

25/01/23

JAMIA HAMDARD

Department of Biotechnology
School of Chemical and Life Sciences
New Delhi-110062

M.Sc. Programme Sem I, Odd Semester-End term Examination (2023)

Paper Name: Essentials of Genetic Engineering
Paper Code: MBT-CC102

Time: 3 hrs
Maximum Marks: 60

Note: This paper has 3 sections A, B, and C, attempt all the three sections.

Section A: Answer all the questions; Section B: Answer any 2 out of 4; Section C: Answer all the questions, each question has an internal choice

Abbreviations Used

CO- Course Outcome, PO- Program Outcome, BTL- Bloom Taxonomy Level: BT level 1- Remember; BT level 2-Understand; BT level 3-Apply; BT level 4-Analyse; BT level 5-Evaluate; BT level 6-Create

COURSE LEARNING OUTCOME

Upon completion of the course the student will be able to:

CLO102.1: understand the basic genetics and its application to modern genetic engineering approaches (Cognitive Level: Understand)

CLO102.2: understand the applications of microbes in genetic engineering (Cognitive Level: Apply)

CLO102.3: understand the basic applications of genetic engineering involving use of enzymes and vectors. (Cognitive Level: Understand)

CLO102.4: gain knowledge and training on high end versatile tools and techniques employed in recombinant DNA technology to construct DNA, cDNA libraries. (Cognitive Level: Apply)

SECTION A

Attempt all the questions:		(1×10=10 Marks)	
Q. No.	Question	CO	BTL
1.	Name an enzyme that is useful for TA cloning purpose?	4	K2
2.	Name two types of qPCR assays.	4	K2
3.	Explain the role of linkers in genetic engineering.	4	K2
4.	What is iPCR? Write down its significance.	4	K3
5.	What is Electromobility Shift Assay? Write down its principle.	2	K3
6.	How do you define epigenetics?	1	K1
7.	What are the two types of transductions?	2	K1
8.	Define test cross.	1	K1
9.	State one difference between miRNA and siRNA.	1	K2
10.	How is Western blotting different from far Western blotting?	2	K3

SECTION B

Attempt any TWO questions out of four: (15×2=30)			
Q. No.	Question	CO	BTL-
11.	Evaluate the three most common ways in which bacteria diversify their DNA. Discuss them in detail.	2	K5
12.	a. Differentiate between cloning and expression vectors with suitable examples. b. Give a detailed account on the nucleic acid modifying enzymes.	3	K4
13.	Evaluate Mendel's experimental design for monohybrid and dihybrid crosses and analyze the outcomes with suitable examples.	1	K5
14.	Write down the principle, procedure and application of Southern blotting.	4	K5

SECTION C

Attempt all questions. Each question has an internal choice: (4×5=20 Marks)			
Q. No.	Question	CO	BTL-
15.	Explain the Life cycle of bacteriophage. OR Discuss the method of introduction of DNA into the bacterial cell.	3	K2
16.	Write a short note on Human Insulin production. OR Differentiate between binary and co-integrate vectors.	3	K3
17.	Explain the methods used for detection and analysis of DNA-Protein interaction. OR Write a short note on DNase Foot printing.	2	K3
18.	What is RNAi? How this approach can be used in reverse genetics. OR Explain the genetic basis of blood grouping in human population.	1	K3
19.	What are the steps involved in the construction of genomic library? OR Write short notes on the following: a. Blue-white screening b. Replica plating	4	K2

Table 1: Distribution of question & marks among the Units of syllabus

Unit	Question Numbers	Total Marks
1	3, 6, 8, 9, 13, 18	23
2	5, 7, 10, 11, 17	22
3	12, 15, 16	23
4	1, 2, 3, 4, 14, 19	23

Table 2: Mapping between COs and questions

COs	Knowledge level	Question Numbers	Total Marks
1	K1 and K2	1, 2, 3, 6, 7, 8, 9, 15, 19	15
2	K3 and K4	4, 5, 10, 16, 17, 18	15
3	K4, K5, K6	11/12/13/14 (any two)	30