FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
DEPARTMENT OF PLANT BIOLOGY
FIRST SEMESTER BTECH. EXAMINATION, 2017/2018 SESSION

COURSE CODE: BIO 511
COURSE TITLE: POPULATION GENETICS
COURSE UNIT: 3
TIME ALLOWED: 2 HOURS

INSTRUCTION: *USING APPROPRIATE LABELED DIAGRAM WHERE NECESSARY; ANSWER ANY FOUR (4) QUESTIONS IN ALL.*

1. In a biology class, 65% of the students had the ability to roll the tongue. This is conferred by the dominant allele of a gene while it's recessive allele, 'n' leads to non-rolling of the tongue.
   a. Compute both the genetic and phenotypic frequencies of the trait in the population.
   b. If there are a total of 160 students in the class, compute the exact number of students in each genetic group.

2a. If $p^2 + 2pq + q^2 = 1$; clearly explain the principles that sustains the equation.
   b. Briefly explain the roles of assortative mating in the expression in 2a above

3a. What do you understand by the term genetic variability?
   b. Explain how low genetic variability in a population can lead to extinction of the population.

4a. Explain the concept of Hardy Weinberg equilibrium.
   b. Clearly discuss how any two genetic factors can directly influence this equilibrium.

5. Out of 5320 stands, only 5% produced white flowers controlled by gene c while the remaining plants produce purple coloured flowers controlled by the dominant form of the gene.
   a. Compute the genetic frequencies in the floral colors within the population of the plant.
   b. What are the exact number of plants expected to be in each genotypic group.

6. Write a comprehensive notes on Polymorphism.