JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- MAY-2023

COURSE CODE(CREDITS): 20MS1BT211(3) MAX. MARKS: 25
COURSE NAME: Genetic Engineering
COURSE INSTRUCTORS:Dr Anil Kant MAX. TIME: 1 Hour 30 Minutes

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

Q.1 Briefly explain the following technical terms. [4]

I. Cloning and Subcloning
II. Striengent and Relaxed control of plasmid vector replication
III. Conjugative and Nonconjugative plasmids
IV. Positive and Negative selection

Q.2

a. Write main properties and most important use of any two of given tools in genetic engineering? i) Terminal transferase ii) Reverse transcriptase iii) Ribonuclease H [2]

b. Why were phage based vectors developed? Give key points about following i) Genome of λ bacteriophage ii) Life cycle of M13 bacteriophage ii) M13 based vectors [3]

Q.3

a. Highlight the main disadvantages of linkers and how it gets solved with adapters. Design a conversion adapter for PstI 5 CTGC\AG 3 and NdeI 5 C\ATATG 3. [3]

b. Identify and elaborate advance methods available for insertion of PCR products directly in cloning vectors without any end modification. Highlight the advantages offered over the existing techniques. [3]

Q.4

a. Identify DNA, RNA and Oligonucleotide probes with respect to their origin, starting material, labeling. [2]
b. Enlist some commonly used isotopic and direct fluorescent labels used for nucleic acid labeling? What is the role of reporter, affinity group and marker group in indirect nonisotopic labeling of nucleic acids. Give one example to each group. [3]

Q.5

Let you are using a pUC series vector having kanamycin resistance and lacZ' genes as markers. The polylinker is located in lacZ'. i) Outline the steps you will take to construct recombinant vector, and its selection in the form transformed *E. coli* colonies. ii) Mention Mechanism of kanamycin as selection agent iii) Mechanics of action of kanamycin resistance. [5]