JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- 2025
B.Tech-V Semester (BT/BI)

COURSE CODE (CREDITS): 1811BT512 (4) **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	CO	Marks
Q1	**Answer in at most two lines only?** 1. Why should a vector be small in size and should be under relaxed replication control? 2. What is an MCS or polylinker? 3. Enlist any four major types of gene transfer methods. 4. What is the function of cos sites in the λ phage life cycle? 5. What is a stuffer fragment in λ based replacement vectors? 6. How do expression vectors differ from cloning vectors in terms of functional modules? 7. What are regulated and constitutive promoters? 8. How do Fosmids differ from Cosmids? 9. What is the function of T7 and SP6 promoters in BAC vectors? 10. Which two types of vectors are combined to construct a phagemid?	CO-2,3	10x0.5=5
Q2	**Attempt any four of following questions** 1. Demonstrate your understanding about following terms, giving suitable examples i) Selectable marker ii) Scorable marker and reporter gene iii) Insertional inactivation iv) Replica plating 2. What are similarities and differences between pUC series vectors and pBR322 in terms of functional modules and cloning and selection procedures. Enlist the advantage pUC series vectors offer over pBR322. 3. What factors contributed in development of λ phage based vectors? Explain concept, design λ, and selection approaches used in case of λ insertion and λ replacement vectors citing suitable examples. 4. How does the lac operon function as a regulatory system in expression vectors? Why is IPTG preferred for induction of lac promoters in experimental and industrial set up? 5. Explain the working principle, equipment design and working of following gene transfer methods i) Electroporation ii) Particle bombardment. **P.T.O.**	CO-5	4x3=12

Q3	Describe the structure and working mechanism of the pET expression vector system, considering the examples of pET 3 and pET 11. What improvements were done in pET 11 to prevent leaky expression. Draw a suitable diagram and categorically mention the sequence of events that occurs during the growth phase and induction phase.	CO-3	4
Q4	Draw a detailed diagram of yeast artificial chromosome(YAC) vectors and explain functions of each functional module. Highlight the characteristics of yeast strain used along with and basis of red and white selection.	CO-2	4