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

THIRD YEAR FIRST SEMESTER 2018/2019 ACADEMIC YEAR

MAIN CAMPUS - REGULAR

COURSE CODE: **SZL 302**

COURSE TITLE: **BIOSTATISTICS**

EXAM VENUE: **STREAM: (BEd. Sc)**

DATE: **EXAM SESSION:**

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**

SECTION A: SHORT ANSWER QUESTIONS (30 MARKS)

1) Describe the below listed data types:
   a) Nominal data (1 mark)
   b) Ordinal data (1 mark)
   c) Bivariate data (1 mark)
2) An investigation into the body mass index of a sample of university students resulted into the following data set:

   24.1, 25.6, 23.3, 25.1, 24.0, 30.0, 25.6, 26.4, 23.5, 24.7, 23.6, 24.5, 24.7, 25.1, 24.0

   Showing your working, calculate the sample's:
   a) Mean (0.5 marks)
   b) Variance (2 marks)
   c) Standard deviation (0.5 marks)
3) Use the data set below to construct a stem and leaf plot. (3 marks)

   65, 67, 87, 73, 78, 67, 82, 84, 87, 76, 86, 91, 94, 99, 100
4) Distinguish between a point and an interval estimate. (3 marks)
5) Using an example, state the null and alternate hypotheses for a left tailed test. (3 marks)
6) Describe scenarios where a biostatistician would use the following means comparison tests:
   a) Dependent sample *t*-test. (1.5 marks)
   b) Independent sample *t*-test. (1.5 marks)
7) State the assumptions of an analysis of variance test. (3 marks)
8) Describe the goodness of fit test and give an example of a dataset that can be analyzed using it. (3 marks)
9) A scientist is interested in finding out the abundance of malaria vectors in houses within Bondo sub-county. Giving reasons, describe what would be the scientist's:
   a) Target population (1.5 marks)
   b) Sampling unit (1.5 marks)
10) Distinguish between the Mann-Whitney *U* test and the Wilcoxon tests. (3 marks)

SECTION B: ESSY QUESTIONS(40 MARKS)

11) Discuss the different types of probability sampling methods. (20 marks)
12) A comparative study on seed set between pollinated and non-pollinated eggplant fruits gave the following results.

    Open pollinated: 43, 42, 34, 48, 38, 36, 41, 43, 28, 39, 37, 39, 35, 34, 30

Non pollinated: 10, 12, 12, 13, 14, 14, 14, 14, 15, 16, 17, 17, 18, 18, 20

a) Perform a statistical test to compare if the difference in seed set between the two groups is significant. (12 marks)

b) Use a boxplot to summarize the difference in seed set between the two groups. (8 marks)

13) Correlation analysis and bivariate plot

A second-year student at JOOUST investigated the relationship body weight and body mass index (BMI). He took a sample of 15 people and measured their weights and heights, from which he determined their BMI. The data set showing their weights and BMI is given below.

Weight	62	53	61	61	68	61	58	67	57	58	71	60	63	57	61
BMI	24	26	23	25	24	30	26	26	23	25	24	25	25	25	24

Base on this data set:

a) Summarize the data using a bivariate plot. (5 marks)

b) Determine whether there is a relationship between the body weight and BMI. (10 marks)

c) Based on your findings, highlight a possible flaw in the way this study was conducted. (5 marks)

14) A study was conducted to determine whether the effort that students put in their studies affects their perception towards examination fraud. Students' effort was determined by the number of hours in a week each student spent revising their course work while perception on exam fraud was determined using based on what they thought was the best punishment for students caught cheating during examinations. A crosstabulation of the of the data is presented below.

	Hours of study per week			
Appropriate action	0 - 5 hours	5 - 10 hours	10 - 15 Hours	15 - 20 hours
Expel	5	14	16	10
Suspend	19	27	42	54
Pardon	7	11	26	30

a) Use a mosaic plot to summarize the data. (10 marks)

b) Perform a statistical test on the objective of the study (5 marks)

c) Discuss the inference from your results. (10 marks)