Total No. of Questions :6]

SEAT No. :

P1849

[Total No. of Pages :2

[4936]-11
M.Sc.
BIOTECHNOLOGY
BT-11: Advanced Biological chemistry
(2008 Pattern) (Semester - I)

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

Instructions to candidates:

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

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

a) Role of thermodynamics in biological system.

b) Define allosterism. Explain with reference to Haemoglobin.

c) What are terpenoids? Give its significance to medicinal plants?

d) Enlist the methods used for metabolic engineering.

e) State the principle of Infra red spectroscopy with its applications in structure elucidation.

Q2) Answer the following: **[7+8=15]**

a) Describe the biosynthetic pathway for alkaloids in medicinal plants.

b) Explain how peptide bonds in formed. Give its significance in peptide folding

Q3) Answer the following: **[3×5=15]**

a) Discuss the regulation and practices used world wide for use of herbal medicines.

b) Explain the mechanism of chaperon assisted protein folding.

c) Explain the pathway for the glycogenesis.

P.T.O.

Q4) Answer the following: **[8+7=15]**

a) With the help of schematic diagram explain the components and working of polyacrylamide gel electrophoresis.

b) Explain how chromatographic techniques can be used in separation of secondary metabolites.

Q5) Write short notes on. **[3×5=15]**

a) Super crtical fluid e*x*traction.

b) α heli*x*.

c) Protein microarray.

Q6) Define Metabolomics. Discuss how metabotic pathway manipulation is a means to produce novel compounds. **[15]**

Total No. of Questions :6]

SEAT No. :

P1850

[Total No. of Pages :2

[4936]-12
M.Sc.
BIOTECHNOLOGY
BT-12: Molecular & Cell biology
(2008 Pattern) (Semester - I)

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

Instructions to candidates:

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

Q1) Short notes on. **[4×5=20]**

a) MAP kinase.

b) Homeostasis & temperature regulation.

c) Regulation of cell cycle.

d) Hardey- Weinberg law.

e) Assembly of chromosomes.

Q2) a) Explain in detail transport of proteins across the nucleus. **[7]**

b) How are Gibberelic acid transported to the target cells. Add a note on their mode of action. **[8]**

Q3) Short notes on. **[5×3=15]**

a) Chemiosmotic hypothesis.

b) Inhibitors of electron transport chain.

c) Ultrastructure of mitochondria.

P.T.O.

Q4) a) Explain the concept of homeobox in detail. **[7]**

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

Q5) Explain in detail four types of post- transcriptional modifications. **[15]**

Q6) Short notes on. **[3×5=15]**

a) DNA binding dyes as mutagens.

b) SOS repair.

c) Chaperons & protein folding

Total No. of Questions :6]

SEAT No. :

P1851

[Total No. of Pages :2

[4936]-13
M.Sc.
BIOTECHNOLOGY
BT-13: Environmental Biotechnology
(2008 Pattern) (Semester - I)

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

Instructions:

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 4). **[4×5=20]**

a) Gaussian plume model.

b) Ecomarks.

c) Bio materials as substitute for non- degradable materials.

d) Ex situ conservation of organisms.

e) ISO 14000 series.

Q2) What is renewable energy? Enlist types of renewable energy sources and explain in detail any two types. **[15]**

Q3) a) Explain the principle of EIA. Give importance of EIA and elaborate on the planning and working of EIA for sugarcane industry **[8]**

b) What is GIS? Explain its principle and give its applications in Agro forestry systems. **[7]**

Q4) a) Explain: Environmental priorities in India. **[7]**

b) What is Bioremediation? Explain microbial bioremediation of pesticide contaminated soil. **[8]**

P.T.O.

Q5) a) Elaborate on chemical treatment strategies for municipal sewage waste water. **[8]**

b) Explain strategies applied for monitoring and control of So_x and No_x. **[7]**

Q6) a) Explain Biological process applied in municipal waste water treatment and give advantages of activated sludge process. **[8]**

b) Explain methods used for Biosolid waste removal with neat diagrams. **[7]**

Total No. of Questions :8]

SEAT No. :

P1852

[Total No. of Pages :2

[4936]-21
M.Sc.
BIOTECHNOLOGY
BT-21: Genetic Engineering
(2008 Pattern) (Semester - II)

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 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 PCR? Describe its types and applications. **[8]**

b) Describe automated DNA sequencing technique. **[8]**

Q2) a) Describe strategies in mapping of single nucleotide polymorphism. **[8]**

b) What are vectors? Describe mammalian expressing vectors and their applications. **[8]**

Q3) a) Discuss the applications of ASO in the detection of genetic disorders. **[8]**

b) Describe role of RFLP and RAPD as plant DNA markers. **[8]**

.

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

a) DNA microarrays and genetic screening.

b) Primer designing strategies.

c) SCID and gene therapy.

P.T.O.

SECTION- II

Q5) a) What is DNA finger printing? Give its applications. **[8]**

b) What is gene annotation? Describe with examples. **[8]**

Q6) a) Describe different viral vectors used in gene therapy. **[8]**

b) What are fusion proteins? Describe their applications. **[8]**

Q7) a) Describe cause and symptoms of cystic fibrosis genetic disorder. **[8]**

b) Write a note on cDNA library. **[8]**

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

a) Colony hybridization technique & its applications.

b) Terminal transferases & their applications.

c) Linkage maps.

Total No. of Questions :8]

SEAT No. :

P1853

[Total No. of Pages :2

[4936]-22
M.Sc.
BIOTECHNOLOGY
BT-22: Bioinformatics
(2008 Pattern) (Old) (Semester - II)

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

Instructions to the candidates:

1) ***Attempt a total five questions selecting at least two question from each section.***
2) ***Answer 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 the tools of bioinformatics and explain application of bioinformatics. **[16]**

Q2) a) Distinguish between primary database & secondary database. **[8]**

b) Explain methods of sequence alignment. **[8]**

Q3) What is energy minimization? Explain any two techniques in detail. **[16]**

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Q4) Write a note on any two of the following. **[16]**

a) Gene prediction.

b) SMILES.

c) BLAST

P.T.O.

SECTION- II

Q5) What is protein structure prediction? Describe Homology modeling in detail with example. **[16]**

Q6) a) Explain the methods of epitope prediction. **[8]**

b) What is computer based research? Discuss any one case study of bioinformatics research. **[8]**

Q7) How protein structures are classified? Describe scop and CATH in detail. **[16]**

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

a) Routes of research funding.

b) Ramchandran Plot.

c) PDB.

Total No. of Questions :8]

SEAT No. :

P1854

[Total No. of Pages :2

[4936] - 23

M.Sc.

BIOTECHNOLOGY

BT - 23 : Plant Biotechnology

(Semester - II) (2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt a total of Five questions selecting at least two questions from each section.***
2) ***Answers to the 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) Mention major landmarks in plant Biotechnology with respect to crop plants. **[8]**

b) Explain with at least two examples, the biotechnological potential of algae. **[8]**

Q2) Mention the important areas of fungal biotechnology. Explain the current achievements in any one area. **[16]**

Q3) What is micropropagation? Explain with suitable example, technology for mass multiplication of timber plants. **[16]**

Q4) Write explanatory notes on any Two of the following; **[16]**

a) Significance of cell suspension culture.

b) Advantages of direct embryogenesis over indirect embryogenesis.

c) Use of haploids in plant breeding.

P.T.O.

SECTION - II

Q5) What are transgenic plants? Mention the methods of Transgenic Technology and explain any one. Cite an appropriate example. **[16]**

Q6) a) Explain with suitable example, use of somaclonal variation in plant Biotechnology. **[8]**

b) How can photosynthesis be manipulated? What are its applications. **[8]**

Q7) a) What is phytoremediation? Explain any one technology applied for it. **[8]**

b) Use of transgenic technology to develop biological stress tolerence. **[8]**

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

a) Plant derived vaccines.

b) Biofuels of algal origin.

c) Phytopharmaceuticals.

Total No. of Questions :8]

SEAT No. :

P1855

[Total No. of Pages :2

[4936] - 31

M.Sc.

BIOTECHNOLOGY

BT - 31 : Animal Biotechnology

(Semester - III) (2008 Pattern)

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

Instructions to the candidates:

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

SECTION - I

Q1) Mention the Factors that control the productivity of livestock breed. Explain, with the help of an appropriate example, influence on any one factor. **[16]**

Q2) Explain the initiation, growth kinetics and method of maintenance of animal cell cultures. **[16]**

Q3) Explain: **[16]**

a) Method of artificial breeding.

b) Microinjection - purpose and procedure.

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

a) Cryopreservation and its use in animal biotechnology.

b) Immobilization of cells in vitro.

c) Long term maintenance of stem cells.

P.T.O.

SECTION - II

Q5) What are transgenic animals? How are they produced? Explain any one method in detail. **[16]**

Q6) What is artificial insemination? Explain the procedures, precautions and product with reference to any one animal. **[16]**

Q7) Explain **[16]**

a) Advantages of embryo transfer.

b) Scope of animal biotechnology.

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

a) Germ cell storage.

b) Microinjection and its applications.

c) Bioethical problems arising out of transgenic animals.

Total No. of Questions :8]

SEAT No. :

P1856

[Total No. of Pages :2

[4936] - 32

M.Sc.

BIOTECHNOLOGY

(BT - 32) : Fermentation Technology

(Semester - III) (2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt a total of Five questions selecting 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 how HFRs differ in basic design as compared to CSTRs. Explain the need of using HFRs in bioprocesses. **[16]**

Q2) a) Using an appropriate example, draw and explain any regulatory pathway for overproduction of a primary metabolite. **[8]**

b) Justify the statement 'Though mechanical agitation exerts strong shear forces, and can disrupt microbial cells, it is still a preferred mode of bulk mixing.' **[8]**

Q3) a) Explain why K_La is a better parameter to measure oxygen transfer as compared to OTR. **[8]**

b) What is time course of a Fermentation Process? Explain its need in monitoring and control of Fermentation process run. **[8]**

P.T.O.

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

a) Critical operating parameters for an immobilized cell reactor.

b) Strain improvement of bacterial culture for secondary metabolite production.

c) Operating variables of Fermentation.

SECTION - II

Q5) Explain the use of rotary drum Filters as a unit - process in down stream processing of a Fermentation product specify the product and state the principle of the process. **[16]**

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

b) Explain the phases of biochemical conversion of complex substrates to methane. **[8]**

Q7) a) List the names of microorganisms used as biocontrol agents and explain the mechanism of biocontrol by any one. **[8]**

b) How is the overproduction of microbial metabolites regulated by feedback repression? **[8]**

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

a) Use of solvents in enzyme recovery.

b) Application of plant cells in bioprocessing.

c) Down stream processing for vitamin manufacture.

Total No. of Questions :6]

SEAT No. :

P1857

[Total No. of Pages :2

[4936] - 33

M.Sc.

BIOTECHNOLOGY

BT - 33 a : Principles of Virology

(Semester - III) (2008 Pattern)

Time : 1½ 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 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 characters used for classification of plant and animal viruses. **[10]**

Q2) Mention the methods of detection of viral diseases. Explain advantages limitations and application of any one method. **[10]**

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

a) Subunit vaccines.

b) H1N1

SECTION - II

Q4) Describe different aspects of epidemiology of HIV. **[10]**

P.T.O.

Q5) Explain with the help of an appropriate example, the clinical trials required for release of a vaccine in market. **[10]**

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

a) Immunopathogenesis.

b) Infectivity assays.

Total No. of Questions :6]

SEAT No. :

P1858

[Total No. of Pages :2

[4936] - 34

M.Sc.

BIOTECHNOLOGY

BT - 33 b : Advanced Immunology

(Semester - III) (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 sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Explain the role of cell - cell interaction and signal transduction during immune response. **[10]**

Q2) Describe any two techniques of molecular immunology. **[10]**

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

a) Aquired immunology.

b) Evolution of immune response in insects.

P.T.O.

SECTION - II

Q4) Describe the scope of experimental immunology and explain any one aspect of experimental immunology. **[10]**

Q5) How are immuno diagnostics manufactured? What are applications of them? **[10]**

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

a) Recombinant vaccine production.

b) Advantages of engineered vaccines over normal vaccines.

Total No. of Questions :8]

SEAT No. :

P1859

[Total No. of Pages :2

[4936] - 41

M.Sc. (Part - II)

BIOTECHNOLOGY

BT - 41 : Genomics & Proteomics

(Semester - IV) (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) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

SECTION - I

Q1) What is genomics? Discuss different strategies applied for the whole genome analysis with special emphasis on any one. **[12]**

Q2) a) Explain the scope of functional Genomics in the future of biotechnology. **[6]**

b) Define transcriptomics. Add a note on transcriptomic microarray methods. **[6]**

Q3) a) What is structural genomics? Explain use of databases in understanding genome arrangements. **[6]**

b) Define chemoinformatics. Give role of SMILES in chemoinformatics. **[6]**

Q4) Write explanatory notes on: **[3×4=12]**

a) Pharmacogenomics.

b) Immunoinformatics.

c) NCBI

P.T.O.

SECTION - II

Q5) Explain the principle and working of IEF. Write applications of 2D gel electrophoresis. **[12]**

Q6) a) Give principle and importance of Yeast two hybrid ratio. **[6]**

b) What is microarray? Give its advantages & applications in proteomics studies. **[6]**

Q7) a) Explain the term functional proteomics. Add a note on its application in drug development. **[6]**

b) Explain the role of structural databases in studying protein - protein interactions. **[6]**

Q8) Write short note on: **[3×4=12]**

a) Strategies in proteomics.

b) Ramachandran plot.

c) Protein based diagnostic markers.

Total No. of Questions :8]

SEAT No. :

P1860

[Total No. of Pages :2

[4936] - 42

M.Sc.

BIOTECHNOLOGY

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

(Semester - IV) (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) Compare in between IPR and other types of Property rights. Describe various forms of IPR. **[12]**

Q2) What is Patent? Describe the conditions for Patentability with suitable example. **[12]**

Q3) Give the detail procedure for copyright registration and discuss Transfer of copyrights. **[12]**

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

a) Laws on Industrial design.

b) Patent Infringement.

P.T.O.

SECTION - II

Q5) What is Trade Related Intellectual Property Rights? Discuss with suitable example post TRIPs effects on Indian Patent system. **[12]**

Q6) Write notes on: **[12]**

a) Geographical Indications.

b) Budapest Treaty.

Q7) Give detail procedure for patenting biological product. Elaborate with suitable example. **[12]**

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

a) Protection on Plant varieties.

b) IPR laws for Biodiversity.

Total No. of Questions :6]

SEAT No. :

P1861

[Total No. of Pages :2

[4936] - 43

M.Sc.

BIOTECHNOLOGY

BT - 43 : Clinical Research & Database Management

(Semester - IV) (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) ***Answer 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 R and D activities with reference to any one medical device. **[10]**

Q2) What is FDA? Explain important legislations of FDA regarding drugs. **[10]**

Q3) Short Notes (any 2): **[10]**

a) Schedule Y in clinical research trials.

b) Marketing of herbal drugs.

c) Research and development of biologics.

P.T.O.

SECTION - II

Q4) Explain the phases involved in designing the clinical trials. Comment on importance of clinical trials. **[10]**

Q5) Explain the procedure for recording and reporting serious and non serious adverse events. **[10]**

Q6) Short notes (any two): **[10]**

a) GLPs for manufacturing of Pharmaceuticals.

b) Principle of data managment.

c) Development of licencing process.

Total No. of Questions :6]

SEAT No. :

P1862

[Total No. of Pages :2

[4936] - 44

M.Sc.

BIOTECHNOLOGY

(BT - 44 a) : Nano Biotechnology

(Semester - IV) (2008 Pattern)

Time : 1½ Hours] *[Max. Marks :40*

Instructions to the candidates:

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

SECTION - I

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

a) Discuss the applications of Nano Biotechnology in life sciences.

b) Explain any one chemical method of synthesis of nanoparticles.

Q2) Answer the following: **[2×5=10]**

a) Describe the application of nanoparticles in Drug delivery.

b) Describe the applications of electron micros copy in characturization of nanoparticles.

Q3) Write short notes on: **[2×5=10]**

a) Nano their films.

b) Recent trends in Nano Biotechnology.

P.T.O.

SECTION - II

Q4) Answer the following: **[2×5=10]**

a) Discuss the significance of functionalization of nanoparticles for biological applications.

b) What are the applications of nanoparticles in gene therapy?

Q5) "Nanoparticles have immerse applications in physical and material sciences". Justify. **[10]**

Q6) Write short notes on: **[2×5=10]**

a) Biomolecules as Nanostructures.

b) Band gap.

Total No. of Questions :4]

SEAT No. :

P1863

[Total No. of Pages :2

[4936] - 45

M.S.C. - II

BIOTECHNOLOGY

BT - 44 - b : Stem Cell Techniques & Reproduction

(Semester - IV) (2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt both the sections on separate answer sheets.***
2) ***All questions are compulsory.***
3) ***Draw Neat labelled diagrams wherever necessary.***

SECTION - I

Q1) Write short notes on (Any three): **[3×5=15]**

a) Cell differentiation.

b) Embryonic induction.

c) Pattern formation.

d) Characteristics features of stem cell.

Q2) a) What is polyspermy? What prevents polyspermy? Explain the mechanism. **[7]**

b) Explain the process of sperm maturation and describe the ultra structure of sperm. **[8]**

OR

Explain the process of egg maturation and describe the structure of an ovum. **[8]**

P.T.O.

SECTION - II

Q3) Write short notes (Any three): **[3×5=15]**

a) Gene therapy - advantages & limitations.

b) Application of knock out.

c) Induced pluripotent stem cell.

d) Advantages & limitations of cloning animal.

Q4) How are transgenics obtained? Explain the methods with the help of an appropriate example. **[15]**

OR

What is the scope and applications of embryonic stem cell technology? Explain with appropriate example.

Total No. of Questions :8]

SEAT No. :

P1864

[Total No. of Pages :2

[4936]-46
M.Sc. BIOTECHNOLOGY
BT-44C:Agricultural Biotechnology
(2008 Pattern) (Semester - IV)

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

Instructions to the candidates:

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

SECTION - I

Q1) What are pure lines? 'Production of purelines through ovule/Anther/Pollen culture is convinient over conventional methods' Justify. **[12]**

Q2) Explain how triploid plants are produced by tissue culture technique. Give significance of triploid plants in Agriculture. **[12]**

Q3) With suitable example comment on micropropagation of any one cereal crop plant. **[12]**

Q4) Write notes on (Any two) **[12]**

a) Significance of embryo culture.

b) Induced polyembryony.

c) Biofertilizers.

P.T.O.

SECTION - II

Q5) Enlist and explain types of bioreactors used in plant production. **[12]**

Q6) Elaborate transgenic approaches used to develop plants resistant to any two abiotic stresses. **[12]**

Q7) Define somaclonal variations. Explain factors affecting somaclonal variations. Add note on its significance. **[12]**

Q8) Write notes on (Any two) **[12]**

a) Virus indexing.

b) Types of apomixis.

c) Marker assisted selection.

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