JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- 2025
M.Sc.-II Semester (BT)

COURSE CODE (CREDITS): 20MS1BT211(3) MAX. MARKS: 25
COURSE NAME: Genetic Engineering
COURSE INSTRUCTORS: Dr Anil Kant MAX. TIME: 1 Hour 30 Min

Note: *(a) All questions are compulsory.*
(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	Marks
Q1	a. What are site directed mutagenesis? Illustrate how PCR can be used to introduce point mutation, deletion mutation, large insertion mutation in cloned gene using PCR primers. Also explain the working of a specifically designed vector system to generate mutants using PCR. 4 b. Write as note on two of following i) Proofreading thermostable DNA Polymerase ii) Nested PCR and touchdown iii) Real time PCR iv) Reverse transcriptase PCR 4	8
Q2	a. Explain any two of the following citing suitable examples wherever required i) Positive and negative selection ii) Selectable marker and scorable marker gene iii) Kanamycin as selection agent and ampicillin resistance gene as selectable marker. 4 b. Write a comprehensive note on following techniques; include principle, procedure, applications, advantage and limitations of DNAase I Footprinting or Electrophoretic Mobility Shift Assay (EMSA) 2	6
Q3	a. Enlist three ideal characteristics and three essential functional modules of any cloning vectors. 2 b. How puC series vectors were different from pBR322 in terms of functional modules and selection strategies? Also elaborate on the basis of selection strategy. 4	6
Q4	**Do any one of the following** a. Briefly explain design, cloning, selection and basis of selection in case of three following types of vectors i) M13mp7 ii) λgt10 and λzap, iii) Cosmids and phagemids b. What do you understand by an expression cassette in an expression vector? Briefly explain the functional modules of pET expression vectors considering the example of pET 11. Explain why the expression of recombinant protein remains switched off during the growth phase and turned on in the induction phase.	5