

**M.Sc. BOTANY**  
**THIRD SEMESTER**  
**BIOPHYSICAL INSTRUMENTATIONS, BIOTECHNOLOGY**  
**& DEVELOPMENTAL BOTANY**  
**MSB-302**

Duration: 3 Hrs.

Marks: 70

PART : A (OBJECTIVE) = 20  
PART : B (DESCRIPTIVE) = 50

[ PART-B : Descriptive ]

Duration: 2 Hrs. 40 Mins.

Marks: 50

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

1. What is micropropagation? Write the technique and applications of micropropagation. (2+8=10)
2. Write notes on: (5+5=10)
  - a. cDNA library.
  - b. Gene isolation from Plants.
3. What are the major characteristics of an ideal vector used in Genetic Engineering? Compare and contrast between Binary and Shuttle Vectors. (3+7=10)
4. What is the principle of electrophoresis? Discuss the method of separation of proteins by SDS PAGE. (2+8=10)
5. What is the principle of pH meter? Write with suitable diagram the instrumentation of pH meter. (2+8=10)
6. Write short notes on: (10)
  - a. Megagametogenesis
  - b. Cryopreservation
7. Discuss the different methods of transfer of recombinant DNA into host cells. (10)
8. What is nucleic acid hybridization? Discuss the southern blotting technique and its application. (2+8=10)



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**[ PART-A : Objective ]**

**Choose the correct answer from the following:**

**1×20=20**

1. YAC is/are:
  - a. capable of accommodating insert with size greater than 1000kb.
  - b. an Eukaryotic expression system.
  - c. capable of undergoing post-translational modification.
  - d. all of the above.
2. Which of the following can accommodate the maximum size of the insert?
  - a. Plasmid
  - b. Cosmid
  - c. Phagemid
  - d. Lambda Bacteriophage
3. Which of the following must have a Strong Promotor?
  - a. Cloning vector
  - b. Expression Vector
  - c. Both
  - d. None
4. Which of the following statements are true regarding restriction enzymes?
  - a. Type I and II enzymes cut far away from the restriction site.
  - b. Type II cuts DNA within restriction sites.
  - c. Eco RI is a type II restriction enzyme.
  - d. All of these.
5. A technique that measures degree of genetic similarities between pools of DNA sequences is called:
  - a. Annealing
  - b. Denaturation
  - c. Hybridization
  - d. None of the above
6. The ability of component cells of a callus to form a whole plant is known as:
  - a. Redifferentiation
  - b. De differentiation
  - c. Either (a) or (b)
  - d. None of these
7. The separation technique of charged molecules under the influence of electric current is called:
  - a. Colony hybridization
  - b. Electrophoresis
  - c. Dot blot techniques
  - d. Western blotting
8. For protein detection, most commonly used probe is:
  - a. Antibody
  - b. Lectin
  - c. Antigens
  - d. Interferon
9. Which type of chromatography is used for the structural analysis?
  - a. Column chromatography
  - b. Paper chromatography
  - c. Partition chromatography
  - d. Affinity chromatography
10. Which of the following is not an application of high performance liquid chromatography?
  - a. Analysis of proteins, drugs and explosives.
  - b. Separation of pharmaceutical drugs.
  - c. Elimination of undesirable substances from blood.
  - d. Separation of lipids, fatty acids and steroids.
11. The phenomenon of the reversion of mature cells to the meristematic state leading to the formation of callus is known as:
  - a. Redifferentiation
  - b. De differentiation
  - c. Either (a) or (b)
  - d. None of these
12. Which breeding method uses a chemical to strip the cell wall of plant cell of two incompatible species?
  - a. Mass selection
  - b. Protoplast fusion
  - c. Transfomation
  - d. Transpiration
13. Protoplast are the cells devoid of:
  - a. Cell membrane.
  - b. Cell wall.
  - c. Both cell wall and cell membrane.
  - d. None of these.



**UNIVERSITY OF SCIENCE & TECHNOLOGY, MEGHALAYA**



**[PART (A) : OBJECTIVE]**

Duration : 20 Minutes

Serial no. of the  
main Answer sheet

- 14. Stage one in differentiation involves:
  - a. Recognition of apical meristems.
  - b. Formation of embryo.
  - c. Recognition of cambium.
  - d. Production of leaf primordia.
  
- 15. In flowering plant a mature gametophyte is derived from a pollen mother cell by:
  - a. One mitotic division.
  - b. Two mitotic division.
  - c. A single meiotic division.
  - d. One mitotic and two mitotic division.
  
- 16. If there are 4 cells in anthers then what will be number of pollens?
  - a. 4
  - b. 8
  - c. 12
  - d. 16
  
- 17. Taq polymerase is used in PCR because of its:
  - a. Low thermal stability.
  - b. High fidelity.
  - c. High speed.
  - d. High thermal stability.
  
- 18. Telomeric sequences are found in:
  - a. HAC
  - b. BAC
  - c. YAC
  - d. PAC
  
- 19. The uptake of plasmid DNA into bacterial cell is facilitated in the presence of:
  - a. Calcium chloride
  - b. Magnesium chloride
  - c. Potassium chloride
  - d. All of these
  
- 20. Which of the following bacterium is considered as natural genetic engineer?
  - a. *Agrobacterium tumefaciens*
  - b. *Agrobacterium radiobactor*
  - c. *Pseudomonas putida*
  - d. *Thermus aquaticus*

Course : .....

Semester : ..... Roll No : .....

Enrollment No : ..... Course code : .....

Course Title : .....

Session : ..... 2017-18 ..... Date : .....

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**Instructions / Guidelines**

- The paper contains twenty (20) / ten (10) questions.
- Students shall tick (✓) the correct answer.
- No marks shall be given for overwrite / erasing.
- Students have to submit the Objective Part (Part-A) to the invigilator just after completion of the allotted time from the starting of examination.

Full Marks	Marks Obtained
20	

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Scrutinizer's Signature

Examiner's Signature

Invigilator's Signature