

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
MID-SEMESTER EXAMINATION: March-2015
B.Tech. Bioinformatics Semester IV

Course Code: 15B11BI411

Max. Marks: 30

Course Name: Genetic Engineering & Genomics

Course Credit: 4

Max. Time: 2 Hrs

Note: All questions are compulsory.

SECTION A (6 Marks)

Explain following in brief: (6x1= 6)

- i) What separates genetic engineering from genomics?
- ii) Which discoveries created rDNA technology and how?
- iii) Why do we have multiple cloning sites in a vector and always within LacZ gene?
- iv) Was bioinformatics possible without genetic engineering?
- v) Differentiate RFLP vs Southern Blotting
- vi) What determines copy number in a plasmid vector & how?

SECTION B (9 Marks)

Q. No. 1) You are given 100 DNA fragments of 0.5-2 kb sizes. Can you characterize those for following? (3x1= 3)

- i) How those can be used as probes in DNA fingerprinting?
- ii) Can you classify those into different classes as per copy number & how?
- iii) How can you detect if any of those have restriction sites within?

Q. No. 2) Why microsatellites are molecular markers of choice in different organisms? What strategy would you use to develop microsatellite markers for an organism of industrial importance in India, but not common elsewhere?

(3.0)

Q. No. 3) Why most of the restriction enzymes are obtained from bacteria? What kind of different modifications can you do to DNA fragments for creating ends of choice and How?

(3.0)

SECTION C (15 Marks)

Q. No. 1) Why BAC vectors are preferred in the preparation of genomic libraries for eukaryotes? Can you plan a strategy to construct a BAC library for a plant species indigenous to India and identify clones corresponding to a biosynthetic pathway of medicinal importance?

(5.0)

Q.No. 2) Can you design a DNA diagnostic for a genetic disorder so as to detect it at a prenatal stage? Lay out complete strategy with materials required and resources to be used. Can that DNA diagnostic be used in genetic counselling?

(5.0)

Q.No. 3) How & Why bioinformatics is complementary to genomics? What are different domains in bioinformatics to benefit industries in food, health, environment and energy sectors, with reference to India?

(5.0)