JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

M.Tech-II Semester (BT)

COURSE CODE (CREDITS): 14M11BT215 (03) MAX. MARKS: 15

COURSE NAME: Metabolic Engineering

COURSE INSTRUCTOR: Dr. Saurabh Bansal MAX. TIME: 1 Hour

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculators is not allowed

Q. No.	**Question**	**Marks**
	Section A	
Q1	How secondary metabolites functions differs with the primary metabolites and give any two examples of any two secondary metabolite types?	3
Q2	Summarize the building blocks serve as the basis for each major pathway of secondary metabolism?	3
	Section B	
Q3	What do you understand by Metabolic engineering? How is it different from genetic engineering?	2
Q4	Discuss the role of **rate-limiting steps** in metabolic pathways. How can metabolic engineers identify and overcome them?	3
Q5	A research team has introduced genes from *Zymomonas mobilis* into *E. coli* to enable ethanol production. However, the yield is much lower than expected. a) Explain all possible metabolic bottlenecks in *E. coli*. b) Suggest strategies (gene knockouts, promoter engineering, cofactor balancing) to improve ethanol yield.	 2 2

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