M.TECH/BT/1st SEM/BIOT 5131/2017
AGRICULTURAL BIOTECHNOLOGY
(BIOT 5131)

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) Free living nitrogen fixing bacterium is
(a) clostridium (b) azotobacter
(c) rhizobium (d) both (a) and (b).

(ii) Most of the phytoallexins are a type of
(a) terpenoid (b) alkaloid
(c) flavonoid (d) none of these.

(iii) A fern commonly inoculated to paddy fields is
(a) Azolla (b)Marsilea
(c) Salvinia (d) Anabaena.

(iv) To obtain haploid plant we need
(a) entire anther (b) matured embryo
(c) nucleus (d) apical bud.

(v) RAPD is
(a) DNA sequencing method
(b) restriction digestion based method
(c) PCR based method
(d) all of these.

(vi) Rubisco binds to
(a) O_2 only (b) CO_2 only
(c) none (d) both.

(vii) Carotenoids are
(a) terpenoid (b) alkaloid
(c) flavonoid (d) none of these.

(viii) 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.

(ix) The enzyme that first fixes CO_2 in C3 plants is
(a) Rubisco (b) PEPC
(c) either of the two (d) none.

(x) Part of plant used for culturing is
(a) Callus (b) Explants
(c) Scion (d) Stock.

Group - B

2. (a) Mention the characteristics of a genetic marker.

(b) Mention different categories of molecular marker with suitable example.

(c) Mention how molecular markers are effective in plant breeding.

(d) Mention the advantages of MAS.

2 + 3 + 3 + 4 = 12

3. (a) What is QTL and eQTL?

(b) Mention any two applications of QTL.

(c) Mention the different types of SSRs.

(d) What is the use of MISA, the public domain, with respect to SSR.

(e) Mention the advantages of SSR markers over the other marker system.

(1 + 1) + 4 + 2 + 1 + 3 = 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) Name two physiologically active alkaloids with their plant source and mode of action.

(b) Alkaloids are secondary metabolites- explain.

(2 + 2 + 4) + 4 = 12

7. (a) What is glyphosate? Write down its mode of action.

(b) Write any two techniques for developing herbicide resistant plant.

2 + 4 + 6 = 12

Group - E

8. (a) "Nitrogen fixing heterocysts helps in improvement of soil fertility"- What are these heterocysts?

(b) Write how they help in improvement of soil feritility.

(c) Mention different potential products which are antioxidant, antiviral, anticancer and anti inflammatory in nature and which have been isolated from cyanobacteria?

1 + 3 + (4 × 2) = 12

9. (a) Mention briefly the process of somaclonal variation.

(b) Mention the role of factors which triggers this phenomena.

(c) Mention the importance of germplasm conservation in agriculture.

4 + 4 + 4 = 12