PLANT BIOTECHNOLOGY
(BIOT 3202)

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) Which of the following is a component of Binary vector system
(a) pGreen (b) pCAMBIA 1301
(c) pBI121 (d) all of these

(ii) ABRE-35S CaMV (upto -40) chimera is used as
(a) selectable marker gene (b) visible marker gene
(c) inducible promoter (d) transgene

(iii) Pathogenesis Resistant proteins are expressed
(a) When a plant is exposed to biotic stress (b) At the site of infection
(c) Only in plants resistant to pathogen (d) None of these

(iv) Vir D1/D2 is a/an
(a) Autophosphorylating kinase (b) Endonuclease
(c) Transcriptional activator of *vir* operon (d) ssDNA binding protein

(v) Digitoxin is a/an
(a) Drug for heart disease (b) Anticancer drug
(c) Antifertility compound (d) Antihypertension drug

(vi) Which one of the following vitamins is an integrated part of plant tissue culture medium?
(a) Nicotinic acid (b) Myo-inositol
(c) Retinoic acid (d) Vitamin-C

(vii) Which one of the following is not used for immobilization of plant cells?
(a) Alginate (b) Chitin
(c) Carageenan (d) Hollow fibres

(viii) SUMOylation results into
(a) Recruitment of HDAC (b) Recuitment of HAT
(c) Recruitment of RNA polymerase (d) Recruitment of DNA polymerase

(ix) Plant homeodomain proteins are
(a) Leucine Zipper transcription factor (b) Zn-finger transcription factor
(c) Developmental transcription factor (d) Basal transcription factor

(x) Different strains of *Agrobacterium tumefacience* produces
(a) Octopine (b) Nopaline
(c) Agropine (d) Either of these

Group – B

2. (a) Why explants darken and lose its functionality after transfer to a new media?

(b) What is the actual phenomenon going on and mention how this problem can be overcome.

(c) Write a short note on: micropropagation and its importance in plant tissue culture industry.

4 + 4 + 4 = 12

3. (a) Auxin is needed for the sustenance of plant life-justify the statement in view of its application aspect (write any three).

(b) Mention the name of any two synthetic auxins.

(c) Mention the mode of action of auxin with suitable diagram with respect to acid growth hypothesis.

3 + 2 + (5 + 2) = 12

Group – C

4. (a) What are the major differences between primary and secondary metabolites? Mention briefly any five factors affecting the production of secondary metabolite production.

(b) Name the plant secondary metabolite compound with an antimalarial property and write the chemical nature and biosynthetic pathway of it.

(2 + 5) + 5 = 12

5. (a) What are precursors? Give two example of precursors with the plant name and product name

(b) Mention the name of a stress metabolite which is produced in tobacco cell suspension culture and describe how this is produced?

(2 + (4 × 2)) + (1 + 1) = 12

Group – D

6. (a) What is histone code hypothesis? State its principle in context of nuclear gene regulation in plant.

   (b) Describe the structure of eukaryotic core promoter. How much of it must be taken from CaMV 35S rRNA promoter in cloning of a transgene?

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

7. (a) Describe the structure of basic leucine zipper class of transcription factor with a diagram.

   (b) Describe the experiment of Barbara McClintock in the discovery of Activator and Dissociation elements in Maize. Give an account of them.

6 + (3 + 3) = 12

Group – E

8. (a) Compare the following techniques for gene delivery to plant cells:
   Protoplast fusion, LASER-mediated.

   (b) Mention the role of following components in plant expression vectors:
   Kanamycin resistant gene, GFP, 35S CaMV promoter

(3 + 3) + (2 + 2 + 2) = 12

9. (a) Compare the advantages and disadvantages of Agro-mediated gene delivery with particle gun method.

   (b) Mention two examples gene based herbicide resistance in plants.

   (c) Write short notes on the constructs used for the production of Golden Rice with suitable diagrams.

3 + 3 + 6 = 12

Department & Section	Submission Link
BT	https://classroom.google.com/c/MzE3NDgxMzAzMzI5/a/MzY1MTYyNDUxMjUx/details