Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(BT-NEW)/SEM-6/BT-601/2011

2011

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 × 1 = 10

i) Role of auxin in plant science in relation to plant tissue culture was first put forward by

a) R.J. Gautheret b) P. Nobecourt

c) F. Skoog d) P.R. White.

ii) Which one of the following plant growth regulator is required for shoot induction in plant tissue culture ?

a) Auxin b) Cytokinin

c) Gibberellic acid d) Ethylene.

iii) Which of the following is not used for surface sterlization of explants ?

a) $HgCl_2$ b) H_2O_2

c) UV radiation d) Sodium hypochlorite.

iv) C-value represents

a) haploid genome content of eukaryote

b) diploid genome content of eukaryote

c) polyploidy in eukaryote

d) none of these.

v) The protein that first binds ot TATA box in plant is

a) TF II A b) TF II B

c) TBP d) TF II D.

vi) Synthetic seed is produced by encapsulating somatic embryos with

a) Sodium alginate

b) Sodium nitrate

c) Sodium acetate

d) Sodium sulphate.

vii) Digitoxin is an/a

a) drug for heart disease

b) anticancer drug

c) antifertility compound

d) antihypertension drug.

viii) RNA editing is prevalent in the regulation of gene expression in

a) mitochondrial genome

b) nuclear genome

c) chloroplast genome

d) all of these.

ix) Binary vector system is used in

a) *Agrobacterium*-mediated plant transformation

b) Biolistic

c) Chlorobacterium transformation

d) PEG-mediated plant transformation.

x) Ubiquitination is the signal for

a) protein degradation

b) post-translational modification

c) *m*RNA degradation

d) protein retention.

xi) In which phase of growth curve of callus/cell suspension culture of plant secondary metabolites accumulate

a) Stationary phase

b) Lag Phase

c) Log Phase

d) Lag and Stationary phase.

xii) Ribozyme is

a) RNA with enzyme activity

b) self-replicating RNA

c) RNase

d) RNase A.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Describe the non-lysosomal pathway of protein degradation in plant. Why is this of more consequence in case of plants ? Mention its importance in plant gene regulation citing one example. 2 + 1 + 2

3. Give an outline of the process technology of diosgenin.

4. What is copy-nature strategy ? Explain its role in plant biotechnology.

5. Compare and contrast between chloroplast and mitochondrial genome.

6. The following are plant derived antibodies on the left side. Match with its suitable activity from the right side list :

a)	Aricidine	i)	Cancer imaging
b)	T84·66	ii)	Anticancer activity
c)	Caro Rx	iii)	Therapy for non-Hodgkin lymphoma
d)	38C13	iv)	Controls tooth decay
e)	PIPP	v)	Pregnancy detection.

GROUP – C
(Long Answer Type Questions)

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

7. Write short notes on any *three* of the following :

   a) Catharanthus alkaloids

   b) Hairy root culture

   c) Physical conditions for tissue culture

   d) Somaclonal variation.

8. a) "Success in product formation (biomass/metabolites) in tissue culture depends on the wise manipulation of physico-chemical conditions of the media." Explain with suitable example. 8

b) Mention the importance of alkaloids in plant. 2

c) Name the plant secondary metabolite compound with hypotensive property found from *Chatharanhus roseus*. Write the chemical nature of it and biosynthesis procedure of that compound with the precursor. 5

9. a) Describe the different levels of DNA packaging into a metaphase chromosome.

b) How conformational variation in chromatin, both chemical and sequential, plays and important role in nuclear gene regulation in plant ?

c) How is *m*RNA turnover important in plant genome regulation ?

d) What is understood by C-value paradox ?

3 + 4 + 4 + 4

10. a) Mention the role of basal transcription factors in plant *m*RNA transcription stating how they are arranged in transcription initiation complex.

    b) What are the different families of plant transcription factors ? Give one example from each class.

    c) Describe the structure of bZIP class of transcription factor with a diagram.

    d) Name some important *cis*-regulatory elements that play an important role to enhance plant gene transcription.

    4 + 4 + 4 + 3

11. a) What is the strategy for making transgenic crop plant resistant against phosphinothricin (Basta) application.

    b) Briefly describe the structure and function of cry proteins.

    c) What are the modifications adopted for having optimum expression level of Cry proteins in plants. 6 + 5 + 4