National Open University of Nigeria
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja
Faculty of Science
Department of Pure and Applied Sciences
2021 EXAMINATION_1 1234

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

1a. Outline the main causes of genetic variation among organisms? (5 marks)
b. Explain what you understand by Founder Effect in Cytogenetics (3 marks)
c. Give a brief description of Bottleneck Effect in Cytogenetics (3 marks)
d. Write briefly on sex linked traits (2 marks)
e. Genetic drift affect small populations. Discuss (7 marks)
f. The number of genotypes in a species of butterflies are as follows:
350 BB, 65 Bb, and 6bb. Calculate the genotypic frequencies (5 marks)

2a. Outline any three examples of traits as a result of adaptation (3 marks)
b. When is a population said to be in equilibrium? (6 marks)
c. Explain the possibilities of forward and backward mutations (6 marks)

3a. What do you understand by coefficient of breeding? (2marks)
b. Define Darwinian fitness (2marks)
c. Explain the no Natural Selection of a population (3 marks)
d. If a population of diploid plants is with 855 AA, 520Aa, and 124 aa
Individuals, then determine the allele frequency of that population. (8 marks)

4a. What do you understand by selective mating? (2 marks)
b. State the equation for determination of allelic frequencies at an X-linked locus from the genotypic frequencies. (3 marks)
c. Provide evidence(s) to support the fact that: recessive X-linked traits are more frequent amongst male. (4 marks)
d. Calculate the genotypic frequencies of a butterfly collected in a location in Abuja with the following genotypes: 820BB, 100Bb and 10bb out of the total of 930. (6 marks)

5a. Use the Dunkers to explain genetic drift. (7marks)
b. Explain coefficient of inbreeding (f) as a component of selected mating. (8marks)