STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted during the academic year 2019 – 2020 & thereafter)

B. Sc. DEGREE EXAMINATION, NOVEMBER 2023
BRANCH V (a) – PLANT BIOLOGY AND PLANT BIOTECHNOLOGY
FIFTH SEMESTER

COURSE : MAJOR – CORE
PAPER : CELL AND MOLECULAR BIOLOGY
SUBJECT CODE : 19BT/MC/CM54
TIME : 3 HOURS MAX.MARKS:100

SECTION – A

ANSWER ALL QUESTIONS (18 x 1=18 marks)

I. CHOOSE THE CORRECT ANSWER:

1. Photorespiration takes place in
   a. Chloroplast b. Mitochondria c. Peroxisomes d. All
2. The correct sequence of cell cycle is
   a. G0, G1, S, G2, M c. G1, G0, G2, S, M
   b. S, M, G1, G0, G2 d. G0, G1, G2, S, M
3. DNA replication occurs during the phase ----.
   a. G1 b. G2 c. S d. M
4. Pribnow box contribute to
   a. Protein synthesis c. ATP synthesis
   b. RNA synthesis d. DNA synthesis
5. In operon concept, regulator gene functions as
   a. Inhibitor b. Regulator c. Repressor d. Operator

II. FILL IN THE BLANKS:

6. The organelle which functions as receiving, sorting and shipping is ----------.
7. 28S rRNA and 18S rRNA of nucleolus form the organelle ==========.
8. During DNA replication, the double strands get separated by the enzyme ----------.
9. DNA synthesis from mRNA is by the enzyme ----------.
10. Methylation of DNA is most commonly occurring in the sequence of ----------

III. MATCH THE FOLLOWING:

11. Camillo Golgi	a. Heat Shock Protein
12. Hofmeister	b. tRNA
13. Meselson and Stahl	c. Chromosomes
14. Chaperville	d. DNA replication
15. Chaperone	e. Dictyosome

IV. STATE WHETHER THE FOLLOWING STATEMENTS ARE TRUE OR FALSE:

16. Cisternae are associated with smooth endoplasmic reticulum.
17. The enzyme that removes RNA primer after DNA replication is DNA polymerase-I.
18. ABC model explains the pattern formations of root and shoot in *Arabidopsis*.

V. ANSWER ANY SIX QUESTIONS:
Each answer should not exceed 50 words. (6x3=18 marks)

19. Cell theory concept
20. Chargaff's rule
21. Central dogma
22. Amino acetyl-tRNA synthetase
23. Functions of β-galactosidase
24. ABC model
25. Wobble hypothesis
26. Semi-autonomous organelle
27. Tm value

SECTION B

ANSWER ANY FOUR QUESTIONS. EACH ANSWER SHOULD NOT EXCEED 200 WORDS. DRAW DIAGRAMS WHEREVER NECESSARY. (4x6=24)

28. Describe the ultrastructure of chloroplast. Add a note on its functions.
29. Illustrate with details on the B and Z type of DNA.
30. High light the various types of DNA repair mechanism.
31. Outline the process of transcription reactions.
32. Chart out the details on *lac* operon model in *E. coli*.
33. Summarize the genetic mechanism of flower development in *Arabidopsis thaliana*.

SECTION C

ANSWER ANY TWO QUESTIONS.EACH ANSWER SHOULD NOT EXCEED 1000 WORDS. DRAW DIAGRAMS WHEREVER NECESSARY. (2x20=40)

34. Elucidate the molecular organization of cell membrane. List the functions.

35. Explain with labelled diagrams on the sub stages of Meiosis-I.

36. Give an account on the mechanism of protein synthesis.

37. Elaborate on the gene regulation in prokaryotes with illustrations.

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