2024

(CBCS)

(6th Semester)

BOTANY

TWELFTH PAPER

(Plant Biotechnology and Experimental Embryology)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(SECTION : A—OBJECTIVE)

(*Marks* : 10)

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

1. In polymerase chain reaction, _____ are used as primer.

(a) double-stranded DNA oligonucleotides ( )

(b) single-stranded DNA oligonucleotides ( )

(c) double-stranded RNA oligonucleotides ( )

(d) single-stranded RNA oligonucleotides ( )

2. In genetic engineering, modified or new gene transfer is done to

(a) make disease-resistant plant ( )

(b) introduce new traits ( )

(c) increase the yield of secondary metabolites ( )

(d) All of the above ( )

3. *Agrobacterium tumefaciens* is

(a) plant virus ( )

(b) gram-negative bacteria ( )

(c) gram-positive bacteria ( )

(d) plasmid ( )

4. _____ enzyme is responsible for making a DNA copy from RNA.

(a) DNA polymerase ( )

(b) RNase ( )

(c) Taq polymerase ( )

(d) Reverse transcriptase ( )

5. Which of the following is used as a solidifying agent for media?

(a) Beef extract ( )

(b) Peptone ( )

(c) Agar ( )

(d) Yeast extract ( )

6. Sterilization of media is achieved by _____ at the temperature ranging from 115 °C–135 °C.

(a) dry sterilization ( )

(b) autoclaving ( )

(c) flame sterilization ( )

(d) UV radiation ( )

7. Transgenic tomato ripes slower due to the antisense gene encoding the enzyme

(a) phytase ( )

(b) polygalacturonase ( )

(c) ribozyme ( )

(d) lipase ( )

8. In Golden rice, endogenous enzymes process the lycopene to beta-carotene in

(a) epidermis ( )

(b) seed coat ( )

(c) endosperm ( )

(d) aleurone cells ( )

9. A novel or increased production of GABA in edible plants would be an example of

(a) pest resistance ( )

(b) stress tolerance ( )

(c) delayed ripening ( )

(d) improved nutrition ( )

10. In protoplast fusion, the lack of _____ allows the plasma membrane of two or more protoplasts to come into intimate contact.

(a) cytoplasmic membrane ( )

(b) cell wall ( )

(c) cell membrane ( )

(d) nuclear membrane ( )

(SECTION : B—SHORT ANSWERS)

(*Marks* : 15)

Answer the following : 3×5=15

UNIT—I

1. What do you understand by the term 'vectors'?

OR

2. Write a short note on Taq polymerase.

UNIT—II

3. Write short notes on any two enzymes used in molecular cloning.

OR

4. Briefly describe the Ti-plasmids of *Agrobacterium tumefaciens.*

UNIT—III

5. Describe cryopreservation.

OR

6. Write on anther culture.

UNIT—IV

7. Describe plantibodies.

OR

8. Briefly describe the genes involved in the production of Golden rice.

UNIT—V

9. Differentiate between the direct and indirect method of somatic embryogenesis.

OR

10. Write a short note on embryogenesis.

(SECTION : C—DESCRIPTIVE)

(*Marks* : 50)

Answer the following questions : 10×5=50

UNIT—I

1. Describe the detailed process of amplification of DNA with diagram. Also add a short note on the applications of the process. 8+2=10

OR

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

   (a) Characteristics of plasmid

   (b) Restriction enzymes

UNIT—II

3. Briefly describe the following : 5+5=10

   (a) Gene gun

   (b) Transgenic plants

OR

4. Describe the method of agrobacterium-mediated gene transformation of plant cells. 10

UNIT—III

5. Why is sterilization needed in tissue culture? Describe the different sterilization methods used in plant tissue culture. 2+8=10

OR

6. Describe the components of growth media in detail. 10

UNIT—IV

7. Give an account of genetically modified crops, highlighting some commercially introduced plant varieties. 10

OR

8. Briefly describe the following : 5+5=10

(a) Flavr Savr tomato

(b) Golden rice

UNIT—V

9. What is protoplast? Describe the isolation and culture of protoplast. 2+8=10

OR

10. What is micropropagation? Describe the advantages and disadvantages of micropropagation. 2+8=10

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