Total No. of Questions : 7] [Total No. of Pages : 1

P845

[3927-B] - 51
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) Types of RNA.

b) Glycogen metabolism.

c) Gene chester.

d) Structure and function of chromatin.

e) 2-D gel electrophoresis.

f) Fluoroscence spectroscopy.

Q2) a) Define corbohydrates. Give in detail classification of carbohydrates with suitable examples. **[7]**

b) What is enzyme regulation? Explain feed back inhibition. **[8]**

Q3) a) Write the principle and applications of UV-visible spectroscopy. **[7]**

b) Discuss in detail replication of DNA. **[8]**

Q4) a) Proteins are modified before transportation or targetting. Explain. **[7]**

b) Discuss the pathway of glucose metabolism in which NADPH is generated. **[8]**

Q5) a) Explain the structural features of Watson and Crick model of DNA. **[7]**

b) Write the principle, working and applications of native gel electrophoresis. **[8]**

Q6) a) What is meant by repetitive DNA? Explain. **[7]**

b) Discuss in detail principle, working and applications of TLC. **[8]**

Q7) a) Discuss the structural aspects of phospholipids in biological membrane. **[7]**

b) Explain the reactions leading to palmitic acid biosynthesis. **[8]**

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Total No. of Questions : 7] **[Total No. of Pages : 1**

P846

[3927-B] - 52
M.Sc. - I (Sem. - I)
BIOTECHNOLOGY
BT - 12 : Cell Biology
(Theory) (Old Course) (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 any four: **[4 × 5 = 20]**

a) Explain various types of plastids. Add a note on their functions.

b) Write a note on neurotransmitters.

c) Enlist different structures that help in cell motility. Explain any one.

d) Discuss role of morphometry in studying cell biology.

e) Describe in brief the structure nuclear pore complex.

f) Enlist various hormones and growth factors involved in cell differentiation. Explain any one.

Q2) a) Explain the principle of electron microscope. Add a note on its significance. **[7]**

b) What is extracellular matrix? Describe in brief the components of extra cellular matrix. **[8]**

Q3) a) Explain the structure of plasmodesmata. Add a note on its importance. **[8]**

b) Differentiate between endocrine, paracrine and autocrine signalling. **[7]**

Q4) a) Describe in brief assembly and intracellular organization of intermediate filaments. **[7]**

b) Explain light reactions of photosynthesis. **[8]**

Q5) Explain in detail structure of plasmamembrane. Add a note on its fluidity and asymmetry. **[15]**

Q6) a) Explain in detail formation of primary cell wall in plants. Write in brief its role in growth. **[8]**

b) What are peroxisomes? Describe functions of peroxisomes. **[7]**

Q7) a) Enlist pathways of intracellular signal transduction and explain any one. **[8]**

b) Write a note on cytosenescence. **[7]**

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

P847

[3927-B] - 53

M.Sc. - I

BIOTECHNOLOGY

BT - 13 : Quantitative Methods

(Old Course) (2005 Pattern) (Sem. - I)

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

Instructions to the candidates:

1) ***Question No.1 and 5 are compulsory.***
2) ***Attempt any two from questions 2,3 and 4 in Section I and from question 6,7 and 8 in Section II.***
3) ***Use separate answer-sheet for each section.***
4) ***Provide sketch wherever necessary.***
5) ***Marks are given in parenthesis.***

SECTION - I

Q1) Attempt following (Any two):

a) Sketch curves for following functions. **[5]**

i) $y = x^2 + 1$ ii) $y = |x|$

b) Explain the terms with suitable examples **[5]**

i) Confidence Limit ii) 't' distribution

c) Get derivatives of following functions **[5]**

i) $y = 9x^4 + 6x^3 + 3x^2 + 2x + 3$ ii) $y = \sin(x^2+x)$

Q2) Attempt following:

a) Give a comparative account of normal, binomial and poisson distribution, give an example of any one. **[8]**

b) Calculate mean, median, mode, standard deviation and variance for following data

{23, 18, 19, 20, 21, 22, 17, 24, 26, 25, 16}. **[7]**

Q3) Attempt following:

a) Solve integrals **[8]**

i) $\int \frac{1}{\sqrt{x}} dx$ ii) $\int \cos\frac{x}{2} dx$

P.T.O.

b) Solve the following system of linear equation using Matrix-row reduction. **[7]**

$3x - 7y - 2z = -7$

$-3x + 5y + z = 5$

$6x - 4y = 2$

Q4) Attempt following:

a) Explain "Second derivative test" for local minima and maxima. Determine local minima/maxima for function **[8]**

$y = x^4 - 4x^3 + 10$

b) Suppose that 3% of people in a population of adults in Vidarbha have attempted suicide. It is also known that 20% of population in Vidarbha are living below poverty level. If these two events are independent, what is probability that **[7]**

i) a person selected at random from population will have attempted a suicide "and" be living below the poverty level?

ii) a person selected at random will be living below poverty level and have not attempted suicide?

SECTION - II

Q5) Answer the following (Any two):

a) What is computer virus? How are they transmitted? What precautions should be taken against them? **[5]**

b) Enlist Secondary Memory Storage devices explain any two of them. **[5]**

c) Differentiate type of computer networks with respect to coverage area. **[5]**

Q6) Answer the following:

a) What is WWW? What do you mean by browsing the internet? Enlist applications of WWW. **[8]**

b) Give differences between "batch-processing" and "real-time processing". **[7]**

Q7) Give a brief account of different input and output devices. Enlsit the types of printer you know and elaborate characteristic and utility of any two of them. **[15]**

Q8) Attempt following:

a) Write short note on "Search engines". **[8]**

b) Write short notes on "Memory Register" and "Memory buffer". **[7]**

Total No. of Questions : 7] **[Total No. of Pages : 1**

P848

[3927 - B] - 61
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 four from the remaining questions.***
3) ***Provide sketch wherever necessary.***
4) ***Marks are given in the parentheses.***

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

a) Discuss in brief the mitochondrial genome organization.

b) Describe with examples the action of DNA ligases.

c) Describe Tm and its significance.

d) Write a note on photoreactivation.

e) What is nucleosome? Describe its organization.

f) Justify that genetic code is degenerate.

Q2) Answer the following:

a) Discuss the folded fibre model of E.coli chromosome. **[8]**

b) Describe theta model of DNA replication. **[7]**

Q3) Attempt the following:

a) What is sos repair? Explain the mechanism and its significance. **[8]**

b) Write a note on prokaryotic RNA polymerase. **[7]**

Q4) Write an essay on : DNA modifications and significance. **[15]**

Q5) Discuss in details the enzymes involved in DNA replication. **[15]**

Q6) Answer the following:

a) Discuss in brief the genomics & its significance. **[8]**

b) Describe the process and significance of reverse. **[7]**

Q7) Attempt the following:

a) What is the genetic code? Explain its features with examples. **[8]**

b) Write a note on the pattern formation during development. **[7]**

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

P849

[3927 - B] - 62

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 two from the remaining questions.***
3) ***Provide the sketch wherever necessary.***
4) ***Marks are given in parantheses.***

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

a) Discuss reasons for Mendel's success.

b) What are chromosomal aberrations? Explain with examples.

c) Write a note on 'Transformation'.

Q2) Write an essay on:

Gene linkage and its significance. **[15]**

Q3) Answer the following:

a) Describe the methods of detection and assay of genotoxicity. **[8]**

b) Explain the significance and mechanism of mutations caused by Acridine dyes. **[7]**

Q4) Attempt the following:

a) Write a note on methods of plant improvement. **[8]**

b) What are Tn-elements? Describe significance with examples. **[7]**

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

P850

[3927 - B] - 63
M.Sc. - I (Sem. - II)
BIOTECHNOLOGY
BT - 23a : Microbiology
(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) Write short notes on (any two): **[2 × 5 = 10]**

a) Plasmids and drug resistance.

b) Yield coefficient.

c) Role of soil bacteria in degradation of cellulose.

Q2) a) What is gaseous sterilization? Give the examples of such agents used and their applications. **[8]**

b) Explain the process of binary fission giving role of different proteins involved. **[7]**

Q3) a) Define sterilization. How will you sterilize the following items? Explain the agents used and mode of action of the agents. **[8]**

i) Packed foods.

ii) Oils.

iii) Hospital instruments.

iv) Enzymes.

b) How is cholera diagnosed in Laboratory? **[7]**

Q4) a) Explain the process of symbiotic Nitrogen fixation. **[8]**

b) Give the molecular adaptations of thermophiles. **[7]**

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

P851

[3927 - B] - 64
M.Sc. - I (Sem. - II)
BIOTECHNOLOGY
BT - 23b : Virology
(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) Write short notes on any 2 of the following: **[10]**

a) DNA vaccines for prevention of viral diseases.

b) Propagation of bacteriophages.

c) Any one disease caused by animal viruses.

Q2) a) Explain the ultrastructure of influenza virus. **[8]**

b) Discuss the replication cycle of any one plant virus. **[7]**

Q3) Justify the following:

a) SiRNAs can be used for prevention of viral diseases. **[8]**

b) Peptide vaccines are safer than conventional vaccines. **[7]**

Q4) With proper examples, discuss the mode of action of anti-retroviral compounds. **[15]**

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

P852

[3927-B] - 65

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 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) Enlist the differences between Innate and Acquired immunity.

b) Write the role of MHC molecules in adaptive immunity.

c) Give a brief account of immune response to bacterial infection.

Q2) a) Write in detail about physiology of Inflammation. **[8]**

b) Describe the structure and function of primary and secondary lymphoid organs. **[7]**

Q3) a) Write a note on Autoimmune disorders. **[7]**

b) Comment on cell-mediated cytotoxic responses. **[8]**

Q4) a) Describe the structure of immunoglobulin molecules of five major classes and write their functions. **[8]**

b) Give expansion of FACS. Write the working principle and use of FACS. **[7]**

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

P853

[3927 - B] - 66

M.Sc. I (Sem. - II)

BIOTECHNOLOGY

BT - 25 : Bioinformatics

(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 parantheses.***

Q1) Answer the following (Any two):

a) Define "Bioinformatics, Discuss the role of Bioinformatics in Genomic Data analysis. **[5]**

b) "Homology" and "Similarity" are two different concepts - explain. **[5]**

c) Write short note on "Homology Modeling". **[5]**

Q2) Answer the following:

a) What do you understand by "Ramachandran Plot"? Give its application. **[8]**

b) What is primary database of sequence? Comment on "ExPASY" and "PDB". **[7]**

Q3) Answer the following:

a) What is "Genome Annotation"? Describe any two methods for annotation. **[8]**

b) Define: "Evalue", "HSP", "Z-score" and "bit-score" in BLAST Analysis. **[7]**

Q4) Explain any two protein secondary structure prediction methods of your choice and Elaborate the steps involved. **[15]**

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

P854

[3927 - B] - 71

M.Sc. II (Sem. - III)

BIOTECHNOLOGY

BT - 31 : Tissue Culture (Plant & Animal)

(Old Course) (2005 Pattern)

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

Instructions to the candidates:

1) ***Question No.1 and 5 are compulsory.***
2) ***Attempt any two questions from each section (Q.No.2-4 & Q.No.6-8)***
3) ***Figures to the right indicate full marks for the respective Question.***
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 2): **[10]**

a) Various additives in plant tissue culture media.

b) Androgenic haploids.

c) Commercial applications of plant tissue culture.

Q2) What are somaclonal variations? How do they differ from epigenetic variations. **[15]**

Q3) a) Describe the role of elicitors in secondary metabolite production. **[7]**

b) Explain the mode of action of auxins. **[8]**

Q4) a) Explain the process of invitro organogenesis in plants. **[7]**

b) Mention the applications of transgenic plants. **[8]**

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SECTION - II

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

a) Methods of detecting mycoplasma contamination.

b) Flow cytometry.

c) Animal cell culture: Scale up.

Q6) Describe in detail advantages and disadvantages of serum in ATC media. **[15]**

Q7) What is specialized cell culture. Explain method of maintaining any one specialized cell culture. **[15]**

Q8) Define histotypic culture. Explain different way to maintain histotypic culture. Give its application. **[15]**

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

P855

[3927 - B] - 72

M.Sc. II

BIOTECHNOLOGY

BT - 32 : Fundamentals of Genetic Engineering

(Old Course) (2005 Pattern) (Sem. - III)

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 cosmid and BAC vectors with the help of suitable examples.

b) Describe the strategy for the construction of genomic libraries.

c) Explain, how induced expression is carried out?

Q2) a) Enlist various enzymes used for gene manipulation and explain role of any two of them. **[7]**

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

i) Site directed mutagenesis.

ii) Shuttle vectors.

Q3) a) Describe various methods for transfering recombinant DNA to host cells. **[7]**

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

i) Sanger's method for DNA sequencing.

ii) Chimeric constructs.

Q4) a) Describe any two expression vectors in bacteria and eukaryotes. **[7]**

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

i) Single gene cloning.

ii) Expression of industrially important products.

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

P856

[3927 - B] - 73
M.Sc. II (Sem. - III)
BIOTECHNOLOGY
BT - 33 : Biological Chemistry - II
(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 from Q.2 to Q.4.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat diagrams wherever necessary.***

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

a) HPLC.

b) MALDI-TOF

c) Tertiary structure of proteins.

Q2) a) Discuss sanger's method of DNA sequencing. **[8]**

b) Write principle and applications of gelfiltration. **[7]**

Q3) a) Write principle and applications of NMR. **[8]**

b) Discuss in detail Affinity chromatography. **[7]**

Q4) a) Write principle and applications of IR. **[7]**

b) Discuss different blotting techniques. **[8]**

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

P857

[3927 - B] - 74

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

BIOTECHNOLOGY

BT - 34 : Biochemical 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) ***Figures to the right indicate full marks.***

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

a) Air lift fermenters.

b) Conduction as a mechanism of heat transfer.

c) Pseudoplastic Rheology.

Q2) a) What is the importance of K_{ha} value in scale-up? Explain giving example. **[8]**

b) Discuss the steps involved in oxygen transfer from gas bubble to cell. **[7]**

Q3) a) Explain the terms shear stress and shear rate. How do these terms affect the broth rheology. **[8]**

b) What are the different types of values used in a bioreactor? Explain the significance of such values. **[7]**

Q4) What is power number and Reynold's number? Explain how the general relationship between power number and Reynold's number depends on the flow regime in a bioreactor. **[15]**

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

P858

[3927-B] - 75

M.Sc. - II

BIOTECHNOLOGY

BT - 35 : Pleuripotent Cell Technologies and Reproduction

(2005 Pattern) (Old Course) (Sem. - III)

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) Metabolic activation of egg/ovum.

b) Characteristics of embryonic stem cells.

c) Knock outs.

Q2) a) Describe the cytoplasmic and nuclear changes during the process of oögenesis. **[7]**

b) Describe the process of fertilization with an emphasis on the cytoplasmic rearrangements occuring immediately after the sperm entry and zygote formation. **[8]**

Q3) a) Compare and contrast transgenic animals and congenic animals with appropriate examples and applications. **[7]**

b) Define primary embryonic induction and explain its role in the process of cell differentiation. **[8]**

Q4) What is animal cloning? Describe its types and add a note on bioethical implications of Human cloning. **[15]**

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

P859

[3927-B] - 81

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

BIOTECHNOLOGY

BT - 41 : Structural Biology

(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) ***Figures to the right indicate full marks.***
4) ***Provide sketch wherever necessary.***

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

a) Write a note on Ewald's sphere.

b) What is nuclear shielding in NMR? What is the result of this?

c) What is fluorescence microscopy? Give two applications of this technique.

d) Write a note on Patterson function.

Q2) a) Describe single-crystal X-ray crystallography. What are its limitations? **[8]**

b) Explain Multiwavelength Anamolus Dispersion [MAD]. **[7]**

Q3) a) Describe the methods of preparing crystals for X-ray crystallography. **[8]**

b) Write a note on overhausser Effect. **[7]**

Q4) Explain in detail the use of X-ray crystallography in structure determination of proteins with a suitable example. **[15]**

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

P860

[3927 - B] - 82

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

BIOTECHNOLOGY

BT - 42 : Industrial Biotechnology

(Old Course) (Theory) (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 parantheses.***

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

a) Explain the mechanism and advantages of cross flow filtration.

b) Use of inducers can improve the quality of product formed. Explain by giving examples.

c) Explain any one technique of advanced biomethanation.

Q2) a) What is the role of metal ions and pH in citric acid production? **[7]**

b) What are the different reactor designs used for immobilization of enzymes? **[8]**

Q3) a) Explain with the help of flow diagram the production of an intracellular enzyme. **[10]**

b) How is dissolved oxygen measured and controlled during fermentation. **[5]**

Q4) a) Discuss the role of microorganisms in solid waste management. **[8]**

b) Explain the methane phase in biogas production emphasizing on different microorganisms involved. **[7]**

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

P861

[3927-B] - 83
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) Write a note on bioengineered food.

b) What are plantibodies? How are they obtained?

c) Enlist types of vectors used in gene therapy and elaborate on any one.

Q2) Mention the methods of obtaining transgenic plants. Explain the details of the method for obtaining disease resistent plants. **[15]**

Q3) a) Enlist various types of programs used for sequence comparison and analysis of nucleic acids. Explain any one. **[8]**

b) What is DNA finger printing? How is it made use of in forensics? **[7]**

Q4) a) Write an illustrative account of evolution of patenting system for scientific findings. **[8]**

b) Explain with suitable example how genetic diseases are diagnosed at DNA level. **[7]**

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

P862

[3927-B] - 84
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 parentheses.***

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

a) Enlist the applications of somaclonal variation and explain any one.

b) Enlist the problems encountered during propagation of forest trees. Explain any one.

c) What is micromanipulation? Explain its advantages.

Q2) What is micropropagation? Mention its stages and explain any one stage with respect to multiplication of propagule. Cite suitable examples for horticultural plants. **[15]**

Q3) a) With suitable examples explain biotransformation as a strategy for enhancing or modifying secondary mefabolites. **[8]**

b) What is pathological indexing? Enlist various methods for pathological indexing and explain any one. **[7]**

Q4) a) Explain how antisense RNA technology can be made use of for genetic improvement of plants. Give suitable examples. **[8]**

b) What is endosperm culture? Discuss factors affecting endosperm culture. Add a note on significance of endosperm culture. **[7]**

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

P863

[3927 - B] - 85

M.Sc. II (Sem. - IV)

BIOTECHNOLOGY

BT - 45 : Chemical Synthesis and Screening in 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) ***Figures to the right indicate full marks.***
4) ***Provide sketch wherever necessary.***

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

a) Write a note on the different types of solid supports in oligopeptide synthesis.

b) Discuss the stages of purification of oligopeptides.

c) What is a linker? Give its importance.

Q2) Describe the phosphoramidite method of oligonucleotide synthesis. **[15]**

Q3) a) Write a note on the use of activating groups in peptide synthesis. **[8]**

b) Describe the applications of synthetic polysaccharides. **[7]**

Q4) What is high thoroughput screening? Explain its advantages. **[15]**

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

P864

[3927 - B] - 86
M.Sc. - II (Sem. - IV)
BIOTECHNOLOGY
BT - 46 : Genomics & Proteomics
(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) Define IEF. Explain the applications of IEF in proteomics.

b) Write a note on structural genomics.

c) Explain the term ab initio method in MS analysis.

Q2) a) Write a note on functional genomics. **[7]**

b) Explain any one method of whole genome sequencing. **[8]**

Q3) a) Write a note on Proteomics : drug development. **[7]**

b) 2D PAGE is extremely important in proteome analysis. Explain. **[8]**

Q4) a) Define transcriptomics and write a note on micro array method of analysis. **[7]**

b) Write a note on computational approach for studying protein-protein interactions. **[8]**

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

P865

[3927 - B] - 87

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) Explain TCR and signal transduction.

b) How the Recombinant Vector Vaccine is produced? Write its advantages.

c) Give a brief account of one organ specific and one systemic autoimmune disease of your choice.

Q2) a) T-cell plays a key role in allograft rejection-discuss. **[8]**

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

Q3) a) How stem cell technology is applicable for therapeutic purposes - Discuss with examples of haemopoietic and embryonic stem cells. **[8]**

b) Write the criteria essential for designing an ideal vaccine for active immunization. **[7]**

Q4) a) Write a note on various immunodiagnostics. **[8]**

b) Jerne's network theory can be established experimentally - Justify. **[7]**

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

P866

[3927-B] - 501

M.Sc.

BIOTECHNOLOGY

BT - 11 : Advanced Biological Chemistry

(2008 Pattern) (New) (Sem. - I)

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 the parameters used for assessing the performance of a chromatographic system. **[8]**

b) Explain the methodology for quantitative estimation of biomolecules using UV-visible spectroscopy. State the principle of UV-visible spectroscopy. **[8]**

Q2) a) Explain the potential contribution of non covalent interactions in protein folding. **[8]**

b) What is protein engineering? How it has revolutionized the expression and purification of recombinant proteins? **[8]**

Q3) Explain:

a) Physical and chemical properties of soluble proteins. **[8]**

b) Maintenance of acid base balance in living cells. **[8]**

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

a) NMR and structure of biomolecule.

b) Protein microarrays and their application.

c) Interactions of proteins with other molecules.

P.T.O.

SECTION - II

Q5) a) What is phytochemistry? Why certain phytochemicals are categorised as secondary metabolites? Mention the major types of secondary metabolites. **[8]**

b) Name at least four natural products and mention pharmacological activity (ies) for each natural product. **[8]**

Q6) a) Define metabolomics. Mention at least three major pathways of secondary metabolism. Explain any one. **[8]**

b) Mention the steps involved in metabolic pathway manipulation. **[8]**

Q7) Explain:

a) Phytochemical variation in species. **[8]**

b) Agricultural importance of secondary metabolites. **[8]**

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

a) Site directed mutagenesis.

b) Synthesis and degradation of lipids.

c) Metabolic Flux-analysis and applications.

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

P867

[3927 - B] - 502

M.Sc. (Sem. - I)

BIOTECHNOLOGY

BT - 12 : Molecular and Cell Biology

(2008 Pattern) (New)

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) Enlist various messengers involved in signal transduction. Explain how Ca^{++} ions act as secondary messengers. **[8]**

b) Describe, with the help of a labelled diagram, the structure of plasmodesmata. How are they involved in trafficking? **[8]**

Q2) a) Give a brief account of light reactions of photosynthesis. Add a note on synthesis of ATP. **[8]**

b) Explain, in brief, the organisation of microtubules and their role. **[8]**

Q3) Explain the interactions between cell and its environment to overcome chilling or heat stress. **[16]**

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

a) Vesicular transport

b) Regulation of cell cycle.

c) Peroxisomes.

P.T.O.

SECTION - II

Q5) a) Explain the organisation of promoter recognised by RNA polymerase II. Add a note on Transcription factors. **[8]**

b) Mention different types of DNA repair mechanisms. Explain any one. **[8]**

Q6) What is homeostasis? Explain different ways of osmoregulation in aquatic and terrestrial organisms. **[16]**

Q7) a) Describe the ultrastructure of a plant or animal sperm cell. **[8]**

b) What is a hormone? Explain with suitable example positive or negative feedback mechanism during hormonal regulation. **[8]**

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

a) Ultrastructure of egg cell or Ovum.

b) Structure of tRNA.

c) Pharmacogenomics.

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

P868

[3927-B] - 503

M.Sc. (Sem. - I)

BIOTECHNOLOGY

BT - 13 : Environmental Biotechnology

(2008 Pattern) (New)

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) Explain, with suitable examples, the advantages of any two non conventional energy sources over conventional sources. **[16]**

Q2) a) Explain in brief Guassian Plume model for the dispersion of air pollutants. **[8]**

b) What are the causes and consequences of sodic soil? **[8]**

Q3) a) What are the problems associated with open land fil techniques used for disposal of MSW? **[8]**

b) Explain the method (s) of monitoring Nox. **[8]**

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

a) Physiological hazards of noise pollution.

b) Biofiltration.

c) Merits and demerits of trickling filters.

P.T.O.

SECTION - II

Q5) Explain at least two methods of remediation of contaminated environment, using biological systems. Cite appropriate examples. **[16]**

Q6) a) Explain the technology to produce a biodegradable material. **[8]**

b) What is a biosensor? Sketch a labelled diagram of any one biosensor. **[8]**

Q7) Enlist the conservation biotechnologies. Explain any two such technologies for conservation of plant resources. **[16]**

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

a) Bioindicators and their applications.

b) ISO 14000.

c) Remote sensing in ecological mappling.

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

P869

[3927-B] - 601

M.Sc.

BIOTECHNOLOGY

BT - 21 : Genetic Engineering

(2008 Pattern) (New) (Sem. - II)

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) What is restriction modification (RM) system? Compare and contrast Type I and Type II RM systems. **[8]**

b) Draw neat labelled feature map of PUC 18 plasmid? **[8]**

Q2) What is DNA finger printing? Explain the procedure, advantages application and limitations of DNA finger printing. **[16]**

Q3) a) Explain with suitable example virus based gene delivry system. **[8]**

b) What are biotherapeutics? How are these produced using recombinant DNA technology? Cite examples. **[8]**

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

a) Chemical methods of transfection.

b) Screening of cDNA library.

c) Transgenic plants - Advantages and applications.

P.T.O.

SECTION - II

Q5) a) Write an elaborative account of eukaryotic expression vector. **[8]**

b) Compare and contrast genetic and physical maps. **[8]**

Q6) What is chain termination method of sequencing? How is it used in automated DNA sequencers? **[16]**

Q7) a) Describe the steps in PCR. **[8]**

b) Explain, with suitable examples of vectors, the production of industrially important products. **[8]**

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

a) Designing the primer.

b) Chimeric constructs.

c) DNA marker technology in plants.

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

P870

[3927-B] - 602

M.Sc.

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 two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) What are biological databases? Explain the basic algorithms used in homology searching in these databases. **[16]**

Q2) a) Discuss the role of bioinformatics in structure based drug designing. **[8]**

b) Explain, with the help of an example, any one method of energy optimization. **[8]**

Q3) a) How are binding sites in a protein structure located? What is its importance? **[8]**

b) Which techniques are used for simulation of molecular interactions? **[8]**

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

a) Gene finding.

b) Acquisition of molecular structures from data base.

c) Chemoinformatics.

P.T.O.

SECTION - II

Q5) Give a concise account of tools used in protein structure classification. **[16]**

Q6) a) Explain the importance of protein folding structure relationship with the help of an appropriate example. **[8]**

b) Discuss the use of any one bioinformatics business model used successfully. **[8]**

Q7) a) Mention important areas of bioinformatics research. Elaborate any one area. **[8]**

b) Explain any one tool used for protein structure prediction in industry. **[8]**

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

a) Conformational energy calculations.

b) Routes to search funing in bioinformatics.

c) Immunoinformatics.

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

P871

[3927-B] - 603

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 two questions from each section.***
2) ***Answers to the sections should 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 examples, biotechnologically significant fungi. Add a note on quantitative improvement of any one of them. **[8]**

b) Explain any one method of mass cultivation of economically important algae. **[8]**

Q2) How can somatic embryos be induced? Which factors affect their development to maturity? Add a note on biochemical and molecular changes during somatic embryogenesis. **[16]**

Q3) a) Mention the types of cell suspension culture. How are these used in plant biotechnology? **[8]**

b) Mention the stages of micropropagation through organogenesis. **[8]**

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

a) Landmarks in plant Biotechnology.

b) Qualitative improvement in fungi.

c) Advantages of plant tissue culture.

P.T.O.

SECTION - II

Q5) a) What are transgenic plants? How are they obtained? Mention any four methods. **[8]**

b) Enlist the applications of transgenic plants and explain any one for stress tolerance. **[8]**

Q6) a) What are haploids? Give a flow diagram for the procedure of in vitro androgenesis. Mention the applications of haploids in agriculture. **[8]**

b) What is somaclonal variation? Mention its causes and consequences. Add a note on its applications. **[8]**

Q7) a) What are somatic hybrids? How are they obtained? Mention the steps involved. Add a note on their applications. **[8]**

b) Explain with suitable example use of micropropagation for mass multiplication of plants. **[8]**

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

a) Biopesticides.

b) Plant biotechnology for qualitative and quantitative improvement of pharmaceuticals.

c) Single cell proteins.

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

P872

[3927-B] - 701

M.Sc.

BIOTECHNOLOGY

BT - 31 : Animal Biotechnology

(2008 Pattern) (New) (Sem. - III)

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) Describe methods of artificial breeding. Explain advantages and hazards of artificial breeding. **[16]**

Q2) a) Mention biotechnological methods of animal conservation. Explain any one. **[8]**

b) Mention the types of cell culture and explain the method (s) of maintenance of any one type. **[8]**

Q3) Explain : **[16]**

a) Applications of animal cell culture.

b) Growth kinetics of cell suspension culture.

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

a) Long term maintenance of stem cells in vitro.

b) Identification and purification of stem cells.

c) Scope of animal biotechnology.

P.T.O.

SECTION - II

Q5) What is in vitro fertilization? Explain the procedures involued in it. With reference to animals. **[16]**

Q6) What are transgenic animals? How are these obtained? Explain any one method. **[16]**

Q7) a) What is artificial insemination? Explain the advantages of this method. **[8]**

b) What is embryo tranfer technique? When is it necessary? Mention the precautions. Add a note on its advantages. **[8]**

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

a) Germ cell storage

b) Transgenic mice as experinental system.

c) Bioethical problems with transgenic animals.

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

P873

[3927-B] - 702

M.Sc.

BIOTECHNOLOGY

BT - 32 : Fermentation Technology

(2008 Pattern) (New) (Sem. - III)

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) Why are KLa values important in fermentation technology? How are KLa values determined using different techniques? **[16]**

Q2) a) How is oxygen transfer rate in fermentation broth affected by i) bubbles, ii) sparging and stirring and iii) presence of antifoam agents? **[8]**

b) What is the importance of microbes as biocontrol agents? Elaborate by giving two appropriate examples. **[8]**

Q3) a) What are non-Newtonian fluids? What are different rheological properties demonstrated by such fluids? **[8]**

b) What are different impellor designs used in fermentation? Compare the efficiency of these impellors. **[8]**

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

a) Choice of construction material used for fermenter.

b) Role of shear in stirred fermenter.

c) Bubble column fermenter.

P.T.O.

SECTION - II

Q5) What are unit operations? Explain the principle of liquid-liquid extraction? How is counter current extraction used in the recovery of pencillin? **[16]**

Q6) a) Explain any two cultivation systems for aerobic organisms **[8]**

b) Mention the different phases during the process of biomethanation. **[8]**

Q7) a) Explain the role of parasexual cycle and protoplast fusion in strain improvement. **[8]**

b) Describe the process of recovery of vitamin B_{12} from fermentation borth. **[8]**

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

a) Biotransformation for antibiotic producation.

b) Role of precursors and inhibitors in fermentation media.

c) Recombinant DNA technology for strain improvement.

Total No. of Questions : 6] [Total No. of Pages :1

P874

[3927-B] - 703

M.Sc.

BIOTECHNOLOGY

(BT - 33 a) : Principles of Virology

(2008 Pattern) (New) (Sem. - 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 necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) How is immunofluorescence useful in viral diagnosis? **[5]**

b) Explain the mode of action of antiviral agents for influenza virus. **[5]**

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

a) Subunit vaccines are useful for prevention of viral diseases.

b) Viral diagnosis can be carried out using animal cell culture techniques.

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

a) Replication of HIV

b) Morphology and ultrastructures of T4 bacteriophage.

SECTION - II

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

b) Explain the causes and consequences of acute infection. Cite example. **[5]**

Q5) a) Explain the pathoqenesis of hepatitis B virus. **[5]**

b) How does Manburg virus act as an agent of new emerging infection? **[5]**

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

a) CMV

b) Ranikhet disease

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Total No. of Questions : 6] **[Total No. of Pages :1**

P875

[3927-B] - 704

M.Sc.

BIOTECHNOLOGY

BT - 33 b : Advanced Immunology

(2008 Pattern) (New) (Sem. - III)

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

Instructions to the candidates:

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

SECTION - I

Q1) a) Describe the structure and role of thymus in human immune system. **[5]**

b) What is the role of T-cells in allograft rejection? **[5]**

Q2) a) What roles phagocytes do play in body's immune defense? **[5]**

b) In what way cytokines play a vital role in immunity? **[5]**

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

a) Factors responsible for immunological tolerance.

b) Molecular immunology.

SECTION - II

Q4) a) Give a concise account of any one animal model in immunology. **[5]**

b) What are chimeric antibodies? Describe their types in brief. **[5]**

Q5) a) How are matched pair antibodies useful in immunodiagnostics? **[5]**

b) Why engineered vaccines are more beneficial than normal vaccines? **[5]**

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

a) Use of stem cells in immunological studies.

b) Large scale manufacture of antibodies.

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

P876

[3927-B] - 801

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 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 genomics? Elaborate the concept and explain the scope of genomics. Add a note on its importance in Biotechnology. **[12]**

Q2) Enlist the sequencing strategies for the analysis of whole genome Explain the strategies with the help of an appropriate example. **[12]**

Q3) Explain in brief : **[12]**

a) Structural genomics and its scope.

b) Functional genomics and its scope.

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

a) Toxicogenomics

b) Pharmacogenomics

c) Microarray

P.T.O.

SECTION - II

Q5) What is proteomics? Mention the steps in proteomics and explain any one. **[12]**

Q6) What are protein-protein interactions? Explain how computational is used to understand such interactions. **[12]**

Q7) Enlist the applications of proteomics. Explain any one application in detail. **[12]**

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

a) Structural proteomics

b) Functional proteomics

c) Problems faced during protein analysis

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

P877

[3927-B] - 802

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 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 types of intellectual property rights. Indicate the IPRs related to biotechnology and explain any one. **[12]**

Q2) Which is the competent authority to grant copyright? Describe the procedure of registration for copyright. **[12]**

Q3) What is a design? Why industrial design needs protection? How is it obtained? **[12]**

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

a) TRIPS

b) Software copyright

c) Rights of a patentee

P.T.O.

SECTION - II

Q5) Explain, with the help of an appropriate example, background facts and implications of a biotechnological product/process patent. **[12]**

Q6) State the summary of Indian Patent Act 1970 and mention the provisions related to Biotechnology. **[12]**

Q7) Mention the farmers' and plant breeders' right. Explain their significance in Indian context. **[12]**

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

a) Budapest Treaty.

b) Legal protection to biodiversity.

c) In fringement of patent laws.

Total No. of Questions : 6] [Total No. of Pages :1

P878

[3927-B] - 803

M.Sc.

BIOTECHNOLOGY

BT - 43 : Clinical Research and Database Management

(2008 Pattern) (New) (Sem. - IV)

Time : 1½ Hours] *[Max. Marks :40*

Instructions to the candidates:

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

SECTION - I

Q1) Explain the scope of clinical research. Mention important regulations that govern clinical research. **[10]**

Q2) What is FDA? When and why was it established? Mention its functions. **[10]**

Q3) Trace the course of approval of a drug from its discovery in laboratory. **[10]**

SECTION - II

Q4) Explain the process of designing and development of a protocol for clinical trial. **[10]**

Q5) What is a database w.r.t. clinical research? Explain the query resolution process. **[10]**

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

a) Recording and reporting non serious adverse events.

b) Principles of data management.

c) Access to investigational products.

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Total No. of Questions : 6] **[Total No. of Pages :1**

P879

[3927-B] - 804

M.Sc. (Sem. - IV)

BIOTECHNOLOGY

BT - 44a : Nanobiotechnology

(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 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 how the use of nanomaterials revolutionized the research in life sciences. **[5]**

b) Comment on the effect of nanosize on physico chemical properties of the materials. **[5]**

Q2) a) Justify biomolecules as nanostructures. **[5]**

b) Explain with the help of suitable example, use of nanotechnology for development of biosensors. **[5]**

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

a) Inorganic nanostructures.

b) Current trends in nanobiotechnology.

SECTION - II

Q4) Explain the role of polymers in biofunctionalization of nanoparticles. **[10]**

Q5) Mention the techniques used for characterization of nanoparticles. Explain any one in detail. **[10]**

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

a) Variation in band gap with size of nanoparticles.

b) Application of semiconductor nanoparticles in life science.

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

P880

[3927-B] - 805

M.Sc.

BIOTECHNOLOGY

BT - 44b : Stem Cell Technology and Regenerative Medicines

(2008 Pattern) (New) (Sem. - IV)

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

Instructions to the candidates:

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

SECTION - I

Q1) Describe the process of fertilization of ovum by a sperm cell. **[12]**

Q2) a) How is the entry of second sperm in to fertilized ovum blocked? **[6]**

b) Explain in brief the process of metabolic activation. **[6]**

Q3) a) Describe the post fertilization cytoplasmic rearrangements in ovum. **[6]**

b) What are cell lineages? How are these established? What is their fate? **[6]**

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

a) Embryonic stem cells.

b) Pattern formation.

c) Embryonic induction.

SECTION - II

Q5) What are stem cells? Mention their characteristic features. **[12]**

Q6) What are knock outs and their applications? **[12]**

P.T.O.

Q7) Explain the concept of bioethics in the context of human cloning. **[12]**

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

a) Gene therapy.

b) Transgenic animals.

c) Embryonic stem cell technology.

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

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[3927-B] - 806

M.Sc.

BIOTECHNOLOGY

BT - 44C : Agricultural Biotechnology

(2008 Pattern) (New) (Sem. - IV)

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

Instructions to the candidates:

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

SECTION - I

Q1) Explain the method of production of dihaploids and their use in crop improvement. **[12]**

Q2) Explain the application of embryo rescue and culture technique in Agricultural biotechnology. **[12]**

Q3) What is micropropagation? How is it used for multiplication of elite oil seed crop? **[12]**

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

a) In vitro induced polyembryony.

b) Somaclonal variations.

c) Large scale production of triploids.

SECTION - II

Q5) How are bioreactor systems used for large scale production of plants? How the process is scaled up? **[12]**

P.T.O.

Q6) Explain with the help of suitable examples the application of transgenic plants as **[12]**

a) source of edible vaccines and

b) source of secondary metabolites.

Q7) Explain :

a) Use of gametoclonal variation in crop improvement. **[6]**

b) Use of Biopesticides in agriculture **[6]**

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

a) Importance of apomicts in agriculture.

b) Herbicide resistant transgenic crops.

c) Metabolic engineering.