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**St Aloysius College (Autonomous)
Mangaluru**

Semester I – P.G. Examination – M.Sc. Biotechnology

January -2023

BIOCHEMISTRY AND METABOLISM

Time: 3 Hours

Max. Marks: 70

Note: Draw neat labeled diagrams/schematic sketches/structures wherever necessary

I Write short notes on any FIVE of the following. (5x3=15)

1. Sucrose structure
2. Unsaturated fatty acids
3. Essential amino acids
4. Denaturation of DNA
5. Cori's cycle
6. Inhibitors of ATP synthesis
7. Deamination
8. Salvage pathway of purine nucleotide biosynthesis

II Write explanatory notes on any FIVE of the following. (5x5=25)

9. Chemical reaction of fatty acids
10. HDL and LDL
11. End group analysis
12. Tertiary structure of proteins
13. Glycolysis and its regulation
14. Structural components of the electron transport chain
15. Carnitine shuttle mechanism
16. β oxidation of Palmitic acid

III Answer any THREE of the following. (3x10=30)

17. Write an account on the Urea Cycle. Add a note on its regulation.
18. Give a detailed account on the TCA cycle and its regulation
19. Describe the conformations of A, B and Z DNA
20. Discuss the structure and functions of homo and heteropolysaccharides
21. Elaborate on gluconeogenesis and regulation of blood sugar

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January -2023

MICROBIOLOGY

Time: 3 Hours

Max. Marks: 70

Note: Draw neat labeled diagrams/schematic sketches/structures wherever necessary

I Write short notes on any FIVE of the following. (5x3=15)

1. List out the antifungal and antibacterial agents obtained from marine microorganisms.
2. Write a short note on the significance of human microbiome.
3. How is quorum sensing responsible in increasing the drug resistance of a bacterial pathogen?
4. What is a synchronous culture? How can a population of cells be synchronized?
5. What is the basis for Baltimore classification of viruses and how are viruses grouped according to this system?
6. How are psychrophiles adapted to the extreme environment?
7. With a labelled diagram explain the structure of HIV.
8. Classify bacteria based on their nutritional requirement. Give suitable examples.

II Write explanatory notes on any FIVE of the following. (5x5=25)

9. Write a note on the use of metagenomics in analyzing an environmental sample.
10. Discuss the use of microbial fuel cells in hydrogen production.
11. Write a brief note on the structure of prions.
12. Describe the steps involved in the formation of a root nodule in a leguminous plant.
13. Write a note on bioinsecticides.
14. Explain the methods used for the cultivation of anaerobic bacteria.
15. Write a brief note on plaque assay.
16. Describe commensalism with suitable examples.

III Answer any THREE of the following. (3x10=30)

17. Describe the types of mycorrhizae. Add a note on the benefits derived by plants from the association.
18. Explain the life cycle of animal viruses.
19. Elaborate on the production of bioplastics.
20. Discuss the molecular methods used in microbial taxonomy.
21. Write a detailed account on the production and application of *Azotobacter* inoculant.

PH 503.1

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**Semester I – P.G. Examination – M.Sc. Biotechnology
January -2023**

CELL AND MOLECULAR BIOLOGY

Time: 3 Hours

Max. Marks: 70

**Note: Draw neat labeled diagrams/schematic sketches/structures
wherever necessary**

I Write short notes on any FIVE of the following. (5x3=15)

1. Active transport
2. Electrical synapses
3. tRNA
4. Promoters
5. Gap genes
6. Hypoxia and regulation of gene expression
7. Oncogenes
8. metastasis

II Write explanatory notes on any FIVE of the following. (5x5=25)

9. Composition of the biological membrane
10. Different types of cell-cell interactions
11. Control of DNA replication
12. Protein splicing
13. Chromatin remodeling
14. Transcription factor motifs
15. Tumor suppressor genes
16. Difference between normal and cancer cells

III Answer any THREE of the following. (3x10=30)

17. Cell cycle regulations and its significance
18. Translation process in eukaryotes
19. Molecular aspects of pattern formation in the dorsoventral axis during embryonic development in *Drosophila*
20. Elaborate on the biological agents causing cancer
21. Give an account of Immunotherapy

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MOLECULAR AND HUMAN GENETICS

Time: 3 Hours

Max. Marks: 70

**Note: Draw neat labeled diagrams/schematic sketches/structures
wherever necessary**

I Write short notes on any FIVE of the following.

(5×3=15)

1. F plasmid conjugation
2. Photoreactivation
3. ZZ-ZW system
4. Prader Willi syndrome
5. Y-linked inheritance
6. Catastrophism
7. Allopatric speciation
8. Postulates of Lamarck

II Write explanatory notes on any FIVE of the following.

(5×5=25)

9. Site specific recombination
10. SOS repair mechanism
11. Liquid Biopsy
12. Chorionic villus sampling
13. Darwinism
14. Experiments of Biogenesis
15. Recapitulation Theory
16. Urey – Miller experiment

III Answer any THREE of the following.

(3×10=30)

17. Explain Griffith's experiment to prove transformation. Add a note on its mechanism.
18. Explain the construction of pedigree, the symbols used and elaborate on the autosomal dominant and recessive pedigrees.
19. Give an overview of the human genome project
20. Describe Hardy-Weinberg equilibrium and conditions for its maintenance.
21. Give a detailed account on the base excision and mismatch repair mechanisms.