Total No. of Questions : 6]

SEAT No. :

P2780

[Total No. of Pages : 2

[4836] - 11

M.Sc. (Biotechnology) (Semester - I)

BT-11 : Advanced Biological Chemistry

(2008 Pattern)

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

Instructions to the candidates:

1) ***Question no. 1 is compulsory.***
2) ***Answer any four from the remaining questions.***
3) ***Marks are given in parentheses.***

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

a) Give the principle of Fluorescence spectroscopy with its applications.

b) Explain the structure of β-pleated sheet of a protein.

c) Discuss the role of alkaloids in plant chemical defence.

d) Define metabolic engineering. Give its role in metabolomics studies.

e) Describe any one homopolysaccharide with example.

Q2) a) Give the manipulation of metabolic pathway at enzyme level. **[7]**

b) Discuss the protein degradation pathway by using ubiquitin. **[8]**

Q3) a) With the help of schematic diagram explain the components and working of UV-Visible spectroscopy. **[8]**

b) Describe the Soxhlet method for isolation of secondary metabolites. **[7]**

Q4) Answer the following :

a) Give the pharmacological applications of terpenoids. **[5]**

b) Discuss the importance of protein micro array in disease diagnosis. **[5]**

c) Explain the three prominent ways of metabolic regulation. **[5]**

P.T.O.

Q5) Write a short notes on :

a) Metabolic Flux. **[5]**

b) Site directed mutagenesis. **[5]**

c) Henderson-Hesselbalch equation. **[5]**

Q6) Describe in detail non covalent interactions involved in forming tertiary structure of a protein. **[15]**

Total No. of Questions : 6]

SEAT No. :

P2781

[Total No. of Pages : 2

[4836] - 12

M.Sc. (Biotechnology) (Semester - I)

BT-12 : Molecular & Cell Biology

(2008 Pattern)

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

Instructions to the candidates:

1) ***Figures to the right indicate full marks.***
2) ***Question no. 1 is compulsory. Solve any four of the remaining.***
3) ***Use of colour pencils restricted to diagrams.***

Q1) Short notes on : (any four) **[4 × 5 = 20]**

a) Tyrosine kinase receptor.

b) Sugar transport in plants.

c) Cell cycle.

d) Pharmacogenomics.

e) Natural defense against diseases.

Q2) a) Explain the mechanism of protein transport to chloroplast. **[7]**

b) How are auxins delivered to the target cells? Add a note on their mode of action. **[8]**

Q3) Short notes on : **[5 × 3 = 15]**

a) Photophosphorylation.

b) Jagendroff's experiment.

c) Hill's reaction.

Q4) a) Explain in detail - Genes involved in early development with the help of suitable example. **[7]**

b) Describe role of secondary messangers with example. **[8]**

P.T.O.

Q5) Describe in detail process of prokaryotic transcription. **[15]**

Q6) Short notes on : **[5 × 3 = 15]**

a) Alkylating agents & mutations.

b) Nucleotide excision repair.

c) O-linked glycosylation.

Total No. of Questions : 6]

SEAT No. :

P2782

[Total No. of Pages : 2

[4836] - 13

M.Sc. (Biotechnology) (Semester - I)

BT-13 : Environmental Biotechnology

(2008 Pattern)

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

Instructions to the candidates:

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

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

a) Gas law governing dispersion of air pollution.

b) Agenda 21.

c) Measures for noise control.

d) Conservation biotechnology.

e) Ecolabeling.

Q2) Compare and contrast between renewable and non-renewable energy sources. Justify the advantages of renewable energy sources giving appropriate examples. **[15]**

Q3) a) Explain the principle of GIS. Give its applications in ecological mapping. **[8]**

b) What is EIA? Write guidelines for EIA with an appropriate case study. **[7]**

Q4) a) Explain the principle and methodology involved in nitrogen removal in waste water treatment. **[8]**

b) Write a note on environmental priorities in India. **[7]**

P.T.O.

Q5) a) Elaborate on biological treatment strategies for air pollution abatement. **[8]**

b) Define soil pollution. Discuss its causes and harmful effects on environment. **[7]**

Q6) a) Explain physical operations applied in waste water treatment and elaborate on adsorption operation. **[8]**

b) Describe in detail aerobic attached growth process for removal of organisms in waste water treatment. **[7]**

Total No. of Questions : 8]

SEAT No. : ____

P2783

[Total No. of Pages : 2

[4836] - 21

M.Sc. (BIOTECHNOLOGY) (Semester - II)

BT-21 : Genetic Engineering

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) a) What are cosmids? Describe their applications with examples. **[8]**

b) Describe criteria to select plasmids as cloning vectors. **[8]**

Q2) a) Describe Maxam and Gilbert's technique of DNA sequencing. **[8]**

b) Describe with example different enzymes used in genetic Engineering. **[8]**

Q3) a) Describe different methods of construction of rDNA molecules. **[8]**

b) Explain the use of RFLP in detection of genetic disorders. **[8]**

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

a) Genetically engineered biotherapeutics.

b) Star activity of restriction enzymes & its significance.

c) Lambda replacement vectors.

P.T.O.

SECTION - II

Q5) a) Describe different methods of transfer of rDNA molecules to host cells. **[8]**

b) What is RT-PCR? Describe the technique & its applications. **[8]**

Q6) a) Describe different strategies in primer designing. **[8]**

b) Describe the technique of maximization of production of proteins using expression vectors. **[8]**

Q7) a) Discuss recombinant retro viruses as gene delivery systems for gene therapy protocols. **[8]**

b) What is genomic DNA library? Describe the technique & its uses. **[8]**

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

a) Hybrid arrested translation & its applications.

b) Cytogenetic maps.

c) DNA markers in plants.

Total No. of Questions : 8]

SEAT No. : ____

P2784

[Total No. of Pages : 2

[4836] - 22

M.Sc. (Biotechnology) (Semester - II)

BT 22 : Bioinformatics

(2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt total five questions selecting atleast two questions from each section.***
2) ***Answer 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) Explain use of genomic databases to obtain the desired sequences. Add a note on features of any one desired genomic database. **[16]**

Q2) a) What are the important features in paire wise alignment of sequences using BLAST? **[8]**

b) How will you find out a gene by using a tool of bioinformatics? **[8]**

Q3) What are drug targets? What is the role of bioinformatics in drug designing? **[16]**

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

a) Genebank.

b) PDB.

P.T.O.

SECTION - II

Q5) a) What are annotations? Explain with the help of suitable example. **[8]**

b) Draw Ramchandran plot & discuss its importance in protein chemistry. **[8]**

Q6) a) Discuss use of scop in protein structure classification. **[8]**

b) Explain the importance of SWISS PROT in protein sequence analysis. **[8]**

Q7) a) What are the strategies used in epitope prediction? **[8]**

b) What is the role of bioinformatics in analysis of protein structure-function relationship? **[8]**

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

a) Bioinformatics business models.

b) Commercial research funding in bioinformatics.

Total No. of Questions : 8]

SEAT No. :

P2785

[Total No. of Pages : 2

[4836] - 23

M.Sc. (BIOTECHNOLOGY) (Semester - II)

BT-23 : Plant Biotechnology

(2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt a total of five question 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) a) What is Plant Biotechnology? How is it different from Plant Biology? **[8]**

b) Mention at least three economically important algae and explain use of biotechnology for qualitative and quantitative improvement of any one. **[8]**

Q2) Mention at least four economically important Fungi. Explain use of Fungal biotechnology for qualitative improvement of any two. **[16]**

Q3) What are the advantages of embryogenesis over organogenesis as route of multiplication during micropropagation? Cite two examples. **[16]**

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

a) Transgenics for secondary metabolites.

b) Importance of callus cultures.

c) Use of PGRs in plant biotechnology.

P.T.O.

SECTION - II

Q5) Explain any one method of developing transgenic plants, cite at least two examples. **[16]**

Q6) Enlist the applications of transgenic plants. Explain with suitable examples any two. **[16]**

Q7) a) What are biopesticides? How are these manufactured? Cite two examples. **[8]**

b) What are somatic hybrids? Explain any two applications. **[8]**

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

a) Application of haploids in crop improvement.

b) Plantibodies.

c) SCP.

Total No. of Questions : 8]

SEAT No. :

P2786

[Total No. of Pages : 2

[4836] - 31

M.Sc. (Biotechnology) (Semester - III)

BT-31 : Animal Biotechnology

(2008 Pattern)

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 on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Mention animal cell culture systems. Explain any one type with reference to maintenance and growth. **[16]**

Q2) What are stem cells? How are they identified? Explain the procedure for long term maintenance and characterization of stem cell cultures. **[16]**

Q3) Explain : **[16]**

a) Hazards of artificial breeding of live stock.

b) Methods of conservation of live stock.

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

a) Gene banking.

b) Heterogenity of stem cells.

c) Applications of animal cell cultures.

P.T.O.

SECTION - II

Q5) Explain the methodology of in vitro fertilization in animals. Add a note on follow up of the immediate products of in vitro fertilization. **[16]**

Q6) Describe in detail the procedures to obtain transgenic animal. **[16]**

Q7) Explain : **[16]**

a) Advantages of artificial insemination.

b) Bioethical issues arising out of transgenic animals.

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

a) Methods of germ cell storage.

b) Embryo transfer and its application.

c) Knock out mice.

Total No. of Questions : 8]

SEAT No. :

P2787

[Total No. of Pages : 2

[4836] - 32

M.Sc. (BIOTECHNOLOGY) (Semester - III)

BT-32 : Fermentation Technology

(2008 Pattern) (New)

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

Instructions to the candidates:

1) ***Attempt a total of five question 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) With the help of suitable diagram(s) describe the operational aspects of the two basic types of impeller systems used in typical fermenters. **[16]**

Q2) a) With the help of a diagram explain how shear forces are reduced in bubble column reactors. **[8]**

b) What is non mechanical agitation? Explain its need and advantages over mechanical agitation. **[8]**

Q3) a) Explain properties of stainless steel that make it compatible for use in construction of bioreactors. **[8]**

b) Illustrate and describe the construction of combined impeller aerators. **[8]**

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

a) Advantages of salting out for recovery of enzymes.

b) Bioprocess as better means for production of organic acids.

c) Control of precursors on metabolite production.

P.T.O.

SECTION - II

Q5) Explain the use of centrifugation as a unit - process in downstream processing of a fermentation product, using suitable example and equipment diagrams. **[16]**

Q6) a) Draw and explain the flow chart for down stream processing for recovery of ethanol from fermented broth. **[8]**

b) Explain the biochemistry of methane production. **[8]**

Q7) a) State and explain the applications of lactic acid bacteria for betterment of human life. **[8]**

b) Explain the role of feedback inhibition in regulating the over production of microbial metabolites. **[8]**

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

a) Use of solvents in enzyme recovery.

b) Limitations of chemical processes as compared to bioprocesses in manufacture of secondary metabolites.

c) Control of over production of metabolites by inhibitors.

Total No. of Questions : 6]

SEAT No. :

P2788

[Total No. of Pages : 1

[4836] - 33

M.Sc. (BIOTECHNOLOGY) (Semester - III)

BT-33a : Principles of Virology

(2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt a total of four question 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 viruses? Mention the characters used for their classification. Draw and explain any one scheme of classification of viruses. **[10]**

Q2) Explain the process of replication of Polio virus and HIV. **[10]**

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

a) Ultra structure of T4 bacteriophage.

b) Diagnosis of viral diseases.

SECTION - II

Q4) Explain various aspects of epidemiology of measles. **[10]**

Q5) a) Enlist at least three viral diseases of plants and describe structure of causative virus for any one disease. **[5]**

b) How does Hepatitis B virus evoke pathogenic responses? **[5]**

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

a) Poultry viruses.

b) Viral vaccines.

Total No. of Questions : 6]

SEAT No. :

P2789

[Total No. of Pages : 1

[4836] - 34

M.Sc. (BIOTECHNOLOGY) (Semester - III)

BT-33b : Advanced Immunology

(2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt a total of four question 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) Explain with the help of an appropriate example, role of cell or tissue system in immune system. **[10]**

Q2) Give a concise account of evolution of immune response in plants. **[10]**

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

a) Monoclonal antibody.

b) Auto immune system.

SECTION - II

Q4) Explain with the help of an appropriate example, use of transgenic animals in immunology. **[10]**

Q5) Mention the steps involved in large scale manufacture of antibodies and explain any one step. **[10]**

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

a) Polyvalent Vaccines.

b) Immunodiagnostics.

✦✦✦✦

Total No. of Questions : 8]

SEAT No. :

P2790

[Total No. of Pages : 2

[4836] - 41
M.Sc. (Semester - IV)
BIOTECHNOLOGY
BT - 41 : Genomics and Proteomics
(2008 Pattern)

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

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 on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Explain how directed sequencing technique is useful for whole genome analysis. **[12]**

Q2) Explain with the help of an appropriate example, how sequence based modeling can be used in structural genomics. **[12]**

Q3) Give an explanatory account of any one of the following: **[12]**

a) SAGE in functional genomics..

b) Transcriptomics.

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

a) Use of pharmacogenomics in drug discovery.

b) RNAi for studying gene expression.

c) Toxicogenomics.

P.T.O.

SECTION - II

Q5) What is protein structure initiative? How is it useful in structural proteomics? **[12]**

Q6) Explain the role of proteomics in drug development. Cite appropriate examples. **[12]**

Q7) Enlist different strategies used in proteomics and elaborate any one strategy. Cite appropriate examples. **[12]**

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

a) Proteomics for screening of diagnostic markers.

b) PDB.

c) Understanding Protein - Protein interactions.

Total No. of Questions : 8]

SEAT No. :

P2791

[Total No. of Pages : 2

[4836] - 42
M.Sc. (Semester - IV)
BIOTECHNOLOGY
BT - 42 : Legal and Ethical Aspects in Biotechnology and IPR
(2008 Pattern)

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

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) What are different types of properties? To which type you would assign a patentable invention? Why? **[12]**

Q2) What is Budapest Treaty? Explain its contribution in Biotechnological IPs. Explain with an appropriate example. **[12]**

Q3) Explain the procedures for

a) Transfer of a copyright. **[6]**

b) Controlling infringement of a patent. **[6]**

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

a) Patent on transgenic plants.

b) Plant Breeders' rights.

P.T.O.

SECTION - II

Q5) What is an industrial design? Justify such design as an intellectual property. Mention the legal provisions that protect such designs. **[12]**

Q6) Compare the Patent Act 1970 (India) and recently ammended Patent Act with reference to Biotechnology patents. **[12]**

Q7) Explain:

a) Protection of Farmers' rights. **[6]**

b) Significance of Geographical Indication. **[6]**

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

a) Mandate of WTO with reference to biotechnology.

b) Role of Biodiversity Act.

Total No. of Questions : 6]

SEAT No. :

P2792

[Total No. of Pages : 2

[4836] - 43
M.Sc. (Semester - IV)
BIOTECHNOLOGY
BT - 43 : Clinical Research and Database Management
(2008 Pattern)

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) State important legislations and regulations that govern clinical research. **[10]**

Q2) What are Biologics? Mention the processes for research, development and licencing of Biologics. **[10]**

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

a) Rights of a patient.

b) Approval of a new drug.

c) Aims and objectives of FDA.

SECTION - II

Q4) Elaborate the process of designing and development of protocol for clinical trials. **[10]**

P.T.O.

Q5) Enlist the fields of information for a clinical research database. Elaborate any one field. **[10]**

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

a) Query resolution process.

b) Recording non serious adverse events.

c) Design of a case report form.

Total No. of Questions : 6]

SEAT No. :

P2793

[Total No. of Pages : 2

[4836] - 44
M.Sc. (Semester - IV)
BIOTECHNOLOGY
BT - 44a : Nanobiotechnology
(2008 Pattern)

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 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) Mention physico chemical features that define nanoparticles. Add a note on scope of nanoscience. **[10]**

Q2) Explain the applications of nanomaterials in Chemical and material sciences. **[10]**

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

a) Nanobiosensors.

b) Nanobiotechnology in separation of cell organelles.

SECTION - II

Q4) Enlist the methods of synthesis of nanoparticles. Explain any one method. **[10]**

P.T.O.

Q5) How are nanoparticles processed for their effective application to biological systems? **[10]**

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

a) Nanomaterials for drug delivery.

b) Applications of nanowires.

Total No. of Questions : 8]

SEAT No. :

P2794

[Total No. of Pages : 2

[4836] - 45
M.Sc. (Semester - IV)
BIOTECHNOLOGY
BT - 44b : Stem Cell Technology and Regenerative Medicines
(2008 Pattern)

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

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 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 ultrastructure of an unfertilized Mature Ovum (Mammal). **[12]**

Q2) Describe post fertilization subcellular changes in Ovum that lead to a viable Zygote formation. **[12]**

Q3) a) Describe the process of establishment of cell lineages. **[6]**

b) What is embryonic induction? Mention the events involved in it. **[6]**

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

a) Pattern formation.

b) Structure of sperm cell.

P.T.O.

SECTION - II

Q5) Explain the features of stem cells. Describe the characteristics of embryonic stem cells. **[12]**

Q6) What is ES cell technology? Explain its applications. **[12]**

Q7) What are knock outs? How are they obtained? Explain their applications. **[12]**

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

a) Ethical issues in human cloning.

b) Advantages of transgenic animals.

Total No. of Questions : 8]

SEAT No. :

P2795

[Total No. of Pages : 2

[4836] - 46
M.Sc. (Semester - IV)
BIOTECHNOLOGY
BT - 44c : Agricultural Biotechnology
(2008 Pattern)

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

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) Enlist the methods of production of homozygous plants. Explain the method that is commercially viable in agrobiotechnology. **[12]**

Q2) Explain with the help of appropriate examples the use of embryo rescue technique in plant breeding. **[12]**

Q3) Explain the advantages of micropropagation of oil seed crops. **[12]**

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

a) Experimental polyembryony.

b) Endosperm culture.

P.T.O.

SECTION - II

Q5) Enlist the applications of transgenic plants and explain any two with suitable examples. **[12]**

Q6) How do gametoclonal variations arise in vitro? How are these employed in agrobiotechnology? **[12]**

Q7) Explain the method of use of bioreactor for large scale production of plants. Add a note on its advantages over conventional micropropagation. **[12]**

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

a) Metabolic engineering.

b) Biopesticides.