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
INTRUCTION: 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 $u=4x10^{-5}$ and $1x10^{-5}$ 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