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Printed Page:-3 **Subject Code:- ABT0503**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
B.Tech
SEM: V - THEORY EXAMINATION (2025 - 2026)
Subject: Plant Biotechnology

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. What is plant tissue culture? (CO1, K1) 1

(a) The technique of in vitro maintaining and growing cells
(b) The technique of in vivo growing cells
(c) The technique of growing plants in gardens
(d) The technique of cutting plants

1-b. Tissue culture technique was first practised by _____ (CO1,K1) 1

(a) White
(b) Haberlandt
(c) Halperin
(d) Skoog

1-c. In transgenesis, only cloned genes are introduced into the donor. (CO2,K2) 1

(a) TRUE
(b) FALSE

1-d. Name the strategy where two-plasmid system is used for the introduction of the gene? (CO2,K2) 1

(a) Binary vector system
(b) Co-integration vector strategy
(c) Agrobacterium
(d) Selectable marker strategy

1-e. Plant breeding is a technique of improving. (CO3,K2) 1

(a) Agricultural crops

(b) Fodder crops
(c) Fruit varieties
(d) All the above

1-f. Apart from high yield, other main objective of plant breeding is---- (CO3,K2) 1

(a) Improvement of quality
(b) Development of resistance
(c) Establishment of change in duration
(d) All the above

1-g. During gene therapy, the possible ways through which the genes can be introduced into the cell are (CO4,K1) 1

(a) micro injection
(b) some viruses
(c) both 1 and 2
(d) Erythrocytes

1-h. In one type of gene therapy, functional genes are introduced into the sperm or the egg. This is called (CO4,K2) 1

(a) somatic cell gene therapy
(b) germline gene therapy
(c) vegetative cell gene therapy
(d) gametic gene therapy

1-i. Which component(s) is/are involved in CRISPR? (CO5,K2) 1

(a) Cas9 enzyme4
(b) DNA0
(c) sgRNA1
(d) All of the answers

1-j. The enzymatic activity of the Cas9 protein can be compared to------(CO5,K2) 1

(a) Glue2
(b) An anchor2
(c) Stapler2
(d) Scissors

2. Attempt all parts:-

2.a. What is Plant Tissue Culture? (CO1,K1) 2

2.b. What is binary vector ? (CO2,K1) 2

2.c. What is crop improvement? (CO3,K2) 2

2.d. What is DNA finger printing? (CO4,K1) 2

2.e. Where do CRISPRs come from? (CO5,K2) 2

SECTION-B 30

3. Attempt all parts:-

3.a. Answer any one of the following:-

3.a.(i) How will you avoid the growing of microbes in nutrient medium during culture process? What are the techniques used to remove the microbes? (CO1, K2) 6

3.a.(ii)	What is hardeninig and acclimatization? (CO1,K1)	6
3.b. Answer any one of the following:-		
3.b.(i)	Discuss the issues related to transgenic plants. (CO2, K1)	6
3.b.(ii)	What are transgenics? What are the benefits of transgenic plants.(CO2,K2)	6
3.c. Answer any one of the following:-		
3.c.(i)	What are the advantages and disadvantages to micropropagation? (CO3, K2)	6
3.c.(ii)	What are some things that might happen during the tissue culture process? (CO3, K2)	6
3.d. Answer any one of the following:-		
3.d.(i)	What are important aspects of crop improvement? (CO4, K2)	6
3.d.(ii)	What is the objective for crop improvement? (CO4, K3)	6
3.e. Answer any one of the following:-		
3.e.(i)	What is genome editing and CRISPR/Cas9? (CO5,K2)	6
3.e.(ii)	How does genome editing work? (CO5,K2)	6

SECTION-C 50

4. Answer any one of the following:-		
4-a.	What is Plant Tissue Culture? Explain the basic concepts involved in plant tissue culture.(CO1,K2)	10
4-b.	What is totipotency? (CO1,K2)	10
5. Answer any one of the following:-		
5-a.	Discuss the methods of direct gene transfer in plants? (CO2,K2)	10
5-b.	Write a detail note on A. rhizogenic and its applications. (CO2,K2)	10
6. Answer any one of the following:-		
6-a.	What are the various steps that a Botanist will undertake to release a new variety of plant? (CO3,K2)	10
6-b.	In crop improvement programmes, how are tissue culture methods beneficial over conventional methods of plant breeding?(CO3,K3)	10
7. Answer any one of the following:-		
7-a.	write an essay on transgenic crops, their current status and future prospects. (CO4, K3)	10
7-b.	What are biopharmaceuticals and Nutraceuticals? How will transgene technology can help in the production of these compounds from plants. (CO4,K2)	10
8. Answer any one of the following:-		
8-a.	How do you compare the CRISPR/Cas9 system with TALs in terms of specificity of the target? (CO5, K2)	10
8-b.	What is the Difference Between ZFN TALEN and CRISPR? (CO5, K2)	10