JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- 2023
B.Tech-Vth Semester BT)

COURSE CODE (CREDITS): 18B11BT512 (4) MAX. MARKS: 25
COURSE NAME: Genetic Engineering
COURSE INSTRUCTORS:Dr Anil Kant MAX. TIME: 1 Hour 30 Minutes

Note: (a)All questions are compulsory. (b)Marks are indicated against each question in square brackets.(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.1 Briefly answer following questions 1x6=6 CO I, III

a. Genetic engineering is also done to practice genetic engineering or to produce some tools of genetic engineering. Justify the statement by citing two suitable examples.
b. You are given a DNA fragment with 5' overhangs. Mention any one method to convert into a blunt end fragment.
c. Why a vector should have i) relaxed control of replication ii) size less than 10Kb
d. What is subcloning? Why is it required in genetic engineering?
e. How does "lac promoter" remain switched off wrt transcription and turns on in presence of lactose
f. Why IPTG is used for induction of lac promoters in place of lactose in industrial applications

Q.2 [5 x 2 = 10] CO II, III

a. Explain the basis of following selection agent and resistance provided by their corresponding resistance genes gene i) ampicillin and ampicillin resistance gene ii) Kanamycin and Kanamycin resistance gene.
b. What extra functional modules are added to make expression vectors? Briefly explain the significance of each of these functional modules.
c. Mention main features of BAC vectors. Draw a well labeled diagram of BAC vectors, highlighting its functional modules.
d. Write about nature, enzymatic activities, source and application of "reverse transcriptase" in genetic engineering?
e. Why is selection important in genetic engineering work? Make us understand the positive selection and negative selection, explain with an example from each category.

Q.3 Do any two of following [4.5 x 2 = 9] CO II V

a. Let you are assigned a task of cloning a gene fragment in a YAC vector with Trp1, URA3 and SUP4 genes in it for selection. Give a detailed strategy for the inserting gene segment, features of yeast strains to be used and selection of recombinant transformants on the basis of red and white colonies of yeast and its scientific basis. Draw suitable diagrams to illustrate cloning procedure.

b. Why do PCR products require special methods for cloning? Enlist different possible solutions to solve the problem. Explain in detail one method you would prefer to clone a PCR product.

c. Discuss λ bacteriophage genome, λ based insertion and replacement vectors, selection strategy when using insertion and replacement vectors? Give examples of each type.