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The Assam Royal Global University, Guwahati

Royal School of Biosciences
M.Sc. Biotechnology (4th semester)
Semester End Examination, June 2023
Course Title: Genetic Engineering
Course Code : BTC154C402

Time: 3 Hours

Maximum Marks: 70

Note: Attempt all questions as per instructions given.
The figures in the right-hand margin indicate marks.

Section – A

1. Attempt all questions. (Maximum word limit 50) 2 x 8
- What are isoschizomers?
 - Mention the name of restriction enzymes which can be used to recover DNA from ssDNA:ssRNA hybrid?
 - What is the role of selectable marker genes in the screening of clones?
 - What is binary vector?
 - State the role of *vir*- region in inducing infection.
 - What are the characteristic features of cDNA library?
 - What is the basic principle behind far-western blotting?
 - Mention the reason behind homopolymer tailing of plasmids for cDNA cloning.

Section – B

2. Attempt any one of the following: 12 x 1
- Propose an experiment to demonstrate DNA-protein interaction.
 - The total size of a plasmid is 700 kb. When digested with EcoRI alone, it produced 2 fragments (*i.e.*, 500 kb and 200 kb); when digested with Bam HI alone, it produced two fragments (*i.e.*, 450 kb and 250 kb). But when treated with both the enzymes, it produced 4 fragments (*i.e.*, 250, 200, 150, and 100 kb). Construct the restriction map and also discuss the findings.
3. Attempt any two of the following: 7 x 2
- Discuss the characteristics of an ideal vector with suitable examples.
 - What are inclusion bodies? Explain the strategies involved in minimizing the formation of inclusion bodies.
 - Describe the *in-vitro* packaging of cosmids with a diagram.
4. Attempt any two of the following: 7 x 2
- Discuss the Okayama and Berg method of cDNA cloning.
 - Differentiate between Northern and Southern blotting.
 - Discuss the role of Western blotting in protein characterization.
5. Attempt any two of the following: 7 x 2
- Describe how microarray helps in studying gene expression.
 - Elaborate the principle and procedure of dideoxy method of gene sequencing.
 - Write a note on gene therapy.