



**WEST BENGAL STATE UNIVERSITY**  
B.Sc. Honours 6th Semester Examination, 2024

**BOTACOR14T-BOTANY (CC14)**

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.  
Candidates should answer in their own words and adhere to the word limit as practicable.  
All symbols are of usual significance.*

1. Answer the following questions in brief: 1×6 = 6
  - (a) What is organogenesis?
  - (b) What is meant by “hardening” of tissue culture raised plants?
  - (c) What is ‘shuttle’ vector?
  - (d) What do you mean by competent cell?
  - (e) Cite one industrial application of the enzyme aspergillus.
  - (f) In microprojectile bombardment, which metal(s) are commonly used as microcarrier particles?
  
2. Answer any **eight** questions from the following: 3×8 = 24
  - (a) What is ‘Cryopreservation’? Mention two important applications of plant tissue culture in germplasm conservation. 1+2
  - (b) Mention the importance of different vitamins used in plant tissue culture media.
  - (c) Discuss the potential role of plant tissue culture in biodiversity conservation efforts.
  - ~~(d)~~ What is a DNA library? Differentiate between genomic DNA library and cDNA library. 1+2
  - (e) Critically differentiate between selectable markers and reporter genes.
  - ~~(f)~~ Draw a labelled diagram of a Ti plasmid indicating its important genes.
  - ~~(g)~~ Why there is a need for biosafety protocols to be followed in case of genetically modified organisms (GMOs)?
  - ~~(h)~~ Enumerate and discuss the important characteristics of an ideal cloning vector.
  - (i) Name the structural domains of ‘Cry proteins’. State the roles of the domains involved in insecticidal activities. 1+2
  - (j) What do you mean by ‘artificial seed’? Mention the advantages of artificial seeds. 2+1
  - (k) Explain the process of  $\alpha$ -complementation with suitable diagram.
  - ~~(l)~~ How does Roundup Ready® soybean plant tolerate the herbicide glyphosate?

3. Answer any *two* from the following: 5×2 = 10
- (a) What is somatic embryogenesis? Explain the process of development of a somatic embryo with suitable diagram.
- (b) What role do restriction enzymes play in bacteria? Describe how bacteria protect their own DNA from being cleaved by restriction enzymes. Compare the Type-I, II, III and IV restriction enzymes. 1+1+3
- (c) Write short notes on:
- (i) Cosmid
  - (ii) Humulin®.
- (d) Write the full form of PCR. State the name of enzyme responsible for DNA amplification used in this technique. Briefly explain the key steps involved in this process.  $\frac{1}{2} + \frac{1}{2} + 4$

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