

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT  
TEST -2 EXAMINATION- Oct. 2017  
B.Tech 5th Semester

COURSE CODE: 10B11BT513

MAX. MARKS: 25

COURSE NAME: Genetic Engineering

COURSE CREDITS: 04

MAX. TIME: 1 Hour 30 Minutes

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

Q.1 Answer following questions briefly.

0.5x8=4

- What do you understand by plasmid incompatibility?
- What is  $\alpha$  complementation?
- Mention only two advancements that were included in pUC vectors compared to pBR series.
- Give largest size of DNA insert that can be cloned in i) plasmid ii)  $\lambda$  vector iii) cosmid iv) BAC
- The three components of an expression cassette are \_\_\_\_\_
- Give two examples of M13 based vectors.
- Why Mammalian artificial chromosomes are difficult to assemble?
- How  $\lambda$  P<sub>L</sub> Promoter is regulated for the expression of recombinant protein

Q.2

3x4=12

- Give an account of two mutant strains used to produce cell lysate for *in vitro* packaging of  $\lambda$  genome.
- Suppose you are given a task of cloning a DNA fragment which may be required in double stranded as well as single stranded for in subsequent experiments Which Vector system would be suitable to accomplish the task in single step. Also explain reason for your selection.
- What is role of following? I) loxP and Cre recombinase in P1 base vectors II) cos N and lox P sites in Bacterial artificial chromosomes (BAC) III) Rare restriction enzyme sites such as NotI and SfiI flanking MCS in vectors
- Write a short note on role of gene copy number, codon usage preferences and GC content of transgene in level of protein expression.

Q.3 Discuss yeast artificial chromosome (YAC) highlighting i) essential components ii) selection strategy and iii) how cloning is done in YAC? 4

Q.4 Discuss pET as expression vectors. You should include following in your answer i) Basic components their source and functions ii) improvements which were made to control leaky expression iii) Overall regulation of expression of transgene in un-induced and induced state. 5