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 (2022-2023)

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. This was the first restriction endonuclease that was discovered (CO1) 1

(a) BamHI

(b) EcoRI

(c) HindIII

(d) HindII

1-b. When was the first animal cloned? (CO2) 1

(a) 1960

(b) 1970

(c) 1975

(d) 1980

1-c. How many ds DNA molecule can be produced, which comprise precisely the target region in double strand form during 4th cycle of PCR? (CO3) 1

(a) Two ds DNA molecule

(b) Three ds DNA molecule

(c) Eight ds DNA molecule

(d) Four ds DNA molecule

1-d. Which kind of packing is done for the fragmented genes? (CO4) 1

(a) In vivo

(b) Population

(c) Group

(d) In vitro

1-e. Which of the following is incorrect about a microarray? (CO5) 1

(a) It is a slide attached with a high-density array of immobilized DNA oligomers representing the entire genome of the species under study

(b) Array of immobilized DNA oligomers cannot be cDNAs

(c) Both are correct

(d) None of the .

2. Attempt all parts:-

2.a. Name any two radioactive probes. (CO1) 2

2.b. What is the application of pUC19 vector? (CO2) 2

2.c. What is mRNA? (CO3) 2

2.d. State any two applications of PCR method. (CO4) 2

2.e. Define siRNA. (CO5) 2

SECTION B **20**

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

3-a. Write a note on chromatin immunoprecipitation assay. (CO1) 4

3-b. What are the methods used in studying DNA-protein interactions? Explain any one in detail. (CO1) 4

3-c. Write a note on plasmid vector pBR322. (CO2) 4

3-d. Write in brief about the importance of inclusion bodies in bacteria. (CO2) 4

3.e. Write a note on the construction of cDNA library. (CO3) 4

3.f. Write a note on the designing of a primer. (CO4) 4

3.g. Write a note on the different types of DNA microarrays. (CO5) 4

SECTION C **35**

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

4-a. What is the application of Electrophoretic Mobility Shift Assay (EMSA)? Which technique is preferred between ChIP and EMSA for DNA-protein interactions 7

and Why? (CO1)

4-b. How does protein interact with DNA? Discuss various techniques used for the DNA protein interaction. (CO1) 7

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

5-a. Explain any three genetic engineering techniques in detail. Mention about the role of vectors in these techniques. (CO2) 7

5-b. What do you understand by plasmids and vectors. State their application in genetic engineering. (CO2) 7

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

6-a. What are the major differences in the structure of a gene cloned into genomic library and cDNA library? (CO3) 7

6-b. What is phage display technique and state its importance in directed evolution? (CO3) 7

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

7-a. What are the characteristics of a good primer sequence? (CO4) 7

7-b. What is the concept of PCR? Discuss the applications of PCR in healthcare sector. (CO4) 7

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

8-a. Describe differential gene expression in detail. (CO5) 7

8-b. State major differences between DNA sequencing and RNA sequencing in detail. (CO5) 7