M.TECH/BT/1ST SEM/BIOT 5131/2016

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) The enzyme that first fixes CO_2 in C4 plants is
(a) Rubisco (b) PEPC
(c) both (a) and (b) (d) none.

(ii) MISA is a public domain developed for recognition of
(a) SSR patterns in the sequence files
(b) SNPs in the sequence files
(c) ESTs in the sequence files
(d) marker patterns in the sequence files.

(iii) Secondary metabolites are produced in
(a) tropophase (b) idiophase
(c) lag phase (d) none of these.

(iv) Essential oil belong to the group----of secondary metabolites,
(a) terpenoids (b) alkaloids
(c) resinous (d) sapogenins.

(v) RFLP are identified by
(a) southern blots (b) northern blots
(c) western blots (d) SDS-PAGE.

(vi) In AFLP which of the following two types of restriction endonucleases are used in digestion:
(a) one is 4 base and other is 6 base cutter
(b) one is 3 base and other is 6 base cutter
(c) one is 2 base and other is 4 base cutter
(d) one is 4 base and other is 8 base cutter.

(vii) A new variation on multicolor FISH is the use of ...,
(a) cosmid vector (b) padlock probes
(c) single nucleotide polymorphism (d) expressed sequence tags.

(viii) Gramene is a
(a) relational database and website for grass comparative genomics
(b) structural database and website for graminae family
(c) relational database and website for graminae family
(d) structural database and website for grass comparative genomics.

(ix) In developing BT-cotton, the transgene used is
(a) exactly same to that of *Bacillus thuringiensis*
(b) totally different from *Bacillus thuringiensis*
(c) codon optimized
(d) under a changed promoter.

(x) HMG CoA reductase is required for the synthesis of
(a) IPP (b) flavonoid
(c) gibberellin (d) none of these.

Group – B

2. (a) Define the following terminologies: morphological marker, genetic marker, dominant marker, co-dominant marker.

(b) Mention four characteristics which an ideal DNA marker should posses.

(2 × 4) + 4 = 12

3. (a) Define QTL.

(b) Mention the situation where advanced backcross AB-QTL analysis is used citing the crop names.

(c) Describe the process how EcoTILLING method can be used for agricultural applications.

2 + (3 + 2) + 5 = 12

Group – C

4. (a) Compare the two ways of plant improvement — breeding and transgenic.

(b) Why the 'Dwarf' character has been such a useful trait for development of high yielding varieties of crop?

(c) Write the prospect for Second Green Revolution. Why at all it has become utmost necessary?

4 + 4 + 4 = 12

5. Describe the detailed mechanism of development of Golden Rice with the help of a flow chart.

12

Group – D

6. (a) Name two physiologically active alkaloids with their plant source and mode of action.

(b) 'Alkaloids are secondary metabolites' — explain.

8 + 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) Define mycorrhizae.

(b) Mention the different types of mycorrrhizae

(c) Mention the usefulness of this in plant system. Cite the application of it in agriculture.

2 + 3 + (4 + 3) = 12

9. (a) Mention the basic steps followed to achieve a successful micropropagation.

(b) Describe the usefulness of this application along with the limitations.

(c) Write short notes on artificial seed.

4 + (2 + 2) + 4 = 12