



**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**National Open University of Nigeria**  
**Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja**  
**Faculty of Science**  
**Department of Biological Sciences**  
**2022\_2 EXAMINATION**

**COURSE CODE: BIO402**

**COURSE TITLE: PHYTOGENETICS OF PLANTS**

**CREDIT: 2 units**

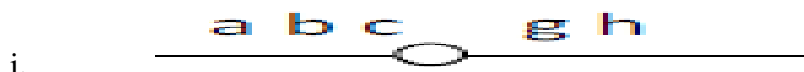
**TIME ALLOWED: 2 Hours**

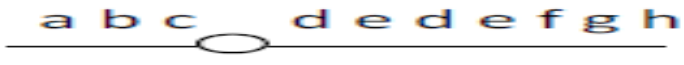
**INSTRUCTION: Answer question ONE (1) and any other TWO (2) questions**

- 1a. Outline the advantages of polyploidy. 5 Marks  
1b. Account for how Cytogeneticists demonstrate chromosome size 5 Marks  
1c. Write a note on Autopolyploidy in plants 5 Marks  
1d. Describe the term Allopolyploidy with clear examples 5 Marks  
1e. Explain how Scientists produced monoploid plants. 10 Marks
- 2a. List six (6) plants in which spontaneous monoploid can be found 3 Marks  
2b. Discuss meiotic behaviour in monoploids 6 Marks  
2c. Enumerate the five (5) advantages of polyploidy 5 Marks  
2d. Theodore Boveri's experiment contributed immensely to chromosome theory of Inheritance. Discuss 6 Marks
- 3a. Outline the role of Wilhelm Roux in the development of Cytogenetics. 4 Marks  
3b. Write a comprehensive note on physical mutagen 8 Marks  
3c. 'Polyploidy is a blessing in disguise among plants that exhibit it'. Discuss 8 Marks
- 4a. a. Identify the following chromosomal aberration found in cytological examination of the chromosomes of a plant species in a particular population (i) **ABC.DE to ACB.DE** (ii) **ABC.DE to ABD.CE** 2 Marks  
4b. A normal chromosome has the following gene sequence (0 = centromere).



Gamma-irradiation of the organism produced the following types of chromosomes:



ii. 

2 Marks

What type of chromosomal aberration occurred in each case?

4c. Define Cytogenetics

2 Marks

4d. Classify chromosomes based on the number of centromeres.

14 marks

5a. Define mutagens

2 Marks

5b. Outline the different types of inversion mutation

3 Marks

5c. Mention four (4) causes of Aneuploidy

4 Marks

5d. Satellite chromosomes do exist in nature in a number of organisms. Discuss

5 Marks

5e. Give a detailed description of the term inversion mutation

6 Marks