2026

BOTANY

(Major)

Paper : BOT0600404

ANANDARAM DHEKIL PHOOKAN COLLEGE LIBRARY
Acc. No.
Date
Nagaon, Assam

(Applied Plant Biology)

Full Marks : 45

Time : 2 hours

The figures in the margin indicate full marks for the questions.

1. Answer the following as directed : 1×5=5

(a) Auxin : Cytokinin > 1 leads to the development of _____.

(Fill in the blank)

(b) Why do cDNA libraries vary between different tissues of the same organism?

(c) What is a palindromic DNA sequence?

(d) What do you mean by germplasm conservation?

(e) Name the microbe used in genetically engineered Roundup Ready soybeans.

2. Answer any *five* of the following questions : 2×5=10

(a) What are symmetric hybrids?

(b) State dedifferentiation and redifferentiation.

(c) Differentiate between selectable markers and screenable markers, giving one example of each.

(d) Why are protoplasts preferred over intact plant cells in techniques like microinjection and electroporation? Give two reasons.

(e) What are degenerate primers, and why are they used in PCR?

(f) What is a reporter gene? Name one commonly used reporter gene in plant transformation.

(g) What are the key features of an ideal cloning vector?

(h) Mention the significance of triploids in plant breeding.

(i) What are Moondust carnations? Name the foreign gene and its source used in the production of Moondust carnations.

(j) Mention how Bt-cotton remains insect pest-free.

(Continued)

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3. Answer any *four* of the following questions : 5×4=20

(a) Write a note on somatic embryogenesis.

(b) Explain the structure and features of pBR322 vector.

(c) Explain the principle of α-complementation in β-galactosidase screening. How does it help to distinguish recombinant from non-recombinant colonies? 2+3=5

(d) Describe the biolistic (particle gun) method of gene transfer.

(e) Write a note on primer design in PCR and factors affecting specificity.

(f) Write a note on transformation of bacterial cells.

(g) Discuss the process of haploid production.

(h) Write a note on Golden rice and its importance.

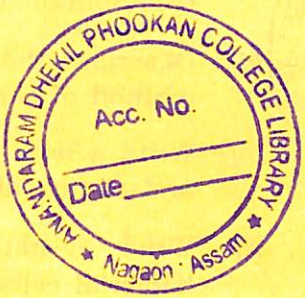
4. Answer any *one* of the following questions : 10

(a) Define protoplast culture. Give a detailed description of the methods of isolation, culture and regeneration of plant protoplasts.

(Turn Over)

(b) Describe in detail the construction and screening of a DNA library to isolate a gene of interest.

(c) Compare *Agrobacterium*-mediated gene transfer and direct gene transfer methods in plants.

(d) What are superbugs? Discuss the role of superbugs in degradation, detoxification and accumulation of pollutants. 2+8=10

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