QP Code : P24A021

Reg. No : .....

Name : .....

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

I SEMESTER M.Voc (CBCSS-VPG) DEGREE EXAMINATION, November 2024

M.Voc Applied Biotechnology

GEC1AB03 : GENETICS

2024 Admission Onwards

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

Part A

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

1. What is a histone octamer, and how is it structured within chromatin? [BTL1]
2. Explain chromosome theory of inheritance. [BTL1]
3. Provide examples of virulence factors associated with episomes in pathogenic bacteria. [BTL4]
4. What are the different types of aneuploidy? Provide examples of each. [BTL2]
5. How does multiple allelism differ from the simple dominant-recessive relationship of alleles? [BTL2]
6. Provide an example of how a mitochondrial mutation in Drosophila has been used to model a human disease. [BTL4]
7. What are transposons ? [BTL1]

(4x2 = 8 Weightage)

Part B

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

8. What role does ATP hydrolysis play in RecA function? [BTL1]
9. Identify the regions in the genome where constitutive and facultative heterochromatin are found. [BTL3]
10. Explain the Ames test for detecting mutations. Describe the methodology, the types of mutations it detects, and its significance in genetic research and toxicology. [BTL2]
11. Explain the classification of Overlapping genes. [BTL2]
12. What are the key similarities and differences in the strategies used for dosage compensation across different species? [BTL3]

Turn Over

13. State Hardy Weinberg Law of Equilibrium with examples [BTL1]

14. A homozygous yellow rat when mated with a homozygous black rat, produces F1 all grey in colour. Brother-sister mating of F2 progeny in the phenotypic ratio 27 grey:8black:3 cream coloured. Explain the inheritance of these phenotypes. [BTL4]

(4x3 = 12 Weightage)

Part C

*Essay-type questions: Answer **any two** questions. Weightage **5** for each question*

15. In chickens, the dominant gene R gives rose comb and dominant gene P gives pea comb. When P and R present together, the comb form is walnut.The homozygous recessive of P and R produce single comb. Determine the comb form of the offspring of the following crosses [BTL3]
    a) RrPp X RrPp
    b) Rrpp X RrPp
    c) rrPp X RRPp
    d) Rrpp x Rrpp

16. Identify the sex determination mechanism in Mammals and Drosophila. [BTL3]

17. Evaluate a case study of frameshift mutation and its effects on an organism. How was the mutation identified and characterized? [BTL5]

18. Discuss the implications of scaffold protein dysfunction on chromosome structure and cell function. Provide an example of a condition associated with such dysfunction. [BTL4]

(2x5 = 10 Weightage)

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