Total No. of Questions :6]

SEAT No. :

P3092

[Total No. of Pages :2

[5036] - 11

M.Sc.

BIOTECHNOLOGY

BT - 11 : Advanced Biological Chemistry

(2008 Pattern) (Semester - I)

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) ***Figures to the rigth indicate full marks.***

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

a) Give the principle of UV - Visible spectroscopy along with its applications.

b) Discuss the fatcs of Pyruvate.

c) Give a brief account on protein folding and explain its significance.

d) Explain applications of metabolic flux analysis.

e) Describe pharmacological activities of phenolics.

Q2) a) Enlist various types of centrifugation techniques? Explain in detail density gradient centrifugation. **[7]**

b) Describe principle & applications of protein microarray. **[8]**

Q3) a) Describe in detail principle and applications of NMR. **[8]**

b) Enlist various methods used in extraction of secondary methabolite?. **[7]**

Q4) Answer the following

a) What are salient features of α - helix structure of proteins. **[5]**

b) Comment on manipulation of Metabolic pathway at enzyme level. **[5]**

c) Comment on temporal & special variation of species of secondary metabolites. **[5]**

P.T.O.

Q5) a) Explain shikimic and pathway. **[8]**

b) Explain allosteric regulation with suitable examples. **[7]**

Q6) Enlist methods associated with analysis of secondary metabolites? Explain any one in detail. **[15]**

Total No. of Questions :6]

SEAT No. :

P3093

[Total No. of Pages :2

[5036] - 12

M.Sc.

BIOTECHNOLOGY

BT - 12 : Molecular and Cell Biology

(2008 Pattern) (Semester - I)

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

Instructions to candidates:

1) ***Answer to the sections must be written on separate answer sheets.***
2) ***All questions are compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Use of color pencil restricted to diagrams.***

SECTION - I

Q1) Attempt the following in two to three sentences: **[8]**

a) Enlist the cell organelles involved in trafficking of secretary proteins.

b) Draw the ultra structure of mitochondria.

c) Facilitated transport of glucose.

d) Short day and long day plants.

Q2) Write self explanatory note on <u>any two</u> of the following: **[16]**

a) Regulation of cell cycle.

b) Z - scheme of photosynthesis.

c) Hormones of posterior pituitary.

Q3) Explain <u>any two</u> of the following in details with suitable illustrations: **[16]**

a) Reciprocal regulation of glycogen metabolism.

b) Assembly and disassembly of monomers in cytoskeleton formation.

c) Asymmetry of cell membrane.

P.T.O.

SECTION - II

Q4) Attempt the following in two to three sentences: **[8]**

a) Enlist the different types of promoters recognized by RNA pol II.

b) Draw the structure RNA polymerase of *E.coli*.

c) Distinguish between Rho dependent and Rho independent termination.

d) Write four post transcriptional modifications of primary transcript and / or hn-RNA.

Q5) Write self explanatory note on any two of the following: **[16]**

a) Origin of Replication.

b) Mutations caused by Base analogs And Acridine dyes.

c) Compare the translation factors of prokaryotes and eukaryotes.

Q6) Explain any two of the following in details with suitable illustrations: **[16]**

a) Ultra structure of DNA polymerase III.

b) Natural defenses against diseases.

c) X - linked immunodeficiencies

Total No. of Questions :6]

SEAT No. :

P3094

[Total No. of Pages :2

[5036] - 13

M.Sc.

BIOTECHNOLOGY

BT - 13 : Environmental Biotechnology

(2008 Pattern) (Semester - I)

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

Instructions to candidates:

1) ***Question 1 is compulsory. Solve any four from the remaining five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Write notes on: Any Four. **[4×5=20]**

a) Tidal Energy.

b) Problems associated with alkalinity of soil.

c) Thermal inversion.

d) Loading rate calculations in (WTP) wastewater treatment plant.

e) Noise pollution.

Q2) a) Explain the significance of study of transport and diffusion of pollutants. Give its brief methodology. **[8]**

b) Give in details the strategies applied in Municipal waste water treatment. **[7]**

Q3) a) Explain the application & advantages of using Biomaterials as substitutes for non - degradable materials. **[7]**

b) Give a detail account of disposal & reuse of biosolids. **[8]**

P.T.O.

Q4) Explain the following: Any three **[3×5=15]**

a) Phosphate removal in WTP.

b) Agenda 21.

c) Ecoplanning.

d) GMO applications in soil bioremediation.

Q5) What is EIA? Discuss guidelines given for EIA. Add a note on its importance with appropriate example. **[15]**

Q6) a) Explain the monitoring and control of SOx, NOx and COx air pollutants. **[8]**

b) Define 'Bioindicators' in environmental monitoring. Explain their characteristics and applications with suitable example. **[7]**

Total No. of Questions :8]

SEAT No. :

P3095

[Total No. of Pages :2

[5036] - 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 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 DNA ligases? Describe with examples their use in genetic engineering. **[8]**

b) Describe Lambda insertion vectors and their applications. **[8]**

Q2) a) Describe dideoxy method of DNA sequencing. **[8]**

b) Compare & contrast between cDNA and genomic libraries. **[8]**

Q3) a) Explain with example inducible expression systems. **[8]**

b) Justify : sickle cell anaemia is a single gene autosomosal recessive disorder. **[8]**

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

a) Compare and contrast ex - vivo and in-vivo gene therapy.

b) Gene therapy approach in HIV treatment.

c) Genetically engineered vaccines.

P.T.O.

SECTION - II

Q5) a) What is transfection? Describe different methods of transfer of rDNA to the host cells. **[8]**

b) What are liposomes? Give their applications in genetic engineering. **[8]**

Q6) a) Discuss whole genome sequencing technique. **[8]**

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

Q7) a) Write a note on ethical issues in gene therapy. **[8]**

b) Describe colony hybridization technique & its applications. **[8]**

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

a) DNA finger printing.

b) Primer designing technique.

c) DNA marker technique in plants.

Total No. of Questions :8]

SEAT No. :

P3096

[Total No. of Pages :2

[5036] - 22

M.Sc.

BIOTECHNOLOGY

BT - 22 : Bioinformatics

(2008 Pattern) (Semester - II)

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

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each section.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the rigth indicate full marks.***

SECTION - I

Q1) Write short notes on: **[16]**

a) SMILE notation

b) BLAST

c) CATH

d) PAM

Q2) a) Define e - value. Give detail explanation for its importance in homology searching. **[8]**

b) Explain chemoinformatics. Describe its role in drug designing. **[8]**

Q3) Explain the principle of Ramachandran plot. Give its importance in secondary structure prediction of proteins. **[16]**

Q4) a) Give an account of multiple sequence alignment methods. **[8]**

b) Define database write their basic classification & characteristics, giving examples. **[8]**

P.T.O.

SECTION - II

Q5) a) Define Bioinformatics. Discuss its role in genome data analysis. **[8]**

b) Explain pubmed. What is its information retrieval system? Explain with example. **[8]**

Q6) What is immunoinformatics? Mention the tools used in immunoinformatics & elaborate on the concept of vaccine candidate prediction. **[16]**

Q7) a) Explain energy optimation in molecular modeling. Give details of any one optimization technique. **[8]**

b) Define structural bioinformatics. Discuss its importance in structure prediction of proteins. **[8]**

Q8) Write short note on: **[16]**

a) Bioinformatics business models.

b) Substitution matrices.

c) SCOP.

d) Protein visualisation softwares.

Total No. of Questions :8]

SEAT No. :

P3097

[Total No. of Pages :2

[5036] - 23

M.Sc.

BIOTECHNOLOGY

BT - 23 : Plant Biotechnology

(New, 2008 Pattern) (Semester - II)

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

Instructions to the candidates:

1) ***Attempt a total 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 rigth indicate full marks.***

SECTION - I

Q1) Explain, with at least two examples application of Fungal biotechnology in large scale production of antibiotics. **[16]**

Q2) a) Mention important algal biotechnologies and explain application of any one. **[8]**

b) State at least two definitions of plant Biotechnology and explain any one. **[8]**

Q3) Explain with appropriate examples, application of micropropagation of economically important gymnosperms. **[16]**

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

a) Advantages of direct embryogenesis over indirect embryogenesis.

b) Applications of somaclonal variants.

c) Transgenics for improved nitrogen fixation.

P.T.O.

SECTION - II

Q5) Explain the applications of transgenic plants for abiotic stress tolerence. Cite two examples. **[16]**

Q6) How are haploids obtained? Explain the application of haploids in crop improvement. **[16]**

Q7) Explain how transgenic technologies are used for improvement of proteins and lipids of plant origin. **[16]**

Q8) Write explanatory notes on Any Two of the following. **[16]**

a) Manufacture of Biofertillizers on commercial scale.

b) Nutraceuticals of plant origin.

c) Biotechnologies for environmental clean up.

Total No. of Questions :8]

SEAT No. :

P3098

[Total No. of Pages :2

[5036] - 31

M.Sc. II

BIOTECHNOLOGY

BT - 31 : Animal Biotechnology

(2008 Pattern) (Semester - III)

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

Instructions to candidates:

1) ***Attempt a total of 5 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 necesssary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Write a note on establishment of fibroblast culture. **[16]**

Q2) a) Write a note on germ cell storage. **[8]**

b) Explain in detail concept of invitro fertilization. **[8]**

Q3) a) Write a note on characterization of stem cells. **[8]**

b) Comment on hazards of artificial breeding. **[8]**

Q4) Write short notes on any two: **[16]**

a) Serum containing media

b) FACS for cell sorting

c) Application of animal cell culture in therapeutics.

SECTION - II

Q5) Explain in detail method to generate chimeric animals. **[16]**

P.T.O.

Q6) Describe any one mouse model to study neurodegenerative disorders. **[16]**

Q7) Explain: **[16]**

a) Organotypic culture and its applications.

b) Concept and applications of gene banking.

Q8) Write short notes on any two. **[16]**

a) Need of characterization of cells in culture.

b) Detection methods of cryptic contamination.

c) Osetrous cycle.

Total No. of Questions :8]

SEAT No. :

P3099

[Total No. of Pages :2

[5036] - 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 two questions 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) With the help of a well labelled diagram explain the different parts of a typical stirred tank reactor and add a note on types of aerators and agitators used in a bioreactor. **[16]**

Q2) a) Discuss the effect of **[8]**

i) Microbial biomass and

ii) Agitation rate on oxygen transfer rate during fermentation.

b) Define Fed batch culture. Discuss different methods of establishing fed batch culture. **[8]**

Q3) Write explanatory notes on the following (any 2) **[16]**

a) Hollow fiber reactor

b) Microbes as biocontrol agents.

c) Gassing out method of $k_L a$ measurement

P.T.O.

Q4) Discuss different methods of measurement and control of: **[16]**

a) Microbial biomass

b) Temperature

during fermentation

SECTION - II

Q5) Explain the principle of liquid - liquid extraction in downstream processing. With the help of suitable diagrams explain the principle and working of CO and counter current extraction for recovery of a product. **[16]**

Q6) a) What is Biotransformation? Discuss givening examples the application of biotransformation in the field of medicine. **[8]**

b) What is Biomethanation? Discuss the role of different types of organisms in biomethanation process. **[8]**

Q7) a) Explain giving examples the role of mutants in strain improvement and over production of a product. **[8]**

b) Describe the process of recovery of any one organic acid from fermentation broth. **[8]**

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

a) Role of Precurssors in improving product quality.

b) Application of Lactic acid bacteria in fermentation.

c) Cultivation Systems for aerobic bacteria.

Total No. of Questions :6]

SEAT No. :

P3100

[Total No. of Pages :1

[5036] - 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) ***Answer 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 necesssary.***
4) ***Figures to the rigth indicate full marks.***

SECTION - I

Q1) a) Give detail account of Baltimore classification of viruses. **[5]**

b) Explain ultrastructure of pox virus. **[5]**

Q2) a) Give comparative account of lytic and lysogenic cycle. **[5]**

b) Explain replication of polio virus. **[5]**

Q3) Write explanatory note on. **[10]**

a) Molecular technique for viral diagnosis.

b) Clinical trial of viral vaccines.

SECTION - II

Q4) a) Discuss epidemiology of Measles. **[5]**

b) Explain the role of zika virus as an agent of new emerging viral disease. **[5]**

Q5) a) Explain immunopathogenesis of HIV. **[5]**

b) Discuss morphology & replication of any plant virus. **[5]**

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

a) Nipah virus

b) Avian influenza.

Total No. of Questions : 8]

SEAT No. :

P3102

[Total No. of Pages : 2

[5036]-41
M.Sc.
BIOTECHNOLOGY
BT- 41:Genomics & Proteomics
(2008 Pattern) (Semester-IV)

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

Instructions to condidates:

1) ***Attempt a total of five questions selecting at least 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 'Functional Genomics' ? Explain in detail its significance and scope. **[12]**

Q2) Explain the strategies applied for WGS with appropriate examples. **[12]**

Q3) Write short notes on: (any two) **[2×6=12]**

a) Toxicogenomics.

b) Important Databases in genomics.

c) Transcriptomics.

Q4) a) Discuss importance of comparative genomics and give its applications in phylogenetic studies. **[6]**

b) Explain applications of genomics studies in Human genetic disorders.**[6]**

SECTION-II

Q5) Explain methodologies applied in structural proteomics. **[12]**

Q6) Explain with appropriate examples: applications of proteomics. **[12]**

P.T.O.

Q7) Write short Note on : (any two). **[2×6=12]**

a) Yeast two-hybrid ratio

b) Mud PIT

c) Functional proteomics

Q8) a) Write principle of IEF and give its significance in protein separation. **[6]**

b) Explain ab initio method for protein structure prediction. **[6]**

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Total No. of Questions : 8]

SEAT No. :

P3103

[Total No. of Pages : 2

[5036]-42
M.Sc.
BIOTECHNOLOGY
BT- 42:Legal and Ethical Aspects in Biotechnology and IPR
(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 section.***
2) ***Answers to the sections must be written on separate answers books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION-I

Q1) State the laws of patents. Explain the procedure for obtaining a microbial patent with a flowchart. **[12]**

Q2) What is copyright? Enlist the forms of copyright and give the procedure for its registration in detail. **[12]**

Q3) Write short notes on:

a) Geographical indications **[6]**

b) Infringement of design patent **[6]**

Q4) a) Give the criteria for grant of breeder's rights. **[6]**

b) Discuss the salient features of Budapest treaty. **[6]**

P.T.O.

SECTION-II

Q5) Describe the procedure for registration under design act 2000. **[12]**

Q6) Give the comparison of Indian patent act 1970 and recently ammended patent act with reference to Biotechnology patent. **[12]**

Q7) Write short Notes on : **[6]**

a) Software copyright

b) Role of Biodiversity act. **[6]**

Q8) a) Discuss the remedies against infringement of patent. **[6]**

b) Explain the procedure for transfer of a copyright. **[6]**

Total No. of Questions : 6]

SEAT No. :

P3104

[Total No. of Pages : 1

[5036]-43
M.Sc-II
BIOTECHNOLOGY
BT- 43:Clinical Research and Database Management
(2008 Pattern) (Semester-IV)

Time : 1½ Hours] *[Max. Marks : 40*

Instructions to condidates:

1) ***Attempt a total of four questions selecting atleast two questions from each section.***
2) ***Answers to each section must be written an separate answers books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION-I

Q1) Explain rights, responsibilities and duties of FDA **[10]**

Q2) Explain the process of designing the clinical trials. Add a note on importance of preclinical trials. **[10]**

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

a) Marketing of herbaldrugs.
b) Query resolution
c) Importance of GMPs in pharamaceutical production

SECTION-II

Q4) What are adverse events? Give a flow chart for the procedure of reporting adverse events to IRB. **[10]**

Q5) Discuss in detail the development of medical device. **[10]**

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

a) Clinical Research data bases
b) Essentials of source documentation
c) Safety of human subject

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Total No. of Questions : 6]

SEAT No. :

P3105

[Total No. of Pages : 2

[5036]-44
M.Sc.
BIOTECHNOLOGY
BT-44a:Nano Biotechnology
(2008 Pattern) (Semester-IV)

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) ***Answers 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 chemical sciences.

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

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

a) Describe the applications of nanoparticles in Biosensors.

b) What are the different methods of characterization of nanoparticles.

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

a) Nano wires

b) Band gap

P.T.O.

SECTION-II

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

a) Explain the significance of biomolecules as nanostructures and comment on its applications.

b) Discuss the recent trends of research in Nano Biotechnology.

Q5) "Nanoparticles have immense applications is Drug Deleviry". Justify. **[10]**

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

a) Functionalization of nanoparticles.

b) Chemical sol-gel method of nanoparticle synthesis.

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Total No. of Questions : 8]

SEAT No. :

P3106

[Total No. of Pages : 2

[5036]-45
M.Sc.
BIOTECHNOLOGY
BT- 44b:Stem Cell Technology and Regenerative Medicines
(2008 Pattern) (Semester-IV)

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

Instructions to the condidates:

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 process of spermatigenesis. Add a note on structure of sperm. **[12]**

Q2) a) Explain in brief the cortical reaction. **[6]**

b) Describe the process of fertilisation in sea urchin. Add a note on its significance. **[6]**

Q3) a) Give the role of maternal gives in pattern formation of Drosophila. **[6]**

b) Explain the structure of spemanns organizer and its role in embryonic induction. **[6]**

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

a) Cell differentiation

b) Cell lineage

c) Embryonic stem cells

SECTION-II

Q5) Describe in brief bioethical issues involved in human cloning. **[12]**

Q6) Explain in detail embryonic stem cell technology and its applications. **[12]**

P.T.O.

Q7) Enlist Various methods of transgenesis. Explain any one of them in detail. **[12]**

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

a) Conditional knock out

b) Gene therapy

c) Adult stem cells

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Total No. of Questions : 8]

SEAT No. :

P3107

[Total No. of Pages : 2

[5036]-46
M.Sc.-II
BIOTECHNOLOGY
BT-44c:Agricultural Biotechnology
(2008 Pattern) (Semester-IV)

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

Instructions to the condidates:

1) ***Attempt a total of five questions selecting atleast two questions from each section.***
2) ***Answers to the questions 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 detail, endosperm culture. Add a note on its significance. **[12]**

Q2) With a suitable example, discuss micropropagation of a cereal crop. **[12]**

Q3) What is apomixis ? Describe with suitable example, significance of apomixis in agriculture. **[12]**

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

a) Virus indexing

b) Anther and pollen culture

c) Use of embryo culture in rearing hybrids.

P.T.O.

SECTION-II

Q5) What are the applications of transgenic crops? Discuss production of transgenic plants resistant to insects. **[12]**

Q6) What are bioreactors? How they are used for large scale production of secondary metabolites? **[12**

Q7) a) What are molecular markers? How they help for crop selection? **[6]**

b) Elaborate on causes of somaclonal variation. **[6]**

Q8) Write notes on <u>any two</u> of the following: **[12]**

a) Edible vaccines

b) Biofertilizers

c) Molecular pharming.