UNIVERSITY OF RUHUNA

BACHELOR OF SCIENCE HONOURS IN FISHERIES AND MARINE SCIENCE DEGREE

Level – II, Semester-I Examination

August/September 2018

FSC 2112- Basic Ecological Principles

Time 2 hours

Answer all questions in Part-I, part –II and only two questions in Part-III

Part-I

1. Three common distribution patterns of population are

     i.   clumped, uniform and mosaic
     ii.   uniform, random and disperse
     iii. random, regular and clumped
     iv.   patchy, uniform and independent
     v.   clumped, isolated and random

2. Age structure of a population describes the

     i.   numerical relationship between male and female age groups
     ii.   distribution of male and female number in a population
     iii. relative numbers of individuals in each age class
     iv.   average time between the birth of an organism and the birth of its offspring
     v.   number of organisms in a unit area or a unit volume of habitat of a given time period

3. Key factor analysis is a method used to determine the
     i.   interspecific competition among species
     ii.   component that causes the major fluctuations in population size
     iii. interaction between different populations
     iv.   age structure of a population
     v.   birth and mortality rate of a population

4. life table analysis was introduced to ecology by

     i.   Charles Darwin
    ii.   Raymond Pearl
   iii.   Ernst Haeckel
   iv.   Alfred Russel
    v.   Gause

5. Logistic growth pattern of a population is given by

    i. $\frac{dN}{dt} = N\gamma(1 - \frac{\gamma}{K})$
    iv. $\frac{dN}{dt} = \gamma N(1 - \frac{N}{K})$

   ii. $\frac{dN}{dt} = \gamma k(1 - \frac{N}{K})$
    v. $\frac{dN}{dt} = \gamma N(\frac{N}{K} - 1)$

   iii. $\frac{dN}{dt} = N(1 - \frac{N}{\gamma K})$

6. Sympatric species can be described as
    i.   closely related species that occupy in the different geographical area
   ii.   species that are not closely related but occupy in the same geographical area
   iii.   closely related species that occupy the same geographical area
   iv.   species that utilize different resources in the same locality
   v.   species that plays a unique and crucial role in the way an ecosystem functions

7. In estimating populations using Petersen method, an erroneous estimation can be given when the population is
    i.   open
   ii.   at the carrying capacity
   iii.   isolated
   iv.   closed
   v.   immature

8. Wave length range of Photosynthetically Active Radiation (PAR) is
    i.   400 to 700 nanometer
   ii.   200 to 600 nanometer
   iii.   400 to 900 nanometer
   iv.   300 to 400 nanometer
   v.   350 to 500 nanometer

9. The key factors that determine the population growth are
   i.   growth, mortality, survival and migration
   ii. immigration, emigration, birth and death
   iii. fecundity, survival, natality and immigration
   iv. natality, mortality, growth and reproduction
   v.   immigration, natality, death and fertilization

10. Gypsy moths (*Lymantria disor*) are annual insects in which breading takes place in early to mid-summer. After females lay eggs, all adults die. The eggs hatch the following spring into larvae that feed on the leaves of tree species. A researcher found, 4 gypsy moths egg masses/ha in 2012. When he returned in again in 2015, he found 5 egg masses/ha with an average of 40 eggs/mass. What is the net growth rate per generation
    i.   1.56
    ii. 1.25
    iii. 1.90
    iv. 1.00
    v.   0.87

(1.5 x 10 = 15 Marks)

Part-II

1. List five important characteristics of a community

   i. ....

   ii. ....

   iii. ....

   iv. ....

   v. ....

   (5 marks)

2. What is the difference between a cohort life tables and a static life table?

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   (4 marks)

3. List four factors that decides the biotic potential of a population

   i. ....

   ii. ....

   iii. ....

   iv. ....

   (4 marks)

4. Define the term exploitation efficiency of an ecosystem

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(4 marks)

5. What is the difference between fundamental niche and the realized niche?

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(4 marks)

6. List three ecological importance of predation

   i. ....

  ii. ....

 iii. ....

(3 marks)

7. Following graph shows one of the possible scenarios of the competition between two species.
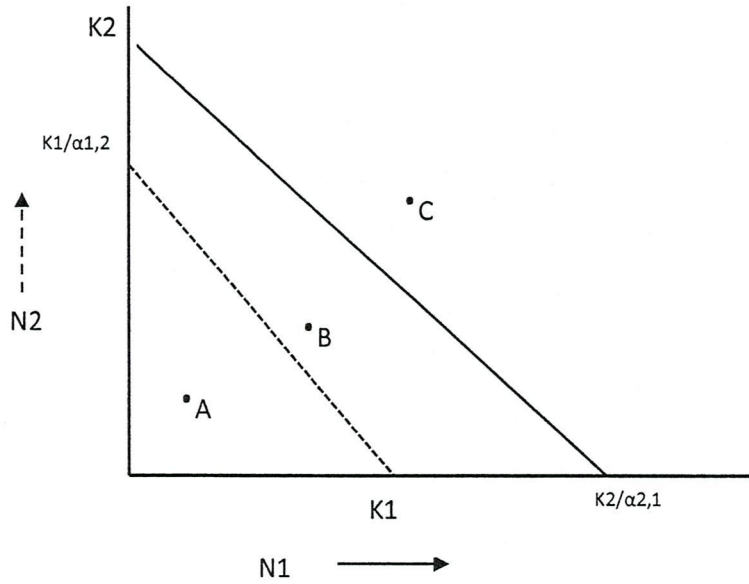
a. Describe the composition changes of the populations at A, B and C locations.

   i. A

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(3 marks)

ii. B

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(3 marks)

iii. C

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(3 marks)

b. In this particular scenario, which species compete better than other

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(2 mark)

Part-III

Answer only two (02) questions

1. "Several strategies have evolved to avoid the intraspecific competition in the natural environment". Justify this statement providing suitable examples.

(25 marks)

2. Stability of an aquatic system is highly governed by the primary production of the systems
   a. What are the factors that affect to the primary production in an aquatic ecosystem?
   b. Explain the impact of global climate change on aquatic primary producers with suitable examples

(25 marks)

3. Write short notes on any **four (04)** of the followings
   a. Aquatic succession
   b. Carrying capacity
   c. Competitive exclusion
   d. Mark and recapture technique
   e. Killing factor

(25 marks)