



## BRAINWARE UNIVERSITY

Term End Examination 2023-2024  
Programme – M.Sc.(BT)-2022  
Course Name – Plant Biotechnology  
Course Code - MBTC301  
( Semester III )

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

### Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Mark the potential limitation of relying solely on molecular techniques in crop improvement.
- |   |                                |
|---|--------------------------------|
| a) Reduced precision in trait selection             | b) Increased genetic diversity |
| c) Ethical concerns related to genetic modification | d) Reduced crop productivity   |
- (ii) Name the growth of plant tissues in artificial media \_\_\_\_\_
- |                         |                       |
|-------------------------|-----------------------|
| a) Gene expression      | b) Transgenesis       |
| c) Plant tissue culture | d) Cell hybridization |
- (iii) In the following given options, select the vector that is genetic.
- |            |               |
|------------|---------------|
| a) Plasmid | b) Transposon |
| c) Phage   | d) Anopheles  |
- (iv) Out of the following, identify which one is NOT the basic component of culture media used for plant cultivation?
- |                             |                   |
|-----------------------------|-------------------|
| a) Complex mixture of salts | b) Amino acids    |
| c) Serum albumin            | d) Sugar/ sucrose |
- (v) Select the correct answer: By which mechanism does the transfer of genes into the chloroplast genome take place?
- |                          |                             |
|--------------------------|-----------------------------|
| a) Replication           | b) Homologous recombination |
| c) Restriction digestion | d) Apoptosis                |
- (vi) Cite which of the following is NOT a plant growth regulator?
- |                  |                |
|------------------|----------------|
| a) Auxin         | b) Cytokinins  |
| c) Abscisic acid | d) Polyphenols |
- (vii) Which of the following plant hormone control fruit ripening?
- |                 |                  |
|-----------------|------------------|
| a) Ethylene     | b) Auxin         |
| c) Gibberellins | d) Abscisic acid |

- (viii) Vectors based on naturally occurring \_\_\_\_\_ of Agrobacterium are used in plants.
- a) Plasmids  
b) Phages  
c) Cos sites  
d) Chromosomes
- (ix) On Ti-plasmid T-region or T-DNA is flanked by a direct repeat of
- a) 12 bp  
b) 20 bp  
c) 25 bp  
d) 30 bp
- (x) What is the basis of "binary vector" strategy?
- a) No physical attachment  
b) Big size  
c) Strain dependence  
d) Lysogenic/lytic cycle
- (xi) In a plant tumour cell
- a) complete Ti plasmid is incorporated in plant nuclear DNA  
b) different parts of the Ti-plasmid are incorporated  
c) only a small specific segment of callus T DNA is incorporated  
d) may vary from plant to plant
- (xii) Name the first transgenic virus resistant plant?
- a) Rice  
b) Cotton  
c) Tobacco  
d) Tomato
- (xiii) Select the correct answer for cereal seed proteins:
- a) They are rich in Lysine  
b) They are deficient in Lysine  
c) They are rich in Alanine  
d) They are deficient in Alanine
- (xiv) What is the role of auxins in tissue culture?
- a) Promoting root formation  
b) Promoting shoot formation  
c) Inhibiting cell division  
d) Inhibiting leaf growth
- (xv) Determine the main advantage of conventional hybrid plants over GM plants in terms of regulatory approval.
- a) They require less testing and regulation  
b) They are immune to diseases  
c) They have lower crop yields  
d) They are less adaptable to changing environmental conditions

#### Group-B

(Short Answer Type Questions)

3 x 5=15

2. How do crown gall infections first appear? (3)
3. How do scientists evaluate that DNA delivery methods are safe for the environment and human health? (3)
4. Elaborate the process of PEG mediated DNA delivery in protoplasts. (3)
5. What do you mean by tissue specific promoter? (3)
6. Distinguish in between Ti Plasmid and TDNA (3)

OR

Briefly explain the processes of plant transformation. (3)

#### Group-C

(Long Answer Type Questions)

5 x 6=30

7. Describe the protocol of chloroplast transformation in brief. (5)
8. Justify the significance of plant tissue culture and plant molecular biology as the fundamental units of plant biotechnology in crop improvement. (5)
9. Explain the role of genetic engineering in confirming resistance to herbicides (5)
10. What are the applications of Somatic embryogenesis? (5)
11. Recommend your opinion on how can biotic and abiotic stresses be mitigated through crop improvement strategies? (5)

12. Examine the potential applications of plant-based vectors in environmental remediation. (5)

**OR**

Write down the key technologies and methods used in the development of marker-free plants? Provide examples of these methods. (5)

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