I Semester Department of Biotechnology Examination, Nov/Dec. 2007

(Semester Scheme)

BIOTECHNOLOGY (Paper – I)

Cell Biology and Genetics

Time: 3 Hours Max. Marks: 60

Instruction : Draw neat and labeled diagrams **wherever** necessary.

SECTION – A

I. Answer the following: **(5X2=10)**

1. What are microtubules?
2. What is heterochromatin?
3. Define cell cycle.
4. What is Chargaff's equivalence rule?
5. Define point mutation.

SECTON – B

II. Answer **any four** of the following:
(4X5=20)

6. Describe the structure of Lamp brush chromosome.
7. Turner's syndrome.
8. Distinguish between spontaneous mutations and induced mutations. Give two examples.
9. Explain the Fluid Mosaic model of plasma membrane with labeled diagram.
10. Explain coupling and repulsion hypothesis.

SECTION – C

III. Answer **any three** of the following: **(3X10=30)**

11. Give an account of structure, chemical composition and functions of nucleus.
12. Explain Watson and Crick's double helix model of DNA with the help of neat labeled diagram.
13. What is multiple allelism? Explain with reference to blood groups in human beings. A man with blood group 'A' maries a woman with blood group 'B'. What will be the blood groups of their children if both the parents are heterozygous.
14. Give a detailed account of meiotic prophase.
15. What are chromosomal aberrations? Explain in detail about structural aberrations.

II SEMESTER B.Sc. Examination, June 2008

(Semester Scheme)

BIOTECHNOLOGY – II

Microbiology and Biostatistics

Time: 3 Hours Max Marks: 60

Instruction : Part – **I** and Part – **II** must answered in **separate** answer booklets.

PART – I

(Microbiology)

SECTION – A

I. Answer the following: **(4X2=8)**

1) Endospore staining
2) Structure of TMV

3) Distinguish between pathogen and parasite
4) UV-rays.

SECTION – B

II. Answer **any two** of the following: **(2X6=12)**

5) Asexual reproduction in algae
6) Bacterial photosynthesis
7) Prevention of Tuberculosis.

SECTION – C

III. Answer **any two** of the following: **(2X10=20)**

8) What are the symptoms of pneumonia? Explain the nature of causative agent.
9) Explain glucolysis with different enzymes involved in the pathway. Mention total number of ATP produced at the end of glycolysis.
10) Explain the structure and composition of bacterial cell wall.
11) Write short notes on
a) Capsule
b) Phenols
c) TEM
d) Branches of microbiology

PART – II

Biostatistics

Instruction : All questions carry **equal** marks.

Answer **any four** questions. **(4X5=20)**

1. Lives or two models of refrigerators in a survey are as follows. Suggest which model to be purchased?

Life Time (In years)	**MODEL-A**	**MODEL-B**
0-2	05	02
2-4	16	07
4-6	13	12
6-8	07	19
8-10	05	09
10-12	04	01

2. In a sample of 1,000 cases, the mean marks scored in a certain test is 14 with standard deviation of 2.5. Assume the distribution to be normal find
i) How many students scored between 12 and 15?
ii) How many students scored exactly 16?
iii) How many students scored between 10 and 14?

3. The following data gives number of deaths took place due to road accident during last month in a city. Represent the data by histogram and hence find mode.

No. of deaths	0-3	3-6	6-9	9-12	12-15	15-18
No. of days	02	05	08	07	06	03

4. The result of an investigation to measure the effect of vaccination of laboratory animal against a particular disease is given below. Test the hypothesis that vaccination is not effective.

	GOT DISEASE	DID NOT GET DISEASE
VACCINATED	45	70
NOT VACCINATED	65	20

5. Find mean, median and standard deviation from the following data:

CI	0-4	4-8	8-12	12-16	16-20	20-24	24-28	28-32
Frequency	08	09	12	07	05	04	03	02

6. Explain the following:

i) Type I and Type II error.

ii) Null and alternate hypothesis.

III Semester B.Sc. Examination, November/December 2008

(Semester Scheme)

BIOTECHNOLOGY – II

Biochemistry and Biophysics

Time: 3 Hours Max. Marks: 60

Instructions: i) Part **I** and Part **II** must be answered in **separate** booklets.

ii) Draw the structures and labeled diagrams **wherever** necessary.

PART – I

(Biochemistry)

SECTION – A

I. Answer **any four** of the following: **(4X2=8)**

1. Primary structure of proteins.
2. Active centre of enzyme.
3. Sanger's reagent.
4. Structure of tristearin.
5. Steroid hormones.

SECTION –B

II. Answer **any two** of the following: **(2X6=12)**

6) Explain quarternary structure of proteins with an example.

7) What are sugar phosphates? Write the structure of any two.

8) Explain the properties of amino acids.

SECTION – C

III. Answer **any two** of the following: **(2X10=20)**

9) How are enzymes classified? Explain with examples.

10) Explain the importance of vitamins. Add a note on their dietary source.

11) Explain the properties of lipids and add a note on saponification and rancidity.

12) Write the structure of starch. Explain carbohydrates as energy source.

PART – II

(Biophysics)

SECTION – A

I. Answer **any two** of the following: **(2X5=10)**

1) List out the differences between ionic and covalent bonds.

2) Explain the importance of pH and buffers.
3) Write the principle and applications of GLC.

SECTION – B

II. Answer **any one** of the following: **(1X10=10)**

4) Explain X-ray crystallography and NMR.
5) Describe the methods of measuring radio activity.

IV Semester B.Sc. Examination, June 2008

(Semester Scheme)

BIOTECHNOLOGY – IV

Molecular Biology

Time : 3 Hours Max. Marks : 60

Instruction: Draw neat and labeled diagrams **wherever** necessary.

SECTION – A

I. Answer the following: **(5X2=10)**

1) Function of RNA
2) 'A' form the DNA
3) Genetic code
4) -10 box
5) SD sequence.

SECTION – B

II. Answer **any four** of the following: **(4X5=20)**

6) Explain the activation of amino acid by amino asyl t-RNA synthetase enzyme.
7) What are transposable elements? Explain recombination in maize by transposons.
8) Explain excision and mismatch repair mechanism.
9) Differentiate the eukaryotic RNA from prokaryotic RNA.
10) Explain Griffith's experiment on transformation.

SECTION – C

III. Answer **any three** of the following: **(3X10=30)**

11) Write briefly about the replication of DNA.
12) Explain the mechanism of translation in prokaryotes.
13) What is cytoplasmic DNA? Explain in detail about cytoplasmic and mitochondrial genome.
14) With the help of neat and labelled diagram explain the structure and function of all types of RNA.

V Semester B.Sc. Examination, Nov./Dec. 2007

(Semester Scheme)

BIOTECHNOLOGY – V

Genetic Engineering and Environmental Biotechnology

Time: 3 Hours Max. Marks: 60

Instructions: Draw neat and labelled diagrams **wherever** necessary.

SECTION – A

I. Answer the following: **(5X2=10)**

1) Bioleaching
2) PCR

3) Reverse transcriptase
4) VAM
5) Conventional fuel.

SECTION – B

II. Answer **any four** of the following: **(4X5=20)**

6) What are plasmid vectors? Explain with examples.
7) Explain the role of gene libraries in genetic engineering.
8) Explain different hybridization techniques.
9) Write short note on biopesticides and their mode of action.
10) Explain biomining with suitable examples.

SECTION – C

III. Answer **any three** of the following:

11) Explain the procedure of screening and detection of recombinant cells.
12) Discuss in detail about various gene transfer techniques.
13) Explain the application of r-DNA techniques in human health.
14) What are Xenobiotic compounds? Explain the degradation of pesticides.
15) Write a detailed account on primary, secondary and tertiary treatment of effluents.

V Semester B.Sc. Examination, Nov./Dec. 2007

(Semester Scheme)

BIOTECHNOLOGY – VI

Immunology and Animal Biotechnology

Time: 3 Hours Max. Marks: 60

Instruction: Draw **neat** and labeled diagram **wherever** necessary.

SECTION – A

I. Answer the following: **(5X2=10)**

1) Humoral immunity
2) Epitopes
3) DNA vaccine
4) PDGF
5) Transformed cells.

SECTION – B

II. Answer any **four** of the following: **(4X5=20)**

6) What are T-cells? Explain types of T-cells.
7) Give an account on antigens and antibodies present in ABO blood groups. Add a note on Rh factor.
8) What is hypersensitivity? Explain Type-I hypersensitivity in detail.
9) What is erythropoietin? Explain its role as a growth factor.
10) Recombinant vaccines.

SECTION – C

III. Answer **any three** of the following: **(3X10=30)**

11) Name the invitro tests for antigen and antibody reaction, and explain any three tests in detail.
12) Describe the structure of antibody molecule. Explain in detail about IgM.

13) What are lymphoid organs? Give an elaborate account of primary and secondary lymphoid organs.
14) What are genetically modified animals? Explain the techniques involved in generating a transgenic mice and add a note on its significance.
15) Describe the physicochemical properties of media used in animal tissue culture.

VI Semester B.Sc. Examination, June 2008
(Semester Scheme)
BIOTECHNOLOGY – VIII
Industrial Biotechnology

Time : 3 Hours Max. Marks: 60

Instruction : Draw neat labeled diagram **wherever** necessary.

SECTION – A

I. Answer the following: **(5X2=10)**
1) Lyophilization.
2) Baffles.
3) Batch sterilization.
4) Continuous Fermenters.
5) Maintenance of strain.

SECTION – B

II. Answer **any four** of the following: **(4X5=20)**
6) Explain the production of Saffron.
7) Explain the steps involved in the production of citric acid.
8) Give an account on Air Lift Fermenters.
9) Briefly explain different types of sparger.
10) Write a note on rotary vacuum filter.

SECTION – C

III. Answer **any three** of the following. **(3X10=30)**
11) Draw a neat diagram of fermenter, describe its parts and its body construction.
12) Describe the different methods of isolating a micro-organism and screening of microbes.
13) Explain the steps involved in the production of Alcohol.
14) Write short notes on:
a) Enzymes used in Pharmaceutical Industry.
b) Drying.
15) Give an account on:
a) Industrially produced enzymes.
b) Single cell protein.

VI Semester B.Sc. Examination, June 2008
(Semester Scheme)
BIOTECHNOLOGY – VII
Plant Biotechnology

Time : 3 Hours Max. Marks : 60

Instruction : Draw **neat** and labeled diagrams **wherever** necessary.

SECTION – A

I. Answer the following: **(5X2=10)**

1) Secondary metabolite.
2) Anther culture.
3) Embryogenesis.
4) Patent.
5) Gibberellins.

SECTION – B

II. Answer **any four** of the following: **(4X5=20)**

6) Discuss the applications of somaclonal variations.
7) Write a brief note on techniques and applications of endosperm culture.
8) Give an account of techniques used for the sterilization of explants under in vitro conditions.
9) Discuss the process of plant genetic transformation by Ti-plasmid.
10) Discuss the role of tissue culture in horticulture.

SECTION – C

III. Answer **any three** of the following: **(3X10=30)**

11) Discuss the method of isolation, fusion and regeneration of protoplasts.
12) Elucidate the techniques and applications of somatic embryogenesis. Write a brief note on synthetic seeds.
13) What are Secondary Metabolites? Discuss the techniques used for the production of secondary metabolites under in vitro conditions.
14) What is Plant Tissue Culture? Highlight the applications of Plant Tissue Culture.

Department of Biotechnology
I Semester M.Sc. Degree. Examination, January 2007
(New Syllabus Scheme)
BIOTECHNOLOGY

Paper – BTP 101 : Cell Biology

Time : 3 Hours Max. Marks : 80

SECTION – A

Write brief notes on **any five** of the following: **(5X3=15)**

1. Neuron
2. Membrane lipid
3. Platelets
4. cAMP
5. Acetylcholine
6. Apoptosis
7. Morphogenetic movements

SECTION – B

Answer **any four** of the following: **(4X5=20)**

8. Describe the role of leukocytes in immune
9. Outline the structure of membrane proteins.
10. Explain the role of endocytosis in bulk transport.
11. Explain the mechanism of cell-cell adhesion.
12. Write an account on the role of myosim and actin in muscle contraction.

13. Elaborate on the process of spore formation in plants.

SECTION – C

Answer **any three** of the following: **(3X15=45)**

14. Describe the structure and organization of cell wall and its significance.
15. Explain in detail the role of membranes in active and passive transport.
16. Discuss in detail the different cell junctions. Add a note on their role in intercellular communications.
17. Describe the structure of cilia and flagella. Add a note on their functions.
18. Describe the role of cyclins and protein kinases in the regulation of cell cycle.

Department of Biotechnology

Government Science College, Bangalore – 560 001

I M.Sc. I Semester Preparatory Examination Jan 2008

BTP 102 GENETICS

Time : 3 hours Max. Marks 80

SECTION A

Answer any FIVE of the following 5X3=15

1. telomeres
2. Euchromatin
3. Unequal crossing over
4. Ac-Ds System in Maize
5. Luria-Delbruck Fluctuation Test
6. Dosage Compensation
7. Speciation

SECTION B

Answer any FOUR of the following 4X5=20

8. Describe the organization of nucleosome
9. Gene Mapping for quantitative traits
10. Retrotransposons
11. Methods of epigenetic inheritance
12. Mitochondrial gene mutations in human beings
13. Discuss Kp-Alu elements in human genome

SECTION C

Answer any THREE of the following 3X15=45

14. Explain the molecular basis of mutations and their role in evolution.
15. Highlight the molecular and phylogenetic evolution of homologous genes
16. Give an account of structure and importance of transposable elements in Bacteria and Yeast
17. Briefly explain the genomes of *Arabidopsis* and *Drosophila.*
18. Describe sex determination in mammals and *Drosophila.*

I Semester M.Sc. Degree Examination, January 2008

(New Scheme)

BIOTECHNOLOGY

BTP – 104: Biomolecules

Time: 3 Hours Max. Marks: 80

SECTION – A

Write brief notes on **any five** of the following: **(5X3=15)**

1. Flavonoids.
2. Sialic acids.
3. Triple helix.
4. Lecithin.
5. UV absorption spectra of amino acids.
6. Hyper chromicity of DNA.
7. Peptide bond.

SECTION – B

Answer **any four** of the following: **(4X5=20)**

8. Discuss the bonds involved in the maintenance of secondary structure of proteins.
9. Discuss acid-base properties of amino acids.
10. Explain Ramachandran's plot.
11. Discuss ionic product of water and the concept of pH.
12. Write a note on Beer-Lambert's law and its applications.
13. Describe the structure of tRN'A.

SECTION – C

Answer **any three** of the following: **(3X15=45)**

14. Describe the A and Z forms of DNA. Elucidate the differences between A, B and Z forms.
15. Describe the structure and functions of polysaccharides. Add a note on the differences between starch and glycogen.
16. Discuss the principle, types and applications of electrophoresis.
17. Explain the technique of X-ray crystallography and its applications.
18. Elaborate on the classification and properties of lipids.

Department of Biotechnology, Government Science College

I M.Sc. II Semester, Preparatory Examination

BTP 201 BIOCHEMISTRY

Time 3 hours Max. marks-80

SECTION A

Answer **any five** of the following **5X3=15**

1. Free energy change.
2. Active site.
3. Active spectrum.
4. β-Oxidation.
5. L-B plot.
6. Ketone bodies.
7. Oxidative steps in glycolysis.

SECTION B

Answer **any four** of the following **4X5=20**

8. Explain the mechanism of ETC.
9. Explain the process of transamination & deamination with suitable example.

10. Derive M.M. equation.
11. Describe CAM pathway.
12. Explain the role of carnitine in the oxidation of fatty acids.
13. Describe gluconeo genetic pathway.

SECTION C

Answer **any three** of the following 3X15=45

14. Describe in detail the Kreb's cycle.
15. Describe the mechanics of enzyme regulation.
16. Give an account of the biosynthesis of saturated fatty acids.
17. Explain the role of photosynthetic pigments.
18. Explain the biosynthesis of androgens.

II Semester M.Sc. Degree Examination, June 2009

(New Scheme)

BIOTECHNOLOGY

BTP – 203 : Immunology and Immunotechnology

Time : 3 Hours Max. Marks : 80

SECTION – A

Write brief notes on **any five** of the following: **(5X3=15)**

1. Rh incompatibility.
2. Effector mechanisms.
3. HLA systems.
4. Adjuvant.
5. Interferons.
6. Plantibodies.
7. Antigens.

SECTION – B

Answer **any four** of the following: **(4X5=20)**

8. Explain immune responses.
9. Describe the structure of MHC – 1 molecule.
10. Write a note on tumor markers.
11. Explain with example the immunity to bacterial infections.
12. Explain the assay methods of lymphokines and cytokines.
13. Write a note on immunization programmers in India.

SECTION – C

Answer **any three** of the following: **(3X15=45)**

14. Write an account on the various cells involved in immune system.
15. What is a complement? Explain complement and their pathways with their biological consequences.
16. Describe autoimmune diseases and their treatment.
17. Write a detailed account on Anaphylaxis.
18. Give an account on conventional vaccines.

III Semester M.Sc. Degree Examination, Nov./Dec. 2007

(New Syllabus)

BIOTECHNOLOGY

BTP 301 : Plant Biotechnology

Time: 3 Hours Max. Marks: 80

SECTION – A

Write brief notes on **any five** of the following: **(5X3=15)**

1. Plant tissue culture certification
2. Micronutrients
3. Binary vector
4. Random primer
5. Electroporation
6. Osmogenes
7. Polyhydroxyalkoanates.

SECTION – B

Answer **any four** of the following: **(4X5=20)**

8. Explain the advantages of micropropagation.
9. Write about the technique of cryopreservation.
10. Write a brief account on chloroplast transformation.
11. Discuss the significance of rice genome project.
12. Write a note on heat shock proteins.
13. Explain the current status of transgenic plants in India.

SECTION – C

Answer **any three** of the following: **(3X15=45)**

14. Describe the technique of somatic hybridization and its significance.
15. Explain the methodology for selecting and screening of transgenics for herbicide resistance in plants.
16. Discuss the recent methods of genomic studies in plants.
17. Discuss the strategies for yield improvement in plants using transgenic plants.
18. Explain the technology for production of therapeutic proteins in plant cells.

III Semester M.Sc. Degree Examination, November/December 2007

(New Scheme)

BIOTECHNOLOGY

BTP 303 : Genetic Engineering

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **any five** of the following: **(5X3=15)**

1. Paliandromes
2. Multiple cloning sites
3. Plasmid amplification
4. DNA fractionation
5. Transformation efficiency
6. P32 labelling
7. Maxam Gilbert sequencing.

SECTION – B

Answer **any four** of the following: **(4X5=20)**

8. Give the characteristics of an ideal vector.

9. Write an account on yeast selection markers.
10. Describe the importance of T7 and TaC promoters in cloning.
11. Explain purification of mRNA.
12. Describe transformation mechanism by calcium phosphate.
13. Elaborate on radioactive methods to identify target mRNA from total mRNA preparation.

SECTION – C

Answer **any three** of the following: **(15X3=45)**

14. Describe the characteristics and functions of various enzymes employed in recombinant DNA work.
15. Describe in detail the methodology of gene library construction.
16. Describe the principles and applications of Agrobacterium, gene gun and electroporation methods for gene transfer.
17. Explain labeling by adopting nick translation and random priming methods. Add a note on non-radioactive labeling.
18. Describe the principle and experimental outlay for conducting western blot.

III Semester M.Sc. Degree Examination, November/December 2007

(New Scheme)

BIOTECHNOLOGY

BTP – 302: Animal Biotechnology

Time: 3 Hours Max. Marks: 80

SECTION –A

Write brief notes on **any five** of the following: **(5X3=15)**

1. E.G.F.
2. Homeostasis.
3. Cell line.
4. Stem cells.
5. Lipofection.
6. Super ovulation.
7. Cell-synchronization.

SECTION –B

Answer **any four** of the following: **(4X5=20)**

8. Present a critical note on serum-free culture media and its applications in tissue culture.
9. Write an account on pre-implantation genetic diagnosis.
10. Explain the methods of cloning in animal systems.
11. Explain the importance of gonadotropin releasing hormones in the regulation of reproduction in human.
12. "Silkworm is an invaluable bioreactor". Comment.
13. Describe the production of proteins for pharmaceutical use employing transgenic animals.

SECTION – C

Answer **any three** of the following: **(3X15=45)**

14. Give an account of measurement of viability any cytotoxicity.
15. Explain the process of in vitro fertilization and embryo transfer technique.
16. What are the various approaches for scaling up of monolayer culture? Discuss the advantages and limitations.

17. Describe in details the procedure involved in producing transgenic mice.
18. Explain in detail cloning of sheep. Comment on the current status animal cloning experiments.

III Semester M.Sc. Degree Examination, November/December 2007

(New Scheme)

BIOTECHNOLOGY

BTP-304 : Environmental Biotechnology

Time : 3 Hours Max. Marks: 80

SECTION – A

Write brief notes on **any five** of the following: **(5X3=15)**

1. Xenobiotic compounds
2. Anaerobic sludge.
3. CETP
4. Biofuels
5. Ex situ Bioremediation
6. De-lignification
7. GMOs

SECTION – B

Answer **any four** of the following: **(4X5=20)**

8. Enumerate air pollution and explain the various methods of measuring air pollution.
9. Explain the process of bioretrieving rare metals from ores.
10. Write about the aerobic processes involved in water treatment.
11. Explain the process involved in the reduction of organochlorine compounds.
12. Write about the methods used in pulp bleaching.
13. Discuss the impacts of green house effect and acid rain.

SECTION – C

Answer **any three** of the following: **(3X15=45)**

14. Describe the role of biotechnology in the conservation of biodiversity.
15. Explain the process involved in the production of oils and fuels from wood waste.
16. Explain the use of microbes in bioremediation of Xenobiotics.
17. Explain the use of reverse osmosis and ultrafiltration in the treatment of industrial effluents.
18. Write a note on bioindicators of environmental pollution and explain their applications.