JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATIONS-2022
B.Tech-IV Semester (BI)

COURSE CODE (CREDITS): 18B11BI412(3) MAX. MARKS: 35
COURSE NAME: Genetic Engineering and Genomics
COURSE INSTRUCTORS: Dr. Anil Kant MAX. TIME: 2 Hours

Note: *All questions are compulsory. Marks are indicated against each question in square brackets. Use of a calculator is allowed.*

Q.1 [3x2 = 6.0] CO III

a. Analyze the role of different factors which dictates the minimum number of clones to be maintained in a gene library? Which one is most significant as per your analysis?

b. Calculate minimum number of clones to be included in a S. cerevisiae genomic library of insert size of 700 kb and with 0.99 probability of finding any random clone ? Genome size of S. cerevisiae is 1.8 $X10^6$ bp

Q.2 [3x2 = 6.0] CO II

Let you are assigned a task of cloning a gene fragment in the following type of vectors? Give a detailed strategy for the inserting gene segment and selection of recombinant transformants and its scientific basis.

a. A pUC series vector with ampicillin and multiple cloning sites in lacZ gene
b. Yeast artificial Chromosome with Trp1, URA3 and SUP4

Q. 3 [3x2 = 6.0] CO V

Figures out any two similarities and differences wrt design and applications between following vectors a) Cosmid and Fosmid b) M13 based plasmid and phagemids

Q.4

a. Let you interested in preparing a gene library of a bacterial species for gene identification? Which type of library would you prefer to construct? Give any four reasons for your choice? Arrange and elaborate on main steps for the construction of the chosen library. [5.0] CO III

b. A scientist is interested in cloning cDNA fragments in the vectors during library preparation in a particular direction. Draw an outline of one of the methods to do so. [3.0]CO III

Q.5

a. Consider gene transfer via gene gun. Interpret the functions of following components in its working. a) Rupture Disc b) Stop plate c) Microcarriers d) Gold/tungsten particles [4.0] CO I

b. Dideoxynucleotides in sanger sequencing terminate the growing DNA chain?Give a reason. Single out and interpret the modification that lead to following automation of Sanger's sequencing A) Automatic base calling b) Conducting Sequencing reaction in single tube c) Electrophoresis of sequencing product at high voltage [5.0]CO IV