



National Open University of Nigeria  
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja  
Faculty of Science  
Department of Pure and Applied Sciences  
2023\_1 POP EXAMINATION

**COURSE CODE: BIO403**

**COURSE TITLE: POPULATION CYTOGENETICS**

**CREDIT: 2 Units**

**TIME ALLOWED: 2 Hours**

**INSTRUCTION: Answer Question ONE (1) and any other THREE (3) Questions**

- Q1 a. What is gene pool? 2marks  
b. State the distinguishing characteristics of complete dominance. 6marks  
c. Image a population of 1200 diploid individuals with 553AA, 372Aa and 275aa individuals. Calculate the allelic frequency. 6marks  
d. If the genotype formation of voles trapped in Nigeria were 19MM, 86MJ and 18JJ individuals, determine that the population are in Hardy-Weinberg proportion. 6marks  
e. Justify the use of genetic drift equation. 3marks  
f. What is Adaptation? 3marks
- Q2 a. What is Genotype? 1marks  
b. Given the haemoglobin genotype of AA 1437, AS 482, SS 18, SC 42, AC 168 and CC 18; calculate:  
i. Genotypic frequency and 7.0marks  
ii. Allelic frequency 7.0marks
- Q3 a. Define Biogenetics? 2mark  
b. Enumerate methods of determining the number of allele in X-linked locus. 8marks  
c. Succinctly explain the first assumption of Hardy-Weinberg equilibrium. 5marks
- Q4 a. State Hardy-Weinberg law. 2marks  
b. State the characteristics of natural selection as a force in evolutionary change. 5marks  
c. Distinguish between forward and reverse mutations. 8marks
- Q5. a Justify the major assumptions of the Hardy-Weinberg law. 6marks  
b. Explain how bottleneck effect affects genetic drift. 5marks  
c. State the two major effects of gene flow as a population. 4marks