QP Code: P25C004

Reg. No : ....

Name : ....

ST MARY'S COLLEGE (AUTONOMOUS), THRISSUR-20

III SEMESTER (CBCSS - PG) DEGREE EXAMINATIONS, OCTOBER 2025

M. Sc. Biotechnology

GBT3C01 : GENETIC ENGINEERING

2024 Admission Onwards

Time:3 Hours **Maximum Weightage:30**

Part A

*Short answer type questions: Answer **any four** questions. Weightage **2** for each question.*

(4x2 = 8 Weightage)

1. Compare the role of RGCM and GEAC in India.
2. Define biosafety and state its importance in biotechnology.
3. Define molecular markers and give two examples with its applications.
4. You have a plasmid carrying a selectable marker and want to introduce it into yeast cells. Explain how you would perform yeast transformation using the lithium acetate method. How would you identify successfully transformed yeast colonies?
5. You want to introduce a plasmid carrying a gene of interest into HEK293 cells using calcium phosphate precipitation. Explain the steps you would follow to perform this transfection. How would you check for successful transfection?
6. Critically evaluate the ethical implications of germline gene editing.
7. Define genetic engineering and mention its three core principles.

Part B

*Short essay-type questions: Answer **any four** questions. Weightage **3** for each question.*

(4x3 = 12 Weightage)

8. Define Polymerase Chain Reaction (PCR). Give general outline of their classification.
9. Differentiate between a genomic library and a cDNA library with examples.
10. You have bacterial clones that may contain a recombinant plasmid carrying a gene of interest fused to GFP. How would you use GFP as a reporter to identify the clones that carry the recombinant plasmid?

Turn Over

11. Apply electroporation for cloning. How would you introduce a plasmid carrying antibiotic resistance gene into bacteria?
12. Analyze any four parameters that has negative impact on PCR efficiency.
13. How colony hybridisation differs from plaque hybridisation?
14. Critically evaluate the ethical and legal aspects of patenting life forms.

Part C

Essay-type questions: Answer ***any two*** *questions. Weightage* **5** *for each question.*
(2x5 = 10 Weightage)

15. Write an account on Yeast Artificial Chromosomes (YACs): structure, construction, advantages and applications.
16. Explain Molecular mapping.Give a detailed account of various types of molecular mapping approaches.
17. Compare and contrast second and third generation DNA sequencing platforms.
18. Analyze the molecular and technical challenges in delivering recombinant DNA to mammalian stem cells and propose strategies to improve efficacy and safety for research and therapy.

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