NATIONAL OPEN UNIVERSITY OF NIGERIA

14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS

SCHOOL OF SCIENCE AND TECHNOLOGY

MARCH/APRIL 2015 EXAMINATION

COURSE CODE: **BIO 402**

COURSE TITLE: **CYTOGENETICS OF PLANTS**

TIME ALLOWED: **2 Hours**

INTRUCTION: Answer question ONE (1) and any other THREE (3) questions

1(a) Distinguish between the terms monoploid and haploid numbers. (2 marks)

(b) Describe the roles of the following scientists in the development of Cytogenetics as a discipline:

(i) Emil Heitz (5 marks)

(ii) Wilhelm Roux (4 marks)

(c) How do multipolar mitosis might cause aneuploidy? (3 marks)

(d) Explain why is it that banana cannot be propagated by seed. (5 marks)

(e) Arrange the plants with the genome formulas below according to their degrees of fertility starting with the most fertile. Give reasons to support your answer.

RRRRR RRYY RRRR. (6 marks)

2 (a) Compare the following hypothetical monoploids for their degree of infertility. A: x = 5; B: x= 7 (3 marks)

(b) Describe the different methods of production of monoploids. (12 marks)

3 (a) Summarize the advantages of polyploidy. (6 marks)

(b) You are given the following chromosome complement for plant with chromosome number 2n =10; bb, cc, dd, ee, ff. Give the chromosome complement and the chromosome number of the following aneuploids.

(II) A monosomic for chromosome d and e (3 marks)

(III) A double nullisomic for chromosomes b and f (3 marks)

(IV) A trisomic for chromosome d and e (3 marks)

4 (a) Explain why is polyploidy less common in animals than in plants? (6 marks)

(b) Account for the fact that diploids are usually fertile without experiencing the problems of fertility associated with triploids? (4 marks)

(c) Summarize the consequences of deletion. (5 marks)

5 Write **short notes** on the following:

i. Satellite chromosomes (5 marks)

ii. mitotic behavior in monoploids (5 marks)

iii. fertility in monoploids. (5 marks)

6a. Highlight Thomas Morgan's contribution to the chromosome theory of inheritance. (3 marks)

b. Give a detailed description of the possible causes of aneuploidy. (6 marks)

c. Classify chromosomes based on the location of their centromeres. (6 marks)