QP Code: PV25DRSI003

Reg. No : .....

Name : .....

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

I SEMESTER (CBCSS - VPG) DEGREE EXAMINATIONS, NOVEMBER 2025

(Regular/Improvement/Supplementary)

M. Voc. Applied Biotechnology

GEC1AB03 : GENETICS

2024 Admission Onwards

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

Part A

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

(4x2 = 8 Weightage)

1. Define gene frequency and genotype frequency.
2. Name two examples of multiple alleles in genetics.
3. Explain Mendel's laws of Inheritance.
4. What are the different types of base pair substitutions? Explain their potential effects on protein function.
5. If a child is born with *Down syndrome*, what type of chromosomal aberration is present, and which chromosome is affected?
6. If an IS element inserts into a bacterial plasmid, how might this affect the plasmid's function?
7. Provide examples of traits in humans or other organisms that exhibit multiple allelism.

Part B

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

(4x3 = 12 Weightage)

8. Explain the significance of the histone H1 protein in relation to the histone octamer and nucleosome structure.
9. What are the major types of transposable elements found in the human genome? Describe their characteristics, mechanisms of transposition, and the impact they have on the human genome and health.
10. What is non-random breeding?
11. What is genetic suppression? Discuss the different types of genetic suppressors, providing examples for each type. Explain the mechanisms by which genetic suppression can restore function to mutated genes and its significance in genetic research.

Turn Over

12. How can karyotype analysis inform genetic counseling for prospective parents? Provide an example for the use of this imformation.
13. Dosage compensation ensure equal expression of X-linked genes in males and females. Justify.
14. Which method of horizontal gene transfer poses the greatest risk for the spread of antibiotic resistance genes? Explain your reasoning.

Part C

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

15. Identify the likely outcomes on secondary sex characteristics if testosterone production is inhibited during puberty in mammals.
16. How are site-specific recombinases used in genetic engineering and biotechnology? Provide specific examples.
17. State nucleus, nucleolus and extra chromosomal inheritance.
18. Comment on the human disorders caused by mutations in the mitochondrial genome. Describe the mechanisms by which these mutations lead to disease and discuss the clinical features and diagnosis of these disorders.

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