



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

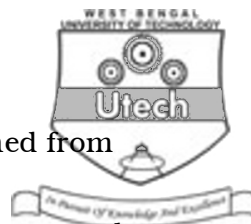
- i) pGV3850 is a
 - a) Cloning vector
 - b) Disarmed Ti plasmid
 - c) Promoter
 - d) Terminator.
- ii) A plasmid can be transformed into *Agrobacterium* by
 - a) CaCl_2 -phenol mediated gene delivery
 - b) Tri-parental mating
 - c) electroporation
 - d) all of these.
- iii) Glutathione acts as antioxidant due to the presence of
 - a) sulphhydryl 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 gramineae family
 - c) relational database and website for gramineae 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

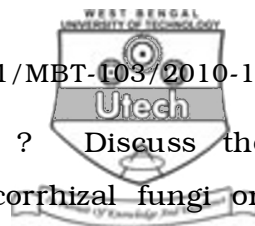
- a) one is 4 base and other is 6 base cutter
- b) one is 3 base and other is 6 base cutter
- c) one is 2 base and other is 4 base cutter
- d) one is 4 base and other is 8 base cutter.

GROUP – B

(Short Answer Type Questions)

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

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

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