



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES

**UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF
EDUCATION SCIENCE WITH IT**

3rd YEAR 1st SEMESTER 2016/2017 ACADEMIC YEAR

MAIN CAMPUS - REGULAR

COURSE CODE: SZL 302

COURSE TITLE: BIostatISTICS

EXAM VENUE: LAB 9

STREAM: (BED)

DATE: 20/04/16

EXAM SESSION: 9.00 – 11.00 AM

TIME: 2 HOURS

Instructions:

- 1. Answer ALL questions in Section A and Any two questions in Section B**
 - 2. Candidates are advised not to write on question paper**
 - 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**
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SECTION A: ANSWER ALL QUESTIONS (30 MARKS)

1. Describe the three measures of central tendency. (3 marks)
2. Calculate the variance, standard deviation and mean of the data set given below.(3 marks)

29	34	39	21
40	35	35	23
20	33	29	39
32	31	36	27
23	26	27	24

3. A random sample of 100 12-year-old boys were chosen and their heights recorded. The sample mean height was 64 inches, and the sample standard deviation was 5 inches. Calculate the 95% confidence interval of the mean. You may assume heights of 12-year-old boys are normally distributed. (3 marks)
4. List the statistical tests you would use to test the following: (3 marks)
 - a. Determine the variation in wing length of butterflies from five different locations
 - b. To validate the statement “people having high cholesterol suffer more from hypertension”
 - c. Determine the difference in the weights
5. Explain why scientists do not conduct a population census when they set out to carry a scientific research. (3 marks)
6. State the null and alternate hypothesis for the following scenarios
 - a. A two tailed test. (1 mark)
 - b. A left tailed test. (1 mark)
 - c. A right tailed test. (1 mark)
7. State three assumptions of analysis of variance. (3 marks)
8. Explain the following terminologies:
 - a. Simple linear regression. (1 mark)
 - b. Cause and effect relationship. (1 mark)
 - c. Spurious correlations. (1 mark)
9. List three advantages of non-parametric tests.
10. Describe the Kruskal-Wallis test indicating scenarios when one can use it. (3 marks).

SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)

11.
 - a. Discuss the Chi square (χ^2) test procedure describing its use, its characteristics and how to make inferences from its results. (10 marks)
 - b. In an experiment with peas one observed 360 round and yellow, 130 round and green, 118 wrinkled and yellow and 32 wrinkled and green seeds. According to the

Mendelian theory of heredity the numbers should be in the ratio 9:3:3:1. Determine if there is any evidence of difference from the plants at 5% level of significance? (10 marks)

12. You have been asked to conduct a study in Siaya County to find out if a new invasive species of a lepidopteran pest that lays its eggs in the stems of maize is present in all districts.
- Discuss the sampling technique that you would use. (5 marks)
 - Describe the type of data that you would collect. (4 marks)
 - State the hypothesis that you would use in your study. (3 marks)
 - Based on your hypothesis, describe a statistical test that you would use. (8 marks)
- 13.
- Discuss the paired t test procedure describing its use, test statistics and how to make inferences from its results. (10 marks)
 - The data set given below indicates the yield of wheat during the years 2011 and 2012 from the same fields. At 95% confidence interval, determine whether there is a difference in yield between the two years.

2011	2012	2011	2012	2011	2012
81	80.7	82.3	103.1	98.9	66.4
105.4	82.3	77.3	105.1	89	49.9
119.7	80.4	78.4	116.5	69.1	96.7
109.7	87.2	131.3	139.9	89.3	61.9
98.3	84.2	89.6	129.6	104.1	80.3
146.6	100.4	119.8	98.9	86.9	67.7
142	115.5	121.4	61.9	77.1	66.7
150.7	112.2	124	96.2	78.9	67.4
191.5	147.7	140.8	125.5	101.8	91.8
145.7	108.1	124.8	75.7	96	94.1

14. Consider the data set given below which shows the results of a study that investigated the number of animal species in three different habitats. At 95% confidence interval determine whether there are differences in the number of animal species between the three habitats. Summarize your data in a table.

Number of animal species		
Island	Mainland	Peninsula
5	5	7
2	7	5
1	6	6
5	3	6
2	9	5
4	8	6
3	10	5
4	9	6
2	9	6
3	7	6