

M.TECH/BT/1<sup>ST</sup> SEM/BIOT 5141/2019  
**AGRICULTURAL BIOTECHNOLOGY**  
**(BIOT 5141)**

**Time Allotted : 3 hrs**

**Full Marks : 70**

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and  
any 5 (five) from Group B to E, taking at least one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group - A**  
**(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Most of the phytoalexins are a type of  
(a) terpenoid (b) alkaloid  
(c) flavonoid (d) none of (a), (b) and (c).
- (ii) Phosphinothricine is  
(a) Herbicide (b) Pesticide  
(c) Fungicide (d) none of (a), (b) and (c).
- (iii) Fern commonly inoculated to paddy fields is  
(a) Azolla (b) Marsilea  
(c) Salvinia (d) Anabaena.
- (iv) Carotenoids are  
(a) terpenoid (b) alkaloid  
(c) flavonoid (d) none of (a), (b) and (c).
- (v) Mycorrhizae is associated with the following  
(a) Formation of root nodules (b) Hyphae penetrating the soil  
(c) Found mostly in lower plants (d) Soil erosion.
- (vi) Which of the following organisms forms a beneficial symbiotic relationship with plant roots to help the plant get Nitrogen?  
(a) Rhizobium (b) Mycorrhizae  
(c) Lichen (d) Mycelium.
- (vii) The enzyme that first fixes CO<sub>2</sub> in C<sub>4</sub> plants is  
(a) Rubisco (b) PEPC  
(c) Either of the two (d) none(a), (b) and (c).

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- (viii) Which of the following is a cloning vector  
(a) Cosmid (b) Phasmid  
(c) Plasmid (d) all (a), (b) and (c).
- (ix) The BT gene was taken from  
(a) *Bacillus thuringiensis*  
(b) Artificially synthesized by codon optimization  
(c) Promoter region of BT-gene  
(d) cotton BT gene.
- (x) HMG CoA reductase is required for the synthesis of  
(a) IPP (b) flavonoid  
(c) gibberellin (d) none of (a), (b) and (c).

**Group - B**

2. (a) Define marker.  
(b) Mention four characteristics which an ideal DNA marker should possess.  
(c) Write a comparative analysis between RAPD and AFLP.  
**2 + 4 + 6 = 12**
3. (a) SSR markers are useful for variety of applications in plant genetics and breeding – cite the reasons and briefly describe it.  
(b) Schematically represent the development and application of genetic simple sequence repeat markers.  
**8 + 4 = 12**

**Group - C**

4. (a) Compare and contrast: breeding vs. Transgenic technology.  
(b) How high yielding winter wheat variety was developed?  
(c) Write the prospect for Second Green Revolution. Why at all it has become utmost necessary?  
**4 + 4 + 4 = 12**
5. (a) What is meant by photosynthetic efficiency and dry matter partitioning?  
(b) How photosynthetic efficiency can be improved?  
**(3 + 3) + 6 = 12**

**Group - D**

6. (a) What are alkaloids? Give examples of two active alkaloids with their plant source and mode of action.

(b) Terpenoids are secondary metabolites- explain.

$$(2 + 3 + 3) + 4 = 12$$

7. (a) Write mode of action of tocopherol and glutathione reductase.

(b) Name three industrially important enzymes extracted from plant and discuss their mode of action.

$$(3 + 3) + 6 = 12$$

**Group - E**

8. (a) Write short notes on artificial seed production.

(b) Briefly describe the role of microalgae as microbial fertilizer citing suitable example.

(c) Explain the advantage of microbial fertilizer over conventional fertilizer

$$4 + 6 + 2 = 12$$

9. (a) Write briefly on cryopreservation.

(b) Mention different potential products isolated from bacteria which are antioxidant, antiviral, anticancer and anti inflammatory in nature citing suitable example.

$$4 + (4 \times 2) = 12$$