UNIVERSITY OF SWAZILAND
SUPPLEMENTARY EXAMINATION PAPER 2007/2008

TITLE OF PAPER: BIOSTATISTICS

COURSE CODE: B305

TIME ALLOWED: THREE (3) HOURS

INSTRUCTIONS:

1. ANSWER ANY FOUR QUESTIONS.
2. EACH QUESTION CARRIES TWENTY FIVE (25) MARKS.
3. ILLUSTRATE YOUR ANSWERS WITH LARGE AND CLEARLY LABELED DIAGRAMS WHERE APPROPRIATE.
4. CLEARLY STATE YOUR NULL AND ALTERNATIVE HYPOTHESES AND YOUR CONCLUSIONS WHERE APPROPRIATE.

SPECIAL REQUIREMENTS:

1. CALCULATORS (CANDIDATES MUST BRING THEIR OWN).
2. GRAPH PAPER.
3. STATISTICAL TABLES (TO BE SUPPLIED BY THE LECTURER).

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

ANSWER FOUR (4) OUT OF SIX (6) QUESTIONS

QUESTION 1

The following data were collected by a bat biologist:

Call frequency (kHz)	Body mass (g)
17	60
22	20
24	15
26	12
33	28
39	8
44	18
69	5
83	8
105	6

Is there a significant correlation between call frequency and body mass in bats? Use an **appropriate** statistical test to support your answer.

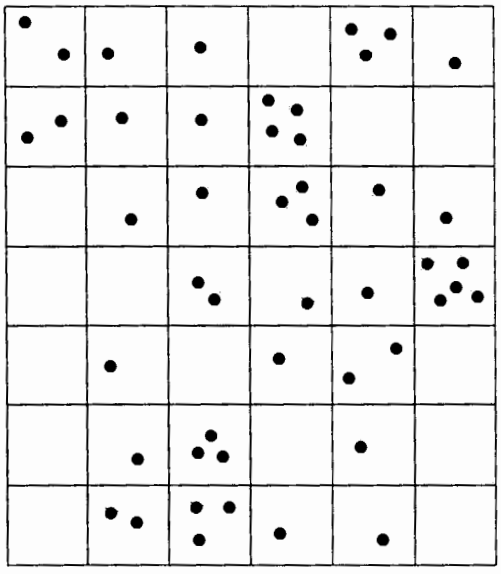
[TOTAL = 25 marks]

QUESTION 2

Consider the distribution of sparrow nests (see map on next page). Each dot represents a nest. Are the nests distributed randomly in the habitat? Tip: use the squares provided to calculate the number of squares with no nests, one nest, two nests, etc., and then use the poisson distribution.

QUESTION 2 (continued)

Distribution of sparrow nests in a natural habitat.



[TOTAL = 25 marks]

QUESTION 3

Year	Number of juveniles	
	male	female
2001	22	55
2002	39	45
2003	53	55
2004	48	45
2005	39	36

Is the sex ratio (male : female) even across the different years? Use chi-square to test this.

[TOTAL = 25 marks]

QUESTION 4

The following table shows the average contribution of protein (mg) in the stomach contents of a rodent species in four different habitats. The data are **NOT** normally distributed.

Protein component (mg) in stomach contents			
Habitat 1	**Habitat 2**	**Habitat 3**	**Habitat 4**
10	8	9	10
11	9	12	10
13	7	14	13
12	6	11	12
9	6	10	11

Using an **appropriate** statistical test, establish whether rodents in the four different habitats have significantly different amounts of protein in their diets.

[25 marks]

QUESTION 5

Consider the data in the Table in Question 4 (previous question).

a) Calculate the standard deviation and confidence interval associated with each sample (habitat).

[10 marks]

b) Present these data graphically.

[10 marks]

c) What type of graph have you presented? And what is the difference between a histogram and an x-y graph?

[5 marks]

[TOTAL = 25 marks]

QUESTION 6

The following mortality data were collected for a particular species of bird. A total of 163 juveniles were followed until their death. The number present under the "survival" column refers to the number of birds dying in that particular age group (out of the total of 163 birds).

Mortality	Age group (years)
75	<1
30	1
10	2
10	3
8	4
7	5
6	6
7	7
5	8
5	9
Total = 163	

a) Calculate the mortality rate associated with each age group and present it as a percentage

[5 marks]

b) Present these data graphically.

[10 marks]

c) What are the essential components of a research proposal?

[10 marks]

[TOTAL = 25 marks]