Total No. of Questions : 7] **[Total No. of Pages : 2**

P901

[4038] - 11

M.Sc. - I (Sem. - I)

BIOTECHNOLOGY

BT - 11 : Biological Chemistry (I)

(Old Course) (2005 Pattern)

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

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any four questions from Q.2 - Q.7.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) Write notes on <u>any four</u> of the following: **[20]**

a) Biologically important vitamins.
b) Secondary structure of proteins.
c) Coenuples and cofactors.
d) Gene of Eukaryotes and Prokaryotes.
e) Importance of pH in biological system.
f) Fate of glucose in cytosol under aerobic condition.

Q2) a) Explain the reactions leading to β - oxidation of palmitic acid. **[8]**

b) Define amino acids. Write in detail classification of amino acids. **[7]**

Q3) a) Write the principle, applications of SDS - PAGE. **[8]**

b) Discuss the forces involved in stabilizing the testiary structure of protein. **[7]**

Q4) a) Discuss in detail citric acid cycle of carbohydrate metabolism. **[8]**

b) Which radioisotopes are used in biological system? Explain the applications of radioisotopes. **[7]**

Q5) a) How protein biosynthesis takes place? Explain in detail. **[8]**

b) Discuss in detail the structure and functions of homopolysaccharides. **[7]**

P.T.O.

Q6) a) Discuss the mechanism of oxidative phosphorylation. **[7]**

b) How substrate concentration affects the enzyme activity? Explain Michaelis Menten equation. **[8]**

Q7) a) Discuss in detail Transcription process. **[8]**

b) What are different chromatography used in protein purification. **[7]**

Total No. of Questions : 7] **[Total No. of Pages : 2**

P902

[4038] - 12

M.Sc. - I (Sem. - I)

BIOTECHNOLOGY

BT - 12 : Cell Biology

(Old Course) (Theory) (2005 Pattern)

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

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any four from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in parenthesis.***

Q1) Answer the following (Any four) **[4 × 5 = 20]**

a) Write a note on voltage gated channels.

b) What is photorespiration? Explain its significance.

c) Write a note on assembly of microtubules.

d) How microscopy helps in studying cell biology? Elaborate with an example?

e) Give structure of ATP synthase with a labeled diagram.

f) Enlist different types of vacuoles and comment on their functions.

Q2) a) Explain the cotranslational pathway for targetting secretory proteins to endoplasmic reticulum. **[8]**

b) How microtubules are organized? Add a note on their function. **[7]**

Q3) a) Explain the structure of plasmodesmata. Add a note on it's role in trafficking. **[8]**

b) Enlist various components of primary cell wall in plants. Elaborate any one. **[7]**

Q4) Explain light reactions of photosynthesis. Add a note on ATP synthesis during the process. **[15]**

Q5) a) Enlist various messengers in signal transduction. Why it is better to use Ca^{++} ions as second messenger than Na^{+} ions. **[8]**

b) Explain structure and organization of action filaments. **[7]**

P.T.O.

Q6) a) Elaborate the structure of plasma membrane. **[8]**

b) Describe MAP kinase pathway in eukaryotes. **[7]**

Q7) a) Explain significance of hormones in cell differentiation. **[8]**

b) Write a note on cell - matrix interaction. **[7]**

Total No. of Questions : 8] **[Total No. of Pages : 3**

P903

[4038] - 13

M.Sc. - I (Sem. - I)

BIOTECHNOLOGY

BT - 13 : Quantitative Methods

(Old Course) (2005 Pattern)

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

Instructions to the candidates:

1) ***Question 1 and 5 are compulsory.***
2) ***Attempt any two from question 2, 3 and 4 from section I and any two from questions 6, 7 and 8 from section II.***
3) ***Use separate Answer - sheet for each section.***
4) ***Draw sketches if necessary.***
5) ***Marks are given in parenthesis.***

SECTION - I

Q1) Attempt following (any two)

a) Explain the terms with suitable example. **[5]**

i) Type I and Type II errors.

ii) Standard Normal distribution.

b) Get the derivatives of following functions using chainrule **[5]**

i) $y = 7x^4 + 3x^2 + 7$

ii) $y = \sin^5 x$

c) What is correlation coefficient, give its range and significance. **[5]**

Q2) Attempt following:

a) Sketch curve for following function. **[8]**

i) $y = \sin(x)$

ii) $y = |x + 2|$

b) Find the area of the region between the curve $y = 4 - x^2$ and the x axis where $0 \leq x \leq 3$. **[7]**

Q3) Attempt following:

a) What are the characteristics of x^2 (chi - square) test? When it is used? **[8]**

b) What do you mean by testing of hypothesis? What is null hypothesis? What parametric and non - parametric tests are used in testing of hypothesis? **[7]**

P.T.O

Q4) Attempt following:

a) TATA Boxes (Sequences associated with promotors) in Bacterial genome are analyzed for nucleotide frequencies for first three position and following frequencies were observed. **[8]**

	Position 1	Position 2	Position 3
A	40%	65%	30%
T	60%	25%	60%
G	0%	5%	4%
C	0%	5%	6%

If occurrance of nucleotide at given position is independent of nucleotides present at other positions then calculate

i) Probability of obtaining "A" at position 2 in randomly selected promoter sequence.

ii) Probability of obtaining "T" at position 1 and "G" at position 2 in randomly selected promotor sequence.

iii) Probability of obtaining "TGT" in first 3 positions in randomly selected sequence.

b) Find the "inverse" of following matrix, if it exists. **[7]**

$$A=\begin{bmatrix}0 & 1 & 2\\ 1 & 0 & 3\\ 4 & -3 & 8\end{bmatrix}$$

SECTION - II

Q5) Attempt following (Any two)

a) Give a comparative account of RAM, ROM, PROM & EEPROM. **[5]**

b) What are different resources are there on www? Give a brief account of the services provided by internet. **[5]**

c) Enlist types of printers. How ink-jet printer works? **[5]**

Q6) Write short notes on

a) Secondary Memory storage devices **[8]**

b) Processors and Memory Management. **[7]**

Q7) Enlist Components of Networking and briefly describe their utilities? What do you mean by topologies used in networking? Explain any two. **[15]**

Q8) a) Differentiate between **[8]**

i) Batch process and real time process.

ii) Primary Memory & Secondary Memory.

b) Give brief account of computer generations. **[7]**

Total No. of Questions : 7] **[Total No. of Pages : 2**

P904

[4038] - 21

M.Sc. - I (Sem. - II)

BIOTECHNOLOGY

BT - 21 : Molecular Biology

(Old Course) (2005 Pattern)

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

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any <u>four</u> from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in the parenthesis.***

Q1) Answer the following: (Any four) **[4 × 5 = 20]**

a) Write a note on Klenow fragment.
b) Write in brief on Oncogenes.
c) Describe post transcriptional modifications with examples.
d) Describe genome organization in the organelles.
e) Write a note on wobble hypothesis & its significance.
f) Justify that genetic code is commaless.

Q2) Answer the following:

a) Comment on packaging and organization of T_4-genome. **[8]**
b) Describe rolling circle model of DNA replication. **[7]**

Q3) Attempt the following:

a) Discuss in brief DN age hypersensitivity. **[7]**
b) Write a note on organization and functions of ribonucleo proteins. **[8]**

Q4) Write an essay on:
Chromosomal inactivation and sex determination. **[15]**

Q5) What is nucleosome? Discuss in detail eukaryotic genome organization. **[15]**

P.T.O.

Q6) Attempt the following:

a) Discuss in brief proteomics and its significance. **[8]**

b) What is dark repair? Explain the mechanism and significance. **[7]**

Q7) Answer the following:

a) Write a note on the regulation of protein synthesis. **[8]**

b) Comment on DNA reassociation kinetics & its significance. **[7]**

Total No. of Questions : 4] **[Total No. of Pages : 1**

P905

[4038] - 22

M.Sc. - I (Sem. - II)

BIOTECHNOLOGY

BT - 22 : Genetics

(Old Course) (2005 Pattern)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any <u>two</u> from the remaining questions.***
3) ***Provide the sketch wherever necessary.***
4) ***Marks are given in the parenthesis.***

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

a) What is concept of dominance? Explain its importance with examples.

b) What is Hardy - Weinberg law? Explain its significance with examples.

c) What is Ames test? Discuss the test with applications.

Q2) Write an essay on:

Tryptophan operon and its control. **[15]**

Q3) Answer the following:

a) Discuss with example the mechanism of substitution mutations. **[8]**

b) What is dosage compensation? Explain its significance. **[7]**

Q4) Attempt the following:

a) What is an operon concept? Discuss lactose operon and its control. **[8]**

b) Discuss with example the techniques of genetic mapping. **[7]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P906

[4038] - 23

M.Sc. - I (Sem. - II)

BIOTECHNOLOGY

BT - 23 a : Microbiology

(Old) (2005 Pattern) (Part - I)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are in the parenthesis.***

Q1) Write short notes on (any 2): **[2 × 5 = 10]**

a) Hyophilization.

b) Role of soil bacteria in nitrate reduction.

c) Extremophiles in Biotechnology.

Q2) a) Explain the various modes of action of antimicrobial agents giving examples. **[8]**

b) What are the precautions to be taken while handling pathogens? **[7]**

Q3) a) Explain the disease tuberculosis in relation to its

- Symptoms.
- Modes of transmission.
- Causative agent and
- Diagnosis. **[10]**

b) Give the role of immunoprobes in disease diagnosis. **[5]**

Q4) a) How are anaerobes cultivated in laboratory? **[8]**

b) Explain the importance of steroid biotransformation. **[7]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P907

[4038] - 24

M.Sc. - I (Sem. - II)

BIOTECHNOLOGY

BT - 23 b : Virology

(2005 Pattern) (Old Course)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in parenthesis.***

Q1) Write short notes on any 2 of the following: **[10]**

a) Propagation of animal viruses.

b) Any one disease caused by plant viruses.

c) Morphology and ultrastructure of TMV.

Q2) a) Explain strategies to improve sensitivity in ELISA. **[8]**

b) Explain with examples the benefits of using peptide vaccines for viral diseases. **[7]**

Q3) Justify the following:

a) Knowledge of life cycle of virus is important for designing antiviral agents. **[8]**

b) Vaccines can be used as therapeutic agents. **[7]**

Q4) Explain the general scheme of classifying virus. **[15]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P908

[4038] - 25

M.Sc. - I (Sem. - II)

BIOTECHNOLOGY

BT - 24 : Immunology

(Theory) (Old Course) (2005 Pattern)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any <u>two</u> from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in parenthesis.***

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

a) Write a note on the functions of complement.

b) State the principle of western blot and it's applications.

c) Give a brief account of antigen processing and presentation.

Q2) a) Describe in detail the structure and function of MHC - I and II molecules. **[8]**

b) Explain the terms "Primary and Secondary immune responses" with the help of graphical representation. **[7]**

Q3) a) Write in details the 'Hypersensitivity Reaction'. **[7]**

b) With a neat labelled sketch compare the structure of BCR and TCR. **[8]**

Q4) a) Mention the various components of innate immunity and their functions. **[7]**

b) Discuss immune response to Viral Infection. **[8]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P909

[4038] - 26

M.Sc. - I (Sem. - II)

BIOTECHNOLOGY

BT - 25 : Bio-Informatics

(Old Course) (2005 Pattern)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any <u>two</u> from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in parenthesis.***

Q1) Answer the following (Any two):

a) Explain role of Bioinformatics in Biomedical Sciences. **[5]**

b) What is gene prediction? Explain "Specificity" and "Sensitivity" of gene prediction algorithms. **[5]**

c) Why "Gaps" are introduced in alignments? What do you understand by the terms **[5]**

i) Gap opening panalty.

ii) Gap extension panalty.

Q2) Answer the following:

a) Differentiate between **[8]**

i) Pairwise sequence alignment and multiple sequence alignment.

ii) "Homology" and "Similarity"

b) How proteins are classified based on their structural features? Comment on SCOP & CATH. **[7]**

Q3) Answer the following:

a) How genomes are compaired with each other? What are the applications of genome comparison? **[8]**

b) What do you mean by Database Similarity search? Enlist the tools involved in the same. **[7]**

Q4) Explain BLAST search, its parameters and applications. **[15]**

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P910

[4038] - 31

M.Sc. - II (Sem. - III)

BIOTECHNOLOGY

BT - 31 : Tissue Culture (Plant & Animal)

(2005 Pattern) (Old Course)

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

Instructions to the candidates:

1) ***Question 1 & 5 are compulsory.***
2) ***Attempt any two questions from each section Q.No. 2 to 4 and Q.NO. 6 to 8.***
3) ***Figures to the right indicate full marks for the respective questions.***
4) ***Neat diagrams are expected wherever necessary.***
5) ***Answers to both the sections are to be written on separate answer sheets.***

SECTION - I

Q1) Write a short note on [any two] **[10]**

a) Dedifferentiation in plants.

b) Role of growth regulators in plant tissue culture media.

c) Applications of transgenic plants.

Q2) What is somatic hybridization? Explain the procedure to generate somatic hybrids and give its application. **[15]**

Q3) What is clonal propogation? Give its applications. **[15]**

Q4) a) Discuss the commercial applications of plant tissue culture. **[7]**

b) Describe the incubation systems used in plant cell culture. **[8]**

P.T.O

SECTION - II

Q5) Write a short note on [any two] **[10]**

a) Lymphocyte culture.

b) Methods of cell disagregation.

c) Characterization of cell line.

Q6) What are serum free media? Explain the advantages of these media over media with serum. **[15]**

Q7) What are three dimensional cultures? Explain the methods of establishing 3D cultures and their application. **[15]**

Q8) What is cryopreservation? Give its principle and procedure in detail. Add a note on application of cryopreservation. **[15]**

Total No. of Questions : 4] **[Total No. of Pages : 1**

P911

[4038] - 32

M.Sc. - II (Sem. - III)

BIOTECHNOLOGY

BT - 32 : Fundamentals of Genetic Engineering

(Old Course) (2005 Pattern)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in parentheses.***

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

a) Write salient features of plasmid and lamda phage vectors.

b) Describe the strategy for construction of cDNA libraries.

c) Enlist different expression vectors in bacteria and eukaryotes and write salient features of any one of it.

Q2) a) Explain any two methods of recombinant DNA transfer to host cells. **[7]**

b) Write explanatory note on the following: **[2 × 4 = 8]**

i) Colony hybridisation.

ii) Site - directed mutagenesis.

Q3) a) Explain strategies for screening and selection for transformants. **[7]**

b) Write explanatory note on the following: **[2 × 4 = 8]**

i) YAC.

ii) Western blotting.

Q4) a) What is meant by induced expression? With suitable examples explain how is it carried out? **[7]**

b) Write explanatory note on the following: **[2 × 4 = 8]**

i) Chimeric constructs.

ii) Expression of industrially important products.

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P912

[4038] - 33

M.Sc. - II (Sem. - III)

BIOTECHNOLOGY

BT - 33 : Biological Chemistry - II

(2005 Pattern) (Old Course)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any two questions from Q.2. to Q.4.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat diagrams wherever necessary.***

Q1) Write short notes on any two of the following: **[10]**

a) Agarose gel electrophoresis.

b) Ramachandran plot.

c) Microarray analysis.

Q2) a) Write the principle, working and applications of XRD. **[7]**

b) Discuss in detail Two - D gel analysis. Add a note on Maldi - Tof of proteins. **[8]**

Q3) a) How ionexchange chromatography is used for protein purification? **[8]**

b) Explain sequencing of proteins. **[7]**

Q4) a) Discuss the features of secondary structure of proteins. **[7]**

b) What is differential centrifugation? Explain how cell fractionation is carried out? **[8]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P913

[4038] - 34

M.Sc. - II (Sem. - III)

BIOTECHNOLOGY

BT - 34 : Biochemical Engineering

(Old Course) (2005 Pattern) (Theory)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) Write short notes on (any two) of the following: **[5 × 2 = 10]**

a) Scale up in bioprocess.

b) Flow patterns in agitated tanks.

c) Types of aerators used in bioprocess.

Q2) a) What are the advantages of non-mechanically agitated fermenters? Explain the design and working of any one such fermenter. **[8]**

b) What are different heat transfer configurations for bioreactors? **[7]**

Q3) a) What are the different types of rheologies demonstrated by fermentation medium? **[8]**

b) How is mixing achieved in a bioreactor? Give different designs of such mixing equipments. **[7]**

Q4) What are the different mass transfer steps involved in transport of oxygen from gas bubble to cell? Explain the process of Gas - liquid mass transfer.**[15]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P914

[4038] - 35

M.Sc. - II (Sem. - III)

BIOTECHNOLOGY

BT - 35 : Pleuripotent Cell Technologies and Reproduction

(Theory : Non - Credit System) (Old Course) (2005 Pattern)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any two questions. Out of the remaining three.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat, labelled, diagrams wherever necessary.***

Q1) Write short notes on (any two): **[10]**

a) Cytoplasmic rearrangements.

b) Characteristics of adult stem-cells.

c) Transgenic animals.

Q2) a) "Cleavage pattern is governed by size and quantity of yolk granules along with their distribution in cytoplasm". Justify with appropriate examples. **[7]**

b) Describe the process of fertilization with an emphasis on fast and slow block of polyspermy. **[8]**

Q3) a) Enlist the gene transfer techniques used to produce transgenic animals and explain any one of them in detail. **[7]**

b) Describe in detail the pattern formation in Drosophila embryo. **[8]**

Q4) "Gene Therapy, a bliss to the people suffering from various genetic disorders". Justify the statement and discuss with reference to applications, advantages and limitations of gene therapy. **[15]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P915

[4038] - 41

M.Sc. - II (Sem. - IV)

BIOTECHNOLOGY

BT - 41 : Structural Biology

(Theory) (Old) (2005 Pattern)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any two of the remaining questions.***
3) ***Figures to the right indicate full marks***
4) ***Provide sketch wherever necessary.***

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

a) Mention the various conditions that influence formation of crystal used in X - ray crystallography.

b) What is nuclear shielding?

c) What is fluorescence spectroscopy? Mention any two examples of this technique.

Q2) a) What is single wavelength anomalus dispersion [SAD] in X-ray crystallography? What are its limitations? **[8]**

b) What is nuclear magnetic resonance? Give the principle behind the use of nuclear magnetic resonance spectroscopy as a technique. **[7]**

Q3) a) What is X-ray crystallography? What is the basic set - up of this technique? Give two applications of this technique. **[8]**

b) Write a note on Patterson function. **[7]**

Q4) Data obtained from X-ray crystallography of a protein is a scattering pattern. Explain how this data is converted to a structure of the protein.

What are the limitations of the use of this technique in structure determination. **[15]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P916

[4038] - 42

M.Sc. - II (Sem. - IV)

BIOTECHNOLOGY

BT - 42 : Industrial Biotechnology

(Old Course) (2005 Pattern)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in parenthesis.***

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

a) Inhibitors can be used to chanelize a metabolic pathways to obtain a product of commercial value. Explain giving examples.

b) Immobilization of enzymes can adversely affect the properties of enzymes. Justify.

c) Explain the role of Pseudomonas in oil spill remediation.

Q2) Discuss with the help of flow diagram, commercial production of Ethanol from cane molasses. Mention the important by - products formed. **[15]**

Q3) a) What are the different methods of composting? **[8]**

b) What is Super Critical fluid extraction? **[7]**

Q4) a) How can micro-organisms be used for converting agricultural wastes into useful products. **[8]**

b) How is microbial biomass measured during fermentation. **[7]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P917

[4038] - 43

M.Sc. - II (Sem. - IV)

BIOTECHNOLOGY

BT - 43 : Applications of Genetic Engineering

(Theory) (Old Course) (2005 Pattern)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in parenthesis.***

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

a) What is patent? Mention the criteria for a patentability.

b) Mention the biosafety regulations for Genetic Engineering research.

c) Write a short note on protein databases used in bioinformatic analysis.

Q2) Enlist atleast four important pharmaceutical products obtained through plant genetic engineering. Explain any one in detail. **[15]**

Q3) a) What is proteomics? Enlists applications of proteomics and discuss any two. **[8]**

b) What are biosafety regulations? Discuss the necessity of such regulations in Genetic Engineering research. **[7]**

Q4) a) What are DNA markers? Enlist applications of DNA marker technology in plants & explain any one. **[8]**

b) Explain any one strategy employed in sequencing and assembling human genome. Comment on the vectors used in sequencing human genome.**[7]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P918

[4038] - 44

M.Sc. - II (Sem. - IV)

BIOTECHNOLOGY

BT - 44 : Plant Biotechnology

(Theory) (Old Course) (2005 Pattern)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in parenthesis.***

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

a) Compare seed propagation and vegetative propagation.

b) Define morphogenesis. Enlist the factors controlling in vitro morphogenesis.

c) What is embryo rescue? Discuss its advantages and disadvantages.

Q2) What is significance of hardening stage during micropropagation? Explain the ex vitro methods of hardening of forest tree plantlets. **[15]**

Q3) a) What is cryopreservation? How it is used for conservation of germplasm? **[7]**

b) What is somatic hybridization? How is it achieved? Explain its role in genetic improvement. **[8]**

Q4) a) With suitable example, explain how genetic improvement can be achieved using tranogenic technology. **[8]**

b) Write a note on immobilization as an intervention for enhancing production of secondary metabolites. **[7]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P919

[4038] - 45

M.Sc. - II (Sem. - IV)

BIOTECHNOLOGY

BT : 45 - Chemical Synthesis and Screening in Biotechnology

(Theory) (2005 Pattern) (Old Course)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any two from the remaining.***
3) ***Figures to the right indicate full marks.***
4) ***Provide sketch wherever necessary.***

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

a) Describe the synthesis of the diasaccharide glucose - ribose .

b) Give the applications of synthetic oligopeptides.

c) How are monomers for the phosphoramidite method prepared?

Q2) a) Describe the various protective groups in oligopeptide synthesis. **[8]**

b) Write a note on microwave assisted peptide synthesis. **[7]**

Q3) a) Give the importance of oligonucleotides in diagnostics. **[8]**

b) Describe the phosphodiester method of oligonucleotide synthesis. **[7]**

Q4) Describe the strategies for development and screening of drugs. **[15]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P920

[4038] - 46

M.Sc. - II (Sem. - IV)

BIOTECHNOLOGY

BT - 46 : Genomics & Proteomics

(2005 Pattern) (Theory) (Old Course)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in parenthesis.***

Q1) Write notes on any two: **[2 × 5 = 10]**

a) Functional Genomics.

b) Transcriptomics.

c) Proteomics and its application in characterization of novel proteins.

Q2) Discuss different strategies in proteomics. **[15]**

Q3) What is genomics. Discuss different strategies for whole genome analysis. **[15]**

Q4) Write a note on:

a) Toxicogenomics. **[7]**

b) Pharmacogenomics. **[8]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P921

[4038] - 47

M.Sc. - II (Sem. - IV)

BIOTECHNOLOGY

BT : 47 - Immunotechnology

(Theory) (Old Course) (2005 Pattern)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Question No.1. is compulsory.***
2) ***Attempt any two from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in parenthesis.***

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

a) Classify cytokine Receptors with their ligands.

b) Give a brief account of mechanisms of establishment and maintenance of tolerance.

c) What do you mean by molecular mimicry explain with examples.

Q2) a) Comment on transgenic models used in immunological experiments. **[8]**

b) Write a note on chimeric antibodies and their applications. **[7]**

Q3) a) Give a brief account of phage-display technology and it's application. **[8]**

b) What is HAT - selection? Write application of Monoclonal antibodies. **[7]**

Q4) a) Describe the network theory proposed by Jerne. **[7]**

b) Write a note on various immunodiagnostics and their uses. **[8]**

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P922

[4038] - 101

M.Sc. (Sem. - I)

BIOTECHNOLOGY

BT - 11 : Advanced Biological Chemistry

(New) (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) a) Explain with the help of a schematic diagram, the working of UV - visible spectrophotometer. State the principle of working. **[8]**

b) What is Affinity chromatography? Explain its application in biological chemistry. **[8]**

β

Q2) a) Give a comparative account of α helices and sheets of proteins. **[8]**

b) Explain the structure of protein - ligand complexes. **[8]**

Q3) Explain: **[16]**

a) SDS - PAGE as a separation technique.

b) Protocol and product of protein engineering.

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

a) Synthesis and degradation of starch.

b) Chemical properties of soluble protein.

c) Maintenance of acid base balance in a living cell.

P.T.O

SECTION - II

Q5) a) Why plants have been a source of medicine? What is pharmacognosy? What is pharmacology? **[8]**

b) Compare primary and secondary metabolism. **[8]**

Q6) a) What is a herbal product? List the phytochemical investigations necessary for selecting a herbal product as a medicine. **[8]**

b) Define metabolomics. Mention the scope of metabolomics and explain any one of the aspects of metabolomics. **[8]**

Q7) Explain: **[16]**

a) Metabolic pathway manipulation as a means to produce a novel compound.

b) Applications of Protein arrays.

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

a) Site directed mutagenesis.

b) Agricultural importance of secondary metabolites.

c) Types of secondary metabolites.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P923

[4038] - 102

M.Sc. (Sem. - I)

BIOTECHNOLOGY

BT - 12 : Molecular and Cell Biology

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

SECTION - I

Q1) a) Compare endocrine, paracrine and autocrine signalling pathways. **[8]**

b) Enlist various cell receptors. Mention their functions and explain any one of them. **[8]**

Q2) a) Describe the electron transport chain in mitochondria with the help of a labelled diagram. **[8]**

b) Explain the structure and organisation of micro filaments. **[8]**

Q3) a) Explain the ultrastructure of the male gamete of flowering plant. **[8]**

b) What are plasmodesmata? Describe their ultrastructure and function. **[8]**

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

a) Protein transport in mitochondria.

b) G-proteins.

c) Structure of plant egg.

P.T.O

SECTION - II

Q5) a) Explain the role of DNA in heredity. **[8]**

b) What is meant by differential gene expression? Explain with the help of an example. **[8]**

Q6) Explain the ultrastructure and functions of plasma membrane. **[16]**

Q7) Explain: **[16]**

a) Genetic variability and evolution.

b) X linked immunodefficiencies.

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

a) Pharmacogenomics.

b) Gene interactions.

c) Natural defence mechanisms against insects.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P924

[4038] - 103

M.Sc. (Sem. - I)

BIOTECHNOLOGY

BT - 13 : Environmental Biotechnology

(New) (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) Enlist nonconventional sources of energy. Explain with the help of suitable examples, the advantages and limitations of any two such sources. **[16]**

Q2) a) Enlist the air pollutants and explain the methods of monitoring and control of any two air pollutants. **[8]**

b) Explain with suitable examples the scope of ecotoxicology of soil pollutants. **[8]**

Q3) a) Explain the meteorological factors that affect noise levels. **[8]**

b) Enlist the operations involved in wastewater engineering and explain any one. **[8]**

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

a) Biological treatment of waste water.

b) Ecomarks.

c) ISO 14,000.

P.T.O

SECTION - II

Q5) a) Explain with suitable examples, use of genetically modified plants in restoration of contaminated soils. **[8]**

b) Mention the advantages and application of biomaterials in reducing pollution. **[8]**

Q6) What is bioremediation? Mention different methods involved and explain any two methods with suitable examples. **[16]**

Q7) Explain the scope methods and advantages of conservation Biotechnology. **[16]**

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

a) GIS for ecological mapping.

b) Biosensors.

c) Importance of EIA.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P925

[4038] - 201

M.Sc. (Sem. - II)

BIOTECHNOLOGY

BT : 21 - Genetic Engineering

(New) (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) a) What are DNA dependent DNA polymerases? How are they used in genetic engineering? **[8]**

b) Illustrate important features of MB phase vectors. How are these used in DNA sequencing? **[8]**

Q2) Explain with the help of appropriate examples, procedure of detection and diagnosis at molecular level. **[16]**

Q3) a) What are molecular markers? State any two applications of such markers in plant biotechnology. **[8]**

b) How are vaccines produced using recombinant DNA technology? Explain with appropriate example. **[8]**

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

a) CDNA synthesis.

b) Trasgenic plants.

c) Genomic DNA library.

P.T.O

SECTION - II

Q5) a) Write an illustrative account of prokaryotic expression vectors. **[8]**

b) What is genetic mapping? How does it differ from physical mapping? **[8]**

Q6) Explain Sanger's method of DNA sequencing. How is it used in automated DNA sequencing? **[16]**

Q7) a) Explain how the sequence and length of target DNA influence the choice of the type of PCR. **[8]**

b) How are industrially important products synthesized by genetic engineering? Explain with the help of appropriate examples. **[8]**

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

a) Nested PCR.

b) Yeast vectors for heterologous expression.

c) Molecular diagnostics.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P926

[4038] - 202
M.Sc. (Sem. - II)
BIOTECHNOLOGY
BT - 22 : Bioinformatics
(2008 Pattern) (New)

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

Instructions to the candidates:-

1) ***Attempt a total of five questions selecting at least 2 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) Write about salient features of biological databases. **[8]**

b) What is homology searching? Elaborate on BLAST. **[8]**

Q2) a) Explain with an example, energy optimization of proteins. **[8]**

b) Explain the role of bioinformatics in drug designing. **[8]**

Q3) Define chemoinformatics. Give an account of energy optimization techniques and their importance in chemoinformatics. Explain SMILES. **[16]**

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

a) Smith-Waterman algorithm.

b) Golden section method.

c) Immunoinformatics.

P.T.O.

SECTION - II

Q5) What is bioinformatics? Elaborate on the concept of structural bioinformatics. Give a brief account of protein folding structure function relationship. **[16]**

Q6) a) Explain the importance of Ramchandran plot in structural bioinformatics. **[8]**

b) How are CATH and Scop used in protein structure classification in bioinformatics? **[8]**

Q7) a) Explain the applications of protein structure predictions. **[8]**

b) In what way Immuno informatics has revolutionised medical field. **[8]**

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

a) Bioinformatics business models.

b) Energy calculations in protein structure visualization.

c) Significance of bioinformatics in biological research.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P927

[4038] - 203
M.Sc. (Sem. - II)
BIOTECHNOLOGY
BT - 23 : Plant Biotechnology
(2008 Pattern) (New)

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

Instructions to the candidates:-

1) ***Attempt a total of five questions selecting at least 2 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) Define Biotechnology. Explain the concept of plant biotechnology and mention its scope. **[8]**

b) Explain with the help of an appropriate example, the biotechnology for qualitative/quantitative improvement of an economically important alga. **[8]**

Q2) Enlist at least eight economically important fungi. Explain the biotechnology for improvement of any one industrially important fungus. **[16]**

Q3) Mention tissue culture based techniques for crop improvement. Explain with an appropriate example application of each techniques. Mention the advantages. **[16]**

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

a) Somatic embryogenesis.

b) Importance of PGRs in plant biotechnology.

c) Indirect organogenesis.

P.T.O.

SECTION - II

Q5) What are transgenic plants? Enlist their applications. Explain any one procedure to obtain abiotic stress tolerant crops. **[16]**

Q6) a) Explain with the help of appropriate examples use of somaclonal variants. **[8]**

b) What are the advantages of somatic hybrids over sexual hybrids? Add a note on application of somatic hybridization. **[8]**

Q7) Explain the following : **[16]**

a) Transgenics for secondary metabolites.

b) Plant derived vaccines-advantages and limitations.

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

a) Phytoremediation.

b) Plant biotechnology for production of nutraceuticals.

c) Biofuels.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P928

[4038] - 301
M.Sc. (Sem. - III)
BIOTECHNOLOGY
BT - 31 : Animal Biotechnology
(2008 Pattern) (New)

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

Instructions to the candidates:-

1) ***Attempt a total of five questions selecting at least 2 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) Describe in brief the scope of animal biotechnology. **[8]**

b) What is live stock breed? Which factors influence their productivity? Explain with the help of suitable example. **[8]**

Q2) a) Enlist the methods of artificial breeding. What are like hazards of artificial breeding of animals? **[8]**

b) Explain the concept of gene banking. Mention its advantages. **[8]**

Q3) Mention the methods of initiation and maintenance of animal cell cultures. Explain the growth kinetics of any one type of cell culture. **[16]**

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

a) Application of cell cultures.

b) Identification and purification of stem cells.

c) Long term maintenance of stem cells.

P.T.O.

SECTION - II

Q5) What is in vitro fertilization? Why is it necessary? Explain the procedure of in vitro fertilization and follow up of its product(s). **[16]**

Q6) a) What is germ cell storage? Why it is required? Explain any one method of the storage. **[8]**

b) Explain the procedure and precautions for artificial insemination. **[8]**

Q7) What are transgenic animals? What are the methods of genetic modifications? Explain any one. **[16]**

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

a) Knock out mice.

b) Problems associated with transgenic animals.

c) Advantages of artificial breeding.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P929

[4038] - 302
M.Sc. (Sem. - III)
BIOTECHNOLOGY
BT - 32 : Fermentation Technology
(2008 Pattern) (New)

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

Instructions to the candidates:

1) ***Attempt a total of five questions selecting at least 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) Explain how the relationship between power number and Reynold's number change with flow regimes in stirred tank fermenters. **[8]**

b) Explain the steps involved in oxygen transfer to the microbial cells in fermentation broth. **[8]**

Q2) A fermentation process has been set up that requires measurement and control of : **[16]**

a) Temperature.

b) Microbial biomass.

c) Inlet and exit gas analysis and

d) Dissolved oxygen. What are the appropriate methods used for these parameters?

Q3) a) Explain how (i) air flow rate (ii) rheology of broth and (iii) cell morphology affect the KLa values. **[8]**

b) How are microbes used as chemical factories? Explain with the help of two examples. **[8]**

P.T.O.

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

a) Air lift fermenter.

b) Scale up.

c) Sparger design in fermenter.

SECTION - II

Q5) How is biotransformation used to transform. **[16]**

a) pesticides.

b) antibiotics and

c) nonsteroidal compounds? Why biotransformation is preferred over chemical synthesis?

Q6) a) How are analogue resistant mutants and revertants screened for strain improvement? **[8]**

b) What is the effect of permeability of cells on glutamate production? **[8]**

Q7) a) What are different phases in biogas production? **[8]**

b) Explain the theory of filtration. What is the role of different types of filters used in recovery process? **[8]**

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

a) Ultrafiltration and reverse osmosis.

b) Carbon sources in fermentation media.

c) Cultivation of aerobes.

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Total No. of Questions : 6] **[Total No. of Pages : 2**

P930

[4038] - 303
M.Sc. (Sem. - III)
BIOTECHNOLOGY
BT - 33a : Principles of Virology
(2008 Pattern) (New)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Attempt a total of four questions selecting at least 2 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) a) How are viral diseases diagnosed? Explain in brief any one method. **[5]**

b) Enlist the antiviral agents and explain the mode of action of any one agent. **[5]**

Q2) Justify the following : **[10]**

a) Subunit vaccines are more useful compared to whole viral vaccines.

b) Marburg virus is an agent for new emerging infections.

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

a) Replication of HIV.

b) Ultrastructure of T4 bacteriophage.

P.T.O.

SECTION - II

Q4) a) Discuss the epidemiology of measles. **[5]**

b) What is New Castle disease? **[5]**

Q5) a) Enlist the plant viruses and explain the structure of any one. **[5]**

b) What is acute infection? Mention its causes and consequences. **[5]**

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

a) HINI.

b) Immunopathogenesis.

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Total No. of Questions : 6] **[Total No. of Pages : 2**

P931

[4038] - 304
M.Sc. (Sem. - III)
BIOTECHNOLOGY
BT - 33b : Advanced Immunology
(2008 Pattern) (New)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:

1) ***Attempt a total of four questions selecting any 2 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) Explain with the help of an example, an organ as a system with innate immunity. **[5]**

b) Give a concise account of immune response in plants. **[5]**

Q2) a) Describe with the help of appropriate examples, the cell-cell interactions during immune response. **[5]**

b) Compare innate immunity and acquired immunity. **[5]**

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

a) Parasitic immunology.

b) Hybridoma technology.

P.T.O.

SECTION - II

Q4) a) How are congenic mice useful in immunological studies? **[5]**

b) What are chimeric antibodies? How are these produced? **[5]**

Q5) a) Explain how a diverse types of antibodies can be produced in vitro by using phage display. **[5]**

b) What are immune diagnostics? How are they produced? **[5]**

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

a) Stem cell technology for immunological studies.

b) Antibody engineering.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P932

[4038] - 401
M.Sc. (Sem. - IV)
BIOTECHNOLOGY
BT - 41 : Genomics and Proteomics
(2008 Pattern) (New)

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 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) Define the scope of genomics. Describe the method of sequence data analysis. **[12]**

Q2) a) What is structural genomics? Describe its applications. **[6]**

b) What is functional genomics? What is its application in biotechnology? **[6]**

Q3) Explain in detail the methodology of sequencing of whole genome. **[12]**

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

a) Toxicogenomics.

b) Genome annotation.

c) Microarray.

P.T.O.

SECTION - II

Q5) Define the scope of proteomics. Explain in brief methodology of proteomics. **[12]**

Q6) Explain with the help of appropriate examples, the use of computational approach to understand protein-protein interactions. **[12]**

Q7) Mention the applications of proteomics and explain any one. **[12]**

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

a) Structural proteomics.

b) Functional proteomics.

c) Application of proteomics in biotechnology.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P933

[4038] - 402
M.Sc. (Sem. - IV)
BIOTECHNOLOGY
BT - 42 : Legal and Ethical Aspects in Biotechnology and IPR
(2008 Pattern) (New)

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 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) Mention the peculiarities of intellectual property. Enlist the forms of intellectual property. Briefly mention the IPR laws. **[12]**

Q2) What is a patent? Mention the criteria to decide patentability. Cite suitable examples. **[12]**

Q3) Explain with the help of a flow chart, the procedure of obtaining a biotechnology patent. **[12]**

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

a) Transfer of copy right.

b) Patent Infringement.

c) Industrial design.

P.T.O.

SECTION - II

Q5) Explain the major changes in Indian patent system after TRIPS. **[12]**

Q6) Discuss the issue of patents related to Turmeric or Rice or Neem in Indian context. **[12]**

Q7) a) Describe in brief the contents of a patent specification. **[6]**

b) What is software copyright? How is it obtained? **[6]**

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

a) WTO.

b) Remedies against infringement of IPR laws.

c) Budapest Treaty.

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Total No. of Questions : 6] **[Total No. of Pages : 2**

P934

[4038] - 403

M.Sc. (Sem. - IV)

BIOTECHNOLOGY

BT - 43 : Clinical Research and Database Management

(2008 Pattern) (New)

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 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 role of FDA in clinical research. **[10]**

Q2) What are the steps from discovery of a drug in laboratory to its approval for clinical purpose? **[10]**

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

a) Legislations and regulation that govern & protect safety and well being of patients.

b) Medical device research.

c) Marketing of drug.

P.T.O.

SECTION - II

Q4) Mention the fields of information in clinical database and explain any one. **[10]**

Q5) Explain the principles of database management with special reference to clinical database. **[10]**

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

a) Access to investigational products.

b) Recording and reporting serious events.

c) Query resolution process.

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Total No. of Questions : 6] **[Total No. of Pages : 2**

P935

[4038] - 404
M.Sc. (Sem. - IV)
BIOTECHNOLOGY
BT - 44 A : Nanobiotechnology
(2008 Pattern) (New)

Time : 1½ Hours] ***[Max. Marks :40***

Instructions to the candidates:-

1) ***Attempt a total of four questions selecting at least 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 application of nanomaterials in life science. **[5]**

b) Describe the characteristic features of nanoparticles. **[5]**

Q2) a) What is meant by green synthesis? Compare it with chemical synthesis. **[5]**

b) Explain the use of inorganic or metallic nanostructures to study biological systems. **[5]**

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

a) Biofunctionalization of nanoparticles.

b) Nanoparticles for drug delivery.

P.T.O.

SECTION - II

Q4) Enlist the physical vapor deposition techniques used for synthesis of nanostructures. Explain any one. **[10]**

Q5) Explain in detail the sol-gel method for synthesis of nanomaterials. **[10]**

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

a) Nanosensors.

b) Application of Nanobiotechnology in gene therapy.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P936

[4038] - 405

M.Sc. (Sem. - IV)

BIOTECHNOLOGY

BT - 44 B : Stem Cell Technology and Regenerative Medicines

(2008 Pattern) (New)

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

Instructions to the candidates:

1) ***Attempt a total of five questions selecting at least 2 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) Explain the post fertilization changes in Ovum upto embryonic induction. **[12]**

Q2) a) What is polyspermy? What prevents polyspermy? Explain the mechanism. **[6]**

b) Describe ultrastructure of a sperm cell. **[6]**

Q3) What is meant by pattern formation? Mention the events involved in it and explain any one. **[12]**

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

a) Cell differentiation.

b) Significance of cell lineages.

c) Characteristic features of stem cells.

P.T.O.

SECTION - II

Q5) Give a concise comparative account of embryonic stem cells and adult stem cells. **[12]**

Q6) What is a transgenic animal? How is it produced? Explain one method. **[12]**

Q7) What is meant by cloning? Explain the advantages and limitations of cloning animals. **[12]**

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

a) Gene therapy-advantages and limitations.

b) Applications of knock outs.

c) Induced pluripotent stem cells.

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P937

[4038] - 406
M.Sc. (Sem. - IV)
BIOTECHNOLOGY
BT - 44C : Agricultural Biotechnology
(2008 Pattern) (New)

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

Instructions to the candidates:-

1) ***Attempt a total of five questions selecting at least 2 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) What is apomixis? Explain the application of induced apomixis in agricultural biotechnology. **[12]**

Q2) What are homozygous plants? What is their significance in agriculture? Explain the method of the production of homozygous diploids through pollen culture. **[12]**

Q3) How are elites of pulse crops multiplied to obtain true to the type progeny? Explain with one example. **[12]**

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

a) Virus indexing.

b) Marker assisted technology.

c) Embryo rescue.

P.T.O.

SECTION - II

Q5) What are transgenic crops? Enlist their applications in agriculture. Explain any one application with the help of suitable examples. **[12]**

Q6) Explain the concept of metabolic engineering of plants. Using at least two examples, describe the production of novel plant products through metabolic engineering. **[12]**

Q7) What is a bioreactor? How is it used for a very large scale production of plants? Mention the advantages of use of bioreactors over conventional micropropagation. **[12]**

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

a) Biopesticides.

b) Biofertilizers.

c) Advantages of triploids.

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