LS2GPHC500 Reg. No.: | | | | | | | | |

St Aloysius (Deemed to be University)

Mangaluru

School of Life Sciences (PG Programme)

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

October/November - 2025

BIOCHEMISTRY AND METABOLISM

Time: $2^1/_2$ Hours **Max Marks: 60**

Note: Draw neat, labelled diagrams /schematic sketches/structures wherever necessary

SECTION – A

Write Short note on any FIVE of the following. **(5x2=10)**

1. Define disaccharides and provide examples of common disaccharides found in nature.
2. What are lipoproteins? Mention the different types.
3. Discuss in detail on properties of DNA.
4. How do amino acids contribute to the formation of peptide bonds in protein synthesis?
5. What is the Pentose Phosphate Pathway (PPP), and what are its primary functions in cellular metabolism?
6. Given a scenario where an individual has consumed an excessive amount of protein-rich food, describe the physiological processes involving deamination and transamination that would occur to handle the excess amino acids in the body.

SECTION - B

Write Explanatory notes on any SIX of the following. **(6x5=30)**

7. Discuss the physical properties of oils and fats.
8. Describe the main roles of chitin in both arthropods and fungi, and highlight the structural features that allow it to fulfill these functions.
9. Discuss the wobble hypothesis and its significance in decoding the genetic code. How does it allow for flexibility in base pairing between the third position of the codon and the first position of the anticodon?
10. Analyze the biochemical reactions involved in the Cori Cycle.
11. Discuss the function of complex III (cytochrome bc1 complex) in the mitochondrial ETC. How does it participate in both electron transfer and proton pumping?
12. How does malonyl-CoA play a critical role in the regulation of fatty acid biosynthesis?
13. Analyze the potential consequences of impaired urea cycle function on blood ammonia levels and overall metabolic homeostasis.

SECTION – C

Answer any TWO of the following. **(2x10=20)**

14. Compare and contrast the structural differences between starch and glycogen.
15. Provide a detailed explanation of the structure of proteins. Support your explanation with a relevant example of a protein to illustrate these structural levels.
16. Discuss in detail the TCA cycle. Add a note on its regulation.

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St Aloysius (Deemed to be University)
Mangaluru
School of Life Sciences (PG Programme)

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

October/November - 2025

RESEARCH METHODOLOGY, ETHICS AND SCIENTIFIC COMMUNICATION

Time: $2^1/_2$ Hours **Max Marks: 60**

Note: Draw neat, labelled diagrams /schematic sketches/structures wherever necessary

SECTION – A

Write Short note on any FIVE of the following. (5x2=10)

1. List two examples of conflicts of interest that researchers should disclose when publishing their work.
2. Recall the purpose of historical research.
3. Explain the conditions that say that there is an existence of a research problem.
4. Compare between primary data and secondary data.
5. What is journal citation report?
6. What is web of science?

SECTION - B

Write Explanatory notes on any SIX of the following. (6x5=30)

7. Describe the fundamental meaning and purpose of research.
8. Explore ethical considerations in qualitative and quantitative research.
9. Distinguish between sampling and non sampling errors.
10. What do you understand by reference manager? Cite few examples.
11. Discuss how you will write a grant proposal.
12. Describe the various types of research design.
13. What qualities should individuals consider when selecting a mentor?

SECTION – C

Answer any TWO of the following. (2x10=20)

14. How do ethical principles guide researchers in upholding the rights of research participants and ensuring their treatment aligns with obligations?
15. Discuss various types of complex random sampling techniques with an example for each.
16. Describe the elements of a scientific paper.

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St Aloysius (Deemed to be University)

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School of Life Sciences (PG Programme)

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

October/November - 2025

MICROBIOLOGY

Time: $2^1/_2$ Hours **Max Marks: 60**

Note: Draw neat, labelled diagrams /schematic sketches/structures wherever necessary

SECTION – A

Write Short note on any FIVE of the following. **(5x2=10)**

1. Explain different types of media and provide an example for each.
2. Describe the key components of a chemostat and their roles in maintaining a continuous culture.
3. What are parasites? What is their mode of nutrition?
4. Define microbial symbiosis.
5. Describe the structural properties of TMV virus.
6. Write a note on biopesticides.

SECTION - B

Write Explanatory notes on any SIX of the following. **(6x5=30)**

7. Explain pure culture techniques. Add a note on preservation of microbial culture.
8. Describe the procedure of 16S rRNA analysis and how it aids in distinguishing between microorganisms.
9. Explain the concept of the human microbiome.
10. Explain the ultrastructure of H1N1 virus.
11. Describe the primary molecular mechanism by which the prophage integrates into the host cell's genome during the lysogenic cycle. What are the key proteins involved in this process?
12. Explain the field applications and benefits of phosphate solubilizing microorganisms.
13. Explain microbial fuel cells. Add a note on its types.

SECTION – C

Answer any TWO of the following. **(2x10=20)**

14. Briefly explain microbial growth and add a note on the environmental effects on the growth of microbes.
15. Discuss the implications of microbiome research for various fields, such as medicine, agriculture, and environmental science.
16. Provide a comprehensive overview of Baltimore classification of viruses and discuss how these features influence categorization.

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St Aloysius (Deemed to be University)

Mangaluru

School of Life Sciences (PG Programme)

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

October/November - 2025

FOOD BIOTECHNOLOGY

Time: $2^1/_2$ Hours **Max Marks: 60**

Note: Draw neat, labelled diagrams /schematic sketches/structures wherever necessary

SECTION – A

Write Short note on any FIVE of the following. **(5x2=10)**

1. Define prebiotics and probiotics.
2. Write a note on the preparation of Tempeh.
3. What is meant by food poisoning? Give an example.
4. Differentiate between endo and exotoxins. Give examples for each.
5. Define refrigeration and freezing as methods of food preservation.
6. What is the primary purpose of pasteurization?

SECTION - B

Write Explanatory notes on any SIX of the following. **(6x5=30)**

7. Analyze the impact of different food processing methods on the nutritional content and sensory attributes of food products.
8. Describe the role of regulatory agencies in preventing and controlling food adulteration.
9. How to control the bacteria during handling and processing of milk?
10. Identify the significance of blanching of foods and mention its types.
11. Explain smoking of food as a preservative technique and add a note on the types of woods used.
12. Explain the process of manufacture of Miso.
13. Define microbial exopolysaccharides and write a note on any two of them.

SECTION – C

Answer any TWO of the following. **(2x10=20)**

14. Critically evaluate the role of Codex Alimentarious in harmonizing international food standards and its effectiveness in promoting global food safety and trade.
15. Elaborate on the spoilage of meat. How to control the spoilage of meat?
16. Explain the process of manufacture of Beer.

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St Aloysius (Deemed to be University)

Mangaluru

School of Life Sciences (PG Programme)

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

October/November - 2025

MOLECULAR GENETICS

Time: $2^1/_2$ Hours **Max Marks: 60**

Note: Draw neat, labelled diagrams /schematic sketches/structures wherever necessary

SECTION – A

Write Short note on any FIVE of the following. **(5x2=10)**

1. Explain the concept of multiple alleles in coat colour of rabbits.
2. What are Col plasmids?
3. Write a note on Down's syndrome.
4. Describe Y linked pedigree and give an example.
5. Define the central idea of Lamarckism and explain with an example.
6. Explain Biogenesis Theory and write a note on the experiment of Francisco Redi.

SECTION - B

Write Explanatory notes on any SIX of the following. **(6x5=30)**

7. Summarize dominant epistasis with an example.
8. Explain the experiment to prove the process of transformation.
9. Illustrate how X: A ratio plays a major role in determining the sex.
10. Compare and contrast the clinical features and genetic mechanisms of Angelman syndrome with another genetic disorder characterized by intellectual disabilities, such as Martin Bell syndrome.
11. Describe the process of Amniocentesis and mention its one merit and demerit.
12. Elaborate on Urey-Miller experiment of chemical origin of life.
13. Explain in brief about the theory put forth by Darwin.

SECTION – C

Answer any TWO of the following. **(2x10=20)**

14. Compare the process of Base excision repair mechanism with that of mismatch repair mechanism.
15. Explain autosomal dominant and recessive pedigrees in detail with examples.
16. Compare and contrast the two types of speciation. Add a note on the pre and post zygotic barriers.

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