Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.Tech(BT)/SEM-1/MBT-103/2010-11

2010-11

ADVANCED 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) pGV3850 is a

a) Cloning vector b) Disarmed Ti plasmid

c) Promoter d) Terminator.

ii) A plasmid can be transformed into *Agrobacterium* by

a) $CaCl_2$ -phenol mediated gene delivery

b) Tri-parental mating

c) electroporation

d) all of these.

iii) Glutathione acts as antioxidant due to the presence of

a) sulphydryl grp b) carbonyl grp

c) Hydroxyl grp d) none of these.

iv) Acyl thioesterase enzyme involved in the genetic modification of

a) plant oil b) protein

c) carbohydrate d) none of these.

v) *aad, ble, dhfr, npt II,, aph II* are genes well known as

a) visible marker gene

b) reporter gene

c) selectable marker gene

d) transgene.

vi) Chromosomal genes necessary for T-DNA transformation are

a) *chv A* and *chv B* b) *vir*-operon

c) LB and RB d) none of these.

vii) In HAPPY mapping

a) chromosome breaks are introduced by irradiating somatic cell hybrids

b) genomic DNA is sheared by vortexing sonication

c) chromosome breaks are introduced by vortexing or sonication

d) genomic DNA is sheared by irradiating somatic cell hybrids.

viii) KEGG is an example of

a) metabolic pathway b) genomic database

c) molecular marker d) proteomic approach.

ix) Particular pattern of sequential SNPs (or alleles) found on a single chromosome in a single individual is known as

a) Haplotype b) Genotype

c) Hap map d) SNP map.

x) Arabdiopsis genome initiative group employed several libraries as primary strategy for sequencing, which is not correct from the list

a) BAC b) CAC

c) TAC d) PAC.

xi) 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.

xii) Bagasse extensively tried as raw material for the production of

a) Bioethanol b) hydrogen gas

c) organic acid d) charcol.

xiii) Polyunsaturated fatty acids are obtained from

a) diatom b) blue-green algae

c) red algae d) coconut shell.

xiv) In AFLP two types of restriction endonucleases used in digestion are

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.

GROUP – B

(Short Answer Type Questions)

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

2. Describe chloroplast transformation mentioning its advantages.

3. What is superbinary vector and supervirulent strain of Agro ?

4. What is herbicide ? Give one example with mode of action.

5. Mention the application of molecular markers in selection of plant genes.

6. What is Mycorrhizal symbiotic system ? Discuss the contribution of vesicular-arbuscular mycorrhizal fungi on soil and plant community in brief. 2 + 3

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

   a) Quantitative trait loci

   b) Positional cloning

   c) AFLP

   d) RAPD.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

8. a) What do you mean by mapping ?

   b) Mention the different types of mapping.

   c) Mention briefly radiation hybrid mapping and *in situ* hybridization methods. 2 + 3 + (5 + 5)

9. a) Define marker.

   b) Mention different types of molecular marker.

   c) Mention how molecular marker effective in plant breeding.

d) Write briefly on the following :

i) MP-PCR

ii) STS

iii) Isozyme

iv) KEGG. 2 + 2 + 3 + (4 × 2)

10. a) What is T-DNA ?

b) Describe its structure in different strains of *Agrobacterium.*

c) Mention the functions of all *vir*-genes in the natural process of gene delivery of *Agrobacterium* to plant cell.

d) What are the advantages of Agro-mediated gene delivery ? 2 + 5 + 5 + 3

11. a) What are ROS ?

b) How are they generated ?

c) Describe the mode of action of glutathione in prevention ROS.

d) Explain the mechanism salt tolerance other than glycine betaine production. 2 + 3 + 5 + 5

12. a) Mention how the expression of a transgene can be maximized by optimization of the following things :

i) Codon

ii) Transgene positioning

iii) Inducible promoter.

b) Write short notes on Gene Silencing and Clean-Gene Technology. 3 + 3 + 3 + 3 + 3

13. a) Give a short introduction on morphology and physiology of different microalgae

b) What are different high valued metabolites obtained from cyanobacteria ?

c) What are different potential antiviral, antituberculosis and anti inflammatory compounds have been isolated from cyanobacteria ? 4 + 5 + 6