

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2915

L

Unique Paper Code : 2162583601

Name of the Paper : PLANT BIOTECHNOLOGY: CONCEPTS AND APPLICATIONS

Name of the Course : Botany (Applied Life Science-2026)

Semester : VI

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **FOUR** questions in all.
3. Question No. 1 is compulsory.
4. Attempt all parts of every question together.
5. Draw well-labelled diagrams wherever necessary.

1. (a) Fill in the blanks (**any five**) (5×1=5)

- (i) Blue biotechnology focuses on applications derived from _____ organisms and aquatic environments.
- (ii) The process of introducing foreign DNA into a host cell is called in bacteria, and _____ in the eukaryotes.
- (iii) CRISPR-Cas9 is a modern gene-editing tool derived from the immune system of _____.
- (iv) pBR322 is a type of _____ plasmid cloning vector.
- (v) Southern blotting is used to detect specific _____ sequences, while Northern blotting detects _____.
- (vi) _____ are the world's first commercially available genetically modified flowers, developed by Florigene.

- (a) Match the following (**any five**) (5×1=5)

Column A	Column B
(a) Bt-cotton	i. delaying fruit softening
(b) Glyphosate	ii. Tissue culture
(c) Flavr Savr tomato	iii. phytoene synthase from maize + phytoene desaturase from <i>Pantoea ananatis</i> bacterium
(d) Restriction enzymes	iv. Broad-spectrum herbicide that inhibits the EPSPS enzyme
(e) Beta-carotene biosynthesis genes in Golden Rice	v. <i>cry</i> gene
(f) Ex-plant	vi. Molecular scissors

P.T.O.

- (c) Expand the following (**any five**) (5×1=5)
- (i) GMO
 - (ii) CRISPR
 - (iii) ABA
 - (iv) GUS
 - (v) YAC
 - (vi) SDS
2. Differentiate between the following (**any three**) (3×5=15)
- (a) Alkaline phosphatase and polynucleotide kinase
 - (b) Linker and Adapter
 - (c) Classical Biotechnology and Modern Biotechnology
 - (d) Prokaryotic and Eukaryotic vectors
3. Write short notes on the following (**any three**) (3×5=15)
- (a) Role of transgenics in bioremediation
 - (b) Transgenic crops and their biosafety
 - (c) Artificial seed
 - (d) Enzymes used in cloning
4. Answer the following : (2×7.5=15)
- (a) Define recombinant DNA technology. Describe steps in detail in the construction of recombinant DNA and its introduction into host organism. What are the essential tools used in this process.
 - (b) Explain protoplast isolation, culture, and fusion in plants,, and their role in plant biotechnology and crop improvement.
5. Answer the following : (2×7.5=15)
- (a) Explain, in detail the various methods of gene transfer to plants.
 - (b) What is nutrient medium? Explain the functions of mineral nutrients, vitamins, and hormones used in a nutrient medium.