Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech/BT(NEW)/SEM-6/BT-603/2013

2013

PLANT BIOTECHNOLOGY

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

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

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

i) Shoot meristem is used for which of the following purposes ?
   a) Androgenesis b) Micropropagation
   c) Somatic hybridization d) None of these.

ii) Biotransformation of digitoxin to digoxin, a cardioprotectant, involves which of the following reaction type ?
   a) Hydroxylation b) Glycosylation
   c) Acetylation d) Methylation.

iii) Glyphosate inhibits the activity of EPSP synthase by
   a) metabolizing one of the substrates of this enzyme
   b) binding to EPSP synthase in place of PEP
   c) degrading EPSP synthase
   d) transporting EPSP synthase to the chloroplast.

iv) First attempt of plant tissue culture done by
   a) power b) murashige & skoog
   c) white d) haberlandt.

v) Neutralized activated charcoal is occasionally added to young regenerating cultures to
   a) remove toxic phenolics produced by the stressed plant cell
   b) help to remove plants growth regulators introduced at an earlier stage
   c) both (a) and (b)
   d) maintain the pH of the medium.

vi) Which technique is used to introduce genes into dicots ?
   a) Electroporation b) Particle acceleration
   c) Microinjection d) Ti plasmid infection.

vii) Opines are
   a) amino acid derivatives found in tumor tissues
   b) amino acid derivatives found in normal tissues
   c) amino acid derivatives found in both normal as well as tumour tissues
   d) none of these.

viii) Which of the following genes are constitutively expressed and control the plant induced activation of other *vir* genes ?
   a) *vir A* and *vir G* b) *vir C* and *vir D*
   c) *vir B* and *vir E* d) *vir A* and *vir B*.

ix) What is essential for *T*-DNA transfer ?
   a) Inverted repeat border sequences
   b) Palindromic border sequences
   c) Direct repeat border sequences
   d) An Atul restriction site at the border sequence.

x) What are the precursors for the synthesis of nopalines ?

a) Pyruvat + amino acid

b) Alpha-Ketoglutarate + amino acid

c) Oxalate + amino acid

d) Phosphoenolpyruvat + amino acid.

xi) Native GFP emits green light and is excited by

a) UV light b) blue light

c) yellow light d) red light.

xii) Which of the following statements is true for Datura innoxia ?

a) In this plant, anther culture technique was first successfully developed by Guha and Maheshwari

b) It shows good response when culture media contains 2-4% sucrose

c) The best stage for pollen culture is just before or after first mitosis of pollen

d) All of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Mention the types of somatic embryogenesis. Mention the role of synthetic auxin in this process.

3. Mention the role of auxin and gibberellin in plant cellular activity.

4. What is open continuous culture ? How does it differ from batch cultre ? 2 + 3

5. Write short notes on any *two* of the following : $2 \times 2\frac{1}{2}$

a) Catharanthus alkaloids

b) Hairy root culture

c) Physical conditions for tissue culture.

6. What are the applications of haploid culture in agriculture ?

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) What do you mean by immobilization ?
   b) Mention its effectiveness in plant tissue culture.
   c) Write any three polymers associated with immobilization.
   d) Mention how viability can be tested in immobilized cells.
   e) Mention two examples of secondary metabolites in immobilized system with product and the type of immobilization. 2 + 3 + 3 + 3 + 4

8. a) Describe the different levels of DNA packaging into a metaphase chromosome.
   b) Does conformational variation in chromatin, both chemical and sequential, play an important role in nuclear gene regulation in plant ?
   c) How *m*RNA turnover is important in plant genome regulation ?
   d) What is understood by *C*-value paradox ? 3 + 4 + 4 + 4

9. What is *T*-DNA ? Mention in brief the process of Ti-DNA transfer and integration in plant citing examples with suitable diagrams. Briefly describe vector less plant DNA transfer methods. 2 + 4 + 5 + 4

10. What are elicitors ? Give an example of each type of elicitors. Mention the role of elicitors in plant cell culture production with suitable example. Mention the benefits of somaclonal variation for crop improvement. 2 + 3 + 4 + 6

11. Define Plant Secondary metabolites. What are the different factors we should consider during optimization of secondary metabolite production in *in verto* culture system ? Explain each factor with suitable example. 2 + 3 + 10

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