

**Model Question Papers in
M.Sc. Biotechnology (CSS)
Mahatma Gandhi University**

**Mahatma Gandhi University, Kottayam
First Semester M.Sc. Biotechnology Examination - 2012
(MODEL QUESTION PAPER)
BTPG01 –Biochemistry**

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Heparin
2. Chitin
3. Sunshine Vitamin
4. Flagellin
5. Disulfide linkage
6. Collagen
7. deoxyribose sugar
8. Prostaglandins

II Write Short Essay on Any Five (Wt: 2 each)

9. Protein sequencing
10. α helix

11. t- RNA
12. Differentiate DNA from RNA
13. Mechanism of action of steroid hormones
14. Peptidoglycan
15. Glycoproteins
16. Physiological buffers

III Answer Any Three in Detail (Wt: 5 each)

17. Describe in detail the structure of DNA.
18. Give an account of protein structure
19. What are lipids? How are they classified?
20. What are hormones? How are they classified? Describe the different hormones you have studied.
21. What are vitamins? Give an account of the different vitamins you have studied with special reference to their role in the biological system.
22. Describe in detail the evolutionary divergence of organisms and its relationship to protein structure and function.

Mahatma Gandhi University, Kottayam
First Semester M.Sc. Biotechnology Examination - 2012
BTPG02- Cell Biology And Genetics (Model question paper)

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Fluid Mosaic model of membranes
2. Oncogene
3. Tumor suppressor gene
4. Ribosome
5. Histones
6. Monohybrid ratio
7. Down's syndrome
8. Chloroplast

II Write Short Essay on Any Five (Wt: 2 each)

9. Differentiate apoptosis from necrosis
10. Functions of biological membranes
11. Chromosome mapping
12. Cytoplasmic inheritance
13. Hardy Weinberg principle
14. Multiple alleles
15. Regulation of cell cycle
16. Inherited disorders in metabolism

III Answer Any Three in Detail (Wt: 5 each)

17. Describe the process of aging. Comment on the different theories of aging.
18. Give a detailed account of the different stages involved in the cell cycle.
19. Describe the importance of medical genetics
20. With the help of a labeled diagram describe a typical cell and its constituents.
21. What are the causes of cancer? Describe the different stages of cancer development. Add a note on diagnosis and treatment.
22. Mitochondrion: structural features and functions

Mahatma Gandhi University, Kottayam
First Semester M.Sc. Biotechnology Examination – 2012
BTPG03 – Biophysics And Bioinformatics (Model question paper)

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. PERL
2. Z DNA
3. Enthalpy
4. Leucine zipper motif
5. SWISSPROT
6. world wide web
7. similarity search
8. histones

II Write Short Essay on Any Five (Wt: 2 each)

9. Ramachandran plot
10. High energy molecules
11. Zinc fingers
12. BLAST
13. Biological databases
14. globin fold
15. Construction of phylogenetic tree
16. Laws of thermodynamics

III Answer Any Three in Detail (Wt: 5 each)

17. Applications of Bioinformatics in genetic research.
18. Comment on DNA- Protein interactions you have studied
19. Give an account of the different protein structural data bases chromatographic techniques used for separation
20. What is DNA polymorphism?
21. Describe the Applications of Bioinformatics in drug designing. different spectroscopic techniques you have studied
22. Describe in detail sequencing of DNA principle and working of confocal microscopy.

Mahatma Gandhi University, Kottayam
First Semester M.Sc. Biotechnology. Examination – 2012
BTPG04 –Instrumentation And Biostatistics(Model question paper)

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Beer- Lambert's law
2. Arithmetic mean
3. Resolving power of a microscope
4. Phase contrast microscope
5. cation exchange resin
6. Isoelectric focusing
7. Ultrafiltration
8. specimen preparation for electron microscopy.

II Write Short Essay on Any Five (Wt: 2 each)

9. Correlation and regression
10. interference microscope
11. Agarose as a support matrix in electrophoresis
12. GM Counter
13. Tests of significance
14. density gradient centrifugation.
15. pulsed field gel electrophoresis.
16. immunoaffinity chromatography

III Answer Any Three in Detail (Wt: 5 each)

17. Describe the different methods used for collection classification and tabulation of data.
18. Explain the working mechanism of HPLC.
19. Give an account of the different chromatographic techniques used for separation
20. What is SDS PAGE? Add a note on its working principles and significance.
21. Describe the different spectroscopic techniques you have studied
22. Describe in detail the principle and working of confocal microscopy.

Mahatma Gandhi University, Kottayam
Second Semester M.Sc. Biotechnology. Examination - 2012
BTPG06 –Microbiology(Model question paper)

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

- 1) Insertion sequences
- 2) Enrichment media
- 3) Fermentation
- 4) Prions
- 5) Lyophilization
- 6) Photoreactivational repair
- 7) Lowenstein – Jensen media
- 8) Sterilization

II Write Short Essay on Any Five (Wt: 2 each)

- 9) Conjugation
- 10) Quorum sensing
- 11) Transposons
- 12) Phenol Coefficient Test
- 13) Adansonian Classification
- 14) Robertsonian Translocation
- 15) Explain Flagellar Structure with a note on difference between prokaryotic & eukaryotic flagella.
- 16) Viral Classification

III Answer Any Three in Detail (Wt: 5 each)

- 17) Elaborate on the structure of bacterial cell wall with a note on peptidoglycan synthesis.
- 18) Explain the mechanism of drug resistance in Bacteria
- 19) Write in detail about aerobic respiration
- 20) Elaborate on Generalized & Specialized transduction
- 21) Classify fungi, with a note on economic importance of fungi.
- 22) What are the Principles of Taxonomy? Describe in detail.

Mahatma Gandhi University, Kottayam
Second Semester M.Sc. Biotechnology Examination - 2012
BTPG07- Immunology(Model question paper)

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

- 1) Adjuvants
- 2) Abzymes
- 3) Immunofluorescence
- 4) Chimeric antibody
- 5) Superantigens
- 6) Idiotype and Isotype
- 7) Dendritic cells
- 8) SCID Mice

II Write Short Essay on Any Five (Wt: 2 each)

- 9) Active & Passive Immunization
- 10) Describe the process of Inflammation
- 11) Erythroblastosis foetalis
- 12) T- Cell Receptor Complex
- 13) MHC Molecules
- 14) ABO blood grouping
- 15) Mechanism involved in Graft Rejection
- 16) Mitogens

III Answer Any Three in Detail (Wt: 5 each)

- 17) Elaborate on the molecular basis of Antibody Diversity. Write a note on class switching.
- 18) Describe the various Antigen- Antibody reactions in detail.
- 19) Describe the different types of Hypersensitivity reactions.
- 20) What is autoimmunity? Describe the various autoimmune diseases.
- 21) What are Complements? How are they involved in the defense mechanism?
- 22) Explain the process of B – cell maturation, activation & differentiation.

Mahatma Gandhi University, Kottayam
Second Semester M.Sc. Biotechnology Examination – 2012
BTPG08- Molecular Biology (Model question paper)

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Release factors
2. Looping in Ara operone
3. DNA polymerase I
4. Scaffold DNA
5. C-value paradox
6. Ribozymes
7. Okazaki fragments
8. Topoisomerase

II Write Short Essay on Any Five (Wt: 2 each)

9. Post transcriptional modification of eukaryotic mRNA
10. RNA polymerases in prokaryotes and eukaryotes,
11. Wobble hypothesis
12. Attenuation.
13. promoters
14. split gene concept
15. Human genome project
16. Difference between prokaryotic and eukaryotic replication

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss in detail lac operon system and its regulatory components.
18. Types of transposons and their significance.
19. Write in detail about repetitive sequences and their importance.
20. Explain the DNA repair mechanisms
21. Explain the different stages in transcription. Add a note on regulation of transcription.
22. Describe in detail the role of enzymes in DNA replication.

Mahatma Gandhi University, Kottayam
II Semester M.Sc. Biotechnology Examination - 2012
BTPG09 -Metabolism and Enzymology (Model question paper)

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Chemiosmosis
2. Salvage Pathway
3. Deamination,
4. Allosteric Enzymes
5. Zymogen
6. Purines
7. Oxidative Phosphorylation
8. Amylase

II Write Short Essay on Any Five (Wt: 2 each)

9. Michaelis -Menten Equation And Km Value
10. Competitive Inhibition Of Enzyme
11. Alkaline Phosphatase And Its Application In Diagnosis
12. Glycolytic Pathway
13. Multienzyme Complexes
14. Alosteric Control Of Enzymes
15. Urea Cycle
16. Transition State Stabilization

III Answer Any Three in Detail (Wt: 5 each)

17. Explain the different classes of enzymes.
18. Explain the structural and functional properties of ATP synthesis.
19. Describe the steps for the purification of enzyme.
20. A nalytical applications of enzymes
21. Describe in details the degradation of cholesterol.
22. Regulation of enzymatic action: activation of enzymes, covalent modification, allosteric interaction, multienzyme complexes.

Mahatma Gandhi University, Kottayam
Third Semester M.Sc. Biotechnology Examination - 2012
BTPG11 – Bioprocess Technology (Model question paper)

Time : 3 Hrs Weightage: 30

I. Write Brief Notes on Any Five (Wt: 1 each)

1. Fed batch bculture
2. Sparger
3. Air lift fermentor
4. Reynod's Number
5. Thermal death time
6. Antifoams
7. Spirulina
8. Secondary screening

II Write Short Essays on Any Five (Wt: 2 each)

9. Solid state fermentation
10. Ergot alkaloids
11. Rennet
12. Food poisoning
13. Microbial Transformation
14. Types of fluids
15. Kinetics of batch culture
16. Microbial production of pectinases

III Answer Any Three in Detail (Wt: 5 each)

17. Describe the Design of a typical Fermentor.
18. Elaborate on role of microbes in production of antibiotics with an example.
19. Discuss Fermented milk products and their nutritional value & safety aspects.
20. Explain Microbiological aspects of manufacture of alcoholic beverages
21. Desribe the methods of Control of Bioreactors.
22. Comment on the important points of media designing for a fermentation.

Mahatma Gandhi University, Kottayam
III Semester M.Sc. Biotechnology Examination – 2012
BTPG12 –Recombinant DNA technology (Model question paper)

Time : 3 Hrs Weightage: 30

I. Write Brief Notes on Any Five (Wt: 1 each)

1. S1 nuclease
2. SNP
3. Homopolymer tailing
4. CAT assay
5. liposomes
6. Chromosome jumping
7. CTAB
8. Blue revolution

II. Write Short essays on Any Five (Wt: 2 each)

11. M13 vectors
12. In vitro packaging
13. Replica plating
14. HART
15. RNA interference
16. Production of pesticide resistant plant varieties.
17. Reporter gene
18. Alpha complementation

III Answer Any Three in Detail (Wt: 5 each)

18. Explain the steps of Southern blotting in detail with labelled diagrams.
19. Give an explanation on E coli based vectors
20. Outline the production of insulin through rDNA technology.
21. Describe the construction of c DNA library.
22. Give an account on restriction enzymes.

Mahatma Gandhi University, Kottayam
Third Semester M.Sc. Biotechnology Examination – 2012
BTPG13 Plant and Animal Biotechnology (Model question paper)

Time : 3 Hrs Weightage: 30

I. Write Brief Notes on Any Five (Wt: 1 each)

1. Surface sterilization
2. lentivirus
3. CaMV promoter
4. Balanced salt solution
5. Triploids
6. Binary vector
7. Auxins
8. Anchorage dependence

II Write Short Essay on Any Five (Wt: 2 each)

9. Haploid production
10. Applications of MAb
11. suspension culture of plant cells
12. Animal pharming
13. Somaclonal variation.
14. Gene therapy
15. primary cell lines
16. organ culture

III Answer Any Three in Detail (Wt: 5 each)

17. Gene transfer Methods in animal cells.
18. Describe haploid production and its significance.
19. Write an essay on Medicinal applications of animal cell culture.
20. Give a detailed description of Agrobacterium based genetic transfer in plants.
21. Describe in detail the Principles and method of preservation of animal cells.
22. Describe the points to be considered during the designing of a tissue culture lab.

Mahatma Gandhi University, Kottayam
Third Semester M.Sc. Biotechnology Examination – 2012
BTPG14 – Environmental Biotechnology (Model question paper)

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. UASB
2. Significance of Biological oxygen demand of water.
3. Bt toxin
4. Microbial consortium in biodegradation
5. Biofouling
6. Mycorrhiza
7. Salmonella
8. Gene bank

II Write Short Essay on Any Five (Wt: 2 each)

9. Effect of petroleum exposure on marine organisms
10. Conditions for patenting
11. Biosurfactant
12. Microbes used in bioleaching
13. Steps for disinfection of water
14. Biofilm formation & significance
15. Production of Bacterial biofertilizers
16. Hazardous group of microorganisms

III Answer Any Three in Detail (Wt: 5 each)

17. Stages of composting process.
18. Elaborate on the mechanism & genetics of biological nitrogen fixation. Explain Root nodulation.
19. Give in details the methods of Bioremediation.
20. Give an account of activated sludge treatment.
21. Explain biogeochemical cycling and significance of Nitrogen and carbon
22. Mechanism of Biogas production by microbes

**Model question papers for
ELECTIVES BTPG19E –BTPG38E**

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination
BTPG19E ADVANCED METHODS IN MOLECULAR DIAGNOSTICS

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Salting out
2. Phenol chloroform extraction in DNA isolation
3. Ribonuclease
4. Real time PCR
5. SAGE
6. SNP
7. SMD
8. Electrokinetic Molecule focussing

II Write Short Essay on Any Five (Wt: 2 each)

9. Paired end sequencing
10. Microfluidic DNA sequencer
11. Ligase chain reaction
12. Fluorescent PCR
13. RNA isolation
14. Oligonucleotide Ligation Assay
15. Microarray technique
16. Ribiswitches.

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss the various methods of Mutation detection .
18. Explain the important methods of DNA isolation
19. Discuss the various types of PCR
20. Explain the different types of new generation sequencing
21. Specify the importance of various PCR based molecular markers
22. Discuss DNA barcoding and specify its applications

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG 20E BIOTECHNOLOGY IN MOLECULAR PATHOGENESIS AND
CLINICAL DIAGNOSIS

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Prions
2. Nosocomial infections
3. Bacterial toxins
4. 6SrRNA sequence
5. Amplified ribosomal DNA restriction analysis
6. Fluorescence microscopy
7. Dermatophytoses
8. POX virus

II Write Short Essay on Any Five (Wt: 2 each)

9. AIDS virus
10. Filariasis
11. Hepatitis virus
12. Candidiosis
13. Membrane trafficking and invasion of microbes
14. PCR based microbial typing
15. DGGE and TRFLP
16. Leishmaniasis

III Answer Any Three in Detail (Wt: 5 each)

17. Explain the diagnosis of various .Protozoan diseases
18. Discuss the diagnosis of Candidosis and Aspergillosis
19. Specify the importance of PCR based methods in the detection of viral pathogens
20. What are monoclonal antibodies? Discuss its applications.
21. Discuss the various factors predisposing to microbial pathogenicity
22. Discuss the various strategies adopted in the molecular diagnosis of fungal pathogens

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG21E BIOTECHNOLOGY AND FORENSIC MEDICINE

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Lectins
2. Bombay Blood groups
3. Lewis antigen
4. Typing of PGM
5. Amp-FLP
6. Y-STR
7. Synthetic DNA.
8. Mini STRs

II Write Short Essay on Any Five (Wt: 2 each)

9. Pitfalls in red cell typing
10. HLA typing
11. DNA chip technology
12. Analysis of SNP
13. VNSTR
14. Genetic polymorphism and typing of ADA
15. Immunodiffusion and immuno electrophoresis
16. Methods of ABO blood grouping

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss the role of sero-genetic markers in individualization and paternity disputes.
18. Discuss the various types of Immunoglobulins. Explain their physico-chemical properties and function
19. Discuss the genetic polymorphism and typing of - Hb, HP, Tf, Bf, C3 . and their forensic significance.
20. Discuss the importance of RFLP and PCR in forensic analysis
21. What is DNA profiling? Explain the procedural & ethical concerns in it.
22. Discuss the Microarray technique and specify its applications

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG22E GENOMICS, PROTEOMICS AND NANOTECHNOLOGY

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Biogenic nanoparticles
2. Nanobiotechnology
3. Quantum dots
4. SEM
5. Role of fungi in nanoparticle synthesis
6. Nanoalloy
7. Extracellular synthesis of nanoparticles
8. AFM

II Write Short Essay on Any Five (Wt: 2 each)

9. Use of nanoparticles in cancer therapy
10. Nanocomposite
11. Applications of silver nanoparticles
12. Uses of nanoparticles in MRI
13. Applications of Dynamic light scattering technology in nanoscience
14. Green nanotechnology
15. Mechanism of silver nanoparticle biosynthesis
16. Nanowires

III Answer Any Three in Detail (Wt: 5 each)

17. Explain synthesis of nanoparticles by various groups of microorganisms
18. Explain toxicology of nanoparticles
19. Explain methods used for the characterization of nanoparticles
20. Explain methods used for the synthesis of nanoparticles
21. Explain applications of metal nanoparticles
22. Explain process design for industrial scale synthesis of nanoparticles

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG23E MOLECULAR BREEDING

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Satellite DNA
2. Real time PCR
3. QTL mapping
4. Expressed sequence tags
5. SNP
6. RFLP
7. ISSR
8. DNA chip

II Write Short Essay on Any Five (Wt: 2 each)

9. Plant genome and its size
10. LINE and SINE
11. Pseudo genes
12. SCAR markers
13. Gene pyramiding
14. Genetically modified plants for herbicide resistance
15. Nongel based techniques for plant genotyping
16. Methods of germplasm analysis

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss the significance of plant organelle genome.
18. Discuss the importance of RFLP as a plant molecular marker
19. What are the different stages in performing RAPD? Discuss its applications.
20. Discuss the importance of marker assisted selection in plants.
21. Discuss the importance of generating pest and disease resistance in plants through transgenic technology
22. What is AFLP? Discuss its application in Plant Molecular Biology

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG24E MOLECULAR MARKERS IN CANCER

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. CpG islands
2. Epigenetics
3. SNP
4. Telomerase and cancer
5. Tumor suppressor genes
6. SSCP
7. Survivin
8. Phage display

II Write Short Essay on Any Five (Wt: 2 each)

9. p53 and its importance in the cancer disease
10. Early detection of colorectal carcinoma
11. Protein chip technology in cancer detection
12. Real time PCR in cancer detection
13. COLD PCR and its application
14. Antibody microarray
15. Glycans as biomarkers of tumor
16. DNA methylation and significance

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss the role of mi RNA in cancer
18. Protein markers in the disease of cancer
19. Discuss gene expression profiling
20. Explain the importance of sequencebased approaches in the early detection of cancer
21. Discuss the various cancer associated mutations and specify its importance
22. Discuss the various assays based on proteins and enzymes for the detection of cancer

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG25E CANCER BIOLOGY

Time: 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Tumor suppressor genes
2. Rous sarcoma virus
3. Retinoblastoma
4. Protooncogenes
5. Aflotoxins
6. Akt pathway and its significance
7. Metastasis
8. Angiogenesis

II Write Short Essay on Any Five (Wt: 2 each)

9. Radiation therapy
10. Membrane disruption in cancer
11. Retroviruses and cancer
12. Telomerase and cancer
13. Diet and cancer
14. Gene therapy in cancer
15. Biochemical assays for cancer detection
16. Tumor markers

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss the various types of cancers
18. Discuss the significance of cell cycle regulation in the generation of cancer disease
19. What is chemotherapy? Discuss the advantages and disadvantages in chemotherapy
20. Specify the differences between cancerous cells and normal cells
21. discuss the various molecular methods used for early detection of cancer
22. Discuss the basic principle involved in cancer invasion

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG26E PROJECT MANAGEMENT AND PHARMACOECONOMICS AND
PHARMACOGENOMICS

Time: 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Qualitative research
2. Hypothesis in scientific research
3. Selection of Objectives in research
4. Data collection in scientific research
5. Precautions to be taken in the management of a clinical trial
6. Medical device research
7. Preparation of clinical study reports
8. Management of medical documents

II Write Short Essay on Any Five (Wt: 2 each)

9. Pharmacokinetics
10. Health economics
11. Labelling of clinical trial drugs
12. Post marketing surveillance
13. Pharmacoeconomics
14. Licensing in pharmacological research
15. Pre clinical research
16. Presentation skills in scientific research

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss the various quantitative and qualitative research methods in science
18. Explain the various strategies in scientific research for maintaining and managing essential documents
19. Discuss the various stages in the development of drugs and specify the significance of each stage
20. Discuss pharmacogenomics and explain its application in clinical research
21. Discuss the various regulatory affairs relevant to research in pharmacology
22. Discuss the various methods for monitoring drug safety in pharmacological research

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG27E BIOPHARMACEUTICALS AND APPLIED NANOTECHNOLOGY

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. GMP
2. Nanoparticle sensors
3. Production of silver nanoparticles
4. Pharmacodynamics
5. Computer aided drug discovery
6. Liposomes
7. Transdermal delivery system
8. Nano-agglomerates

II Write Short Essay on Any Five (Wt: 2 each)

9. Pharmacokinetics
10. Health economics
11. Labelling of clinical trial drugs
12. Post marketing surveillance
13. Pharmacoeconomics
14. Licensing in pharmacological research
15. Pre clinical research
16. Presentation skills in scientific research

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss the various stages in the development of drugs and specify the significance of each stage
18. Discuss pharmacogenomics and explain its application in clinical research
19. Explain the significance of drug receptor interactions. Discuss the significance with examples
20. Discuss the various applications of SEM, TEM and AFM in Nanotechnology
21. Discuss the various methods for the biological production of nanoparticles
22. Explain the various applications of nano biotechnology for human health.

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG28E IPR, BIOSAFETY & BIODIVERSITY

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Copy right
2. USPTO
3. Biohazard
4. Biosafety cabinet
5. RCGM
6. Cartagena Protocol
7. UPOV
8. PGRFA

II Write Short Essay on Any Five (Wt: 2 each)

9. Indian biodiversity ACT and provisions for crop genetic resources
10. Conservation strategies for seed gene bank
11. Impact of GM crops on biodiversity
12. International treaties on biodiversity
13. Climate change and conservation of plant genetic resources
14. Role of institutional biosafety committees
15. Environmental release of GMO
16. Biosafety guidelines in India

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss the importance of patenting. Explain the advantages of patenting scientific inventions
18. What are the various types of patents/ Discuss each with examples.
19. Discuss the various requirements of patenting. Comment on each requirement.
20. Discuss the recommended biosafety levels of specific microorganisms in India
21. Discuss the various regulations in the analysis, assessment and management of risk in India
22. Discuss the biodiversity act in India and comment on its merits and demerits.

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG29E BIOTECHNOLOGY AND IPR

Time: 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Bt brinjal
2. Cartagena Protocol
3. Biohazard
4. Biosafety cabinet
5. RCGM
6. USPTO
7. Labelling of GM foods
8. PGRFA

II Write Short Essay on Any Five (Wt: 2 each)

9. DBT guidelines on biodiversity rules
10. Conservation strategies for seed gene bank
11. Impact of GM crops on biodiversity
12. International treaties on biodiversity
13. Ethical, legal and social implications of Biotechnological research
14. Role of institutional biosafety committees
15. Environmental release of GMO
16. IPR policy of government of India

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss the importance of patenting. Explain the advantages of patenting scientific inventions
18. What are the various types of patents/ Discuss each with examples.
19. Discuss the various requirements of patenting. Comment on each requirement.
20. Discuss the recommended biosafety levels of specific microorganisms in India
21. Discuss the various regulations in the analysis, assessment and management of risk in India
22. Discuss the biodiversity act in India and comment on its merits and de merits.

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG30E MICROBIAL BIOTECHNOLOGY

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. SCP
2. Biocosmetics.
3. Biogas
4. Biopolymers
5. Bioweapons
6. Microbial biosensor
7. Recombinant lycopenes
8. Bioleaching

II Write Short Essay on Any Five (Wt: 2 each)

9. Industrially important microbes
10. Batch culture of microorganisms
11. Biofertilizers
12. Activated sludge process
13. Anaerobic treatment of solid waste
14. Different types of Composting
15. Isolation of industrially important microorganisms
16. Biopolyesters

III Answer Any Three in Detail (Wt: 5 each)

17. Explain the various industrially important enzymes produced from microorganisms
18. Discuss the various aerobic methods in the biological treatment of industrial effluents
19. Explain the various methods of strain improvement for industrial microorganisms
20. What are biosensors? Give a schematic representation of a typical biosensor and explain its parts.
21. What is biodegradation? Explain the various factors affecting the biodegradation of xenobiotic compounds
22. Discuss the various steps in the fermentative production of recombinant proteins. Give specific examples

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG31E MICROBIAL FOOD SAFETY

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Genetically modified foods
2. Aflatoxins
3. Phosphatase test
4. Botulism
5. Hurdle Concept
6. HFCS
7. HACCP
8. Codexalimentaris

II Write Short Essay on Any Five (Wt: 2 each)

9. Transgenic Fish
10. Edible vaccines
11. Methionine-enriched oil
12. B.t. maize
13. Hepatitis B vaccine in maize
14. Food and Drug Administration
15. indicator organisms
16. Bioprocessing of meat.

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss the various safety aspects of Transgenic Animals. Explain with specific examples
18. Discuss the various precautions adopted in food formulations, cooking, preservation, processing, irradiation and packaging
19. What are the various Food borne diseases? Discuss the strategies that can be adapted to prevent food contaminations?
20. Discuss the structure and properties of various chemical additives used for the processing of fermented foods
21. Discuss the various safety challenges, emergence of new pathogens and emergence of new food borne diseases in fermentation industry.
22. What are GM food? Discuss the risks, public perception- facts and myths about GM foods.

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG32E FOOD BIOTECHNOLOGY

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. GMP
2. Prebiotics
3. Mycoproteins
4. GHPs are critical for Food Safety
5. Transgenic fish
6. High fructose corn syrup
7. Pasturisation.
8. Differentiate between genetically modified food and organic food

II Write Short Essay on Any Five (Wt: 2 each)

9. Contamination of milk
10. Starlink corn
11. Elaborate on procedures for risk assessment of GM seeds and plants.
12. Applications of cellulose in food industry.
13. Single cell proteins : Advantages and disadvantages.
14. Explain Food Safety Management Systems
15. Low temperature for food preservation.
16. Ethical concerns of biotechnological food research and innovations

III Answer Any Three in Detail (Wt: 5 each)

17. Explain the microbial production of vitamins.
18. Why is food packaging crucial for safety and quality control? Explain briefly by highlighting the functions and types of packaging you will use to ensure food safety.
19. Explain the food preservation techniques.
20. Role of biotechnology in blue revolution.
21. HACCP is a preventive and cost effective approach to food safety". Comment on the statement, highlighting the benefits of HACCP for the consumer, industry and the Government.
22. How r DNA technology is useful in improving the food production. Discuss with examples.

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG33E NUTRITIONAL BIOCHEMISTRY

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. BMR and SDA
2. Respiratory quotient
3. Respiratory quotient
4. RDA,
5. Fructose oligosaccharides
6. Glycemic index:
7. Diet derived antioxidants
8. artificial sweetners

II Write Short Essay on Any Five (Wt: 2 each)

9. Tran's fatty acids
10. omega 6 fatty acids
11. gestational diabetes mellitus
12. Comparative composition of human & bovine milk,
13. Vegetarianism
14. oral hypoglycemic drugs
16. artherosclerosis,.

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss the features of Rheumatic heart disease. Explain the various precautionary measures that be adopted for managing the disease
18. Explain the ideal diet for patients suffering from hypertension. Justify the suggestions
19. What are Nutrigenetics and Nutrigenomics/ Discuss its aims and advantages.
20. Discuss the various types of Food allergy. Explain its cause, symptoms and treatment strategies.
21. What is Malnutrition? Explain the various causes of malnutrition. Discuss the different measures that can be taken to combat malnutrition.
22. Discuss Nutrition and Metabolomics. Specify the significance of both.

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG34E NEUROBIOCHEMISTRY

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Myoneural junction
2. Serotonin,
3. GABA
4. Brain-Barrier
5. Senile dementia
6. Synapse
7. Short term memory
8. Sympathetic nervous system

II Write Short Essay on Any Five (Wt: 2 each)

9. Disorders associated with CNS.
10. Sympathetic and Parasympathetic neurotransmitters
11. Molecular biology of hearing
12. Myoneural junction
13. Mechanism of synaptic transmission
14. Nitric oxide,
15. Histamine, Glutamine
16. Biochemistry of learning and memory.

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss the features of various neurodegenerative disorders
18. Discuss the structure and functions of various neurotransmitters
19. Explain the various disorders associated with conduction of nerve impulse.
20. Discuss the disorders associated with neurotransmitter deficiency.
21. Discuss the mechanism of conduction of nerve impulse. Illustrate with suitable diagrams
22. Discuss disorders associated with CNS. Explain with suitable examples.

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG35E DEVELOPMENTAL BIOLOGY

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Gametogenesis
2. Gastrulation
3. Double fertilization in plants
4. Maternal genes
5. Bicoid proteins
6. Bithorax mutant
7. Hunchback genes
8. metamorphosis

II Write Short Essay on Any Five (Wt: 2 each)

9. Seed formation and germination.
10. Eye lens induction in vertebrates
11. Necrosis
12. Theories of aging
13. Caspases
14. Floral development
15. Shoot and root development
16. Differentiation of neurons

III Answer Any Three in Detail (Wt: 5 each)

17. What is apoptosis? Discuss the extrinsic and intrinsic pathway of apoptosis.
18. Discuss the science behind aging. Specify the role of mitochondrial stress in aging
19. Comment on the floral differentiation in plants.
20. Discuss the various studies conducted in *Caenorhabditis elegans* with respect to development and differentiation.
21. Explain the genetic control of embryonic development in *Drosophila* .Discuss the contributions of Edward Lewis and his coworkers in this area
22. What are homeotic genes? Specify the significance. Discuss with examples.

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG 36E PHYSIOLOGY

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Haemopoiesis
2. Rh.factor
3. ECG
4. Cardiac cycle
5. Action potential
6. Rubisco
7. Vernalization
8. Plant hormones

II Write Short Essay on Any Five (Wt: 2 each)

9. Neuroendocrine regulation
10. Haemostasis– mechanisms
11. Blood volume, Blood volume regulation
12. Taste and Tactile response.
13. C3, C4 and CAM pathways
14. Photoperiodism
15. Absorption and transport of water
16. Photorespiration.

III Answer Any Three in Detail (Wt: 5 each)

17. What are Endocrine glands? Discuss the basic mechanism of hormone action.
18. Discuss the physiology of respiratory System. Specify the importance of the various phases of respiration. Comment on the neural and chemical regulation of respiration.
19. Discuss the plant mitochondrial electron transport system and ATP synthesis
20. Explain the physiology in the various responses of plants to biotic and abiotic stresses.
21. Discuss the significance of regulation of water balance, electrolyte balance and acid-base balance in human physiology system..
22. Discuss the growth of microorganisms. Specify the various stages in the growth cycle. Comment on the yield and rate of growth

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG37E ENVIROMENTAL SCIENCE

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Biome
2. Marine ecosystem
3. Characteristics of a community
4. Sources of air pollution
5. What is ecofeminism?
6. Control of noise pollution
7. Ecological succession
8. Hotspots of biodiversity

II Write Short Essay on Any Five (Wt: 2 each)

9. Types of ecological pyramids
10. Characteristics of freshwater habitat
11. Sources of water pollution
12. Bioremediation strategies
13. Microbial indicators of water pollution
14. Organisms used as bioweapons
15. Application & construction of biosensors
16. Current Major environmental issues in India.

III Answer Any Three in Detail (Wt: 5 each)

17. Give a detailed account of abiotic components of environment.
18. Methods for conservation of biological diversity
19. Give a brief account of bacteriological analysis of water quality.
20. Methods for control of soil pollution
21. Write an account of different types of Mycotoxins
22. Discuss global environmental problems & solutions

Mahatma Gandhi University, Kottayam
Fourth Semester M.Sc. Biotechnology Examination - 2012
BTPG38E EVOLUTION AND BEHAVIOUR

Time : 3 Hrs Weightage: 30

I. Write Notes on Any Five (Wt: 1 each)

1. Lamarckian concepts of variation
2. Spontaneity of mutations
3. Sexual selection
4. Experiment of Miller
5. Origins of unicellular organisms;
6. Gene duplication and divergence.
7. Altruism
8. Kin selection

II Write Short Essay on Any Five (Wt: 2 each)

9. Allopatricity and Sympatricity
10. Migration and random genetic drift
11. Convergent evolution
12. Molecular divergence and molecular clocks
13. Origin of new genes and proteins
14. Origin of eukaryotic cells
15. Origin of new genes and proteins
16. Convergent evolution.

III Answer Any Three in Detail (Wt: 5 each)

17. Discuss the concepts put forward by Darwin with specific reference to concepts of variation, adaptation, struggle, fitness and natural selection.
18. Discuss the concept of Oparin and Haldane. Comment on its significance.
19. Specify the evolutionary time scale and comment on the major events.
20. Discuss the various Molecular tools used in phylogenetic studies for classification and identification
21. What is the significance of Population genetics? Explain Populations, Gene pool, Gene frequency and Hardy-Weinberg Law
22. Discuss the various approaches and methods adopted in the study of animal behavior. Comment on the merits and demerits of each method.