Printed Page:- 03 **Subject Code:- AMTBT0211**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech

SEM: II - THEORY EXAMINATION (2023- 2024)

Subject: Genetic Engineering

Time: 3 Hours **Max. Marks: 70**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* **three Sections -A, B, & C.** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION A **15**

1. Attempt all parts:-

1-a. Isoschizomers are defined as _____ (CO1) 1

(a) enzymes having same recognition sequence and always cutting at the same site

(b) enzymes having same recognition sequence and always cutting at different site

(c) enzymes having different recognition site and cutting at the same site

(d) enzymes having same recognition site and they may or may not cut at the same site

1-b. The vaccines prepared through recombinant DNA technology are (CO2) 1

(a) Third generation vaccines

(b) First generation vaccines

(c) Second generation vaccines

(d) None

1-c. Polymerase can be defined as _____ (CO3) 1

(a) an enzyme used to synthesize a new DNA or RNA strand on the basis of

pre-existing strand or at times without a pre-existing strand

(b) an enzyme used for removal of nucleotides from the DNA or RNA strand

(c) an enzyme which can synthesize only a new DNA strand, not an RNA strand

(d) an enzyme which can synthesize either a new DNA or an RNA strand but only when a strand is there

1-d. Choose the incorrect statement for the preparation of genomic libraries. (CO4) 1

(a) The first step is the isolation of genomic DNA

(b) Physical damage to the DNA should be avoided

(c) If a nuclear DNA library is to be constructed, organelle DNA is to be removed

(d) For the construction of organelle library, organelle DNA is purified from the nuclear DNA

1-e. You find that your protein sample loses activity during storage. What can you do about this? (CO5) 1

(a) Add an additional purification step

(b) Use a protease inhibitor during purification steps

(c) Perform each step as quickly as possible, in a cold-room

(d) All of the above

2. Attempt all parts:-

2.a. What is genetic engineering? (CO1) 2

2.b. What do you understand by phagemids? (CO2) 2

2.c. Why we insert foreign DNA into host cells? (CO3) 2

2.d. Who discovered PCR technique and in which year? (CO4) 2

2.e. Define high throughput sequencing. (CO5) 2

SECTION B **20**

3. Answer any <u>five</u> of the following:-

3-a. Write in brief about methylation interference. (CO1) 4

3-b. What are the application of hybridization techniques in genetic engineering? (CO1) 4

3-c. Write about the role of baculovirus vector in context of mammalian cells. (CO2) 4

3-d. Explain plant-based vectors with suitable examples. (CO2) 4

3.e. Explain differential gene expression with suitable example. (CO3) 4

3.f. How the RT-PCR technique helps in detecting Covid-19 virus?(CO4) 4

3.g.	What are the methods of identifying differential gene expression? (CO5)	4

SECTION C **35**

4. Answer any <u>one</u> of the following:-

4-a.	Describe the importance of cohesive and blunt ends in detail. (CO1)	7
4-b.	Discuss the role of Electrophoretic Mobility Shift Assay (EMSA) for determining the protein and nucleic acid interactions? (CO1)	7

5. Answer any <u>one</u> of the following:-

5-a.	What are the differences between expression vectors and cloning vectors? Describe with an example. (CO2)	7
5-b.	How does baculovirus expression system work? Discuss the role of baculovirus in protein expression. (CO2)	7

6. Answer any <u>one</u> of the following:-

6-a.	Discuss the role of phage display technology in the production of antibodies. (CO3)	7
6-b.	What are four major steps of gene expression? How the expression of a gene can be enhanced? (CO3)	7

7. Answer any <u>one</u> of the following:-

7-a.	Describe DNA polymerase I and DNA polymerase III in detail. (CO4)	7
7-b.	What do you understand by the fidelity of a polymerase. What does high fidelity and low fidelity mean. Explain. (CO4)	7

8. Answer any <u>one</u> of the following:-

8-a.	Describe the various techniques of transfection with suitable examples. (CO5)	7
8-b.	What are the different types of protein microarrays? Explain with their applications. (CO5)	7