



**MASINDE MULIRO UNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
(MMUST)**

**UNIVERSITY EXAMINATIONS (MAIN PAPER)  
2023/2024 ACADEMIC YEAR**

**THIRD YEAR FIRST SEMESTER EXAMINATIONS**

**MAIN CAMPUS**

**THIRD YEAR FIRST SEMESTER EXAMINATIONS**

**FOR THE DEGREE  
OF  
BACHELOR OF SCIENCE IN MEDICAL BIOTECHNOLOGY**

**COURSE CODE: BMB 315**

**COURSE TITLE: MEDICINAL PLANT BIOTECHNOLOGY**

**DATE: 11<sup>TH</sup> DECEMBER 2023**

**TIME: 2.00-4.00PM**

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**INSTRUCTIONS TO CANDIDATES**

This paper is divided into three sections, **A B** and **C**, carrying respectively: Multiple Choice Questions (**MCQs**), Short Answer Questions (**SAQs**) and Long Answer Questions (**LAQs**). Answer all questions. **DO NOT WRITE ON THE QUESTION PAPER**

**TIME: 2 Hours**

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over.

**SECTION A: Multiple Choice Questions [20 Marks]**

1. The following is a prerequisite for an artificial media used for explant regeneration.
  - A. The medium should contain a source of sulfur.
  - B. The medium should have a very low carbon content
  - C. The medium needs to offer a carbon source
  - D. The medium must offer a nitrogen donor
2. Sacred Forests are those that:
  - A. have rich growth of plants used for worship for people in the region
  - B. are protected by tribal communities due to religious sanctity accorded to them
  - C. have not been discovered by humans
  - D. none of the above
3. Which one of the following is **NOT** included in the in-situ conservation?
  - A. National park
  - B. Botanic garden
  - C. Sanctuary
  - D. Biosphere reserve
4. Tissue culture is a good technique to:
  - A. Cross two varieties
  - B. Rapidly increase the size of a trees by strengthening the stem
  - C. Eliminate virus
  - D. Improve yield of crops
5. Malaria has killed more people than all our wars put together. One cure produced from the bark of the Cinchona tree is called:
  - A. morphine
  - B. codeine
  - C. Belladonna
  - D. Quinine
6. How much of the world's population depends on herbal medicines?
  - A. 80%
  - B. 60%
  - C. 40%
  - D. 20%
7. Which of the following statements relating to the traditional herbal medicinal products is false?
  - A. Attributing a preventive or curative effect to these products is forbidden
  - B. They contain one or more herbal substances, preparations or their combination as active agents
  - C. Their authorization is possible via abridged registration
  - D. They can be distributed in pharmacies
8. Which of the following statement is incorrect about agar?
  - A. Remains stable at incubation temperature
  - B. Does not react with media constituents
  - C. Does not use in micropropagation work
  - D. Not digested by plant enzymes
9. Which of the following is the advantage of collecting medical herbs from their natural habitat?
  - A. The whole process (culturing, harvesting, etc.) can be controlled
  - B. The appropriate harvesting and quality can be guaranteed
  - C. The stock is homogeneous
  - D. No culturing costs are involved

10. The sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures is termed as:
- Ethnomedicine
  - Traditional medicine
  - Phytomedicine
  - Botanical medicine
11. Adjustment of phytopharmaceutical preparations to certain active substance is known as:
- Standardization
  - Regulation
  - Quality Assurance
  - Quality Control
12. Average size seed are propagated by placing in holes. The method is known as:
- Broadcasting
  - Dibbling
  - Grafting
  - Layering
13. The classification system comprising of chemical type of compound and evolution of plant is \_\_\_\_\_.
- Chemical
  - Taxonomical
  - Chemotaxonomical
  - Morphological
14. All are type of asexual method of vegetative propagation **EXCEPT**:
- Seed propagation method
  - Natural method
  - Artificial method
  - Aseptic method
15. Seed and fruit drug should be collected when they are:
- Fully grown and ripened
  - Immature and ripened
  - Fully grown and unripe
  - Immature and unripe
16. Which **ONE** of the following intrinsic factor affects the cultivation of medicinal plants?
- Rainfall
  - Soil
  - Polyploidy
  - Temperature
17. Which of the following groups of compounds consists of primary metabolites?
- Alkaloids
  - Lignans
  - Flavonoids
  - Carbohydrates
18. Explants used for tissue culture can be taken from:
- Bud
  - Root tip
  - Nodal Stem Segments
  - All the above
19. The culturing of cells in liquid agitated medium is called:
- liquid culture
  - micro propagation
  - Agar culture
  - suspension culture

20. Which one of the following scientists did not create somatic hybrids?

- A. Steward
- B. Halperin,
- C. Wetherell
- D. Skoog

**SECTION B: Short Answer Questions (40 Marks)**

1. Write short notes on the following:
  - a) Explant [2.5 marks]
  - b) Pharmacopeia [2.5 marks]
2. Compare and contrast the in situ and ex situ conservation strategies of medicinal plants [5 marks]
3. Outline at least five (5) advantages of in vitro culture in the production of secondary metabolites in plants [5 marks]
4. Highlight the Stages of micropropagation in tissue propagation [5 marks]
5. Outline the factors necessary for plant cell organogenesis [5 marks]
6. Highlight the applications of medicinal plant biotechnology in health [5 marks]
7. Write a brief account of the media components and culture conditions required for plant tissue culture [5 marks]
8. State the selection criteria of hybrid cell for somatic hybridization [5 marks]

**SECTION C: Long Answer Questions [60 Marks]**

1. Discuss the emerging trends in medicinal plant biotechnology [20 marks]
2. Compare and contrast between the secondary metabolites obtained from the cell suspensions culture and that of an intact plant [20 marks]
3. Relate the development of ethnomedicine in the wake of medicinal plant biotechnology [20 marks]