

Total No. of Questions : 6]

SEAT No. :

P3137

[5539]-11

[Total No. of Pages : 2

M.Sc.

BIOTECHNOLOGY

**BT-11 : Advanced Biological Chemistry
(2008 Pattern) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *Q.No. 1 is compulsory.*
- 2) *Answer any four from the remaining questions.*
- 3) *Marks are given in parenthesis.*
- 4) *Neat labelled diagrams must be drawn wherever necessary.*

Q1) Briefly describe any four of the following :

[4 × 5 = 20]

- a) U.V. Spectroscopy.
- b) α - Helix structure of proteins.
- c) Pharmacological properties of terpenoids.
- d) Metabolic flux.
- e) Principle of discontinuous gel electrophoresis.
- f) Principle and applications of GLC.

Q2) a) What are biological buffers? Explain the bicarbonate system for maintaining acid-base balance. **[8]**

b) Compare and contrast - Analytical and preparative centrifugation with examples. **[7]**

Q3) a) Explain Haemoglobin as an example of a perfectly allosteric protein. **[7]**

b) Explain the manipulation of metabolic pathway at whose cell level with a suitable example. **[8]**

P.T.O.

Q4) Write explanatory notes on : **[3 × 5 = 15]**

- a) Factors stabilizing protein structure.
- b) Alkaloids.
- c) Site directed mutagenesis.

Q5) a) Compare and contrast - A, B and Z forms of DNA. **[8]**

b) Write notes on Synthesis and degradation of starch. **[7]**

Q6) Describe the different types of centrifuges and their applications. **[15]**



Total No. of Questions : 6]

SEAT No. :

P3139

[5539]-12

[Total No. of Pages : 2

M.Sc.

BIOTECHNOLOGY

BT-12 : Molecular & Cell Biology

(2008 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *Q. 1 is compulsory. Solve any four of the following.*
- 2) *Figures to the right indicate full marks.*
- 3) *Use of colour pencils restricted to diagram.*

Q1) Write short notes on any four:

[4×5=20]

- a) Membrane proteins.
- b) Receptor tyrosine kinases.
- c) Pseudogenes.
- d) Human genome project.
- e) Differential gene expression.

Q2) a) Describe the transport of proteins to nucleus.

[7]

b) GPCR based signalling.

[8]

Q3) Write notes on:

[3×5=15]

- a) Oxidative phosphorylation.
- b) Calvin cycle.
- c) Plant nutrition.

P.T.O.

Q4) a) Explain with illustration - 'Mutations'. **[8]**

b) Describe giving example vesicular transport. **[7]**

Q5) With neat labelled diagram write an essay on translation. **[15]**

Q6) Write notes on:- **[3×5=15]**

a) RAAS system.

b) Homoeostasis.

c) Quality control in ER.



Total No. of Questions : 8]

SEAT No. :

P3138

[5539]-13

[Total No. of Pages : 2

M.Sc.-I

BIOTECHNOLOGY

**BT - 13: Environmental Biotechnology
(2008 Pattern) (Semester - I) (Credit System)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) Attempt a total of five questions selecting at least two from each section.*
- 2) Answers to the section 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) What are non-conventional energy sources? Explain any two types. Give the advantages and drawbacks of the use of non-conventional energy sources.

[16]

Q2) Write short notes on:

[2×8=16]

- a) Bacteriological analysis of soil.
- b) Bio-materials as substitutes for non-degradable materials.

Q3) What is thermal inversion? Explain in detail the gaussian plume model for pollution dispersion.

[16]

Q4) a) Describe the various factors responsible for toxicity of soil.

[8]

- b) What is noise? How is it measured? Explain the effect of meteorological factors on noise levels.

[8]

P.T.O.

SECTION - II

Q5) What is EIA? Give guidelines and explain assessment methods. [16]

Q6) Write explanatory notes on. [2×8=16]

- a) Biosensors and bioindicators.
- b) Advanced waste water treatment

Q7) What is bio-remediation? Describe the different methods of bioremediation. Explain the bio-remediation of under ground water. [16]

- Q8)** a) Explain the role of genetically modified plants in soil restoration. [8]
- b) GIS for ecological mapping. Give a detailed account. [8]



Total No. of Questions : 8]

SEAT No. :

P3140

[5539]-21

[Total No. of Pages : 2

M.Sc.

BIOTECHNOLOGY

**BT - 21 : Genetic Engineering
(2008 Course) (Semester - II)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *Attempt not more than 5 questions of which atleast 2 questions must be from each section.*
- 2) *Answer 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) Write short notes on -

[16]

- a) Any two DNA modifying enzymes
- b) Transfection
- c) c DNA Library
- d) Plasmids as cloning vectors.

Q2) a) Write notes on Lambda expression vectors.

[8]

- b) Describe the various factors influencing the expression of recombinant proteins.

[8]

Q3) a) Describe the various methods used for screening Genomic DNA libraries.

[8]

- b) Explain the production of industrially important products using recombinant DNA technology giving any one example.

[8]

Q4) a) Discuss the role of DNA polymerases in Genetic engineering.

[8]

- b) Write notes on Type II restriction enzymes and give their importance in genetic engineering.

[8]

P.T.O.

SECTION - II

Q5) Write short notes on - **[16]**

- a) Transgenic plants
- b) DNA finger printing
- c) Gene annotation
- d) Genetically engineered vaccines

Q6) Write self-explanatory notes on any two of the following: **[16]**

- a) Ex-vivo and In-vivo Gene Therapy
- b) Sanger's method of DNA sequencing.
- c) Maxam Gilbert method of DNA sequencing.

Q7) a) Describe the technique and applications of PCR. **[8]**

b) Describe Viral and non-Viral Gene delivery systems. **[8]**

Q8) a) Write notes on Human Genome Project. **[8]**

b) Describe Genetically engineered Biotherapeutics and strategies for their development with any one example. **[8]**



Total No. of Questions : 8]

SEAT No. :

P3142

[5539]-23

[Total No. of Pages : 2

M.Sc. - I

BIOTECHNOLOGY

**BT-23 : Plant Biotechnology
(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 on separate answer books.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

SECTION - I

Q1) Give a comparative account of the use of conventional methods versus modern biotechnological methods for crop improvement. **[16]**

Q2) a) Give the traditional uses of algae. Explain the various strategies used for qualitative improvement of commercially important algal species. **[8]**
b) Explain the various methods used for qualitative and quantitative improvement of seed plants. **[8]**

Q3) a) What is micropropagation? Elaborate on the advantages and limitations of micropropagation. **[8]**
b) What is somatic embryogenesis? Comment on factors affecting somatic embryo induction and maturation. **[8]**

Q4) Write short notes on any two : **[2 × 8 = 16]**

- a) Application of plant tissue culture.
- b) Biofertilizers and vermiculture.
- c) Role of plant growth regulators in tissue culture.

P.T.O.

SECTION - II

- Q5)** a) What are protoplasts? How are they generated? Explain various methods of protoplast fusion? [8]
- b) Explain the methods used for increasing production of secondary metabolites in *in vitro* cultures with suitable examples. [8]
- Q6)** a) Explain the use of transgenics in quality improvement of carbohydrates. [8]
- b) Describe the strategies used to increase productivity by manipulation of nitrogen fixation in plants. [8]
- Q7)** a) What is biotic stress? How can transgenics be used to generate insect tolerance in plants? Explain with a suitable example. [8]
- b) What are haploids? How can they be made fertile? Enlist applications of haploids in agriculture and plant breeding. [8]
- Q8)** Write notes on any two : [2 × 8 = 16]
- a) Plantibodies.
- b) Mass multiplication of economically important tree species.
- c) Biofuel.



Total No. of Questions : 8]

SEAT No. :

[Total No. of Pages : 2

P3143

[5539]-31

M.Sc. - II

BIOTECHNOLOGY

BT-31 : Animal Biotechnology

(2008 Pattern) (Semester - III)

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) Describe the types of animal cell culture. Explain the methods of maintenance of any one type in detail. **[16]**

- Q2)** a) Give the importance of serum in ATC medium. Add a note on advantages and disadvantages of serum. **[8]**
- b) Describe any two methods for the detection of mycoplasma contamination. **[8]**

Q3) Explain - **[16]**

- a) Characterization of animal cells.
- b) Scope of Animal Biotechnology.

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

- a) Identification and purification of stem cells.
- b) Gene banking.
- c) Productivity of livestock breeds.

P.T.O.

SECTION - II

Q5) Define Transgenesis. Explain any two methods for the production of transgenic animals. **[16]**

Q6) What is in vitro fertilization? Explain the procedure of IVF in animals in detail. **[16]**

Q7) a) What is cell line? Give details of any five cell lines along with their tissue of origin and specific characteristics. **[8]**

b) Give the advantages and limitations of artificial insemination. **[8]**

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

a) Types of Stem cells.

b) Germ cell storage.

c) Hazards of Transgenic Animals.



Total No. of Questions : 8]

SEAT No. :

P3144

[5539]-32

[Total No. of Pages : 2

M.Sc.

BIOTECHNOLOGY

BT-32 : Fermentation Technology

(2008 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) Attempt a total of five questions selecting atleast 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) Discuss the kinetics of growth of a bacteria in Batch culture. **[8]**

b) Explain in detail the working of Bubble aeration in non mechanically stirred fermentors. **[8]**

Q2) Describe the measurement and control of temperature and biomass in a fermentation process. **[16]**

Q3) a) Explain the significance of alteration of cell membrane permeability in strain improvement. **[8]**

b) Write a short note on hollow fibre reactors. **[8]**

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

a) Construction material used for fermentor.

b) Scale up.

c) Mass Transfer.

P.T.O.

SECTION-II

Q5) With the help of neat labelled diagram. Explain the down stream processing of any one antibiotic. **[16]**

Q6) Define Biomethanation. Write a note on the substrates used, micro-organisms involved and factors affecting biomethanation. **[16]**

Q7) a) How are analogue resistant mutants and revertants screened for strain improvement. **[8]**

b) Discuss the application of filters in downstream processing. **[8]**

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

a) Cultivation of anaerobes.

b) Steroid transformation.

c) Oxygen requirement in fermentation.



Total No. of Questions :6]

SEAT No. :

[Total No. of Pages :2

P3145

[5539]-33

M.Sc.

BIOTECHNOLOGY

**BT-33 a : Principles of Virology
(2008 Pattern) (Semester -III)**

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) a) Describe ICTN system for classification of viruses. [5]

b) What are infectivity assays? Explain any one with suitable Example. [5]

Q2) Answer the following: [10]

a) Describe molecular diagnostic techniques and its applications in viral diagnosis.

b) Compare and contrast combined and polyvalent vaccines.

Q3) a) Explain with neat and labelled diagram replication of polio virus [5]

b) Comment on hybridoma technology. [5]

SECTION-II

Q4) a) Define the terms: [5]

i) Pandemic ii) Endemic

iii) Sporadic iv) Morbidity

b) Explain immunopathogenesis of HIV virus. [5]

P.T.O.

Q5) Comment on following:

[10]

- a) Pathogenesis of Hepatitis B virus.
- b) Economical effects of poultry viruses

Q6) Write Explanatory notes on:

[10]

- a) New castle disease.
- b) Tobacco mosaic virus



Total No. of Questions :3]

SEAT No. :

P3146

[Total No. of Pages : 1

[5539]-34

M. Sc.

BIOTECHNOLOGY

BT - 33b : Advanced Immunology.

(2008 Pattern) (Semester - III)

Time : 1 ½ Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) *Attempt a total of four questions selecting atleast two questions. From each section.*
- 2) *Answer to the two sections should be written in seperate answer book.*
- 3) *Neat diagram must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

SECTION - I

- Q1)** a) Give an account on secondary lymphoid organs. [5]
b) Compare and Contrast CMI & AMI. [5]
- Q2)** a) What is allografts? Comment on immunological advancement [5]
b) Explain different mechanisms of autoimmunity. [5]
- Q3)** Answer the following questions : [10]
a) Comment on type I hypersensitivity reaction.
b) Explain the technique used in monoclonal antibody preparation.

SECTION - II

- Q4)** a) Explain use of animal models in immunology [5]
b) What are humanized antibodies? Give its significance. [5]
- Q5)** a) Discuss various labels used in development of immunodiagnostics. [5]
b) Comment on benefits of engineered vaccines over normal vaccines. [5]
- Q6)** Write explanatory note on : [10]
a) Recombinant Vaccines
b) Chimeric antibodies.



Total No. of Questions : 8]

SEAT No. :

P3147

[5539]-41

[Total No. of Pages : 1

M.Sc. - II

BIOTECHNOLOGY

BT 41: Genomics and Proteomics

(2008 Course) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 60

Instructions to the candidates:

- 1) Attempt any 5 questions in total with atleast 2 from each section.*
- 2) Figures to right indicate full marks.*

SECTION - I

Q1) Explain micro arrays have accelerated genomics research with an illustration. **[12]**

Q2) Write short notes on any two of the following. **[12]**

- a) Toxicogenomics
- b) Pharmacogenomics
- c) Genome annotation

Q3) Explain data handling is now the bottleneck with DNA sequencing happening at such a high speed. **[12]**

Q4) Describe the studies carried out in structural and functional genomics. **[12]**

SECTION - II

Q5) Write short notes on - (any two) **[12]**

- a) Computational approach for studying protein-protein interactions.
- b) Phage display technique as drug development tool.
- c) Sample preparation in proteomics.

Q6) Explain strategies in proteomics study. **[12]**

Q7) Describe isoelectric focusing and SDS-PAGE of same, forms a versatile tool in proteomics. **[12]**

Q8) How proteomics has helped identification and characterization of novel protein. **[12]**



Total No. of Questions : 6]

SEAT No. :

P3149

[5539]-43

[Total No. of Pages : 1

M.Sc. - II

BIOTECHNOLOGY

BT-43 : Clinical Research and Database Management

(2008 Pattern) (Semester - IV)

Time : 1½ Hour]

[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 the contribution of FDA in Clinical Research? Explain in detail duties and responsibilities of FDA. **[10]**

Q2) Discuss various stages of drug discovery and development of drugs for clinical use. **[10]**

Q3) Enlist various Medical Devices. Explain research and development activities before launching any new Medical Device. **[10]**

SECTION - II

Q4) Explain in detail Pre-clinical Trials and Post Marketing Surveillance in Clinical Research. **[10]**

Q5) What are the principles of data management in Clinical Research. Write a short note on importance of database management. **[10]**

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

- a) Management of Essential documents.
- b) Designing of Case Report form.
- c) Development of Biologics.



Total No. of Questions : 3]

SEAT No. :

[Total No. of Pages : 1

P3150

[5539]-44

M.Sc. - II

BIOTECHNOLOGY

BT-44A : Nanobiotechnology

(2008 Pattern) (Semester-IV)

Time : 1½ Hour]

[Max. Marks : 40

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicate full marks.*

Q1) Write short notes on (any 4):

[20]

- a) Synthesis of nanoparticles using Pyrolysis.
- b) Electron microscopy for characterisation of nanoparticles.
- c) Factors affecting size of nanomaterials.
- d) Functionalisation of nanoparticles.
- e) Recent trends in Nanobiotechnology.
- f) Properties of nanoparticles affecting its activity.

Q2) Answer the following (any 1):

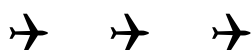
[10]

- a) Discuss the application of spectroscopy in characterisation of nanomaterials.
- b) Describe the advantages and disadvantages of physical and chemical synthesis methods of nanoparticles.

Q3) Answer the following (any 1):

[10]

- a) Discuss the applications of nanotechnology in Gene therapy.
- b) Explain the methods used for chemical synthesis of nanoparticles.



Total No. of Questions : 8]

SEAT No. :

P3151

[5539]-45

[Total No. of Pages : 2

M.Sc. - II

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 and labelled diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

SECTION-I

Q1) Describe the process of gametogenesis in mammals. **[12]**

Q2) a) Write a note on metabolic activation of the egg. **[6]**

b) Elaborate the mechanism of cytoplasmic rearrangement in a fertilized egg. **[6]**

Q3) a) Describe in brief how is polyspermy preveiled? **[6]**

b) Explain the mechanism of cell differentiation. **[6]**

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

a) Fertilization process in mammals.

b) Conditional specification.

c) Mesenchymal stem cells.

P.T.O.

SECTION-II

Q5) Describe in detail role of Adult Stem Cell in therapeutic cloning. [12]

Q6) Describe process of pallirn formation in Animals. [12]

Q7) Write the various aspects of human cloning and legal bioethics. [12]

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

- a) Gene therapy.
- b) Application of stem cells.
- c) Embryonic Stem Cells (ESC).



Total No. of Questions : 8]

SEAT No. :

P3152

[5539]-46

[Total No. of Pages : 2

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 atleast two questions from each sections.*
- 2) Answers to the sections must be written on separate answer book.*
- 3) Neat and labelled diagram must be drawn wherever necessary.*
- 4) Figures to the right indicate full marks.*

SECTION-I

Q1) Write short note on any two: **[12]**

- a) Apomixis
- b) Gametoclonal variation.
- c) Embryo rescue technique.

Q2) Describe multiplication of elite varieties of pulses by micropropagation with suitable example. **[12]**

Q3) What are dihaploids? Write methods for their production in agriculture and their importance. **[12]**

Q4) Explain the technique of endosperm culture. Add notes on production of triploid in agriculture and its significance. **[12]**

P.T.O.

SECTION-II

Q5) Write short note on any two: **[12]**

- a) Edible vaccine.
- b) Virus indexing.
- c) Use of biopesticides in agriculture.

Q6) What are transgenic crop? Describe methods for obtaining stress tolerant transgenics. **[12]**

Q7) What is a bioreactor? Explain how it is used to scale up multiplication of commercially important plants. **[12]**

Q8) Explain in detail metabolic engineering with suitable example. **[12]**

