down a centrifuge cell in 20 minutes at 20,000 rpm, how long would it take to reach the same position if the speed is 40,000 rpm. **[5]**

Q4) a) Write out the reaction sequence for one cycle of the mitochondrial pathway for β-oxidation of fatty acyl Co A. Explain why it is called the 'β-oxidation pathway'. **[5]**

b) Differentiate between glycosylaminoglycans and proteoglycans. **[5]**

c) Write short notes on: **[5]**

i) Sodium error during pH measurement.

ii) Dialysis.

Q5) a) Using appropriate examples distinguish the differences between a condensation reaction, a hydrolytic reaction and a dehydration reaction. **[6]**

b) List two advantages and two disadvantages of 2-dimensional electrophoresis (2-DE) in the analysis of a proteome. **[4]**

Q6) a) How is the α–subunit of *E.coli* RNA polymerase proposed to mediate transcription activation? **[5]**

b) Name the three different structures of DNA and give two major features that are characteristic of each. **[5]**

Q7) a) What are the factors affecting sedimentation coefficient in centrifugation. **[5]**

b) Why is thiamine an essential vitamin and what disease does it cause? Discuss an example of its role. **[5]**

Q8) a) In an organism the number of proteins is much more than the number of genes. How is it possible? Explain in detail. **[5]**

b) Explain the principle of fluorescence spectroscopy. Give an example of where and how it is used in biological samples. **[5]**

Total No. of Questions : 3]

P575

SEAT No. :

[Total No. of Pages :2

[4238] - 12
M.Sc.
BIOTECHNOLOGY
BT-12 : Cell Biology
(Sem.-I) (2005 Pattern) (Theory)

Time : 3 Hours] *[Max. Marks :80*

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 in short : **[20]**

a) List the functions of mitochondria and golgi bodies in eukaryotic cells.

b) How is the coulter counter used in cell counting?

c) Name the three groups into which membrane associated proteins may be classified.

d) Enlist the type of motilities encountered in eukaryotic systems.

e) What are the occular and stage micrometer? Give their uses in morphometry.

f) In which tissues are gap junctions and tight junctions located?

g) What is neoplastic transformation? Give two properties of transformed cells.

h) Differentiate between cytosenescence and cytoquiescence.

i) List any two components of the electron transport chain.

j) Explain the effect of over expression of BCL - 2 on the cell to undergo apoptosis.

P.T.O.

Q2) Attempt any two : **[30]**

a) Write notes on.

i) The role of plasmodesmata in sugar loading

ii) Different signalling pathways in eukaryotes.

b) Explain the following:

i) Structure and function of muscular tissue

ii) Calvin cycle and the role of enzymes involved.

c) Describe the following:

i) How DNA is compacted into chromosomes.

ii) Simple and facilitated diffusion and their significance.

Q3) Attempt any three: **[30]**

a) Describe two methods for assaying protein - protein interactions in living cells.

b) Explain the role of copI and copII resicles in trafficking of proteins between the ER and Golgi apparatus.

c) What is density gradient centrifugation? Elucidate an experiment to carry out sub cellular fractionation.

d) Give the proposed intracellular pathway leading to cell death by apoptosis.

e) Answer the following:

i) What is the role of hormones in plant cell wall elongation?

\ ii) Explain the process of assembly and disassembly of microtubules.

Total No. of Questions : 7]

SEAT No. :

P576

[Total No. of Pages : 2

[4238] - 13
M.Sc.
BIOTECHNOLOGY
BT-13 : Quantitative Methods
(2005 Pattern) (Sem.-I) (Theory) (Back Log)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any four from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in parenthesis.***

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

a) What is network computing? Explain in detail.

b) Define standard deviation. How is it determined? Explain mathematically.

c) Write a short on workstation.

d) Draw the graph of $y = 5x^2$

e) Explain input and output devices in computer.

f) How do you define probability? In a public sector where 800 employees are working, it is observed that 10 employees are absent every day. Check the probability if only 5 employees remain absent.

Q2) a) Determine the eigen values and eigen vectors for the given matrix. **[10]**

$$\begin{bmatrix} 2 & 2 \\ 8 & 2 \end{bmatrix}$$

b) Explain network topologies and protocols with examples. **[5]**

Q3) a) For certain bionomial distribution with m = 5, find parameter p if P(2 successes) = (4/2) P (2 successes)

Also find 1) Expected value (mean)

2) Variance **[10]**

b) What is LAN and what is WAN? Give explanation. **[5]**

P.T.O.

Q4) a) Write briefly about internet and its resources. **[5]**

b) What is database? Explain any of the databases you are acquainted with **[5]**

c) Write a short note network security. **[5]**

Q5) a) Determine the $\frac{dy}{dx}$ of the equation given below. **[5]**

$$\frac{x^2+2}{2x+4}$$

b) Using elementary row transformations find the inverse of the matrix.

$$\begin{bmatrix} 2 & 4 \\ 9 & 9 \end{bmatrix}$$ **[10]**

Q6) a) Define the property "Central tendency" of statistical data. For the following data calculate mode. **[10]**

Class interval	15-20	20-25	30-50	40-70	80-100
Frequency	5	12	25	30	40

b) Draw a block diagram of a computer and explain each component. **[5]**

Q7) a) Evaluate **[5]**

i) $\int dx/\left(x^2-a^2\right)$

ii) $\int e^x x^2 - dx$

b) What is computer virus? Explain any four types of computer virus. **[5]**

c) Briefly describe the following: **[5]**

i) Fiber Media

ii) Unshielded Twisted Pair (UTP)

iii) Firewall

iv) Biometrics

v) Grid Computing

Total No. of Questions : 6]

SEAT No. :

P577

[Total No. of Pages : 2

[4238] - 21
M.Sc.
BIOTECHNOLOGY
BT-21 : Molecular Biology
(2005 Pattern) (Sem.-II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Question No. 1 is compulsory. Out of the remaining attempt 4 questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) a) Give the organization of the proparyotic genome. **[5]**

b) Explain the machinery required for DNA replication. **[5]**

c) Describe the central dogma of life. **[5]**

d) Give the importance of DNA methylation in prokaryotes. **[5]**

Q2) a) Discuss the structure and mechanism of reverse transcriplase. **[8]**

b) Explain the significance of repetitive and unique sequences in Eukaryotic genome. **[7]**

Q3) a) Explain the mechanism of transport of RNA after transcription. **[5]**

b) Comment on the phenomenon of chromosomal inactivation. **[5]**

c) Explain the post translational modifications of proteins in eukaryotes. **[5]**

Q4) Write short notes on: **[15]**

a) Chloroplast genome

b) Genetic code

c) Etiology of cancer

P.T.O.

Q5) a) Explain the molecular basis of development in plants. **[7]**

b) Describe the mechanism and regulation of protein synthesis in eukaryotes. **[8]**

Q6) a) Explain the structure-function of ribonucleo proteins. Add a note on its organization. **[8]**

b) Explain the DNA reassociation kinetics using cot curve analysis. **[7]**

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Total No. of Questions : 4]

P578

SEAT No. :

[Total No. of Pages : 2

[4238] - 22
M.Sc.
BIOTECHNOLOGY
BT-22 : Genetics
(2005 Pattern) (Sem.-II)

Time : 1½ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory. Out of the ramaining attempt 2 questions.***
2) ***Neat digrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Your answers will be valued as a whole.***

Q1) Write short notes on any four of the following: **[4 × 2.5 = 10]**

a) Multiple Alleles
b) Law of seggregation of factors
c) Ames test
d) Inbreeding
e) Auxotrophs

Q2) a) Explain the control of gene expression in bacteria with lactose operon. **[5]**

b) Illustrate on Gene mapping in phages. **[5]**

c) Give an account of transposable elements in organisms. **[5]**

Q3) a) What is 'dosage compensation'? Explain Barr body formation in Humans. **[5]**

b) Explain role of Internal & External environment in expression of genes with suitable examples. **[5]**

c) Describe the molecular mechanism of crossing over. **[5]**

P.T.O.

Q4) a) Write a note on spontaneous mutations. Add a note on DNA damage repair mechanisms. **[5]**

b) Describe transformation in bacteria. **[5]**

c) What is the difference between Mendelian and Quantitative inheritance? Write applications of Quantitative inheritance. **[5]**

Total No. of Questions : 4]

P579

SEAT No. :

[Total No. of Pages : 2

[4238] - 23

M.Sc.

BIOTECHNOLOGY

BT-23a : Microbiology

(2005 Pattern) (Sem.-II)

Time : 1½ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory. Out of the remaining attempt 2 questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) a) Explain the term biotransformation with a suitable example of steroid **[5]**

b) Explain the molecular mechanism of nitrogen fination by bacteria. **[5]**

Q2) a) Describe the production of industrially important secondary metabolite using bacteria. **[8]**

b) Comment upon the occurrence and classification of fungi. **[7]**

Q3) Write short notes on: **[15]**

a) Handling Pathogens

b) Sterilization and disinfection.

c) Y(ATP) & maintenance energy

P.T.O.

Q4) a) Explain the mechanism of multiple drug resistance in pathogens. **[5]**

b) Describe the immunological & molecular techniques used in diagnostic microbiology **[5]**

c) Comment upon the propogation & preservation of beneficial microorganisms. **[5]**

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Total No. of Questions : 4]

P580

SEAT No. :

[Total No. of Pages : 1

[4238] - 24
M.Sc. (Semester-II)
BIOTECHNOLOGY
BT-23b : Virology
(2005 Pattern)

Time : 1½ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 are compulsory. Out of the remaining attempt 2 questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Discuss the possibility of proteins, peptides & DNA as the new vaccine candidates **[10]**

Q2) a) Explain the mechanism of replication in bacteriophages **[5]**

b) Discuss the laboratory tests for viral diagnosis. **[5]**

c) Describe the method for propagation of plant viruses **[5]**

Q3) Write notes on. **[15]**

a) Si RNAs

b) Antiviral drug designing

c) Retroviruses

Q4) a) Explain the use of viral vectors in gene transfer to prokaryotes & Eukaryotes **[8]**

b) Describe morphology and ultrastructure of RNA virus with (+ve) strand. **[7]**

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Total No. of Questions : 4]

P581

SEAT No. :

[Total No. of Pages : 1

[4238] - 25
M.Sc.
BIOTECHNOLOGY
BT-24 : Immunology
(2005 Pattern) (Semester-II)

Time : **1½** *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory. Out of the remaining attemp 2 questions.***
2) ***Neat digrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Give comparitive account on characteristic attributes of innate and aquired immune system. **[10]**

Q2) a) Describe the B cell and T-cell ontogeny **[7]**

b) Differentiate on techniques used in humoral immunology and cellular immunology. **[8]**

Q3) a) Discuss the properties of human class I & II MHC protein. **[5]**

b) Explain the mechanism of antigen antibody interaction. **[5]**

c) Discuss the primary and secondary immune responses. **[5]**

Q4) a) Illustrate & describe the structure of BCR and TCR **[7]**

b) Discuss the characteristics of antigen. What is T-cell dependent and independent antigens. **[8]**

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Total No. of Questions : 4]

P582

SEAT No. :

[Total No. of Pages : 1

[4238] - 26
M.Sc.
BIOTECHNOLOGY
BT-25 : Bioinformatics
(2005 Pattern) (Sem.-II)

Time : 1½ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory. Out of the remaining attempt 2 questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) What is Bioinformatics? Explain primary sequence databases. **[10]**

Q2) a) Describe protein classification based on scop database. **[5]**

b) Justify :- BLAST is tool for homology searching. **[5]**

c) Explain use of pattern searching for sequence annotation. **[5]**

Q3) Write short notes on. **[15]**

a) Genome database

b) FASTA tool

c) CATH

Q4) a) What is homology modeling? Explain its use in protein structure prediction. **[8]**

b) Write detail account of full genome comparison. **[7]**

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P.T.O.

Total No. of Questions : 8]

P583

SEAT No. :

[Total No. of Pages : 2

[4238] - 31
M.Sc. - II
BIOTECHNOLOGY
BT-31 : Tissue Culture (Plants & Animals)
(2005 Pattern) (Semester-III)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Questions 1 & 5 are compulsory.***
2) ***Attempt any two questions out of remaining questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Answers to both the sections are to be written on separate answer books.***
5) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Why dedifferentiation is a prerequisite for in vitro response of a leaf explant? **[5]**

b) What is the role of IAA and K_n in controlling the response of internodal stem segment in vitro? **[5]**

Q2) Enlist the methods to assess the growth differentiation and development of an explant cultured in vitro. Explain one method for each. **[15]**

Q3) Explain the causes and consequences of variation in plant cell populations grown in vitro. **[15]**

Q4) What is plant tissue culture based method of mass clonal multiplication of plants? Mention its stages. Explain the procedure for each stage by flow chart and flow diagram. **[15]**

P.T.O

SECTION - II

Q5) Write short note on (any two): **[10]**

a) Serum free media.

b) Principles of cryopreservation techniques

c) Characterization of cell lines using various techniques.

Q6) Explain lymphocyte culture and its applications. **[15]**

Q7) Discuss advantages and disadvantages of use of anchorage independent cell lines in animal Biotechnology **[15]**

Q8) Design an experiment to establish primary cell lines for economicaly important insects. **[15]**

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Total No. of Questions : 4]

P584

SEAT No. :

[Total No. of Pages : 2

[4238] - 32

M.Sc. - II

BIOTECHNOLOGY

BT-32 : Fundamentals of Genetic Engineering

(2005 Pattern) (Sem.-III) (Theory)

Time : 1½ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in parenthesis.***

Q1) Answer any two of the following: **[2 × 5 = 10]**

a) Write the salient features of any one COSMID vector.

b) Explain the technique used for selection of E.coli cells with recombinant lambda - phage based vector.

c) Describe the features of any on expression vector used in eukaryotes.

Q2) Write notes on any two: **[15]**

a) BAC and YAC vectors

b) Northern blotting

c) Construction of genomic library

P.T.O.

Q3) a) Explain the use of Maxam-Gilbert method for DNA sequencing. **[8]**

b) Discuss the strategies used for human genome sequencing. **[7]**

Q4) a) How are genetically engineered plants exploited for production of vaccines? **[5]**

b) Discuss the genetic mapping techniques used in the study of a genome. **[5]**

c) Explain the applications of RFLP markers in DNA fingerprinting in plants. **[5]**

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Total No. of Questions : 4]

P585

SEAT No. :

[Total No. of Pages : 1

[4238] - 33
M.Sc. - II
BIOTECHNOLOGY
BT-33 : Biological Chemistry - II
(2005 Pattern) (Sem.-III)

Time : 1½ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Draw neat diagrams wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) Write notes on any two of the following.

a) Principles and applications of gel permeation chromatography.

b) Protein sequencing.

c) Differential centrifugation. **[10]**

Q2) a) State the principle(s) underlying the working of NMR. Add a note on its applications in biological research. **[8]**

b) Describe the structure and functions of phospholipids. **[7]**

Q3) a) How is the tertiary structure of protein stabilized? **[7]**

b) Explain the method of separation of nucleic acids by gel electrophoresis. **[8]**

Q4) a) Explain the procedure of 2D gel electrophoresis of proteins. Add a note on its applications. **[8]**

b) Compare the structural types of DNA. **[7]**

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P.T.O.

Total No. of Questions : 4]

P586

SEAT No. :

[Total No. of Pages : 1

[4238] - 34
M.Sc. - II
BIOTECHNOLOGY
BT-34 : Biochemical Engineering
(2005 Pattern) (Semester-III)

Time : 1½ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any two questions from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) What is engineering? Mention the principles of biochemical engineering. Explain any two principles. **[10]**

Q2) a) Explain methodology of scale up of any one bioprocess. **[8]**

b) How does agitation help in fermentation process? **[7]**

Q3) a) Illustrate the design of an ideal fermenter. **[8]**

b) Explain the process of gas-liquid mass transfer. **[7]**

Q4) Write notes on **[15]**

a) Mathematical aspects of enzyme reations

b) Rheology

c) Advantages and limitations of mechanical agitation or nonmechanical agitation in a bioprocess.

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Total No. of Questions : 6]

SEAT No. :

P587

[Total No. of Pages : 1

[4238] - 35
M.Sc.
BIOTECHNOLOGY
BT - 35 : Pleuripotent Cell Technologies and Reproduction
(2005 Pattern) (Semester-III)

Time : **1½** *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Attempt four questions selecting at least two from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Describe the pattern formation with examples. **[10]**

Q2) Describe the properties of embryonic stem cells and their characterization. **[10]**

Q3) Describe the properties of adult stem cells and their characterization. **[10]**

SECTION - II

Q4) Describe the cell lineages with examples. **[10]**

Q5) Describe the production of transgenic cell lines with examples. **[10]**

Q6) Describe the committed cells with examples. **[10]**

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Total No. of Questions : 4]

SEAT No. :

P588

[Total No. of Pages : 1

[4238] - 41
M.Sc. - II
BIOTECHNOLOGY
BT-41 : Structural Biology
(2005 Pattern) (Sem.-IV)

Time : 1½ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any two out of the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) Write notes on any two of the following: **[10]**

a) Patterson function

b) Cosy NMR

c) Direct method of determination of protein structure.

Q2) a) Explain the application of fluorescence spectroscopy in biopolymer structure determination. **[8]**

b) Explain the principle underlying X ray crystallography. Add a note on its application. **[7]**

Q3) a) How will you use NMR for determination of the structure of DNA? Explain. **[8]**

b) What are limitations of X ray crystallography as applied for biomolecular studies? **[7]**

Q4) Write notes on: **[15]**

a) Nuclear overhousser effect

b) Importance of Brag's equation

c) Statistical approach to phase determination.

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P.T.O.

Total No. of Questions : 4]

P589

SEAT No. :

[Total No. of Pages : 2

[4238] - 42
M.Sc. - II (Semester-IV)
BIOTECHNOLOGY
BT-42 : Industrial Biotechnology
(2005 Pattern)

Time : 1½ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Provide sketch whenever necessary.***
4) ***Marks are given in paranthesis.***

Q1) Answer the following (any 2) **[2 × 5 = 10]**

a) Explain role of microorganisms in conversion of agricultural waste.

b) Stability of enzyme function is critical justify.

c) List industrialy important products with their producing micro organisms.

Q2) Discuss in detail methods used for down stream processing in fermentation technology. **[15]**

Q3) a) What is biomethanation? Explain the chemistry of biggas formation. List the bacteria responsible for biogas production. **[8]**

b) Flow chart illustration of single cell protein production. **[7]**

P.T.O

Q4) Elaborate the following (any three) **[3 × 5 = 15]**

a) Immobilization of enzymes.

b) Ethanol Production.

c) Biocomposting of organic waste

d) Strain improvment

Total No. of Questions : 4]

P590

SEAT No. :

[Total No. of Pages : 1

[4238] - 43
M.Sc. - II (Semester-IV)
BIOTECHNOLOGY
BT-43 : Applications of Genetic Engineering
(2005 Pattern) (Theory)

Time : 1½ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in parenthesis.***

Q1) Attempt any two: **[2 × 5 = 10]**

a) How is linkage analysis carried out?

b) What are the different biosafty regulations used for genetically engineered organism?

c) Discuss applications of any one DNA marker technology used in plants.

Q2) How is genetic engineering employed to obtain antibodies using plant resources? Explain the technique with the help of a suitable example. **[15]**

Q3) a) What are the applications of RNAi technology. **[7]**

b) Give a brief account of use of protein databases in bioinformatics. **[8]**

Q4) a) What are important criteria for filing a patent? **[7]**

b) Enlist the applications of proteomics and discuss any one of them in detail. **[8]**

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Total No. of Questions : 4]

P591

SEAT No. :

[Total No. of Pages : 1

[4238] - 44
M.Sc. - II
BIOTECHNOLOGY
BT-44 : Plant Biotechnology
(2005 Pattern) (Sem.-IV)

Time : 1½ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any two out of the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) Answer any two of the following: **[10]**

a) Mention advantages of clonal propagation over seed propagation.

b) Define somaclonal variation. Mention its applications in plant biotechnology.

c) Mention the stages of micropropagation.

Q2) Enlist the problems in Micropropagation of forest trees. Explain the methods to overcome two such problems. **[15]**

Q3) What is somatic embryogenesis? How is it induced? What are the applications of somatic embryos in plant biotechnology? **[15]**

Q4) Explain the process of commercial production of secondary metabolites in vitro. Add a note on the limitations of the method. **[15]**

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Total No. of Questions : 4]

P592

SEAT No. :

[Total No. of Pages : 1

[4238] - 45
M.Sc. - II
BIOTECHNOLOGY
BT-45 : Chemical Synthesis and Screening in Biotechnology
(2005 Pattern) (Sem.-IV)

Time : 1½ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any two out of the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) Write notes on any two of the following: **[10]**

a) Synthesis of oligopeptide

b) Application of oligosaccharides in treatment of disease.

c) Diagnosis of diseases by using synthetic oligonucleotides.

Q2) a) Explain the applications of oligopeptides. **[8]**

b) Draw a flow diagram to describe the process of synthesis of disaccharide-glucose-ribose. **[7]**

Q3) How will you develop the strategy for screening of a new drug? Explain with the help of an appropriate example. **[15]**

Q4) Explain with the help of an appropriate example, the concept of high through put synthesis. **[15]**

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Total No. of Questions : 4]

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SEAT No. :

[Total No. of Pages : 1

[4238] - 46
M.Sc. - II
BIOTECHNOLOGY
BT-46 : Genomics and Proteomics
(2005 Pattern) (Semester-IV) (Theory)

Time : **1½** *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in Parenthesis.***

Q1) Write notes on any two : **[2 × 5 = 10]**

a) Computational approach to protein-protein interactions

b) Role of microarrays in pharmacogenomics

c) Toxicogenomics

Q2) a) How are novel proteins characterized by using tools of proteomics? **[8]**

b) Discuss the strategies used for whole genome analysis. **[7]**

Q3) a) Explain the principles and scope of structural genomics. **[8]**

b) What is the difference between structural and functional proteomics approaches? **[7]**

Q4) a) Give a brief account of steps involved in genome annotation. **[8]**

b) Explain the role of pharmacogenomics in drug discovery. **[7]**

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Total No. of Questions : 4]

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SEAT No. :

[Total No. of Pages : 1

[4238] - 47
M.Sc.-II
BIOTECHNOLOGY
BT-47 : Immunotechnology
(2005 Pattern) (Semester-IV)

Time : 1½ *Hours]* *[Max. Marks :40*

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Marks are given in parenthesis.***

Q1) Answer the following (any two) **[2 × 5 = 10]**

a) What are chimeric antibodies? Write any two important applications of these antibodies.

b) Write down a protocol for production of monoclonal antibodies using hybridoma technology.

c) Elaborate on G-protein mediated (GPCR) signalling pathway.

Q2) a) Discuss causes of autoimmunity with examples **[10]**

b) What is affinity maturation? Give its significance. **[5]**

Q3) a) Describe methods used in molecular immunology. (any two) **[10]**

b) Enlist properties of cytokines. **[5]**

Q4) Write short note on (any three) **[3 × 5 = 15]**

a) Monoclonal antibody production

b) Mechanisms of tolerance

c) Phage display technology

d) Transgenic models for immunology studies

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