BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

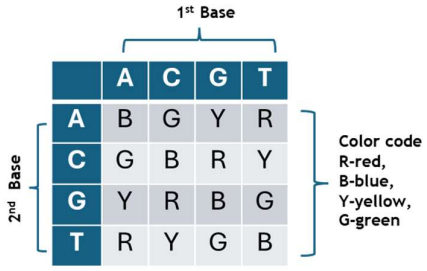
CLASS: BTECH **SEMESTER : V**
BRANCH: BIOTECHNOLOGY **SESSION : MO/2025**

SUBJECT: BE302 FUNCTIONAL GENOMICS AND RDNA TECHNOLOGY

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Differentiate the mechanisms of genome editing by TALEN and CRISPR/Cas systems. Discuss the advantages of CRISPR/Cas9 over TALEN.	[5]	1	3
Q.1(b)	Design an experimental strategy to silence a specific gene in a model plant system, and validation methods you would use to confirm gene silencing.	[5]	1	5
Q.2(a)	Describe the significance of Ct value and mention at least two applications where real-time PCR is advantageous over conventional PCR.	[5]	3	4
Q.2(b)	Explain the principle and steps involved in replica plating technique.	[5]	2	2
Q.3(a)	Explain the principle of SOLiD sequencing technology. Decode the DNA sequence using the color space decoding chart provided. The first di-nucleotide is AT and the sequence obtained from fluorescence colors are as follows : *Red-green-blue-yellow-yellow-green-red-red-green*	[5]	3	5



Q.3(b)	Describe the principle and workflow of the Sanger chain-termination method of DNA sequencing.	[5]	3	2
Q.4(a)	List the characteristic features of an ideal plasmid cloning vector.	[5]	5	1
Q.4(b)	Describe the structure and components of a Yeast Artificial Chromosome with a neat labeled diagram.	[5]	4	2
Q.5(a)	Explain the principle and workflow of PCR-based diagnostic methods.	[5]	6	3
Q.5(b)	Discuss the types and application of gene therapy.	[5]	6	3

::::::20/11/2025::::::M