

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATIONS-2022

B.Tech-V Semester (BT)

COURSE CODE (CREDITS):1811BT512 (4)

MAX. MARKS: 25

COURSE NAME: Genetic Engineering

COURSE INSTRUCTORS: Dr. Anil Kant

MAX. TIME: 1 Hour and 30 Minutes

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q.1

[4.5] CO IV, V

You are assigned a task of expressing a toxic protein in *E.coli*. Elaborate how a pET series vector can be used to produce this recombinant protein. Include all the points contributing in controlling expression and avoiding leaky expression.

Q.2

[3.0 x 3 = 9.] CO II, IV

- Let you work with a primitive type of cloning vector having two antibiotic resistance gene X and Y with cloning sites, and insert the gene of interest in X. Outline the steps you will take for the selection of *E. coli* colonies transformed with recombinant vectors.
- Cosmids and phagemids are improvised vectors. Write about their key components and advantages these offer over the vector from which these have been derived? Draw labeled representative map of both type vectors.
- Write about additional functional modules that are incorporated in Expression Vectors and functions provided to the cloned gene. Let you work with an expression vector having a λ PL promoter, Outline the strategy and logic to achieve two stage production.

Q.3 Interpret and distinguish the following terms.

[1.0 x 4 = 4] CO I

- Cloning and Subcloning
- Host restriction and modification
- Exonuclease and endonuclease
- Replicative form and Single stranded form of M13 genome /vectors

Q.4 Attribute appropriate reasons for following.

[1.5 x 5 = 7.5] CO II, IV

- Lac promoter switch of transcription of gene in absence of IPTG
- λ lysogen with amber mutation in gene D or E can not pack their genome.
- Transformation pUC vectors result in formation of white *E.coli* colonies.
- While working with λ insertion vectors all packed in λ particles will be recombinant.
- Type of promoter affects the level of gene expression.