KENYATTA UNIVERSITY

MOMBASA CAMPUS

UNIVERSITY EXAMINATIONS 2011/2012

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

SZL 300: BIOSTATISTICS

DATE: Friday, 30th March, 2012 TIME: 8.00 a.m. – 10.00 a.m.

INSTRUCTIONS:

Answer **ALL** questions in Section A and **ONE** question in Section B.

SECTION A – Answer **ALL** questions (40 marks)

1. The Ministry of Science and Technology has incorporated you in a study on the biological causes of water borne diseases in Mombasa County. Briefly explain the sampling technique best applicable for the study.

2. A machine, which automatically packs potatoes into bags, is known to operate with a mean of 45 kg and a standard deviation of 1.25 kg. Assuming a normal distribution, what percentage of bags weigh:
   i) More than 45 kg
   ii) Between 42 and 47 kg

3. Preparation of data for analysis is a fundamental activity carried out before data analysis is done. Differentiate between the following aspects of data preparation.
   i) Data coding and data sorting

ii) Data classification and data presentation

4. A study was conducted to compare the poverty causing factors in three counties within the coastal region. The table below shows the number of people who responded to each of the factors.

Factor/District	T/Taveta	Lamu	T/River
Unemployment	325	273	211
Illiteracy	177	423	546
Culture	117	563	395

i) State H_0 and H_1

ii) Test the null Hypothesis using chi-square test and state the conclusion.

5. In a study to compare the changes in weights after ten individuals were put on weight loss programme were as follows:-

Wgt Before: 76; 74; 75; 70; 69; 73; 62; 83; 97; 80

Wgt After: 73; 74; 71; 72; 70; 74; 63; 80; 96; 81

Perform a sign test and comment on whether the programme is working or not.

6. A research data can be classified as either qualitative or quantitative, or as primary or secondary. Using suitable examples, explain clearly the difference between following set of terms:

iii) Qualitative and Quantitative

iv) Primary and Secondary data

7. The following data repreents the marks scored by Bachelor of Education (Science) students of Kenyatta University, Mombasa Campus. 46, 58, 62, 48, 78, 45, 45, 76, 53, 45, 85, 56, 58, 59, 43, 60, 43, 68

Compute; The arithmetic mean, mode and the median of the distribution

8. A supermarket stocks eggs in boxes of six, and 10% of the eggs are found to be cracked. Assuming that the cracked eggs are distributed at random, what is the probability that a customer will find that a box that he chooses contain

   a) No cracked egg

   b) If he examines five boxes, what is the probability that two or more will contain cracked eggs.

SECTION B

Answer any **ONE** question – (30 marks)

9. a) Explain the following sampling techniques used in scientific studies

      i) Stratified Sampling

      ii) Quota Sampling

      iii) Systematic sampling

      iv) Snow-ball sampling

   b) Department of Domestic Taxes provided a listing of incomes of the research assistants in a research consultancy firm. Their annual allowances were as follows:-

18	80	17	82	88	26	43	15	56	12	96
95	12	66	78	70	59	38	28	23	31	45
38	42	49	53	44	56	59	52	39	56	87
52	73	67	51	38	43	38	53	62	53	66
37	40	85	79	61	58	28	46	43	44	40

   Required:

      i) Group the data into appropriate number of classes

      ii) Compute the mean, standard deviation and coefficient variation

      iii) Compute the coefficient of skewness and kurtosis using moments.

10. a) Briefly explain how you would determine the sample size to use for a study if you are want to estimate a:

      i) Population Mean

      ii) Population Proportion

b) A research consulting firm feels that the average no. of days required to complete any biological statistical research contract = 45 days. 31 contracts are randomly selected in order to test this assertion. The mean is found to be 41.8 days with standard deviation = 6.5 days. Dr. Abubakar, the lead scientist wishes to test the hypothesis at 5% level of significance. State the set of hypothesis, run the test and make a conclusion.

c) In a biological field work session, the students were recording the average amount of grass the grasshoppers consumed as well as the weights of those jumbo grasshoppers. After the collection of the data there was a feeling that the eating habit is linked to the weight of those grasshoppers. The following data was recorded.

Weight of Grass (in gms)	**Weight of Grasshopper** (in gms)
45	248
49	230
53	380
54	280
59	410
61	360
66	290
70	350
77	365
83	423

Required:

i) Estimate the grasshopper weight estimating function using regression analysis

ii) Estimate the grass weight for a randomly selected grasshopper weight of 330 gms.

iii) Determine the correlation coefficient for he above scenario and state its meaning.