



**NATIONAL OPEN UNIVERSITY OF NIGERIA  
FACULTY OF AGRICULTURAL SCIENCES  
DEPARTMENT OF CROP AND SOIL SCIENCES  
2020\_1 EXAMINATION**

**COURSE TITLE: INTRODUCTION TO CROP BIOTECHNOLOGY**

**COURSE CODE: CRP511**

**TOTAL SCORE: 70 MARKS**

**TIME ALLOWED: 3 hours**

**INSTRUCTION: Answer compulsory question 1 (25marks) and any THREE questions (15 marks each)**

**Q1.**

- a) Give three definitions of crop biotechnology. (12marks)
- b) Give a brief note on induction of organogenic differentiation. (7marks)
- c) What is nutritional content improvement? (6marks)

**Q2.**

- a) Define micro-propagation and (3marks)
- b) Explain the stages of Micro-propagation. (12marks)

**Q3.**

- a) With the help of a flow chart briefly describe the early patterns of cleavage in cultured pollen grains and the different modes of subsequent development of the pro-embryogenic mass so obtained. (10Marks)
- b) What is the meaning of plant tissue culture? (5marks)

**Q4.**

- a) Write short notes on the following:
  1. Vitrification
  2. Cryoprotective dehydration
  3. Stepwise freezing (15marks)

**Q5.**

- a. What materials can be analysed by chromosome counting and flow cytometry? (7marks)
- b. What are the limitations of TEM? (8marks)

**Q6.**

- a) Write short notes on the following:
  - i. Electron microscope
  - ii. Electron gun
  - iii. Advantages and disadvantages of SEM and TEM (15marks)