Printed Page:- 04 **Subject Code:- ABT0405**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: IV - THEORY EXAMINATION (2023 - 2024)

Subject: rDNA Technology

Time: 3 Hours **Max. Marks: 100**

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 **20**

1. Attempt all parts:-

1-a. Enzymes that remove nucleotides one at a time from the end of a DNA molecule are called _____ (CO1) 1

(a) Ligases

(b) Exonucleases

(c) Endonucleases

(d) Modifying enzymes

1-b. Which endonuclease cleaves both single and double stranded DNA molecules, in a non-specific manner? (CO1) 1

(a) S1

(b) Bal31

(c) DNase I

(d) BamHI

1-c. Adult cell cloning is also known as (CO2) 1

(a) Embryo cloning

(b) Biomedical cloning

(c) Research cloning

(d) Reproductive cloning

1-d. Dolly the sheep was cloned from which type of differentiated adult cell (CO2) 1

(a) Udder

(b) Skin

(c) Blood

(d) Kidney

1-e. The polymerase chain reaction is_____. (CO3) 1

(a) It is a DNA sequencing technique.

(b) It is a DNA degradation technique

(c) It is a DNA amplification technique

(d) All of the above

1-f. Which of the following is not a thermostable polymerase? (CO3) 1

(a) pfu polymerase

(b) Taq polymerase

(c) Vent polymerase

(d) DNA polymerase III

1-g. The first genomic libraries were cloned in _____ (CO4) 1

(a) Plasmid

(b) Bacteria

(c) Human

(d) Plants

1-h. HaeIII and AluI have _____ recognition sites. (CO4) 1

(a) Different

(b) Similar

(c) Short

(d) Unrecognizable

1-i. During conjugation the Donor cell have cell surface appendages known as _____ (CO5) 1

(a) F pili

(b) B pili

(c) A pili

(d) D pili

1-j. By which of the following methods does the F plasmid integrates into the bacterial genome? (CO5) 1

(a) Transformation

(b) Conjugation

(c) Recombination

(d) Mutation

2. Attempt all parts:-

2.a. What is the most significant application of rDNA technology? (CO1) 2

2.b. Explain selectable markers. (CO2) 2

2.c. What is the importance of Taq DNA polymerase during PCR? (CO3) 2

2.e. What is a competent bacterial cell? (CO5) 2

2.d. Why do we need cDNA libraries? (CO4) 2

SECTION B **30**

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

3-a. What is used to digest or break apart the recombinant DNA ? (CO1) 6

3-b. Why adaptors are used in sequencing? (CO1) 6

3-c. What is Ti and Ri vector? (CO2) 6

3-d. How are artificial chromosomes used as vectors? (CO2) 6

3.e. Write about reverse transcription polymerase chain reaction (RT–PCR). (CO3) 6

3.f. Explain the key distinctions between a cDNA library and a genomic DNA library. (CO4) 6

3.g. How can DNA be sequenced using the Sanger method? (CO5) 6

SECTION C **50**

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

4-a. What does star activity mean and why should this be a consideration in a restriction digestion reaction? (CO1) 10

4-b. Explain in detail about the role of Reverse tanscriptase in cloning. (CO1) 10

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

5-a. Why is bacteriophage M13 useful as sequencing vector? (CO2) 10

5-b. Discuss the properties of the cloning vectors. (CO2) 10

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

6-a.	Explain the fundamentals of PCR process and its variations, as well as their applications in genetic engineering. (CO3)	10
6-b.	Write a detailed note on Inverse PCR and multiplex PCR. (CO3)	10

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

7-a.	What are the various genetic selection strategies that may be used for various applications? (CO4)	10
7-b.	What are the different variations of blotting techniques? (CO4)	10

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

8-a.	Write a detailed note on high-throughput sequencing techniques. (CO5)	10
8-b.	What is microarray? What is the purpose of a DNA microarray? (CO5)	10