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Roll No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

(SEM: FIFTH SEMESTER THEORY EXAMINATION (2022-2023)

Subject **Plant Biotechnology**

Time: 3Hours Max. Marks:100

General Instructions:

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. Which one of the following is the best suitable method for the production of virus free plants (CO1) 1

(a) Embryo culture
(b) Ovule culture
(c) Anther culture
(d) Meristem culture

1-b. Cytokinins are derivatives of (CO1) 1

(a) Adenine
(b) Guanine
(c) Thymine
(d) Uracil

1-c. Herbicide resistance marker *bar* gene encodes for (CO2) 1

(a) 5-enolpyruvyl-shikimate 3-phosphate
(b) Phosphinothricin acetyl transferase
(c) Acetolactate synthase
(d) Bromoxynil nitrilase

1-d. Disarming of Ti plasmid is (CO2) 1

(a) Removal of the 25 base pair repeats

(b) Removal of the T-DNA

(c) Removal of the Host specificity region

(d) Removal of the Virulence region

1-e. Which of the following is not a co-dominant marker? (CO3) 1

(a) AFLP

(b) RAPD

(c) RFLP

(d) SSR

1-f. In transgenic plants, the overexpression of proline provides tolerance against (CO3) 1

(a) Cold

(b) Osmotic stress

(c) Drought

(d) Salinity

1-g. Secondary metabolite is source for (CO4) 1

(a) Drugs

(b) Fragrances

(c) Dyes

(d) All of these

1-h. The conservation of plants *in vitro* has a number of advantages over *in vivo* conservation like (CO4) 1

(a) Sterile plants that cannot be reproduced generatively can be maintained *in vitro*

(b) *In vitro* storage of vegetatively propagated plants can result in great savings in storage space and time

(c) In vitro culture enables plant species that are in danger of being extinct to be conserved.

(d) All of the above

1-i. Zn^{+2} ions in zinc fingers are coordinated to which amino acid residues? (CO5) 1

(a) 2 Met and 2 Cys

(b) 4 Val or 2 Met and 2 Cys

(c) 2 Ala and 2 Gly

(d) 4 Cys or 2 Cys and 2 His

1-j. CRISPR is a defense mechanism to prevent attack by viruses that can harm them. It is found in (CO5) 1

(a) Bacteria

(b) Fungi

(c) Plant

(d) Animals

2. Attempt all parts:-

2.a.	What do you understand by cybrids in plant tissue culture? (CO1)	2
2.b.	Enlist the ideal characteristics of a reporter gene.(CO2)	2
2.c.	Define synthetic seed. (CO3)	2
2.d.	Explain the term nutraceuticals by giving suitable examples. (CO4)	2
2.e.	What do you understand by TALENs? (CO5)	2

SECTION – B

3. Answer any <u>five</u> of the following-

3-a.	Elaborate the applications of embryo culture in plant tissue culture? (CO1)	6
3-b.	Discuss the advantages of micropropagation?(CO1)	6
3-c.	Discuss any two methods of direct gene transfer in plant cells being used for genetic transformation. (CO2)	6
3-d.	With the help of any two suitable example discuss how herbicide resistance marker genes are being used for the detection of genetic transformants in plants. (CO2)	6
3-e.	Differentiate between RFLP and AFLP markers. (CO3)	6
3-f.	Elaborate how we can use plants for the production of antibodies. (CO4)	6
3-g.	Write the various applications of CRISPR Cas system. (CO5)	6

SECTION – C

4. Answer any <u>one</u> of the following-

4-a.	Enumerate the significance and uses of haploids. (CO1)	10
4-b.	State the various methods of creating protoplast fusion. (CO1)	10

5. Answer any <u>one</u> of the following-

5-a.	Draw the diagram of T-DNA and explain the functions of different genes present in it. (CO2)	10
5-b.	There are lot many environmental, social, and legal issues associated with transgenic plants. Justify the statement (CO2)	10

6. Answer any <u>one</u> of the following-

6-a.	With the help of suitable example explain how RAPD markers are being used in the genetic improvement of plants. (CO3)	10
6-b.	Discuss how various physical and chemical mutagens are being used for crop improvement. (CO3)	10

7. Answer any <u>one</u> of the following-

7-a.	Describe the method of plant conservation through cryopreservation. (CO4)	10
7-b.	Write a note on the production of secondary metabolites by plant tissue culture. (CO4)	10

8. Answer any <u>one</u> of the following-

8-a.	Elaborate the working mechanism of CRISPR-Cas system in the genetic improvement of crop plants. (CO5)	10

8-b. Explain how ZFNs can be used for genome editing. (CO5) 10