Printed Page:- 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 (2021 - 2022)

Subject: Genetic Engineering

Time: 3 Hours Max. Marks: 70

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.
2. Section A - Question No- 1 is 1 marker & Question No- 2 carries 2 marks each.
3. Section B - Question No-3 is based on external choice carrying 4 marks each.
4. Section C - Questions No. 4-8 are within unit choice questions carrying 7 marks each.
5. 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 is not a cloning factor (CO1) 1

(a) pUC19

(b) SV40

(c) EST

(d) M13

1-b. Southern blotting is (CO2) 1

(a) Attachment of probes to DNA fragments

(b) Transfer of DNA fragments from electrophoresis gel to a nitrocellulose sheet

(c) Camparision of DNA fragments to two sources

(d) Transfer of DNA fragments to electrophoretic gel from cellulose membrane

1-c. Which of the following enzyme is said as reverse transcriptase?(CO4) 1

(a) DNA dependent DNA polymerase

(b) RNA dependent RNA polymerase

(c) RNA dependent DNA polymerase

(d) DNA dependent RNA polymerase

1-d.	To avoid ligation of separate DNA fragments, which of the enzyme is used? (CO4) (a) kinase (b) ligase (c) endonuclease (d) phosphatase	1
1-e.	Is DNA ligase g enzymes is used in pyrosequencing? (CO5) (a) TRUE (b) FALSE	1

2. Attempt all parts:-

2.a.	Mention any two characteristics of DNA structure? (CO1)	2
2.b.	Define Cosmids.? (CO2)	2
2.c.	How do we insert foreign DNA into host cells? (CO3)	2
2.d.	What are the characteristics of enzyme used in PCR technique? (CO4)	2
2.e.	Define Sanger sequencing.? (CO5)	2

SECTION B 20

3. Answer any five of the following:-

3-a.	Give a brief information on the application of restriction enzymes with suitable examples.?(CO1)	4
3-b.	What is the function of linkers in rRNA technology? (CO1)	4
3-c.	What are the three different types of phages. Explain each in brief.? (CO2)	4
3-d.	Differentiate between insertion and replacement vectors. Mention two examples of each.? (CO2)	4
3.e.	What do you understand by mRNA? Why we need to isolate mRNA from total RNA? (CO3)	4
3.f.	How PCR is useful in the identification of pathogens? (CO4)	4
3.g.	How does high throughput sequencing differ from Sanger sequencing?(CO5)	4

SECTION C 35

4. Answer any one of the following:-

4-a.	Who developed homopolymer tailing method. Discuss the importance of homopolymer tailing along with the role of enzyme involved in the process.? (CO1)	7
4-b.	What is the purpose of nucleic acid hybridization? What are the important factors affecting the hybridization process? (CO1)	7

5. Answer any one of the following:-

5-a.	Describe baculovirus and pichia vectors system in detail and compare.?(CO2)	7
5-b.	How do shuttle vectors work? What is the difference between shuttle vector and expression vector? (CO2)	7

6. Answer any one of the following:-

6-a.	What is the importance of genomic libraries? What is the difference between a genomic library and cDNA library?(CO3)	7
6-b.	Describe Southwestern and far-western blotting in detail. State major differences between these two techniques.? (CO3)	7

7. Answer any one of the following:-

7-a.	Describe the steps needed to carry out one round of PCR. Please include in your description what happens during each step and why it is needed.?(CO4)	7
7-b.	What do you understand by SYBR green and Taqman? Compare these two methods.?(CO4)	7

8. Answer any one of the following:-

8-a.	Discuss DNA microarrays and protein microarrays along with their mechanism.?(CO5)	7
8-b.	What is cDNA microarray technology and discuss its applications? (CO5?	7