## NATIONAL OPEN UNIVERSITY OF NIGERIA PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA FACULTY OF SCIENCE

Department of Biological Sciences 2023\_1 POP EXAMINATION

**COURSE CODE: BIO301** 

**COURSE TITLE: GENETICS II** 

**CREDIT: 2 UNITS** 

**TIME ALLOWED: 2 HOURS** 

INSTRUCTION: ANSWER NUMBER ONE (1) AND ANY OTHER TWO (2)

**QUESTIONS** 

1a. What do you understand by microbial genetics? (2 mark)

- b. Mention two ways that genetic information flows in bacteria. (2 marks)
- c. Describe the antibodies and blood antigens relationships in ABO blood group. (5 marks)
- d. Define polygenic inheritance. (2 mark)
- e. Outline three ways by which polygenic traits are distinguished. (2 marks)
- f. Define the following terms: (6 marks)
  - i. Euploidy.
  - ii. Isochromosome.
  - iii. Shifts.
  - iv. Translocation.
- g. As a human geneticist, how will you apply aneuploidy in crop improvement?

**(11 marks)** 

- 2a. Explain what is meant by structural chromosomal aberration. (4 mks)
- b. List the two types of structural chromosomal aberrations. (2mks)
- c. Enumerate the four genetic significance of duplication you know. (4mks)
- d. In a tabular form, differentiate between monoploids and haploids. (4 marks)
- e. Describe how you can determine if there is any mutant colony in a culture. (6 marks)
- 3a. Define genetic transfer. (2 marks)
- b. Describe the mechanisms of balancing selection. (4 marks)
- c. Outline the steps in specialized translocation. (5 marks)
- d. Polyploids are of significant effects. Discuss. (9 marks)
- 4a. Mention any two goals of population genetics you know. (2 marks)
- b. Why do we study populations and gene frequencies. (3 marks)
- c. The table below provides the genotype of 3800 people in Abuja metropolis.

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AA	1000
Aa	2000
Aa	800

Using the table above, calculate the:

- i. Genotype frequencies (3 marks)
- ii. Allelic frequencies (2 marks)
- d. Write short notes on the following:
  - (i) Co-dominance. (5 marks)
  - (ii) Dosage compensation. (5 marks)
- 5a. List the two important features in the structure of DNA. (2 marks)
- b. A homozygous red snapdragon flower was crossed with a homozygous white snapdragon flower; (3 marks)
  - i. What is the colour of the first progeny?
  - ii. What type of non Mendelian inheritance was displayed in the cross/progeny?
  - iii. When the F1 are self fertilized, what will be the outcome of the second progeny?
- c. Enumerate the importance of structural chromosomal aberrations in plant breeding. (5 marks)
- d. Account for the defects of abundant and structural proteins. (10 marks)