JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATION-2022
B.Tech-V Semester (BT)

COURSE CODE (CREDITS): (3) MAX. MARKS: 35
COURSE NAME: Genetic Engineering
COURSE INSTRUCTORS: Dr Anil Kant MAX. TIME: 2 Hour

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

Q.1 CO - 3&2

A. What factors dictate the minimum number of clones in a gene library? Calculate the minimum number of clones required in a gene library of yeast having an genome size 1.8×10^4 KB. Consider the average size of fragments cloned 35 KB, and 95% probability of finding a random clone. [5]
B. Explain Following terms: Palindrome with rotational symmetry, Homopolymeric tailing, Replica plating. [3]

Q.2 CO - 4&5

A. Mention two quick points to explain that higher yield of recombinant protein can result in low cost of production? [2]
B. How nature of protein and difference in codon usage preferences of host and source can affect level of expression of transgene? Suggest at least one solution to improve expression in each case? [3]
C. Why is it advisable to produce recombinant protein in two phases i.e growth and production? Let You are having a recombinant protein gene cloned in an expression vector having the following type of promoters / Control. How will you ensure to have a growth phase and production phase in each case? Mention technological logic as well i) Runway plasmid ii) λPL iii) tac promoter iv) Trp promoter [5]

Q.3 Attempt any four of the following? CO-3&5 [2.5 x 4 = 10]

A. Summarize the concept of Celi based gene cloning and Direct cloning of genes.
B. Mention and elaborate at least five differences between genomic and cDNA libraries on the basis of construction and applications.
C. Let you be given a task of library construction. Which type of library would you prefer to construct for gene isolation from i) Prokaryotic organism ii) Eukaryotic organism ? Give reasons for your choice?
D. Some recombinant proteins when expressed in E.coli form inclusion bodies? Suggest any two possible solutions to obviate this problem.
E. What are purification and assay tags? Give examples. Let a recombinant protein is tagged with glutathione- S-transferase, Demonstrate how it can be purified.

Q4 CO-3 [3.5 x 2 = 7]

A. How it became possible to bring following improvisations in the original Sanger DNA sequencing method? i) Performing Gel electrophoresis in single gel lane and computerizing base calling ii) performing sequencing PCR reaction in Single tube iii) Performing electrophoresis at high voltage and reduction of time required

B. Enlist gene transfer methods and explain components and working of a PDS helium gene gun?