Printed Page:- 04

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 (2024 - 2025)

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

(a) White

(b) Haberlandt

(c) Halperin

(d) Skoog

1-b. What is micropropagation. (CO1,K1) 1

(a) The capacity to generate a whole new plant from any cell

(b) The capacity to generate some branches of new plant

(c) Both are corrected

(d) None of these

1-c. 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-d. Name the marker gene of streptomycin? (CO2,K2) 1

(a) HPT

(b) SPT

(c) PAT
(d) BXN

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. Which one is an improved variety of wheat (CO3,K2) 1

(a) A. 77
(b) Sonalika
(c) Chandramukhi
(d) Kuber

1-g. A technique called southern blotting is used in.....(CO4,K2) 1

(a) monoclonal antibody production
(b) In vitro culture
(c) genetic finger printing
(d) polymerase chain reaction

1-h. VNTR is----------(CO4,K1) 1

(a) variable nucleotide triplet repeat
(b) 2.variable nucleoside tandem repeat
(c) variable nucleoside triplet repeat
(d) 4.variable number of tandem repeats

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

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

1-j. The first plasmid used for the production of recombinant insulin is-------(CO5,K2) 1

(a) pBR 322
(b) Ti plasmid
(c) ACY 17
(d) pUC 18

2. Attempt all parts:-

2.a. What is Totipotency? (CO1,K2) 2

2.b. Name the two properties of agrobacterium ? (CO2,K2) 2

2.c. Name the five major crops of UttarPradesh. (CO3,K1) 2

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

2.e.	Name the component(s) is/are involved in CRISPR? (CO5,K2)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Write the various steps involved in cell suspension culture.(CO1,K2)	6
3-b.	What is an Synthetic Seed? How it is produced ?(CO1,K2)	6
3-c.	Describe the method of agrobacterium mediated gene transfer in plants.(CO2,K2)	6
3-d.	Draw the diagram of T- DNA? What genes are present on it ? Mention their functions.(CO2,K3)	6
3.e.	Why does the formation of callus increase the possibility of physiological and morphological variation in culture.(CO3,K2)	6
3.f.	Why are intergeneric crosses almost unknown and interspecific crosses rare in nature? (CO4,K2)	6
3.g.	With the help of a suitable example explain the mehtod of use of expression vector in the production of recombinant protein.(CO5,K3)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	What is an explant? What are the types of explants used in Plant Tissue Culture? (CO1,K2)	10
4-b.	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)	10

5. Answer any one of the following:-

5-a.	What is the impact of marker gene on environment? How to remove a marker gene.(CO2,K2)	10
5-b.	Do herbicide resistant crops have any environmental risks? Does the expression of these proteins harm the growth of the plant? (CO2,K3)	10

6. Answer any one of the following:-

6-a.	How are mutations beneficial for plant breeding? Discuss with an example. (CO3,K2)	10
6-b.	What is polyploidy? define different types of polyploidy in plant. explain how it can benefit in crop improvement.(CO3,K2)	10

7. Answer any one of the following:-

7-a.	What are biopharmaceuticals and Nutraceuticals? How will transgene technology can help in the production of these compounds from plants. (CO4,K2)	10
7-b.	How to prevent cryopreservation damage? Why is vitrification important for cryopreservation? (CO4,K2)	10

8. Answer any one of the following:-

8-a.	The introduction of CRISPR-Cas in plant breeding is opening up new approaches for crop improvement. Where do you think it is most effectively employed? (CO5,K3)	10

8-b. How does zinc finger nuclease help in genome editing? (CO5,K2) 10