

(Pages : 4)

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Reg. No. :

Name :

Fifth Semester B.Sc. Degree Examination, December 2022

First Degree Programme Under CBCSS

Botany

Core Course

BO 1543 – CELL BIOLOGY, GENETICS AND EVOLUTIONARY BIOLOGY

(2018 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

- I. Answer **all** questions in **one** word or **two** sentences. **Each** question carries **1** mark.
1. Give one example for an inter-chromosomal structural aberration of chromosomes.
 2. What is speciation?
 3. Name the part of chromosome where the chromatids are joined together.
 4. What are autosomes?
 5. What are B- chromosomes?
 6. What is linkage?
 7. What is recombination frequency?

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8. In which phase of the cell cycle does DNA replicates?
9. Who proposed the theory of inheritance of acquired characters?
10. What is epistasis?

(10 × 1 = 10 Marks)

SECTION – B

- II. Answer any **eight** questions; not to exceed a paragraph. Each question carries **2** marks.
11. Give the names of histones that constitute the histone octamer of nucleosomes.
 12. What is telomere?
 13. What is linkage map?
 14. Differentiate between heterogametic and homogametic sex.
 15. Which are the different types of intra chromosomal structural aberrations of chromosomes?
 16. Differentiate between heterochromatin and euchromatin.
 17. What are polytene chromosomes?
 18. What is convergent evolution?
 19. Explain the cause and symptoms of Klinefelter's syndrome
 20. Differentiate between back cross and test cross.
 21. What is interference and coincidence in genetics?
 22. What is complementary gene action? Give one example.
 23. What are the major functions of mitochondria?

24. What causes aneuploidy?
25. Comment on the features of lampbrush chromosomes.
26. What are the functions of cell membrane?

(8 × 2 = 16 Marks)

SECTION – C

- III. Answer any **six** questions; not to exceed 120 words. Each question carries **4** marks.
27. Explain the functional role of peroxisomes in plant cells.
 28. Explain the meiotic events responsible for creating genetic recombination.
 29. Describe the chemical structure of plasma membrane.
 30. What is extrachromosomal inheritance? Give an example for Chloroplast gene inheritance.
 31. Explain the type of gene interaction involved in the inheritance of the fruit shape in summer squash with 9:6:1 ratio.
 32. Describe the structural organization of eukaryotic chromosomes starting from the nucleosome structure.
 33. Genetic Drift is an important force of evolution. Explain.
 34. What is the difference between macroevolution and microevolution?
 35. Citing an example, explain incomplete dominance.

36. Describe the genetics that determine the inheritance of the different blood types in human beings.
37. Describe the inheritance of eye color in *Drosophila* as an example for sex-linked inheritance.
38. What is independent assortment of chromosomes? How does linkage upset independent assortment?

(6 × 4 = 24 Marks)

SECTION – D

- IV. Write essay on any **two** of the following, not more than **three** pages. Each question carries **15** marks.
39. Write an essay to describe the ultra-structure and functions of organelles found in a typical eukaryotic cell.
40. Compare and contrast multiple allelism and polygenic inheritance, citing suitable examples.
41. What is sex determination? Describe the different types of chromosomal sex determination and add a note on the sex determination mechanism in *Melendrium album*.
42. Write a brief account on the various theories of evolution.
43. What are numerical chromosomal aberrations? Which are the types of numerical aberrations?
44. Explain the reasons for the success of Mendel in genetic studies.

(2 × 15 = 30 Marks)