NOUN

NATIONAL OPEN UNIVERSITY OF NIGERIA
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja
Faculty of Science

DEPARTMENT OF BIOLOGICAL SCIENCES

2024 1 EXAMINATION

COURSE CODE: BIO 403
COURSE TITLE: POPULATION GENETICS
CREDIT: 2 Units
TIME ALLOWED: 2 Hours
Instructions: Attempt question number One (1) and any other TWO (2) questions. Question number one (1) carries (30) marks, while the other questions carry (20) marks each.

1 (a) Supposing a population of 100, 000 people carrying the recessive allele a for albinism has 100 *aa* albinos and 1800 *Aa* heterozygous carriers.
(i) Calculate the allelic frequency in the population (10 marks)
(ii) Using Hardy-Weinberg equation, predict the number of individuals of each genotype in the next generation. (5 marks)

(b) Give explanatory notes on the followings:
i) Incomplete dominance (5 marks)
ii) Complete dominance (5 marks)
c) Highlight the assumptions of Hardy-Weinberg's law (5Marks)

2 (a) Explain the role of mutation in the genetic variation and evolution in a population (10 marks)
(b) In what ways can genetic drift be measured in a population? (10 marks)

3. Explain the following terminologies in genetics
i) Coefficients of inbreeding (5marks)
ii) Genetic drift (5 marks)
iii) Allelic frequency (10 marks)

4 (a) State the effects of the followings on a population and evolutionary process.
i) Natural Selection (6 marks)
ii) Bottle neck (6marks)
iii) Gene flow (4 marks)

(b) Explain genotypic frequency (4 marks)

5 (a) Explain random mating as it relates to Hardy-Weinberg Equilibrium (14marks)
(b) How does adaptation act as a selective force on evolutionary changes? (6marks)