RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

Bachelor of Science in Health Promotion
Second Year - Semester II Examination – January/February 2023

BIO 2204–ECOLOGY

Time: Two (02) hours

Answer ONLY FOUR (04) questions.

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1. In some ecological settings, predation influences demography and individual fitness. Discuss scenarios where predation plays an important ecological role and others where it appears to be less important. **(100 marks)**

2. a) Compare and contrast the biogeochemical cycles of P, S, and C, include the origins and importance of gaseous, liquid, and solid phases in soils. **(50 marks)**

   b) Discuss the impacts of occurrence of excess amounts of gaseous and liquid phases of elements in these biogeochemical cycles. **(50 marks)**

3. a) Using suitable illustrations and examples distinguish between the fundamental and realized niche. **(15 marks)**

   b) Citing appropriate examples, describe how intraspecific competition can leads to territoriality. **(15 marks)**

   c) Using suitable examples explain how the above mentioned niches (in part 'a') reduce inter-species competitions between living organisms. **(70 marks)**

4. A study was conducted on a population of Sri Lankan Spiny Mouse (*Mus mayori*) in the Sinharaja rain forest, Sri Lanka. Hundred and twenty (120) month-old mice were removed from their nest, micro-transmitters were inserted under their skin, and they were quickly returned to their nests. Scientists monitored their activities on monthly basis, and during the breeding season nest were checked and babies produced were counted.

   A summary of data only for the female mouse that were tagged (80 individuals) is given as below. For simplicity, the monthly data has been summed into monthly totals.

   Survival: 80 were alive at the start the experiment (month = 0), 65 at the start on the next month (month 1), 52 at month 2, 44 at month 3, 36 at month 4, 30 at month 5, 25 at month 5, 20 at month 6, 15 at month 7, 10 at month 8, 8 at month 8, 4 at month 9 and 1 at month 10

Fecundity: during month 0 to 4, no babies were produced; month 5- females produced an average of 4 babies each; month 6 - 8 babies each; month 7 & 8 – 12 babies each and month 9 - 8 babies each.

Based on the above information …

a). Create a survivorship schedule for this Sri Lankan Spiny Mouse population. **(40 marks)**

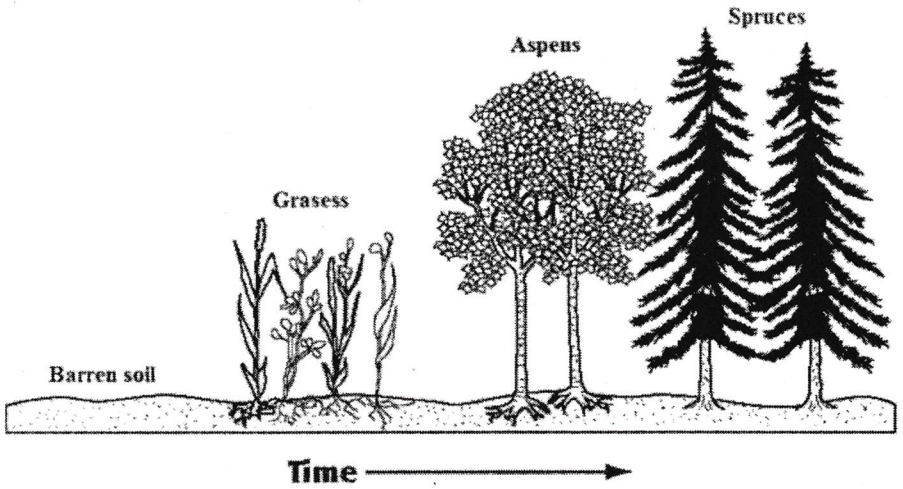
b). What is the net reproductive rate (R_0) and generation time (T) of this population? **(20 marks)**

c) Make a survivorship curve for the mouse population and speculate what factors would have influenced the overall pattern of survivability during the ten months period. **(15 marks)**

c). Plot the change in population size over time (for 1 year) starting with 10 individuals. **(15 marks)**

d). If Sri Lankan Spiny Mouse is an endangered species, what are the other kinds of information you would need to gather to support your predictions made in "c" above ? **(10 marks)**

5. The diagram given below illustrates a succession in a plant community which was a mature forest community completely destroyed by an anthropogenic activity.



Study the diagram and answer the following questions:

a) Define the term succession. **(05 marks)**

b) Describe the stages of succession shown by the above diagram. **(40marks)**

c) Tabulate the differences between primary and secondary succession. **(30 marks)**

d) Using suitable examples, explain briefly the importance of succession in ecosystems. **(25 marks)**

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