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P – 5304

Reg. No. :

Name :

Second Semester M.Sc Degree Examination, September 2022

Botany

BO 223 : CELL BIOLOGY, GENETICS AND EVOLUTION

(2019 Admission Onwards)

Time : 3 Hours

Max. Marks : 75

I. Answer the following

1. What are episomes?
2. Explain the consequence of genetic drift.
3. Enlist the names of transcription factors in prokaryotic system.
4. What are telomeres and why are they important in aging?
5. What is genetic load? Discuss its importance?
6. What are cyclins? What is its function in cell cycle?
7. Explain dosage compensation.
8. What is the role of gyrase in DNA replication?
9. Write short notes on Philadelphia chromosome.
10. What are split genes?

(10 × 1 = 10 Marks)

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II. Answer the following questions in not more than **50** words.

11. (a) Write a note on Neo-Darwinism.

OR

(b) Describe the factors that contribute to the high fidelity of DNA replication.

12. (a) What is cell potency? Name three major categories of potency.

OR

(b) What is meant by incomplete linkage? What does this have to do with pairing of homologous chromosomes during meiosis?

13. (a) Write a note on potential mutagens in the environment that mankind is exposed to.

OR

(b) Give details on high background radiation belts of Kerala.

14. (a) Write short notes on punctuated equilibria.

OR

(b) Write a note on C- value paradox.

15. (a) Describe the cause of Xeroderma pigmentosum.

OR

(b) Describe Ames test.

(5 × 2 = 10 Marks)

III. Answer the following questions in not more than **150** words.

16. (a) 'Structural complexity of eukaryotes is reflected in their subcellular structures'. Discuss.

OR

- (b) What are the major proteins involved in the interaction between the cells?

17. (a) How will you distinguish cytologically between a paracentric inversion and a pericentric inversion?

OR

- (b) Comment on the statement 'transcriptionally active DNA is repaired preferentially over transcriptionally silent DNA'.

18. (a) Describe the nuclear envelop and the structure of its pores.

OR

- (b) Explain the modern concept of evolution and discuss how does it support Darwinism.

19. (a) Briefly describe the genetic structure of a typical retrovirus.

OR

- (b) Describe DNA methylation and its functions.

20. (a) What is microfilament? Describe the structure and function of microfilament in the cell.

OR

- (b) Describe the role of sex factor in bacterial conjugation with reference to F⁺ and Hfr strains.

21. (a) Is there generally a correlation between locations of genes in a chromosome and their phenotypic effect? Give examples.

OR

- (b) Write a note on Hardy Weinberg law and its applications.

22. (a) Why are chromosomal aberrations considered to have less significance than gene mutations for subsequent generations?

OR

- (b) Who proposed one gene-one enzyme hypothesis? What evidence lead to this hypothesis?

(7 × 5 = 35 Marks)

IV. Answer the following questions in not more than **250** words.

23. (a) What are the general steps in the processing of a pre mRNA into an mRNA? What is the role of the snRNAs and the spliceosome?

OR

- (b) Write an essay on the process of speciation.

24. (a) Discuss the extrinsic and intrinsic pathways of apoptosis.

OR

- (b) Write an essay on major type of metabolic errors in human. Mention the treatments available for these disorders.

(2 × 10 = 20 Marks)