

**B.Sc. BIOTECHNOLOGY**  
**Fourth Semester**  
**PLANT BIOTECHNOLOGY**  
**(BBT - 17)**

**Duration: 3Hrs.**

**Full Marks: 70**

PART A (Objective) =20  
PART-B (Descriptive)=50

**PART-B (Descriptive)**

**Duration: 2 hrs. 40 mins.**

**Marks: 50**

**1. Write short notes on (any five):**

**2×5=10**

- a) Embryo rescue
- b) Dihaploid
- c) Cryopreservation
- d) Totipotency
- e) Cell culture
- f) Cybrids
- g) Biotransformation

**2. Answer the following questions (any five):**

**3×5=15**

- a) Define clean gene technology for plants.
- b) Why is 'Golden rice' nutritionally superior to normal rice? Explain.
- c) Describe in detail Agrobacterium mediated gene transfer in Plants.
- d) What is somaclonal variation? Mention its applications.
- e) Describe the basic facilities for a plant tissue culture laboratory.

- f) Write a brief account of the media components and culture conditions required for plant tissue culture.
- g) Give a detailed note on plant transformation vectors.

3. Answer the following questions (any five):

5×5=25

- a) What is meant by plant tissue culture? List the various steps involved in this techniques.
- b) Write the future prospects of plant biotechnology in India giving examples of crops where intervention for yield is required.
- c) Write a small note on the regulations and regulatory bodies in India for the GM Crops and products.
- d) What is anther culture? Briefly explain the factors influencing anther culture and its applications.
- e) What are Cry proteins? How are they classified? Explain how they are exploited to develop insect resistance in plants.
- f) Describe different methods of micro-propagation in plants and its merits and demerits.
- g) Discuss how plants can be used as bioreactors for the production of foreign proteins.

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**Duration: 20 minutes**

**Marks – 20**

**PART-A (Objective)**

**Time: 20 mins**

**Total Marks: 20**

**I. Choose the correct option:**

**1×20=20**

- Who is the father of tissue culture?  
a) Bonner                      b) Haberlandt                      c) Laibach                      d) Gautheret
- A(n) \_\_\_\_\_ is an excised piece of leaf or stem tissue used in micropropagation  
a) Microshoot                      b) Callus                      c) Explant                      d) Scion
- The production of secondary metabolites require the use of  
a) protoplast                      b) cell suspension  
c) meristem                      d) auxillary buds
- Protoplasts can be produced from suspension cultures, callus tissues or intact tissues by enzymatic treatment with  
a) cellulolytic enzymes                      b) pectolytic enzymes  
c) both cellulolytic and pectolytic enzymes                      d) proteolytic enzymes
- Which of the following is considered as the disadvantage of conventional plant tissue culture for clonal propagation?  
a) Multiplication of sexually derived sterile hybrids.  
b) Less multiplication of disease free plants.  
c) Storage and transportation of propagates.  
d) Both (b) and (c).
- What is meant by 'Organ culture'?  
a) Maintenance alive of a whole organ, after removal from the organism by partial immersion in a nutrient fluid.  
b) Introduction of a new organ in an animal body with a view to create genetic mutation in the progenies of that animal.  
c) Cultivation of organs in a laboratory through the synthesis of tissues.  
d) The aspects of culture in community which are mainly dedicated by the need of a specified organ of the human body.

- A medium which is composed of chemically defined compound is called  
a) Natural media                      b) Synthetic media  
c) Artificial media                      d) None of these
- The controversy regarding the use of Bt corn is that it  
a) is potentially harmful to monarch butterflies.  
b) is a potential allergen to humans.  
c) both (a) and (b).  
d) can contaminate groundwater.
- Which tropical fruit crop has been successfully engineered to be protected against a lethal virus?  
a) Passion fruit                      b) Papaya  
c) Mango                      d) Lichi
- Which of the following metabolites are implicated in stress tolerance?  
a) Proline                      b) Betaines  
c) Both (a) and (b)                      d) Citrate
- Which of the following gene detoxifies herbicide phosphinothricin?  
a) Nitrilase                      b) Glutathione S-transferase (GST)  
c) Phosphinothricin acetyl transferase                      d) All of these
- Transplastomics  
a) targets genes in the chloroplast.  
b) provides exceptionally low yields of protein products.  
c) produces genes that are released in pollen.  
d) offers little opportunity for practical use.
- The first transgenic plants expressing engineered foreign genes was  
a) Tobacco                      b) Arabidopsis thaliana  
c) Papaya                      d) Potato
- Which cell-based plant technology involves the combining of two cells without cell walls from different species?  
a) Clonal propagation                      b) Cybridization  
c) Protoplast fusion                      d) Mutant selection
- Which technique is used to introduce genes into dicots?  
a) Electroporation                      b) Particle acceleration  
c) Microinjection                      d) Ti plasmid infection

16. Opines are  
 a) amino acid derivatives found in tumor tissues.  
 b) amino acid derivatives found in normal tissues.  
 c) amino acid derivatives found in both normal as well as tumor tissues.  
 d) none of the above.
17. Which of the following genes are constitutively expressed and control the plant induced activation of other vir genes?  
 a) vir A and vir G                      b) vir C and vir D  
 c) vir B and vir E                      d) vir A and vir B
18. The most common solidifying agent used in micropropagation is  
 a) Agar                      b) Dextran                      c) Mannan                      d) All of these
19. Artificial seeds are  
 a) seeds produced in laboratory condition.  
 b) seeds encapsulated in a gel.  
 c) somatic embryos encapsulated in a gel.  
 d) zygotic embryos encapsulated in a gel.
20. Immobilized cell bioreactors are based on  
 a) cells cultures in solid medium                      b) cells cultured in liquid medium  
 c) cells entrapped in gels                      d) all of these

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**University of Science and Technology, Meghalaya**

Date Stamp: \_\_\_\_\_

SESSION 2016-17 COURSE _____ PAPER Code: _____ NAME OF THE PAPER: _____ SEMESTER _____																																	
<p style="text-align: center;"><b>Instructions to Candidates</b></p> <ol style="list-style-type: none"> <li>This answer booklet has 4 pages. Please check before writing whether it is complete or in good condition.</li> <li>Do not write your name anywhere in the answer booklet.</li> <li>Write legibly on both sides of the paper</li> <li>You may use some space for any rough notes or calculation on the answer booklet if you need. These rough notes, calculations must be scored out before submitting the answer booklet.</li> <li>Do not bring any book or loose paper in the examination hall.</li> <li>Do not tear any page from the answer booklet.</li> <li>Do not write anything on the question paper or blotting paper or any pieces of paper while you are in the examination hall.</li> <li>Any act of indiscipline or misbehavior in the examination hall will result in your expulsion.</li> <li>No examinee is allowed to leave the examination hall until 30 minutes lapse after the commencement of the examination.</li> <li>Additional answer sheet will be supplied after the main answer booklet is completed.</li> </ol>		<b>For Objective Type Questions</b>																															
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