

B.Sc. BIOTECHNOLOGY
SIXTH SEMESTER
AGRICULTURAL BIOTECHNOLOGY
BBT-603

(Use separate answer scripts for Objective & Descriptive)

Duration : 3 hrs.

Full Marks : 70

[PART-A : Objective]

Time : 20 min.

Marks : 20

Choose the correct answer from the following:

1X20=20

1. The application of RFLP technique, for linkage mapping in humans, was first shown by
 - a. Williams *et al.*
 - b. Alec Jeffreys
 - c. Botstein *et al.*
 - d. McClelland
2. RFLP and AFLP markers are
 - a. Dominant and co-dominant markers
 - b. Co-dominant and dominant markers
 - c. Both dominant markers
 - d. Both co-dominant markers
3. Genetic variation created by mutation may be through
 - a. Insertion
 - b. Deletion
 - c. Substitutions
 - d. All of the above
4. SNPs, the most abundant type of molecular marker, are designed by
 - a. Single base deletions
 - b. Single base substitutions
 - c. Single base insertions
 - d. All of the above
5. A short oligonucleotide complementary to a sequence in a larger nucleic acid molecule (template), which serves as a substrate for DNA polymerase in an *in vitro* reaction is known as
 - a. Primer
 - b. Ladder
 - c. Allele
 - d. Marker
6. Homozygous diploid lines can be obtained through
 - a. Tissue culture
 - b. Back Crossing
 - c. Mutations
 - d. β -irradiation
7. The new planting materials (germplasm) are introduced in India by
 - a. IARI
 - b. ICAR
 - c. NBPGR
 - d. RFRI
8. Reduction cell division occurs in
 - a. Primordial cells of apical buds
 - b. Cotyledons of seeds
 - c. Anthers and ovary of flowers
 - d. Meristematic tissues
9. The first opening of a flower is called
 - a. Anthesis
 - b. Pollination
 - c. Budding
 - d. Blooming

10. The selection method including individual plant and progeny test was first reported by
 - a. Gregor Mendel
 - b. Patrick Shireff
 - c. Van Mons
 - d. Murashige and Skoog
11. Both restriction enzyme and PCR are involved in the marker system
 - a. RAPD
 - b. SSR
 - c. RFLP
 - d. AFLP
12. The 1st Agricultural research institute in India is
 - a. Indian Council of Agricultural Research
 - b. Indian Agricultural Research Institute
 - c. Imperial Agricultural Research Institute
 - d. National Research Centre for Pigs
13. The gene obtained from *Bacillus thuringiensis* is
 - a. Bt gene
 - b. BaTh gene
 - c. But gene
 - d. Btt gene
14. The group of endotoxin present in Bt cotton is
 - a. Rby
 - b. Fry
 - c. Cby
 - d. Cry
15. The number of Hydrogen bonds in between A and G is
 - a. 1
 - b. 2
 - c. 3
 - d. 4
16. The Bt gene is toxic for
 - a. Animals
 - b. Insects
 - c. Fungi
 - d. Bacteria
17. The DNA helix is
 - a. Helical
 - b. Spherical
 - c. Square
 - d. Rectangle
18. The central dogma of molecular biology states
 - a. DNA-RNA-Protein
 - b. Protein- DNA- RNA
 - c. DNA-Protein-RNA
 - d. RNA-DNA-Protein
19. Plants growing in snow clad areas are resistant to which stress?
 - a. Heat
 - b. Cold
 - c. Drought
 - d. Salt
20. *Bacillus thuringiensis* is a
 - a. Bacteria
 - b. Fungi
 - c. Insect pest
 - d. Yeast

(PART-B : Descriptive)

Time : 2 hrs. 40 min.

Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. What do you understand by stress in plants? Briefly describe stress associated with drought and Cold. 2+8=10
2. What do you understand by Nucleic acids? What are the different types of nucleic acids? How can they be isolated and purified? 2+3+5=10
3. Give an outline of the principle of tissue culture technique, methods and its application in biological studies. 10
4. What do you mean by gene cloning? Explain the basic events of gene cloning. Mention the role of the restriction endonucleases. 2+5+3=10
5. Briefly describe what do you understand by bio-fertilizers? What are the different types of bio-fertilizers? Mention the advantages of bio-fertilizers. 2+4+4=10
6. What is *Bacillus thuringiensis*? How is Bt cotton prepared? Briefly mention the advantages of using Bt cotton and its role in Indian Agriculture system. 2+3+5=10
7. During RAPD-PCR, what modifications are made to typical thermal cycling? Give a comparative account of widely used molecular marker systems for plant genome analyses. 2+8=10
8. What do you understand by "genetic markers"? Mention the desirable features of an ideal "Molecular Marker". Discuss briefly the principle of "rif-lip" technique. 2+4+4=10

== *** ==