Total No. of Questions :8] **[Total No. of Pages : 2**

P1196

[3727-B]-501
M.Sc.
BIOTECHNOLOGY
BT 11 : Advanced Biological Chemistry
(2008 Pattern, New) (Sem. - I)

Time :3Hours] ***[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 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) a) Explain NMR and IR spectroscopy have been proven to be valuable techniques in structural biology. **[8]**

b) With the help of a schematic diagram, explain the components and working of spectro fluorometer. **[8]**

Q2) a) Explain with the help of a suitable example, how pathway manipulation leads to qualitative and/or quantitative change in the final product. **[8]**

b) Discuss the role of HPLC and GLC in analysis of a metabolite. **[8]**

Q3) a) If the equilibrium concentration of ATP = 1.0×10^{7} M, ADP = 0.165M and Pi = 0.1 M, what are the equilibrium constants and Δ Go for the hydrolysis of ATP (25°C)? **[8]**

b) What is meant by metabolic flux analysis? Mention, with suitable example, its significance. **[8]**

Q4) a) Illustrate the principle of isopycnic density gradient centrifugation. State its applications. **[8]**

b) Enlist the types of terpenoids mention four major steps involved in the biosynthesis of terpenoids. **[8]**

P.T.O.

SECTION - II

Q5) a) Explain 2D gel electrophoresis as an appropriate tool to study proteins. **[8]**

b) Compare and contrast integral proteins and peripheral proteins with respect to isolation, properties and functions. **[8]**

Q6) a) Mention the phytochemical methods for analysis of natural products and explain any one. **[8]**

b) Enlist the types of secondary metabolites and mention at least on pharmacological action of each. **[8]**

Q7) a) Describe the role of chaperons in assisted protein folding. **[8]**

b) Write an explanatory note on sequential model of allosterism. **[8]**

Q8) a) Selecting an appropriate example, illustrate pathway manipulation at cellular level. **[8]**

b) What are alkaloids? Mention their types. State pharmacological action of any four types of alkaloids. **[8]**

# # # #

Total No. of Questions :8] **[Total No. of Pages : 2**

P1200

[3727-B]-602
M.Sc.
BIOTECHNOLOGY
BT 22 : Bioinformatics
(2008 Pattern) (New) (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 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 bioinformatics? Elaborate on the concept of bioinformatics. Mention the tools of bioinformatics and enlist its applications. **[16]**

Q2) a) Mention the publicly available databases. Explain any one of them in detail. **[8]**

b) Explain in brief the methods of visualisation of data. **[8]**

Q3) What is homology search? Mention the steps involved in homology search. Explain the procedure with the help of an appropriate example. **[16]**

Q4) Write notes on any two of the following : **[16]**

a) Gene expression informatics.

b) Parabolic interpolation.

c) Structure based drug designing.

SECTION - II

Q5) a) How are molecular interactions simulated? Explain with the help of suitable example. **[8]**

b) How are binding sites in protein located? Explain with the help of an appropriate example. **[8]**

P.T.O.

Q6) How are protein structures predicted? Add an explanatory note on classification of protein structures. **[16]**

Q7) Explain the following : **[16]**

a) Ramachandran plot

b) Protein folding -structure function relationship.

Q8) Write notes on any two of the following. **[16]**

a) Bioinformatics business models.

b) Computer based research.

c) Role of bioinformatics in drug designing.

# # # #

Total No. of Questions : 8] **[Total No. of Pages : 2**

P1201

[3727-B]- 603
M.Sc.
BIOTECHNOLOGY
BT - 23 : Plant Biotechnology
(Sem. - II) (2008 Pattern) (New)

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 should 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) Explain the concept of plant biotechnology. Mention the landmarks in the development of plant biotechnology as of today. **[16]**

Q2) a) Explain with suitable example, qualitative improvement in an economically important alga. **[8]**

b) Enlist economically important fungi. Explain the technology to improve any one of them. **[8]**

Q3) Enlist the conventional methods of crop improvement. Mention plant tissue culture based technologies used to overcome limitations of conventional methods of crop improvement. **[16]**

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

a) Somaclonal variation.

b) Hormonal control of organogenesis in vitro.

SECTION - II

Q5) a) How are plants used for production of vaccines? **[8]**

b) Explain the strategy for establishment of drought tolerence in transgenic plants. **[8]**

P.T.O.

Q6) Explain with appropriate examples the use of transgenics for qualitative improvement in proteins and lipids. **[16]**

Q7) a) Explain the role of plant biotechnology in phytoremediation. **[8]**

b) Mention essential steps in vermiculture. **[8]**

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

a) Significance of transgenic technology in improvement of secondary metabolite production.

b) Large scale production of SCP.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P1202

[3727-B]- 701
M.Sc.
BIOTECHNOLOGY
BT - 31 : Animal Biotechnology
(Sem. - III) (2008 Pattern) (New)

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 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) a) State the applications of in vitro cultured cells with respect to **[8]**

i) Monoclonal antibodies.
ii) Vaccine production.
iii) Recombinant proteins.
iv) Toxicity testing.

b) Explain microinjection method to bring about genetic modifications. **[8]**

Q2) a) Explain the terms : **[8]**

i) Determination.
ii) Committment.
iii) Differentiation.
iv) Terminal differentiation.

b) What is cryopreservation? Explain the methodology for cryopreservation of a cell line. **[8]**

Q3) a) Describe types of inbreeding and comment on their advantages. **[8]**

b) Describe the pen and Flock methods of breeding poultry birds. **[8]**

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

a) In Vitro fertilization.
b) Immobilization of cells in culture.

P.T.O.

SECTION - II

Q5) Explain the terms embryo transfer. Describe the methods available for increasing the number of progeny. **[16]**

Q6) a) Mention the steps involved in in vitro fertilization. What are the limitations of IVF? **[8]**

b) Explain the limitations of embryo transfer technique. **[8]**

Q7) a) Explain the methods of vector mediated gene transfer in animals. **[8]**

b) What is artificial insemination? Mention advantages and limitations of the same. **[8]**

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

a) Electroporation for genetic modification.

b) Use of transgenic mouse for studying animal development.

Total No. of Questions : 6] **[Total No. of Pages : 1**

P1203

[3727-B]- 703
M.Sc.
BIOTECHNOLOGY
BT - 33 a : Principles of Virology
(Sem. - III) (New) (2008 Pattern)

Time : 1½ 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 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) Explain the replication cycle of Pox Virus. **[10]**

Q2) Discuss the advantages, limitations and applications of different methods for detecting viral infections. **[10]**

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

a) Structure of T_4 - bacteriophage.

b) Subunit vaccines.

SECTION - II

Q4) Discuss the epidemiology of HIV and measles. **[10]**

Q5) Write short notes on : **[10]**

a) TMV plant disease.

b) Criteria for successful viral vaccine.

Q6) What are acute infections? Discuss in details any one such infection. **[10]**

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Total No. of Questions : 6] **[Total No. of Pages : 1**

P1204

[3727-B]- 704
M.Sc.
BIOTECHNOLOGY
BT - 33 b : Advanced Immunology
(Sem. - III) (2008 Pattern) (New)

Time : 1½ 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 two 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) List the primary lymphoid organs and summarize their functions in the immune system. **[10]**

Q2) Explain the evolution of immune response in plants and insects. **[10]**

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

a) Auto immunity.

b) Hybridoma technology.

SECTION - II

Q4) Explain the phenomenon of herd immunity. How does this phenomenon relate to appearence of certain epidemic? Explain with suitable example. **[10]**

Q5) a) How are chimeric antibodies prepared? **[5]**

b) What are stem cells? How are they useful in immunology? **[5]**

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

a) Polyvalent vaccines.

b) Antibody engineering.

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Total No. of Questions : 8] **[Total No. of Pages :2**

P1430

[3727-B] - 801
M.Sc.
BIOTECHNOLOGY
BT - 41 : Genomics and Proteomics
(2008 Pattern) (New) (Sem. - 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 in brief the concept of 'Genomics'. Mention the sequencing strategies for whole genome analysis. **[12]**

Q2) What is computational genomics? Explain its contribution to research in biology. **[12]**

Q3) Explain : **[12]**

a) Main steps in genome annotation.

b) Principles and scope of structural genomics.

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

a) Pharmacogenomics and Drug discovery.

b) Microarray and its application.

P.T.O.

SECTION - II

Q5) Explain the concept of proteomics. Mention its strategies. **[12]**

Q6) Explain with the help of a suitable example, the computational approach for studying protein-protein interactions. **[12]**

Q7) Enlist the applications of proteomics and explain any one with the help of appropriate example. **[12]**

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

a) Functional proteomics.

b) Methodologies of proteomics.

Total No. of Questions : 8] **[Total No. of Pages :2**

P1431

[3727-B] - 802

M.Sc.

BIOTECHNOLOGY

BT - 42 : Legal and Ethical Aspects in Biotechnology and IPR

(2008 Pattern) (New) (Sem. - 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 two 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 are the difference between intellectual property and other types of property? Mention different forms of intellectual property rights. **[12]**

Q2) Explain, with the help of a flow chart, procedure for obtaining a patent. Add a note on rights of a patentee. **[12]**

Q3) Explain with a appropriate example, the background, facts and implications of any one biotechnology patent. **[12]**

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

a) Copyright infringement.

b) Software copyright.

SECTION - II

Q5) What is an Industrial design? Outline the procedure to obtain monopoly rights on such design. **[12]**

P.T.O.

Q6) Discuss the impact of TRIPS on Indian patent Act 1970. **[12]**

Q7) Mention the plant breeders' and farmers' rights. How are these protected? **[12]**

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

a) Budapest Treaty.

b) Contents of a patent specification of biological product.

Total No. of Questions : 7] **[Total No. of Pages : 1**

P1432

[3727-B]- 803
M.Sc.
BIOTECHNOLOGY
BT - 43 : Clinical Research and Database Management
(Sem. - IV) (2008 Pattern) (New)

Time : 1½ 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? What are its duties, responsibilities and authority in the context of clinical research? **[10]**

Q2) Explain with suitable example research, development and marketing of medical device. **[10]**

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

a) Drug development and biologies.

b) GLP and GMP in pharmaceutical Industry.

SECTION - II

Q4) Explain the significance of clinical trials. Outline the design for a clinical trial. **[10]**

Q5) State the principles of data management in the context of clinical research. **[10]**

Q6) What are the essentials of source documentation? Add a note on maintenance and management of essential documents. **[10]**

Q7) Write notes on : **[10]**

a) Recording and reporting non serious adverse events.

b) Designing and development of case report form.

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Total No. of Questions : 6] **[Total No. of Pages : 1**

P1433

[3727-B]- 804
M.Sc.
BIOTECHNOLOGY
BT - 44 a : Nanobiotechnology
(Sem. - IV) (2008 Pattern) (New)

Time : 1½ 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 two 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 are the attributes of a nanomaterial? Compare these with the attributes of the bulk material. Cite appropriate examples. Add a note on different forms of nanomaterials. **[10]**

Q2) a) Compare the principles and scope of nanoscience and nanotechnology with reference to biological systems.

b) Enlist the applications of nanomaterials in physical sciences. Explain any one of them. **[10]**

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

a) Properties of functional nano-bio-materials.

b) Advantages of nanobiotechnology.

SECTION - II

Q4) Enlist physico-chemical methods of obtaining nanoparticles. Explain any one of them. **[10]**

Q5) Explain the biology based method of synthesis of nanomaterials. State the advantages of these methods, over other methods, if any. **[10]**

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

a) Current trends in nanobiotechnology.

b) In vivo synthesis of nanoparticles.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P1434

[3727-B]-805
M.Sc.
BIOTECHNOLOGY
BT 44b : Stem Cell Technology and Regenerative Medicines
(2008 Pattern) (New) (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 two 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, with the help of appropriate diagrams, the structure of an oocyte and a sperm in mammals. **[12]**

Q2) Enlist the major events involved in pattern formation. Explain any two events. **[12]**

Q3) Explain **[12]**

a) Process of embryonic induction.

b) Cell lineages and their significance.

Q4) Define differentiation. Mention the major events during cell differentiation. Explain any one. **[12]**

SECTION - II

Q5) What are 'stem cells'? Mention their peculiarities. Add a note on embryonic stem cells. **[12]**

Q6) Explain the concept of 'Embryonic stem cell technology'. Mention appropriate examples in support of your answer. **[12]**

P.T.O.

Q7) What is a transgenic? Enlist the methods of producing transgenics. Explain any one method. **[12]**

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

a) Advantages of gene therapy.

b) Ethical issues in human cloning.

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Total No. of Questions :8] **[Total No. of Pages : 2**

P1435

[3727-B]-806
M.Sc.
BIOTECHNOLOGY
BT - 44 C : Agricultural Biotechnology
(New) (2008 Pattern)

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 two 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) Enlist the methods of production of doubled haploids. Explain any one method. Mention their application in agriculture. **[12]**

Q2) Explain, with appropriate examples, the role of micro-propagation in multiplication of elite varieties of cereal or pulse or oil seed crop. **[12]**

Q3) Explain : **[12]**

a) Application of embryo rescue in agrobiotechnology.

b) Importance of 'Apomicts' in agrobiotechnology.

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

a) Applications of somaclonal variations.

b) Induced polyembryony.

P.T.O.

SECTION - II

Q5) Explain with appropriate example the use of bioreactor for rapid, large scale production of plants. Add a note on testing the fidelity of regenerents. **[12]**

Q6) What are transgenic crops? Explain with appropriate example, the application of transgenesis to develop herbicide resistant crops. **[12]**

Q7) What is metabolic engineering? What are its advantages? What are its limitations? Cite appropriate examples. **[12]**

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

a) Transgenic plants to produce edible vaccines.

b) Biopesticides.

# # # #

Total No. of Questions : 8] **[Total No. of Pages : 2**

P1273

[3727-B]-61
M.Sc.
BIOTECHNOLOGY
BT-21 : Molecular Biology
(Old)

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

Instructions to candidates:

1) ***Attempt a total of Five questions selecting at least two questions from each section.***
2) ***Answers to the two 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 organisation and structure of genome of a prokaryote. **[16]**

Q2) Explain: **[16]**

a) Repetitive sequences.

b) Chloroplast genome organisation.

Q3) Explain a model of DNA replication. Add a note on role of DNA polymerases. **[16]**

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

a) Structure and mechanism of action of reverse transcriptase.

b) DNA damage.

SECTION - II

Q5) Explain the molecular mechanisms involved in transcription. Add a note on regulation of transcription. **[16]**

P.T.O.

Q6) Give a concise account of post transcriptional processing and transport of RNA. **[16]**

Q7) Explain the molecular basis of the development of plant embryo and its germination. **[16]**

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

a) Pattern regulation during flower development.

b) Oncogenes.

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Total No. of Questions : 6] **[Total No. of Pages : 2**

P1274

[3727-B]-62
M.Sc.
BIOTECHNOLOGY
BT-22 : Genetics
(Old)

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

Instructions to candidates:

1) ***Attempt a total of Four questions selecting at least two questions from each section.***
2) ***Answers to the two 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) State the principles of Mendelian genetics. Add a note on post Mendelian concepts. **[10]**

Q2) Explain with appropriate examples the scope of plant genetics in crop improvement. **[10]**

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

a) Structural aberrations in Chromosomes.

b) Coenorhabditis as a model system to study genetics.

SECTION - II

Q4) Explain Operon concept. Illustrate any one model of Operon. **[10]**

Q5) Explain: **[10]**

a) Transposons in eukaryotes.

b) Applications of chemical mutations.

P.T.O.

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

a) Transformation.

b) Detection of genotoxicity.

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Total No. of Questions : 6] **[Total No. of Page : 1**

P1275

[3727-B]-63
M.Sc.
BIOTECHNOLOGY
BT-23a : Microbiology
(Old)

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 two 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 characteristics of life cycle of Cyanobacteria. **[10]**

Q2) Explain the method of cultivation of bacteria in Vitro. Add a note of growth Kinetics. **[10]**

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

a) Characteristics of anaerobes.

b) Resistance of pathogenic microbes to drugs.

SECTION - II

Q4) Describe salient features of Agrobacterium. Describe post infection changes brought about by Agrobacterium species. **[10]**

Q5) Explain: **[10]**

a) Microbe mediated biotransformation.

b) Immuno probe tests for microbe identification.

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

a) Mycobacteria

b) Extremophiles.

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Total No. of Questions : 6] **[Total No. of Pages : 2**

P1276

[3727-B]-64
M.Sc.
BIOTECHNOLOGY
BT-23b : Virology
(Old)

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 two 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) Illustrate the micromorphology of any one plant virus. Mention the differences between plant and animal viruses. **[10]**

Q2) How are viruses classified? Explain the characters used for the classification. Cite suitable examples. **[10]**

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

a) Retro viruses.

b) Propagation of plant viruses.

SECTION - II

Q4) Mention the methods of viral diagnostics. Explain any one. **[10]**

Q5) Give a concise account of viral Vaccines. **[10]**

P.T.O.

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

a) Designing of antiviral drugs.

b) Viral vectors.

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Total No. of Questions : 6] **[Total No. of Page : 1**

P1277

[3727-B]-65
M.Sc.
BIOTECHNOLOGY
BT-24 : Immunology
(Old)

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 two 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 meant by Immunity? Explain the function / mechanism of an effective immune system. **[10]**

Q2) Compare and contrast the innate and aquired immune systems. **[10]**

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

a) Primary immune responses.

b) T cell ontogeny.

SECTION - II

Q4) Explain the mechanism of generation of immune response. **[10]**

Q5) Explain: **[10]**

a) MHC - Peptide interaction.

b) Auto-immune diseases.

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

a) Lymphocyte traffic.

b) Techniques in cellular immunology.

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Total No. of Questions : 6] **[Total No. of Page : 1**

P1278

[3727-B]-66
M.Sc.
BIOTECHNOLOGY
BT-25 : Bioinformatics
(Old)

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 two 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 concept of Bioinformatics. Describe the methodology and scope of Bioinformatics. **[10]**

Q2) Mention the methods of analysis and interpretation of sequence data. Explain one. **[10]**

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

a) Database browsing.

b) Biological databases.

SECTION - II

Q4) Explain the methods of analysis and interpretation of genome data. **[10]**

Q5) Explain: **[10]**

a) Principles of computational biology.

b) Methods of data retrieval.

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

a) Salient features of biological database.

b) Use of bioinformatics in Biotechnology.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P1279

[3727-B]-71

M.Sc.

BIOTECHNOLOGY

BT-31 : Tissue Culture (Plant and Animal)

(Old)

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 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) Enlist the types of tissue culture systems used in plant / animal tissue culture. Mention advantages, limitations and applications of any one system. **[16]**

Q2) Mention the landmarks in the area of plant tissue culture. Explain any one recent development. **[16]**

Q3) Explain the bases for selecting specific components for preparing plant tissue culture media. Add a note on significance of pH of nutrient medium. **[16]**

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

a) Totipotency of plant cells.

b) Methods of separation of cell types.

SECTION - II

Q5) Compare and contrast in vitro organogenesis and embryogenesis in plants. **[16]**

P.T.O.

Q6) Explain: **[16]**

a) Secondary metabolism in cultured plant cells.

b) Plant protoplast culture.

Q7) Enlist the commercial applications of animal tissue culture and explain any one. **[16]**

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

a) Mammalian cloning.

b) Genetic manipulation of cultured cells.

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Total No. of Questions : 6] **[Total No. of Page : 1**

P1280

[3727-B]-72
M.Sc.
BIOTECHNOLOGY
BT-32 : Fundamentals of Genetic Engineering
(Old)

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 two 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 basic principles of engineering as applied to living system. **[10]**

Q2) Enlist the methods of genetic engineering and explain any one. Cite suitable examples. **[10]**

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

a) Screening of transformants.

b) Site directed mutagenesis.

SECTION - II

Q4) Enlist the expression vectors in bacteria. Explain organisation of any one vector. **[10]**

Q5) Explain with suitable examples the mechanism of induced expression. **[10]**

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

a) Chimeric constructs.

b) Over expression of commercially important products.

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Total No. of Questions : 6] **[Total No. of Page : 1**

P1281

[3727-B]-73
M.Sc.
BIOTECHNOLOGY
BT-33 : Biological Chemistry II
(Old)

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 two 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) Enlist advanced techniques of chromatography and explain principles, method and application of any one. **[10]**

Q2) Explain the techniques of proteomics. **[10]**

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

a) Microarray analysis.

b) Southern Blot.

SECTION - II

Q4) Enlist the techniques used to illucidate the structure of Macromolecules. Explain any one. **[10]**

Q5) Explain the anatomy of Proteins. **[10]**

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

a) Sequencing of DNA.

b) Sequencing of Proteins.

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Total No. of Questions : 6] **[Total No. of Page : 1**

P1282

[3727-B]-74
M.Sc.
BIOTECHNOLOGY
BT-34 : Biochemical Engineering
(Old)

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 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) What is a bioreactor? Illustrate a design of any one type of bioreactor. **[10]**

Q2) Explain mathematical aspects of functioning of a bioreactor. **[10]**

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

a) Simulation of reaction Kinetics.

b) Applications of biochemical engineering.

SECTION - II

Q4) Explain transport phenomena in biochemical engineering w.r.t. mass transfer. **[10]**

Q5) Mention Process control systems in biochemical engineering. **[10]**

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

a) Rheology.

b) Heat transfer during biochemical engineering.

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Total No. of Questions : 6] **[Total No. of Page : 1**

P1283

[3727-B]-75
M.Sc.
BIOTECHNOLOGY
BT-35 : Pleuripotent Cell Technologies and Reproduction (Old)

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 two 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 structure of gametic cells in mammals. Mention the subcellular events during Fertilization. **[10]**

Q2) Explain the Metabolic and subcellular changes during early embryogenesis. **[10]**

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

a) Cell differentiation.

b) Pleuripotency of animal cells.

SECTION - II

Q4) What are stem cells? Describe their special features and types. **[10]**

Q5) Give a concise account of any two embryonic stem cell based technologies. **[10]**

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

a) Gene therapy.

b) Bioethical implications of human cloning.

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Total No. of Questions : 6] **[Total No. of Page : 1**

P1284

[3727-B]-81
M.Sc.
BIOTECHNOLOGY
BT-41 : Structural Biology
(Old)

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 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) Explain reciprocal lattice parameters and transformations. **[10]**

Q2) Describe the Isomorphous and anomalous dispersion methods. **[10]**

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

a) Structure validation.

b) Fibre diffraction.

SECTION - II

Q4) Explain the application of NMR spectroscopy to determine structure of proteins. **[10]**

Q5) Explain the use of Fluorescence spectroscopy in biopolymer structure analysis. **[10]**

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

a) Nuclear Overhousser effect.

b) Cosy technique.

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Total No. of Questions : 6] **[Total No. of Page : 1**

P1285

[3727-B]-82
M.Sc.
BIOTECHNOLOGY
BT-42 : Industrial Biotechnology
(Old)

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 two 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 enzyme technology? Enlist the structural and functional peculiarities of enzymes as biocatalysts. **[10]**

Q2) What is bioprocess technology? Explain the significance of R & D and pilot scale production. **[10]**

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

a) Bioprocess technology for therapeutic proteins.

b) Immobilized enzymes.

SECTION - II

Q4) Explain the concept of bioremediation. Cite suitable examples. **[10]**

Q5) Describe the processes involved in bioconversion of agricultural waste in to useful products. **[10]**

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

a) Biogas production.

b) Bioconversion of petrochemical waste.

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Total No. of Questions : 6] **[Total No. of Pages : 2**

P1286

[3727-B]-83

M.Sc.

BIOTECHNOLOGY

BT-43 : Applications of Genetic Engineering

(Old)

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 two 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, with the help of two examples, application of genetic engineering in production of pharmaceuticals. **[10]**

Q2) Describe the genetic engineering based technologies used for environmental monitoring. **[10]**

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

a) Transgenic plants for pest resistant crops.

b) DNA marker technology to test fidelity of micropropagated plants.

SECTION - II

Q4) Enlist the programmes for sequence analysis and comparison. Explain any one. **[10]**

Q5) Enlist the IPRs related to biotechnology. Explain any one. **[10]**

P.T.O.

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

a) Biosafety regulations.

b) Proteomics.

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Total No. of Questions : 6] **[Total No. of Page : 1**

P1287

[3727-B]-84
M.Sc.
BIOTECHNOLOGY
BT-44 : Plant Biotechnology
(Old)

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 two 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 are somaclonal variations? Mention their advantages and limitations in micropropagation. **[10]**

Q2) Mention the stages of micropropagation. Which is most critical stage? Why? **[10]**

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

a) Problems in micropropagation of forest trees.

b) Micropropagation of ornamentals.

SECTION - II

Q4) Sketch a design of a commercial micropropagation laboratory cum unit. Label the subunits. Indicate the flow of elite explant till a number of regenerents. **[10]**

Q5) Explain the advantages of anther / pollen culture over conventional methods of obtaining homozygous diploid progeny. **[10]**

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

a) Somatic hybrids in agriculture.

b) Synthetic seed.

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Total No. of Questions : 6] **[Total No. of Page : 1**

P1288

[3727-B]-86
M.Sc.
BIOTECHNOLOGY
BT-46 : Genomics and Proteomics
(Old)

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 two 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 genomics? Mention the strategies for analysis of whole genome. **[10]**

Q2) Explain: **[10]**

a) Sequence data analysis.
b) Global analysis of gene expression.

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

a) Functional genomics.
b) Microarray.

SECTION - II

Q4) What is Proteomics? Mention the strategies of Proteomics and explain any one. **[10]**

Q5) Enlist the applications of proteomics and explain any one. Cite appropriate examples. **[10]**

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

a) Structural Proteomics.
b) Novel Proteins.

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Total No. of Questions : 6] **[Total No. of Pages : 2**

P1289

[3727-B]-87
M.Sc.
BIOTECHNOLOGY
BT-47 : Immunotechnology
(Old)

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 two 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 the scope of molecular immunology? Mention the applications of molecular immunology. **[10]**

Q2) a) What is autoimmunity? How is it developed?

b) Enlist the techniques of molecular immunology and explain any one. **[10]**

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

a) Monoclonal antibodies.

b) Bone Marrow Chimera.

SECTION - II

Q4) What are animal models used in immunology? How are transgenic animals employed for immunology? **[10]**

Q5) Explain the procedure of large scale manufacture of antibodies. **[10]**

P.T.O.

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

a) Recombinant vaccines.

b) Immunodiagnostics.

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