LS2GPHC600 Reg. No.: | | | | | | | | |

St Aloysius (Deemed to be University)

Mangaluru

School of Life Sciences (PG Programme)

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

October/November - 2025

ANIMAL 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. List out the adhesive substratum for cell culture.
2. What do you understand by transformed cell line?
3. Why are iPSCs considered pluripotent?
4. How will you clone adherent cells?
5. Which countries have introduced lab grown meat commercially?
6. Distinguish between MESA and PESA.

SECTION - B

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

7. Describe the principle of fluorescence-activated cell sorting (FACS) and its application in cell separation.
8. Explain how you will detect mycoplasma contamination in cell culture.
9. Explain the methods used for synchronizing cells and their biological significance.
10. Discuss the production of human growth hormone using mammalian cell culture system.
11. Compare the properties of continuous vs finite cell lines with examples.
12. Discuss the application of therapeutic cloning in regenerative medicine.
13. Examine gene correction strategies.

SECTION – C

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

14. Explain the initiation of primary culture using chick embryos.
15. Describe the various cell lines used in biotechnological applications.
16. Give a detailed account of *in vitro* fertilization and embryo transfer in humans.

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LS2GPHC601 Reg. No.: | | | | | | | | |

St Aloysius (Deemed to be University)
Mangaluru
School of Life Sciences (PG Programme)
M.Sc. (Biotechnology) Semester III – P.G. Examination
October/November - 2025
PLANT 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. Discuss the significance of antioxidants such as ascorbic acid in media.
2. Describe the role of cytokinins in micropropagation.
3. Explain the primary objective of conducting RAPD analysis in plants.
4. Summarize the limitations of ISSR markers compared to other molecular techniques.
5. Define the concept of cell suspension cultures.
6. Write a note on BT brinjal.

SECTION - B

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

7. Explain the key components and steps involved in the preparation of artificial seeds from plants.
8. Evaluate the role of lab hygiene and personnel practices in preventing contamination in plant tissue culture. Analyze how lapses in hygiene can lead to contamination events and discuss the importance of stringent hygiene protocols in tissue culture laboratories.
9. Discuss the processes and factors contributing to somaclonal variations.
10. Describe the alternative approach of ovary and ovule culture for haploid production.
11. How does DNA barcoding facilitate the identification of plant species?
12. Explain high throughput genotyping and its applications in plant biotechnology.
13. Explain the mechanisms behind the resistance conferred to transgenic plants.

SECTION – C

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

14. Describe the function of growth regulators, with a focus on auxins and cytokinins, in plant tissue culture. Describe in detail the natural and synthetic auxins and cytokinins that are employed in plant tissue culture.
15. Evaluate the reliability and reproducibility of SSR analysis as a tool for assessing genetic diversity in plants.
16. Explore the potential benefits and challenges of Seed Terminator Technology and how it works.

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LS2GPSC621 Reg. No.: | | | | | | | | |

St Aloysius (Deemed to be University)

Mangaluru

School of Life Sciences (PG Programme)

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

October/November - 2025

ENZYMOLOGY

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. Mention the role of NAD^+ as co enzyme.
2. Classify the following enzymes into respective classes: Urease, Tryptophan synthase, lactate dehydrogenase, pyruvate decarboxylase.
3. Mention the equation for Michaelis-Menten derivation and draw its graph.
4. Represent the Cleland notation for ping pong mechanism.
5. Write a note on abzyme.
6. Name the substrate and product of LDH reaction and also mention the different forms of this enzyme.

SECTION - B

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

7. Explain the effect of pH on enzyme activity.
8. Explain the extraction and purification of enzymes.
9. What does "MWC" stand for in the context of allosteric enzyme models? Explain its key features.
10. Derive Lineweaver-Burk plot.
11. How does Penicillin act as a suicide inhibitor?
12. Explain the process of immobilization of enzymes.
13. Compare and contrast alcohol dehydrogenase biosensor with glucose oxidase biosensor.

SECTION – C

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

14. Explain vitamin and non-vitamin co-enzymes.
15. Explain the kinetics of competitive inhibition.
16. Elaborate on the mechanism of blood clotting.

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LS2GPSC622 Reg. No.: | | | | | | | | |

St Aloysius (Deemed to be University)

Mangaluru

School of Life Sciences (PG Programme)

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

October/November - 2025

BIOSTATISTICS AND BIOINFORMATICS

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. What is the Molecular Modeling Database (MMDB), and which organization maintains it?
2. Compare FASTA and BLAST in terms of speed, sensitivity, and accuracy.
3. Describe the applications of gene prediction tools in biotechnology.
4. Explain the principle of maximum parsimony in phylogenetic tree construction.
5. Write a note on stratified sampling.
6. Mention the limitations of diagrammatic representation of data.

SECTION - B

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

7. Explain the features of Sequin and how it is used for complex sequence submissions.
8. Describe the process of protein sequence annotation in Swiss-Prot, including evidence attribution.
9. Discuss the limitations of homology modeling and strategies to improve model reliability.
10. Describe the principles and workflow of protein structure prediction using SWISS-MODEL.
11. Calculate the value of median from the data recorded on the number of grains per earhead on 300 wheat earheads

No of grains/earhead	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45
Frequency	2	27	52	118	57	27	13	4

12. Calculate the Arithmetic Mean from the following

x	0-10	10-20	20-30	30-40	40-50	50-60
f	5	10	25	30	20	10

13. Calculate the mean, variance, standard deviation and the coefficient of variation from the data recorded on respiration rate per minute of 10 persons Respiration/minute=22,22,20,24,16,17,18,19,21,21

Contd...2

SECTION – C

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

14. Explain nucleotide sequence databases with examples and discuss their importance in genomic research.
15. Explain the basic principles of primer design and outline the features and steps of commonly used primer designing tools.
16. Calculate the Mode from the following data

x	7	8	9	10	11	12	13	14	15	16	17	18
f	47	52	56	60	63	64	65	50	52	41	57	64

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