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St Aloysius College (Autonomous)
Mangaluru
Semester III – P.G. Examination - M. Sc. Biotechnology
February - 2022

PLANT 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. Agar
2. ABC model
3. *nif* genes
4. SCAR
5. Strip test
6. Golden Rice
7. Pathogenicity
8. Redifferentiation

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

9. What are the selection techniques employed to screen somaclonal variants?
10. Write a short note on seed storage proteins
11. Write a note on cytoplasmic male sterility
12. Comment on the importance of microelements in plant tissue culture media
13. Give an account on the computational tools and resources used in plant genome informatics
14. Give an account on herbicide resistance
15. Write a note on the production of Bt cotton plant
16. Explain molecular mechanism during plant-pathogen interaction.

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

17. What are the different molecular biology strategies involved in the development of virus resistant plants? Give suitable examples.
18. Explain protoplast isolation. Add a note on somatic hybrid production techniques.
19. Describe the method involved in the production of shikonin using suspension culture. Add a note on its significance.
20. Give a detailed account on RAPD and SSR markers. Add a note on its advantages and disadvantages.
21. With the help of suitable diagrams explain the process of nitrogen fixation in legumes by *Rhizobium*.

PH 501.3

Reg. No:

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Semester III – P.G. Examination - M. Sc. Biotechnology
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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. Tissue plasminogen activator
2. Importance of cell synchronization
3. Adherent and suspension cell culture
4. List bioreactors for immobilized animal cells
5. Enzymes used for cell dissociations
6. Somatic and germline gene therapy
7. Xenotransplantation
8. Histotypic cultures

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

9. Write a note on assessment and importance of the viability and cytotoxicity in cell culture
10. Briefly explain the cryopreservation of cells and its applications
11. Write a note on *in vitro* fertilization and its importance.
12. Discuss about the cell lines used in biotechnological applications.
13. Write a note on natural and synthetic scaffolds.
14. Write a brief note on the production of baculovirus using animal cell culture.
15. Explain reproductive cloning.
16. Discuss the parameters for bioreactor scale up.

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

17. Discuss the types, characteristics and applications of stem cells.
18. Describe the laboratory design, equipment and materials required for animal cell culture.
19. Discuss in detail the somatic cell fusion and detection of hybrids. Mention its applications.
20. Explain the ethics in handling the animals and stem cells
21. Discuss the production of human growth hormone using mammalian cell culture systems.

PS 504.3

Reg. No:

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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. Sonication.
2. Penicillin purification.
3. Drying.
4. Baffles
5. Antifoam agents.
6. Heat exchanger.
7. Batch fermentation.
8. Auxotrophic mutants.

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

9. Genetic recombination for strain improvement.
10. Inoculum development.
11. Explain various carbon and nitrogen sources used in fermentation processes
12. Rotating disc fermentor.
13. SCADA systems.
14. Spargers used during fermentation.
15. Filtration theory and cross flow filtration.
16. Cell disruption techniques.

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

17. Explain citric acid production through fermentation in industries.
18. Explain liquid-liquid extraction and two-phase aqueous extraction methods.
19. Explain various accessories fitted to the fermentors along with their roles during fermentation.
20. Deduce the microbial growth kinetics in batch fermentation.
21. Depict the PID control and its application in fermentation process.

PS 505.3a

Reg. No:

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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. Soil pollution
2. Food chain
3. Indicators of water pollution
4. Expanded bed reactor
5. Management of biofouling
6. Biological filters
7. Packed column reactors
8. Values of biodiversity

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

9. Oysters and figs as keystone species
10. Microbial influenced corrosion
11. Lentic water system
12. Desert ecosystem
13. Mangroves
14. Upflow anaerobic sludge blanket digestion
15. *Ex-situ* bioremediation
16. Bioaccumulation and biomagnification

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

17. Write an essay on Nitrogen Cycle.
18. Describe the sources and effects of air pollution.
19. Give a detailed account on copper biomining.
20. Explain the structure, life cycle, interactions and degradation of biofilms.
21. Describe the components and working principles of activated sludge process and trickling filters.
