PH 501.3

Reg No : | | | | | | | |

St Aloysius College (Autonomous)

Mangaluru

Semester III - P.G. Examination - M.Sc. Biotechnology

November / December - 2023

ANIMAL BIOTECHNOLOGY

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. Write short notes on cryoprotectants.
2. What is attachment efficiency?
3. What do you understand by induced pluripotent stem cells?
4. Explain how somatic cell hybridization can be used to study gene regulation.
5. Write short notes on CHO cell lines.
6. Which countries have introduced lab grown meat commercially?
7. What is ICSI?
8. What is germ line gene therapy?

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

9. Comment of the properties of embryonic stem cells.
10. Comment on the isolation and purification of viral vaccines produced using cell culture systems.
11. Discuss the immunological barriers for xenotransplantation.
12. Give an account of the various techniques available for improvement of cattle.
13. Discuss the cloning of suspension cells.
14. Discuss Plasma clot method of organ cluture. Add a note on its application.
15. Discuss the production of recombinant urokinase using animal cell culture systems.
16. Discuss enzymatic method of cell dissociation.

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

17. Discuss the characterization of cultured cells.
18. Discuss on the various methods available for cell synchronization. Add a note on its applications.
19. Discuss the culture of fish cells and their applications.
20. Discuss on the current trends in gene correction strategies.
21. Give an account of the tissue engineering of cartilage. Add a note on its applications.

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Semester III - P.G. Examination - M.Sc. Biotechnology

November / December - 2023

PLANT BIOTECHNOLOGY

me : 3 Hours Max. Marks : 70

te: Draw neat labeled diagrams/schematic sketches/structures wherever Necessary.

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

1. Name one common method used for encapsulating artificial seeds.
2. Define plant organogenesis.
3. What is the role of plant tissue culture in the production of secondary metabolites.
4. Define embryo culture in plant tissue culture.
5. What does SCAR stand for in plant genetics research?
6. Write a note on intragenesis.
7. What is the concept of BT (*Bacillus thuringiensis)* crops for insect resistance.
8. Write a note on golden rice.

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

9. Describe the various stages involved in micropropagation.
10. Describe how a SNP differs from other types of genetic markers.
11. Explain the genetic modifications that extended Flvr-savr tomato's shelf life.
12. Describe the basic CRISPR-Cas gene editing process.
13. Discuss the significance of macroelements and microelements in plant tissue culture media. How do they affect plant growth and development?
14. Explain how hairy root cultures are initiated and maintained.
15. Discuss the significance of somatic embryogenesis in plant tissue culture.
16. Describe marker-assisted selection by QTL mapping in plants.

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

17. 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.
18. Discuss the applications and potential benefits of somatic hybrids and cybrids in agriculture or horticulture.
19. Analyze how RAPD analysis can aid in the study of genetic diversity within a plant species. Enumerate the limitations or challenges inherent in RAPD analysis.
20. Explain the principles and techniques involved in developing transgenic plants for virus resistance. Provide examples of specific genes or strategies used in this process.
21. Outline the diverse array of computational tools and resources available for plant genome informatics.

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PS 505.3

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Semester III - P.G. Examination - M.Sc. Biotechnology

November / December - 2023

INDUSTRIAL BIOTECHNOLOGY

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. Mention various types of strain improvement techniques.
2. How does pH impact the design of fermentation media?
3. Explain a rotating disc fermentor, and how does it facilitate microbial growth and product formation?
4. Write a note on spargers and its role in a fermentation process.
5. Explain typical agents used in precipitation.
6. What is cross-flow or tangential filtration, and how does it differ from conventional dead-end filtration?
7. Explain the mechanism by which antifoams work. How do they prevent or control foaming in bioreactors and fermentation vessels?
8. What is drying in the context of industrial processes, and why is it an essential step in various industries? Provide a basic explanation of the drying process.

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

9. Explain packed tower fermenter.
10. Discuss the steps involved in the production of citric acid.
11. Explain the Isolation and improvement of industrially important strains by modification of the permeability.
12. Discuss the chemical method of cell disruption.
13. Describe the development of inocula for yeast process.
14. Explain the criteria for designing an ideal fermentor.
15. Explain the theory of filtration.Add a note on filter aids.
16. Discuss the kinetics of batch fermentation with respect to stationary phase and product formation.

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

17. Explain what thermal death kinetics are and why they are important in sterilization processes.
18. Compare and contrast the role of valves and steam straps in controlling and regulating different aspects of a fermenter's operation. Provide specific examples of their applications and the consequences of their malfunction
19. Explain the role of SCADA systems in bioreactor monitoring and control.
20. Evaluate and discuss the various types of centrifuges used in down stream processing
21. Discuss the techniques of liquid liquid extraction in down stream processing

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PS 506.3

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ENVIRONMENTAL BIOTECHNOLOGY

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. Define biomagnification and discuss the quality of pollutants to get biomagnified.
2. Compare between a primary consumer and a secondary consumer in a food chain and draw a schematic representaion with four trophic levels.
3. What is ex-situ bioremediation? Add a note on vermicomposting.
4. What are the fundamental principles of microbial bioremediation?
5. What is biofouling? Mention the organisms invovlved.
6. Explain the remedies for the prevention of microbial influenced corrosion.
7. Explain competition as an interspecific interaction.
8. Summarize the main phases of Environmental Impact Assessment (EIA).

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

9. Identify any four keystone species and write a note on each.
10. Outline the stages of the biofilm life cycle and their respective significance
11. Describe the role of carbon dioxide (CO_2) in the greenhouse effect and its impact on global climate. Discuss how changes in atmospheric CO_2 levels influence Earth's temperature.
12. Explain the Tropical rain forest ecosystem.
13. List and describe the various horizons or layers typically found in a soil profile. Include the names and characteristics of each horizon, starting from the surface down to the bedrock.
14. Define air pollution and few causes responsible for it. Write a note on preventive measures.
15. Explain the types of biofouling and propose treatment methods for controlling microfouling and macrofouling in different contexts.
16. Discuss the challenges and limitations associated with microbial pesticide degradation.

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

17. Illustrate on the coarl reef ecosystem and mangroves.
18. List the different values of biodiversity and the methods of conservation.
19. Explain how trickling filters differ from biological filters in wastewater treatment. Add a note on the activated sludge process with its key components.
20. Develop a step-by-step plan for microbial degradation of petroleum hydrocarbons, including monitoring and assessment.
21. Illustrate on the different steps of Nitrogen cycle.

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