



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/MBT/PHMB/SEM-3/MBT, PHMB-301/2009-10**

**2009**

**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**

1. Write short notes with figure where it is necessary for any *ten* of the following : 10 × 1 = 10
  - i) What is Biotechnology ? Is it different from Molecular Biology, Tissue Culture, Physiology and Biochemistry ?
  - ii) Mention about the specific use and difference between TaQ DNA polymerase and Pfu DNA polymerase.
  - iii) What are the products from plants, that have the ability to regulate gene expression in plant system ?
  - iv) What are the environmental factors that have the ability to regulate gene expression in plants ?
  - v) A promoter not from a plant source but is commonly used to express cDNAs in plant system constitutively. Why does it function as constitutive promoter ?



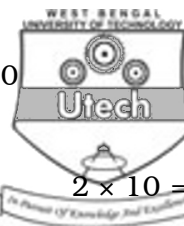
- vi) What are the genes expressed to produce Golden Rice and what are the promoters used to do that ?
- vii) Cite one evidence to show that Molecular Farming in plants through transgenic approach is possible and mention why it is preferred.
- viii) Northern blot analysis is a popular method in Molecular Biology. Why ?
- ix) Foreign DNA can be introduced into plant cell protoplast or in the plant tissue. Write short notes on any of these procedures. Do you need any special equipment to do so ?
- x) Name the tissue specific promoters used to express specific gene in a particular organ to generate male sterility. Is it possible to restore the fertility of the above ?
- xi) How do you define ABRE and DRE from plants ? Mention their importance.
- xii) Name *two* transcription factors known from plant system. What do they do ?
- xiii) Sequence of the entire genome is known from the two higher plants. Can you write their scientific names ? What is the advantage of knowing these information ?



**GROUP – B**

Answer any *four* of the following.  $4 \times 10 = 40$

2. Draw and describe the events to show the mechanism of DNA transfer by a bacteria to a plant cell and show the involvement of the bacterial genes in the DNA transfer mechanism, so far known. Is it possible to produce a drug resistance marker gene-free transgenic lines. 8 + 2
3. What could be the purpose of maintaining different *cis*-acting elements on the upstream of genes ? Can you write down how they regulate gene expression with example ? How can you detect such *cis*-acting elements ? 4 + 4 + 2
4. How do you define signal transduction in plant system ? Describe the mechanism of light inducible gene expression with necessary diagrams. 6 + 4
5. What do you mean by fruit ripening ? Name three genes involved in fruit ripening. How was fruit ripening delayed in tomato ? 5 + 3 + 2
6. What are the three important genes for the production of *siRNA* or *miRNA* in plants ? How can you make a DNA construct to produce such particular RNA ? 6 + 4



**GROUP – C**

Answer any *two* of the following.

2 × 10 = 20

7. Describe briefly about organogenesis. How does it differ from Somatic Embryogenesis. Name at least one essential Vitamin and major plant growth regulators used in plant cell culture. Briefly describe the role of two important plant growth regulators in root and shoot development from callus.  
4 + 2 + 4
8. Why does somaclonal variation occur in plant tissue culture ? Briefly explain the epigenetic and genetic variability of somaclonal variation. State the difference between Aneuploidy and Autopolyploidy.  
3 + 4 + 3
9. Briefly describe the systemic acquired resistance in plant defence mechanism. Diagrammatically explain the different mechanisms of host-pathogen interaction.  
4 + 6
10. Name one plant hormone and describe its role in plant defence mechanism. Explain “gene for gene resistance” and its relation to Guard hypothesis.  
5 + 5
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