KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

FOURTH YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF BACHERLOR OF EDUCATION SCIENCE
SECOND SEMESTER 2022/2023
(JUNE - SEPTEMBER, 2022)

ZOOL 412: POPULATION BIOLOGY

STREAM: Y4 S2   **TIME: 2 HOURS**

DAY: FRIDAY, 3:00 PM – 5:00 PM   **DATE: 09/09/2022**

INSTRUCTIONS:

1. Do not write anything on this question paper.
2. Answer ALL Questions in section A (Compulsory) and any other TWO

SECTION A: 40 MARKS

1. Differentiate between population size and population density and explain why the two parameters are important in studying a population   (4 Marks)

2. Suppose that a cohort of 150 mice in a mouse colony born in February, 125 are still alive at the end of March and 115 are still alive at the end of April.

a) What is the survivorship up to the start of April? Round to the nearest hundredth   (2 Marks)

b) What is the mortality rate during the month of March? Round to the nearest hundredth   (2 Marks)

c) If the survivorship during May is 0.5, how many mice will there be at the end of May? Round to the nearest whole number   (2 Marks)

3. a) State the data that is important in constructing lifetables   (2 Marks)

c) State the factors that contributes to the rarity of a species according to D. Rabinowitz (3 Marks)

b) Explain three factors affecting population growth (3 Marks)

4. a) A population of wood pecker birds in one year is 2000 and the following year 2250. How large will it be the following year if its growing exponentially? Show your work. (3 Marks)

b) What's the doubling time of the above population? (2 Marks)

c) What are the factors that could be contributing to the population growth of the birds (3 Marks)

5. a) Explain how genetics influence population density (3 Marks)

b) Enumerate two forces that contributes to the violation of the Hardy-Weinberg Assumption (4 Marks)

6. a) Using the mark-recapture technique we trap 100 deers and mark them. One week later we capture 100 individuals and find that 40 are marked. What can you conclude from the findings? (4 Marks)

b) State the disadvantages of this method (3 Marks)

SECTION B: 30 MARKS

7. Discuss the density dependent and density independent factors in population regulation (15 Marks)

8. a) According to Hardy Weinberg equilibrium, state five conditions that must be met for the equilibrium to remain in effect in a population (5 Marks)

b) Cystic fibrosis is a recessive condition and affects 1 in 2,500 babies in the Caucasian population of the united states, calculate the frequency of the recessive allele in the population, the frequent of the dominant allele in the population and the percentage of heterozygous individuals (carriers) in the population. (10 Marks)

9. With an aid of clearly labelled diagrams, discuss the types of survivorship curves explaining the factors at play in each. Give an example of each organism displaying the type of survivorship curve. (15 Marks)