



National Open University of Nigeria
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja
Faculty of Science
Department of Pure and Applied Sciences
SEPTEMBER, 2020 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. Enumerate the frequently asked questions in population genetics. 4marks
b. Itemize the three main different types of dominance relationship. 1.5marks
c. Calculate the genotypic frequencies of a moth collected in a location in Abuja with the following genotypes: 842BB, 104Bb and 10bb out of the total of 956. 6.5marks
d. Outline steps to verify that a population is in Hardy-Weinberg equilibrium. 5marks
e. Suppose that a population of 98400 people were carrying the recessive allele 'a' for albinism, there are 87aa albino and 1240 Aa heterozygote carriers. Find the frequency of heterozygous. 8marks
- Q2 a. Enumerate the distinguishing characteristics of incomplete dominance. 4marks
b. Outline the five assumptions of Hardy-Weinberg equilibrium. 5marks
c. State the characteristics of selecting mating as a force in evolutionary change. 6marks
- Q3 a. Define Genotypic frequency? 2.5marks
b. Itemize the steps for calculating genotypic frequency at a specific locus. 3marks
c. Consider a population in which the initial frequencies are $p=0.7$ and $q=0.3$ and the forward and reverse mutations rate were $u=4 \times 10^{-5}$ and 1×10^{-5} respectively. Calculate allelic frequency, equilibrium frequency and the equilibrium values. 9.5marks
- Q4a. With the use of appropriate table illustrate Hardy-Weinberg genotypic frequency. 9marks
b. State the roles of mutation in altering the frequencies of alleles within a population. 6marks
- Q5a. Define genetic drift? 1.5marks
b. With appropriate equation, write short note on variance of allelic frequencies. 3marks
c. Explain how small population affects genetic drift. 6marks
d. Define population? 2marks