

**B.Sc. BIOTECHNOLOGY**  
**FIFTH SEMESTER (SPECIAL REPEAT)**  
**PLANT BIOTECHNOLOGY**  
**BBT-503**

(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*

- Which of the following plant cells will show totipotency?
  - Xylem vessels
  - Sieve tube
  - Meristem
  - Cork cells
- Which of the following is not thermolabile?
  - Vitamins
  - Amino acid
  - Hormones
  - None of the above
- The prerequisites humidity range of a culture room should be:
  - 20-80%, $\pm$ 3%
  - 20-98%, $\pm$ 3%
  - 20-80%, $\pm$ 5%
  - 20-98%, $\pm$ 5%
- The explants may carry microorganisms hence these are surface sterilized by:
  - Mercury chloride
  - Sodium hypochloride
  - Both (a) and (b)
  - None of the above
- Who is the father of plant tissue culture?
  - Bonner
  - Haberlandt
  - Laibach
  - Gautheret
- Mark the INCORRECT statement about agar used in plant tissue culture.
  - Not digested by plant enzymes
  - It is not used for micropropagation
  - It does not react with media constituent
  - Remain stable at incubation temperature
- A medium which is composed of chemically defined compound is called:
  - Natural media
  - Synthetic media
  - Artificial media
  - None of the above
- A/n \_\_\_\_\_ is excised piece of leaf or stem used for micropropagation.
  - Microshoot
  - Explant
  - Scion
  - None of the above
- Out of the following, which one is the basic component of culture media used for plant tissue culture?
  - Complex mixture of salts
  - Amino acids
  - Vitamins
  - All of the above

10. Name the term given to the ability of matured plant cell to divide and give rise to callus tissue.
  - a. Pluripotency
  - b. Dedifferentiation
  - c. Totipotency
  - d. All of the above
11. Mass of undifferentiated cells is called as:
  - a. Callus
  - b. Explant
  - c. Sieve cells
  - d. All of the above
12. When ratio of cytokinin to auxin is low, then this leads to:
  - a. Embryogenesis
  - b. Callus initiation
  - c. Root initiation
  - d. Shoot proliferation
13. Disarming of Ti plasmid means
  - a. Removal of left border and right border
  - b. Removal of virulence gene
  - c. Removal of T DNA
  - d. None of the above
14. Ri plasmid causes which of the following disease?
  - a. Crown gall disease
  - b. Powdery mildew
  - c. Hairy root disease
  - d. All of the above
15. The DNA sample is coated with:
  - a. Mercury particle
  - b. Manganese particle
  - c. Both (a) and (b)
  - d. Gold particle
16. The following method is used for protoplast fusion?
  - a. High calcium and pH
  - b. PEG method
  - c. Electrofusion
  - d. All of the above
17. Which is the ODD one out for different culture techniques employed in protoplast culture?
  - a. Hanging droplet
  - b. Gene gun method
  - c. Co-culture
  - d. All of the above
18. The first report of forming hybrid embryos from *Datura* by invitro was published by
  - a. Nitch
  - b. Maheshwari
  - c. Bourgin and Nitch
  - d. Guha and Maheshwari
19. Which of the following is NOT true about helper plasmid of the binary vector?
  - a. These can replicate in *Agrobacterium*
  - b. These help in mediating conjugation of intermediate vectors
  - c. These cannot replicate in *Agrobacterium*
  - d. All are true
20. Which of the following is vector mediated gene transfer in plants?
  - a. Particle bombardment
  - b. Microinjection
  - c. Liposome mediated
  - d. Ti plasmid mediated

**( PART-B : Descriptive )**

Time : 2 hrs. 40 min.

Marks : 50

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

1. Define micropropagation dedifferentiation and redifferentiation. Explain meristem culture. What is the significance of meristem culture? 3+5+2=10
2. Define somatic hybridization. Explain the process of protoplast fusion. Write how hybrid cells can be identified for culturing. What type of enzymes are used for protoplast isolation and why? Write a note on cybrids. 1+5+2+2=10
3. Define marker genes with example. Describe the organisation of Ti plasmid with a suitable diagram. Write about biolistic method of gene transfer. 2+4+4=10
4. Define suspension culture. Explain the method of somaclonal variation. Write about somatic embryogenesis. 1+5+4=10
5. Write about different types of media used in plant tissue culture. Explain the role of different constituents in plant tissue culture medium. 5+5=10
6. Explain the process of anther culture. Write the significance of haploid plant production. Explain in brief methods for chromosome doubling. 5+3+2=10
7. Write about micro chamber technique and micro drop technique used in single cell culture. With a suitable diagram briefly explain the process of callus culture. 5+5=10
8. Explain the process of explant sterilization. Briefly explain the process of embryo culture. 5+5=10

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