

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: IV - THEORY EXAMINATION (2022-2023)

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. Alkaline Phosphatase is used at times and the vector is treated with it. Choose the incorrect statement. (CO1) 1
- (a) It removes 5' terminal phosphate group from nucleic acids
 - (b) The 5' phosphate group is required for the ligation to take place
 - (c) Two phosphate bonds should be formed for the complete ligation to take place
 - (d) The ligation between vector and insert won't take place
- 1-b. Which enzyme is used to join together two different types of DNA molecules? (CO1) 1
- (a) ligase
 - (b) endonuclease
 - (c) exonuclease
 - (d) protease
- 1-c. The notion that a human clone would be identical to an existing person , the clone's "parent" is (CO2) 1

- (a) FALSE
(b) True
(c) Plausible
(d) Scientifically proven
- 1-d. The first transgenic plant to be produced is (CO2) 1
(a) Brinjal
(b) Tobacco
(c) Rice
(d) Cotton
- 1-e. Reverse transcription PCR uses. (CO3) 1
(a) Artificial DNA
(b) RNA as a template to form DNA
(c) DNA as a template to form ssDNA
(d) All of the above
- 1-f. PCR can be used in (CO3) 1
(a) cloning
(b) sequencing
(c) medical diagnosis and forensic medicine
(d) all of the above
- 1-g. Which kind of packing is done for the fragmented genes? (CO4) 1
(a) In vivo
(b) Population
(c) Group
(d) In vitro
- 1-h. If the DNA strand has nitrogenous base sequence ATTGCC, the mRNA will have? (CO4) 1
(a) ATTGCA
(b) UGGACC
(c) UAACGG
(d) ATCGCC
- 1-i. Plus and minus sequencing is the other name for (CO5) 1
(a) Sanger sequencing
(b) PCR based Sequencing

- (c) Maxam–Gilbert sequencing
- (d) High-Throughput Sequencing

- 1-j. Sequence of which of the following cannot be determined using the Maxam Gilbert method? (CO5) 1
- (a) Bacteria
 - (b) Plants
 - (c) Bacteriophage T7
 - (d) Plasmid

2. Attempt all parts:-

- 2.a. What is host controlled restriction process? (CO1) 2
- 2.b. Which organism can transfer 'T-DNA' within plants? (CO2) 2
- 2.c. What is Nested PCR? (CO3) 2
- 2.d. What is colony hybridization? (CO4) 2
- 2.e. What is a contig in sequencing? (CO5) 2

SECTION B

30

3. Answer any five of the following:-

- 3-a. How can knowledge of recombinant DNA technology be useful in addressing issues and concerns in society? (CO1) 6
- 3-b. Explain the process of DNA digest. (CO1) 6
- 3-c. Draw the structure of YAC and BAC vectors and explain their important properties. (CO2) 6
- 3-d. Explain human cloning and its legal aspects. (CO2) 6
- 3.e. Explain the role of primers while planning for PCR. (CO3) 6
- 3.f. What are the two primary processes for cleaving DNA that are employed in genomic library construction? (CO4) 6
- 3.g. Compare and contrast the benefits and drawbacks of the Sanger and Maxam-Gilbert DNA sequencing methods. (CO5) 6

SECTION C

50

4. Answer any one of the following:-

- 4-a. Explain in detail about the different polymerases and their application in molecular biology. (CO1) 10
- 4-b. Outline the differences between insertional vectors and replacement vectors . (CO1) 10

5. Answer any one of the following:-

- 5-a. Discuss about Bacteriophage in detail. (CO2) 10
- 5-b. Differentiate between YACs and BACs. (CO2) 10

6. Answer any one of the following:-

- 6-a. Write a detailed note on reverse transcription polymerase chain reaction (RT-PCR) and nested PCR. (CO3) 10
- 6-b. List out the different variants of PCR and discuss its principle. (CO3) 10

7. Answer any one of the following:-

- 7-a. Describe the process of colony hybridization with the help of a labelled diagram. (CO4) 10
- 7-b. What do you mean by Immunological screening for expressed genes? (CO4) 10

8. Answer any one of the following:-

- 8-a. Write a detailed note on high-throughput sequencing techniques. (CO5) 10
- 8-b. Explain in detail the methods of protein purification. (CO5) 10

2022-23 Jan - June