SOUTH EASTERN KENYA UNIVERSITY

UNIVERSITY EXAMINATIONS 2016/2017

SECOND SEMESTER EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE (BIOLOGY)

SBL 308: THEORETICAL ECOLOGY

DATE: 11TH APRIL, 2017 TIME: 10.30-12.30 P.M

INSTRUCTIONS TO CANDIDATES

(a) Answer ALL the Questions in Section A

(b) Answer ANY TWO Questions in Section B

(c) Illustrate your answers with well labeled diagrams where appropriate

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SECTION A (30 Marks)

1. Giving appropriate examples, state the difference between bionomic and scenopoetic niche axes.**(3 marks)**
2. Explain how the term represented by 'α' in the following equation affects population growth.**(3 marks)**

$$\frac{dN_1}{dt} = r_1 N_1 \frac{(K_1 - N_1 - \alpha_{12} N_2)}{K_1}$$

3. State the possible ecological outcomes of predation/herbivory.**(3 marks)**
4. Explain the condition under which a time specific life table is equivalent to age specific life table. **(3 marks)**

5. Give the equations that show how the growth rates of populations growing at geometric and logistic rates can be determined. **(3 marks)**
6. Using a graph, show the relationship of extinction rate, immigration rate and equilibrium number of species on:

(a) a near small island.(**1.5 marks**)

(b) a distant large island. (**1.5 marks**)

7. Define the following:
    a) Species diversity.**(1 mark)**
    b) Species richness.**(1 mark)**
    c) Species abundance.**(1 mark)**
8. Explain the schools of thought that explain population regulation. **(3 marks)**
9. Define the following terms:

a) Fundamental niche.**(1 mark)**

b) Realized niche.**(1 mark)**

c) Included niche.**(1 mark)**

10. Explain why large conservation areas are better than small ones.**(3 marks)**

<u>SECTION B</u> (40 Marks)

11. Discuss the mechanisms and consequences of herbivore-plant interactions. **(20 marks)**
12. Graphically illustrate the four possible outcomes of two competing species and critically discuss each of them indicating the natural systems that they might apply to. **(20 marks)**
13. Using appropriate examples, discuss the various hypotheses that have been suggested to explain the differences in species diversity. **(20 marks)**
14 In the life table shown:

(a) Calculate the mortality rates. (**8 marks**)

Age Class	Number of Survivors	Number of Deaths	Mortality rate
0-9	110	0	
10-19	100	7	
20-29	80	17	
30-39	70	9	
40-49	50	20	
50-59	30	20	
60-69	20	10	
70-79	20	7	
80-89	10	10	
90-99	0	10	
100+	0	0	

(b) Draw a survivorship curve and describe it. (**10 marks**)

(c) Give two example of animal population that the curve is likely to represent. **(2 marks)**