

U.G. 6th Semester Examination-2025**BOTANY****[HONOURS]****Course Code : BOT-H-CC-T-14****(Plant Molecular Biology and Biotechnology)**

Full Marks : 40

Time : $2\frac{1}{2}$ Hours*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*1. Answer any five of the following questions: $2 \times 5 = 10$

- a) Mention the role of osmoticum during isolation of protoplast.
- b) State the importance of haploid culture.
- c) Which enzyme is specifically used in PCR and its reasons?
- d) What is palindromic sequence? Give example.
- e) What are the major differences in the structure of a gene cloned into genomic library and cDNA library? Give an advantage of each type of clone.

1+1

- f) Why T-DNA from wild type Ti plasmid cannot be used directly as vectors?

[Turn Over]

g) What is the strategy behind the production of Moondust carnations?

h) What are enhancers and silencers?

2. Answer any two questions: $5 \times 2 = 10$

a) Briefly discuss the functional role of different types of plant growth regulators used in tissue culture. What is totipotency? $2+2+1$

b) Define restriction enzyme. How do bacteria protect themselves from restriction enzymes? What is cosmid? $2+2+1$

c) Explain the process of α complementation with suitable diagram. Write the full form of PCR. $4+1$

d) With particular emphasis on 'Golden rice', briefly discuss how nutritional quality of crop plants can be improved using transgenic approach. 5

3. Answer any two of the following questions:

$10 \times 2 = 20$

a) Describe plant tissue culture technique that is used in the production of secondary metabolite. How can micropropagation contribute to germplasm conservation? Compare hybrid with cybrid. $4+4+2=10$

b) What are vectors? Discuss the properties of good vector. What are the differences between cloning vector and an expression vector? Explain with examples. $2+2+2+4=10$

c) What is meant by reporter gene? Critically differentiate between selectable marker and reporter gene. How GUS gene is used in plant transformation? Which bacteria are capable to induce hairy root culture? $2+2+5+1=10$

d) What is transgenic plant? Describe the process of development of Roundup Ready soybean. Give example of a superbug and mention its role in bioremediation. $2+4+4=10$