Registration Number:

Date & session:

ST JOSEPH'S UNIVERSITY, BENGALURU -27
B.Sc. (BIOTECHNOLOGY) – I SEMESTER
SEMESTER EXAMINATION: OCTOBER 2023
(Examination conducted in November/ December 2023)

BT 121 – CELL BIOLOGY AND GENETICS

Time: 2 Hours **Max Marks: 60**

This paper contains ONE printed page and THREE parts

PART-A

Answer any TEN of the following: **10 X 2= 20 marks**

1. What is the Law of Segregation? What would the genotypic and phenotypic ratio be for a monohybrid cross with complete dominance?
2. What is the difference between the inheritance of coiling in *Limnaea* and kappa particles in *Paramoecium*?
3. Differentiate between complete and incomplete linkage. Add a note on the ratios that could be obtained in a test cross.
4. What are frameshift mutations? What are the genetic effects?
5. What are aneuploids? State any 2 examples of autosomal aneuploids in humans.
6. What is genic balance theory? In Drosophila, what is the ratio for maleness and femaleness to develop?
7. What is synaptonemal complex?
8. What are: a) desmotubules b) flippases?
9. What is the structural organization of a plant cell wall?
10. Name two transport proteins in the plasma membrane and give their function.
11. What are chiasmata?
12. With two examples give the importance of cyclosis for cells.

PART-B

Answer any FOUR of the following: **4 X 5 = 20 marks**

13. Explain the Law of Independent Assortment using the physical basis of chromosomal behavior during meiosis.
14. Explain the inheritance of variegation in *Mirabilis*.
15. What are translocations? Explain the various types of translocations.
16. Explain the structure and significance of salivary gland chromosomes.
17. Explain the functions of : a) lysosomes b) endoplasmic reticulum.
18. What is heterochromatin and euchromatin? How does acetylation and methylation play a role in chromatin organization?

PART-C

Answer any TWO of the following: **2 x 10 = 20 marks**

19. Explain the nucleosome model of chromosomes.
20. Explain 'regulation of cell cycle'.
21. In a three point test cross ABC/abc following data are obtained:

ABC	abc	aBc	AbC	ABc	abC	aBC	Abc	Total
230	240	96	104	138	142	12	8	970

Arrive at the linear order of genes. Calculate the map distances between the genes and the coefficients of coincidence and interference.