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Subject Code:- AMTBT0211

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech

SEM: II - THEORY EXAMINATION (20..... - 20.....)

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. For the production of a DNA copy, the enzyme which uses RNA is called: (CO1, K1) 1
- (a) DNA polymerase
- (b) RNA polymerase
- (c) DNA ligase
- (d) reverse transcriptase
- 1-b. The first transgeneic plant to be produced is: (CO2, K1) 1
- (a) Brinjal
- (b) Tobacco
- (c) Rice
- (d) Cotton
- 1-c. PCR is used: (CO3, K1) 1
- (a) to diagnose genetic diseases
- (b) to solve crimes
- (c) to study gene function
- (d) all of these
- 1-d. Which of the following technique doesn't involve electrophoresis for the separation of biomolecules? (CO4, K1) 1
- (a) Dot blotting

- (b) Southern blotting
(c) Northern blotting
(d) Western blotting
- 1-e. Which of the following is incorrect about Classification of microarray data? (CO5, K1) 1
- (a) For microarray data, clustering analysis identifies coexpressed and coregulated genes
(b) For microarray data, clustering analysis identifies coexpressed but not coregulated genes
(c) For microarray data, clustering analysis identifies and coregulated but not coexpressed genes
(d) Genes within a category have more similarity in expression than genes from different categories.
2. Attempt all parts:-
- 2.a. What do you understand by endonucleases? (CO1, K1) 2
2.b. What is M13 vector? (CO2, K1) 2
2.c. What is northern blotting? (CO3, K1) 2
2.d. Define nested PCR? (CO4, K1) 2
2.e. What is the application of automated DNA sequencing? (CO5, K1) 2

SECTION-B

20

3. Answer any five of the following:-

- 3-a. Explain the structure of DNA with neat and clean diagram. (CO1, K2) 4
3-b. Explain the importance of sticky and blunt ends in genetic engineering. (CO1, K2) 4
3-c. Write a note on R-plasmids. What is the importance of R-factor? (CO2, K2) 4
3-d. Describe Cosmids. How they are different from plasmids? (CO2, K2) 4
3.e. Explain in detail the procedure of isolation total RNA? (CO3, K2) 4
3-f. Differentiate between DNA polymerase I and DNA polymerase III. (CO4, K2) 4
3.g. Describe the role of DNA microarrays in clinical research. (CO5, K2) 4

SECTION-C

35

4. Answer any one of the following:-

- 4-a. Describe the methods available for the labelling of nucleic acids with suitable examples. (CO1, K2) 7
4-b. Discuss the role of methyl interference assay and DNase I footprint assay for the analysis of protein-DNA binding. (CO1, K3) 7

5. Answer any one of the following:-

- 5-a. Describe any three vectors in detail along with their applications. (CO2, K2) 7
5-b. Discuss the role of viral vectors in plant genome engineering. (CO2, K3) 7

6. Answer any one of the following:-

- 6-a. Explain the technique that is most useful to study gene expression? Describe the process in detail. (CO3, K2) 7
- 6-b. Describe expression cloning in prokaryotes and yeast? What is the role of BL21 in protein expression? (CO3, K3) 7
7. Answer any one of the following:-
- 7-a. Discuss any other enzyme that is suitable for PCR technique than Taq polymerase. Discuss with suitable points. (CO4, K3) 7
- 7-b. Discuss the role of linkers and adapters in genetic engineering? (CO4, K2) 7
8. Answer any one of the following:-
- 8-a. What are the different methods of DNA sequencing. Explain each method appropriately with its importance. (CO5, K3) 7
- 8-b. Explain the methods for the introduction of DNA into mammalian cells. (CO5, K2) 7

REG:JAN_JUN-2025