JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -1 EXAMINATION- 2026
B.Tech-V Semester (BT)

COURSE CODE (CREDITS): 25B11BT511 (4) MAX. MARKS: 15
COURSE NAME: Genetic Engineering
COURSE INSTRUCTOR: Dr Anil Kant 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 calculator is not allowed*

Q.No	Question	CO	Marks
Q1	**Answer six of following questions in 2-3 lines only** a. State whether following DNA molecules qualify to be called as recombinant DNA? Support with reason. i) created by joining random DNA from two sources not capable of replication in any host ii) Joined a synthetic DNA and vector DNA which can replicate iii) Progeny of DNA described in option (ii) in a host b. The researchers isolated a gene, inserted it in a vector and transferred the vector to E.coli. Selected the transformed cells and multiplied in a separate culture. Identify the step with a logic statement at which i) genetic engineering of an organism occurred ii) gene cloning was accomplished iii) recombinant DNA was constructed c. A student was trying to join two blunt end DNA using *coli* DNA ligase but failed multiple times? Assign reasons and suggest a solution. d. What is the purpose of developing golden rice and why was rice chosen as the target crop to serve this purpose? e. How does introducing a mouse body-temperature regulation gene logically result in "low-fat" pigs during cold weather? f. Write any three points that differentiate genetic engineering from traditional plant and animal breeding.	CO-1& 2	0.5x6=3.0
Q.2	**Do any three of following questions** a. A 6 bp site of Sal I is represented by short notation 5' G/TC. Write a complete double stranded site of restriction enzymes and show the fragments that would be generated by the action of this enzyme. b. Design the following adapters for 6-bp cutter restriction enzymes: i) A one blunt-end adapter for restriction enzyme XhoI, C/TC ii) A conversion adapter for BamHI, G\GA and NheI, G/CT	CO-22	2.5x3=7.5

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	c. Enlist the method to prevent self ligation of vectors that can be prevented during construction of recombinant DNA. Discuss the enzymatic activities and enzymes involved and draw suitable diagrams. d. What is homopolymeric tailing? Demonstrate how it can be used for construction of recombinant DNA. Include enzymes and their activities in the discussion.		
Q.3	Enlist and briefly explain the applications of genetic engineering in the area of agriculture and plant biotechnology. Include suitable commercialized and potential examples.	Co-5	4.5

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