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(CBCS)

(6th Semester)

BOTANY

TWELFTH PAPER

(Plant Biotechnology, Experimental Embryology)

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks* : 10)

Tick (✓) the correct answer in the brackets provided : 1×10=10

1. The enzymes capable of adding methyl groups to the recognition site of restriction enzymes are known as

(a) phosphatase ( )

(b) kinase ( )

(c) nuclease ( )

(d) methylase ( )

2. The technique of producing multiple copies of segments of DNA is termed as

(a) reproductive cloning ( )

(b) molecular cloning ( )

(c) therapeutic cloning ( )

(d) organism cloning ( )

3. The genes conferring drug resistance that allows only cells that possess it to survive under certain conditions are

(a) selectable markers ( )

(b) scorable markers ( )

(c) lethal genes ( )

(d) transgenics ( )

4. The group of genes responsible for the transfer of the T-DNA region of Ti plasmid into the host plant is found in

(a) the nuclear pore complex (NPC) ( )

(b) the *vir* region ( )

(c) the plant cell wall ( )

(d) the oncogenes ( )

5. A mass of undifferentiated parenchyma cells that develops from explants is called

(a) embryo ( )

(b) zygote ( )

(c) callus ( )

(d) plantlets ( )

6. The phenomenon of the reversion of mature cells to the meristematic state leading to the formation of callus is called

(a) redifferentiation ( )

(b) totipotency ( )

(c) dedifferentiation ( )

(d) cytodifferentiation ( )

7. The production of transgenic organisms through rDNA technology is also known as

(a) genetic engineering ( )

(b) marker-aided genetic analysis ( )

(c) embryo rescue ( )

(d) somatic hybridization ( )

8. An example of insecticidal protein produced by *Bacillus thuringiensis* is

(a) *Mat*K ( )

(b) *Eco*P1 ( )

(c) *Cry*1Ac ( )

(d) *Vir*E2 ( )

9. A cell that lacks cell wall but contains nucleus and cytoplasm is called

(a) cytoskeleton ( )

(b) cybrid ( )

(c) plasmid ( )

(d) protoplast ( )

10. Induced fusion method of protoplast fusion requires compounds like polyethylene glycol (PEG) to serve as a

(a) fusogen ( )

(b) callus ( )

(c) suspension medium ( )

(d) buffer ( )

SECTION—B

(*Marks* : 15)

Write short notes on the following : 3×5=15

1. Ligases

OR

Applications of recombinant DNA techniques

2. The Ti plasmids of *Agrobacterium tumefaciens*

OR

Basic steps of transgenic plant production

3. Cryopreservation

OR

Explants

4. Plantibodies

OR

Biotechnology in agriculture

5. Disadvantages of somatic embryogenesis

OR

Cybrids

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. What is PCR? Describe each of the steps involved in PCR supported by appropriate diagrams. 1+9=10

OR

Briefly describe the following : 5+5=10

(a) Restriction enzymes

(b) Cloning vectors

2. What are reporter genes? Describe any four reporter genes used in plant transformation vectors. 2+8=10

OR

Write short notes on the following : 5+5=10

(a) Enzymes used in molecular cloning

(b) Gene gun

3. Explain the sterilization method required to prepare a sterile nutrient medium. Describe the major components of a nutrient medium. 2+8=10

OR

Give accounts of the following : 5+5=10

(a) Plant cell, tissue and organ culture

(b) Synthetic seeds

4. Give an account of transgenic cotton with emphasis on the different traits introduced through genetic transformation. 10

OR

Write short notes on the following : 5+5=10

(a) Transgenic tomato

(b) Golden rice

5. What is embryo culture? Describe the method and applications of embryo culture. 2+8=10

OR

Briefly discuss the following : 5+5=10

(a) Micropropagation

(b) Isolation of protoplast

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