

UNIVERSITY OF SWAZILAND

MAIN EXAMINATION: DECEMBER 2016

TITLE OF PAPER: ECOLOGY

COURSE CODE: B304

TIME ALLOWED: THREE HOURS

- INSTRUCTIONS:**
- 1. THIS PAPER IS DIVIDED INTO TWO SECTIONS**
 - 2. ANSWER ALL QUESTIONS IN SECTION A WHICH IS COMPULSORY AND CARRIES 40 MARKS**
 - 3. CHOOSE ANY TWO QUESTIONS FROM SECTION B, EACH OF WHICH CARRIES 30 MARKS.**
 - 4. REMEMBER TO USE APPROPRIATE TERMINOLOGY AND ILLUSTRATIONS WHERE APPLICABLE**

SPECIAL REQUIREMENTS: GRAPH PAPER

THIS PAPER SHOULD NOT BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATORS

SECTION A (COMPULSORY) : ANSWER ALL QUESTIONS

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Question 1

You are working in Big Bend Ranch, Swaziland which is within a Lowveld bushveld that has large patches of brightly coloured sandy soil spread throughout the area. This soil has a unique chemistry, different from the soil of the neighbouring clay-rich areas, and results in a different composition of trees. In particular, you notice one shrub that is common throughout many of the brightly coloured sandy patches. However, you also notice that some smaller patches of brightly coloured soil do not have this shrub, though they do have other tree species usually found on the sandy soils.

- (a) Briefly describe three factors that you hypothesize may explain the patchy distribution of the shrub; (15 marks)
- (b) Describe an experiment to test one of these hypotheses. What results would you expect to show support for your hypothesis? What results would not support your hypothesis? (15 marks)
- (c) What characteristics of the populations on the various patches would be consistent with a metapopulation model for this species? (10 marks)

(40 marks)**[TOTAL MARKS = 40]**

SECTION B: ANSWER ANY TWO QUESTIONS

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Question 2

Use the table below derived from annual censuses of blue wildebeest in a game ranch to answer the following questions:

Age	Number of survivors	Offspring produced
0-1	1000	0
1-2	800	0
2-3	790	80
3-4	775	124
4-5	764	115
5-6	730	103
6-7	687	93
7-8	640	87
8-9	570	71
9-10	440	23
10-11	252	9
11-12	101	3
12-13	7	1
13-14	4	0
14-15	1	0
15-16	0	0

(a) Provide an expanded table and populate accordingly. (12 marks)

(b) Draw the survivorship and fecundity graphs, determine R_0 and advise the ranch owner. (18 marks)

[TOTAL MARKS = 30]

QUESTION 3

(a) Differentiate between density-dependent and density-independent population growth. (10 marks)

(b) Compare and contrast life histories of organisms under r-selected and K-selected environments (20 marks)

[TOTAL MARKS = 30]

QUESTION 4

(a) Discuss 4 mating systems in relation to parental investment. (20 marks)

(b) List five of the most invasive alien plants found in Swaziland (use scientific names).. (10 marks)

[TOTAL MARKS = 30]

QUESTION 5

(a) Briefly describe the savannah and grassland biomes of Swaziland. (10 marks) 81

(b) Discuss the principle of allocation in foraging ecology. (6 marks)

(c) Define the following terms:

- (i). Commensalism,
- (ii). Rescue effect,
- (iii). Metapopulation,,
- (iv). Character displacement,
- (v). Acclimation,
- (vi). Foraging,
- (vii). Cohort.

(7 X 2 marks)

[TOTAL MARKS = 30]

END OF QUESTION PAPER