Reg. No. | | | | | | | | |

G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.

UG DEGREE END SEMESTER EXAMINATIONS - APRIL 2025.

(For those admitted in June 2021 and later)

PROGRAMME AND BRANCH: B.Sc., BOTANY

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
IV	PART-III	CORE	U21BO406	CELL AND MOLECULAR BIOLOGY

Date & Session: 28.04.2025/AN **Time: 3 hours** **Maximum: 75 Marks**

Course Outcome	Bloom's K-level	Q. No.	SECTION – A (10 X 1 = 10 Marks) Answer ALL Questions.
CO1	K1	1.	Which of the following statements is true about the differences between prokaryotic and eukaryotic cells? a) Prokaryotic cells have a defined nucleus, while eukaryotic cells lack one. b) Eukaryotic cells contain membrane-bound organelles, while prokaryotic cells do not. c) Both prokaryotic and eukaryotic cells contain ribosomes. d) Prokaryotic cells lack cell walls, whereas eukaryotic cells have them.
CO1	K2	2.	What is the primary function of the plant cell wall? a) To store genetic material b) To regulate the movement of molecules c) To provide structural support and protection d) To carry out photosynthesis
CO2	K1	3.	Which of the following is the correct function of Mitochondria? a) Photosynthesis b) Protein synthesis c) Cellular respiration and energy production d) Transport of proteins
CO2	K2	4.	What is the primary significance of meiosis? a) It results in the formation of genetically identical cells. b) It is responsible for cell growth and division. c) It reduces the chromosome number by half, ensuring genetic diversity in offspring. d) It maintains the chromosome number of the parent cell.
CO3	K1	5.	Which experiment provided evidence for DNA being the genetic material? a) Griffith's experiment b) Hershey and Chase's blender experiment c) Chargaff's rule d) All of the above
CO3	K2	6.	Which of the following is NOT part of the structure of DNA? a) Deoxyribose sugar b) Phosphate group c) Ribose sugar d) Nitrogenous base (A, T, C, G)
CO4	K1	7.	Which of the following processes is the first step in the Central Dogma of Molecular Biology? a) Transcription b) Replication c) Translation d) RNA processing
CO4	K2	8.	Gene regulation in eukaryotes primarily involves the modification of which structure? a) Nucleus b) Ribosome c) Chromatin d) Endoplasmic Reticulum
CO5	K1	9.	Which of the following is a function of RNA polymerase during transcription? a) Synthesizing RNA from a DNA template b) Synthesizing proteins c) Degrading RNA d) Modifying proteins

CO5	K2	10.	Which of the following is a post-translational modification of proteins? a) Splicing b) Phosphorylation c) Transcription d) Translation
Course Outcome	**Bloom's K-level**	**Q. No.**	**SECTION – B (5 X 5 = 25 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	11a.	Describe the key differences between Prokaryotic and Eukaryotic cells. **(OR)**
CO1	K3	11b.	Explain the fluid mosaic model of the Plasma Membrane.
CO2	K3	12a.	Explain the structure and function of Mitochondria in the cell. **(OR)**
CO2	K3	12b.	Describe the stages of the cell cycle and their significance.
CO3	K4	13a.	Describe Griffith's experiment and its significance in the discovery of DNA as Genetic Material. **(OR)**
CO3	K4	13b.	Explain the structure of DNA, focusing on its components and their arrangement.
CO4	K4	14a.	What is the central dogma of molecular biology? Explain the flow of genetic information. **(OR)**
CO4	K4	14b.	Explain the concept of gene regulation in Prokaryotes.
CO5	K5	15a.	What are eukaryotic transcription factors, and what role do they play in gene regulation? **(OR)**
CO5	K5	15b.	Explain the types of RNA in the cell and their roles in Protein synthesis.

Course Outcome	**Bloom's K-level**	**Q. No.**	**SECTION – C (5 X 8 = 40 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	16a.	Describe the structure and function of the Plant cell wall. **(OR)**
CO1	K3	16b.	Discuss the ultrastructure of Plant and Animal cells.
CO2	K4	17a.	Distinguish between Mitosis and meiosis. **(OR)**
CO2	K4	17b.	Discuss the structure and functions of Chloroplasts.
CO3	K4	18a.	Discuss the significance of Hershey and Chase's experiment in understanding the role of DNA in heredity. **(OR)**
CO3	K4	18b.	Explain the contributions of Chargaff's rule to the understanding of DNA structure.
CO4	K5	19a.	Describe the mechanisms of gene regulation in Eukaryotes, including the role of transcription factors. **(OR)**
CO4	K5	19b.	Discuss the process of Post-Transcriptional regulation in Eukaryotes.
CO5	K5	20a.	Discuss the role of chromatin structure in gene regulation and its impact on Transcription. **(OR)**
CO5	K5	20b.	Explain translational regulation in Prokaryotes.