



24. What is an atomic force microscope ? Explain the principle behind it.
25. What do you think are some of the potential risks of releasing bt-Brinjal into the environment ?
26. What is antisense RNA technology ? What are its applications ? (6x2=12)

## SECTION – E

Essay : Answer **any one**. (Each question carries a weightage of **four**)

27. What are the basic steps of a polymerase chain reaction (PCR) ? How can we selectively amplify a DNA fragment ? Write two applications of PCR.
28. a) Describe vector-mediated and vector-less gene transfer in plants.  
b) Why is *Agrobacterium tumefaciens* regarded as nature's genetic engineer ?
29. 'Success in the genetic engineering in relation to nitrogen fixation is very limited' Why ? (1x4=4)

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## SECTION – D



Reg. No. : .....

Name : .....

**VI Semester B.Sc. Degree (CCSS – Reg./Supple./Improve.)**  
**Examination, May 2016**  
**Core Course in Botany/Plant Science**  
**6B14BOT/PLS : BIOTECHNOLOGY, NANOBIO TECHNOLOGY AND**  
**PLANT TISSUE CULTURE**  
**(2011 and Earlier Admn.)**

Time : 3 Hours

Max. Weightage : 30

## SECTION – A

Objective questions. (Multiple choice/one word/sentence/fill in the blanks/Match the following, true or false etc.) in cluster of **four**. Each cluster carries a weightage of **one**.

1. i) The complete set of chromosomal and extrachromosomal genes of an organism is called  
 a) Gene pool                      b) Gene bank                      c) Gene library                      d) Genome
- ii) In recombinant DNA technology a plasmid vector is cleaved by  
 a) Modified DNA ligase  
 b) A heated alkaline solution  
 c) The same enzyme that cleave the donor DNA  
 d) The different enzyme other than that cleave the donor DNA
- iii) The technique that utilizes probes to detect specific DNA sequences  
 a) Southern blotting                      b) Northern blotting  
 c) Western blotting                      d) Eastern blotting
- iv) Variations observed during tissue culture of some plants are known as  
 a) Clonal variations                      b) Somatic variations  
 c) Somaclonal variations                      d) Tissue culture variations
2. i) Technique used to detect the presence or absence of specific DNA sequences on chromosomes using fluorescent probes  
 a) RFLP                      b) FISH                      c) RAPD                      d) PCR



ii) A technique of using very small metal particles coated with desired gene in the gene transfer is called

- a) Electroporation                      b) Microinjection  
c) Liposome                                d) Shot gun method

iii) In forensic science which of the following is used ?

- a) Bacterial cloning                      b) DNA foot printing  
c) DNA finger printing                    d) DNA cloning

iv) Flavr Savr tomatoes has

- a) Improved yield                        b) Disease resistance  
c) Improved flavour                      d) Delayed ripening

3. State **true** or **false**.

- i) Callus is an unorganised dividing mass of cells maintained in culture.  
ii) Genomic library contains complete set of protein of an organism.  
iii) Nod genes are involved in the root nodule formation by *Rhizobium*.  
iv) More than 90% of human genome has known functions.

4. Fill in the blanks.

- i) \_\_\_\_\_ technology is used by seed companies to prevent farmers from saving seeds to plant the following year.  
ii) \_\_\_\_\_ is the process of inserting genes into cells to treat diseases.  
iii) \_\_\_\_\_ is the inherent capacity of a plant cell to develop into an entire plant if suitably stimulated.  
iv) One nanometer is equal to \_\_\_\_\_ meters.

5. Answer in one **word** or one **sentence**.

- i) Cybrid.  
ii) Name a nano-scaled biomolecule.  
iii) Name a commonly utilized surface-sterilant for explant sterilization.  
iv) Biosensor. (5×1=5)



### SECTION – B

Answer **any four**. Differentiate the following : (**Each** question carries a weightage of 1)

6. Dedifferentiation and Redifferentiation.
7. Restriction endonucleases and ligases.
8. pBR322 and PUC.
9. Binary vectors and Hybrid vectors.
10. Southern and Northern blotting.
11. Autoclaving and filter sterilization. (4×1=4)

### SECTION – C

Short answer questions. (Answer **any five** ; **each** question carries a weightage of 1)

12. Why are restriction endonucleases called molecular scissors ?
13. What is the advantage of having a poly linker in a cloning vector ?
14. Why is Bt cotton insect resistant ?
15. How can single plant cells be isolated and cultured ?
16. What are the basic components of a plant tissue culture media ?
17. What is terminator technology ?
18. What are artificial seeds ? (5×1=5)

### SECTION – D

Short answer questions. (Answer **any six** ; **each** question carries a weightage of 2)

19. What is a callus and how can callus cultures be maintained for prolonged periods ? List two applications of callus cultures.
20. What is a cDNA library ? List two advantages of a cDNA library over a genomic library.
21. Why is nutrient medium autoclaved before it is used in tissue culture ? How will you sterilise a heat-labile substance such as an hormone solution ?
22. What is HGP ? What are its implications ?
23. How can you generate hybrids between two plants that are difficult to be hybridized by conventional methods ?