Total No. of Questions : 6]

SEAT No. :

P3137

[Total No. of Pages : 2

[5539]-11
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

[Total No. of Pages : 2

[5539]-12
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

[Total No. of Pages : 2

[5539]-13
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 responsibel 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

[Total No. of Pages : 2

[5539]-21
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]**

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Total No. of Questions : 8]

SEAT No. :

P3142

[Total No. of Pages : 2

[5539]-23
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. :

P3143

[Total No. of Pages : 2

[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 confamination. **[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

[Total No. of Pages : 2

[5539]-32
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. :

P3145

[Total No. of Pages :2

[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 it's 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

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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 explainatary note on : **[10]**

a) Recambinant Vaccines

b) Chimeric antibodies.

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Total No. of Questions : 8]

SEAT No. :

P3147

[Total No. of Pages : 1

[5539]-41
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]**

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Total No. of Questions : 6]

SEAT No. :

P3149

[Total No. of Pages : 1

[5539]-43
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. :

P3150

[Total No. of Pages : 1

[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

[Total No. of Pages : 2

[5539]-45
M.Sc. - II
BIOTECHNOLOGY
BT-44b : Stem Cell Technology and Regenarative 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).

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Total No. of Questions : 8]

SEAT No. :

P3152

[Total No. of Pages : 2

[5539]-46

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]**