JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATIONS-2022
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: *All questions are compulsory. Marks are indicated against each question in square brackets.*

Q1.

a. A student was trying to clone a PCR amplified product in a blunt ended linearized vector but was unsuccessful. Interpret the reasons and suggest methods to solve this problem. Outline one of the advanced methods with its advantages. [3]

b. Design a conversion adapter for EcoRI 5 G/AATTC 3 and ClaI 5 AT/CGAT3. [2]

Q.2

Devise a strategy to carry out each of the following. You are required to mention the main enzymatic tool if any, its enzymatic activities, and rationale of using it. Draw suitable diagrams where required. [8]

a. Converting a blunt ended DNA into Specific Cohesive ended fragment
b. Forming a blunt ended DNA fragment from nonspecific staggered ended DNA
c. Favoring formation of recombinant vectors, during Recombinant DNA construction
d. To produce double stranded DNA from RNA template

Q.3

a. Let you design a new cloning vector, which is replicable in an E. coli host and also has the ability to get packaged in phage particles. The vector should facilitate in vitro RNA synthesis of the cloned gene segment and extraction of the cloned segment for subcloning. Mention all the functional modules to be included in this vector and reason for their inclusion. Draw labeled map of the designed vector. [4]

b. A Scientist is working with a cosmid vector, and wants to do in vitro packaging of recombinant DNA? List the essential components to be included in packaging extract and how these are provided without need to do their purification? [3]

Q.4

a. Appraise the strategies to label a double stranded DNA segment to be used as a probe and single out the best one in your opinion. Let you be interested in developing hybridization signals in an experiment which require fine resolution as well. Which radioactive isotope you will prefer for labeling probes. Give reason for your choice. [3]

b. Figure out the main difference between direct and indirect non- isotopic labeling of probes. Let you use a probe labeled with Biotin as reporter, streptavidin as ligand and Alkaline Phosphatase as marker. Outline one strategy for the detection of hybridization signals. [2]