

**KERALA AGRICULTURAL UNIVERSITY**  
**B.Sc. (Hons.) Agriculture – 2007 Admission – IV<sup>th</sup> Semester**  
**Final Examination - July/August 2009**

Cat.No. : Biot 2201

Course : Principles of Plant Biotechnology, Bio-safety Rules  
and Intellectual Property Rights (2+1)

Max. marks: 80

Time : 3 hours

**I. Fill up the blanks**

10

1. Manipulation of the genetic material towards a desired end in a directed and predetermined way is called -----.
2. Ribosomes are synthesized in -----.
3. RAPD molecular markers are ----- in nature.
4. In tissue culture regeneration of shoot and root occurs by manipulating the balance of ----- and -----.
5. Transfer of genes (gene flow) in between different species is known as -----.
6. Sterilization of medium through autoclaving is done at ----- pounds.
7. In cell culture medium commonly used carbon source is -----.
8. Virus free plants can be obtained by -----.
9. Histone proteins are ----- in nature.
10. For patenting a plant variety it should be -----.

**II. Write short notes/answers on any ten**

30

1. Type II and Type III restriction endonucleases
2. Northern and western blotting.
3. Map based cloning
4. cybrid and hybrid
5. cDNA libraries
6. Dedifferentiation
7. Somaclonal variation
8. WTO
9. Gene patenting
10. Anther culture
11. Protoplast fusion
12. AFLP and RFLP
13. GATT and TRIPS

**III. Write short essays on any six of the following**

30

1. What is RNAi? Describe the various mechanisms of gene silencing and its significance in crop improvement.
2. Describe in detail the principle of Map based gene cloning.
3. What are molecular markers? How do they differ from biochemical markers? Discuss their utility in plant biotechnology.
4. Give details about *Agrobacterium* mediated gene transformation in plants.
5. Why germplasm conservation is needed? What are the advantages of invitro conservation?
6. What is the difference between nick translation and random priming method of labeling of nucleic acids?

7. What is somaclonal variation and give its importance?
8. What are AFLP, SSR and RAPD markers? Give its advantages and disadvantages in crop improvement.

IV. Write essays on **Any one**

10

1. a) Define callus and suspension cultures. Briefly describe the different types of suspension cultures and the various techniques for estimation of Culture growth and viability of cells.  
b) What is somatic hybridization? Discuss different methods of isolation of protoplasts and their fusion technique.
2. a) Briefly describe the modes of production of haploid plants and their various applications for crop improvement. Discuss the achievements, advantages and limitations of haploidy breeding.  
b) Define somaclonal variation. Briefly describe their development, characterization, molecular basis and applications. Discuss their achievements, advantages, and limitations.