

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MAKE-UP EXAMINATION- APRIL-2024

COURSE CODE (CREDITS): 18B11BI412 (3)

MAX. MARKS: 25

COURSE NAME: GENETIC ENGINEERING AND GENOMICS

COURSE INSTRUCTORS: DR. JATA SHANKAR

MAX. TIME: 1 Hour 30 Minutes

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

1. What is the genome size of *E. coli* and how many genes encoding proteins are estimated to be present in the *E. coli*? Calculate the gene density. [3.5 marks] CO II
2. Bacteriophage lambda infects a bacterium & completes the life cycle in 20 minutes, and releases 2 virus particles. If virus particles are incubated for 2 hrs, how many virus particles do you expect to release after the completing life cycle.? [3.5 marks] CO II
3. When a foreign (i.e., non-bacterial) gene is simply ligated into a standard vector and cloned in *E. coli*, it is very unlikely that a significant amount of recombinant protein will be synthesized because it lacks signals. What are the important signals? [3.5 marks] CO II
4. pUC8 is a cloning vector; what is the size of the vector, and how many copies of pUC8 a bacterial host cell can accommodate? Also, draw the structure pUC8 vector. [3.5 marks] CO I
5. What are insertional and replacement vectors, explain with an example. Which one is more preferred to insert foreign DNA for sequencing projects [3.5 marks] CO I
6. Short notes on the following; [2.5 marks each] CO I & II
 - a. 2µm plasmid?
 - b. Explain, Central Dogma.
 - c. Human Mitochondrial Genome