CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE BIOLOGY, BACHELOR OF SCIENCE IN BIOCHEMISTRY, BACHELOR OF SCIENCE IN BIOMED AND BACHELOR OF EDUCATION SCIENCE

BOTA 302: BIOSTATISTICS

STREAMS: BSC (BIO, BIOCHEM, BIOMED) BED (SCI) Y3S1 **TIME: 2 HOURS**

DAY/DATE: MONDAY 03/12/2018 **11.30 AM – 1.30 PM**

INSTRUCTIONS:

- **Answer all the questions in section 1 and Two questions in section II**
- **Use of calculators and statistical tables is allowed**
- **Do not write anything on the question paper**

SECTION 1 (30 MARKS)

1. (a) Differentiate between cluster and stratified random sampling. [2 marks]

   (b) List the characteristics of a good questionnaire. [3 marks]

   (c) Discuss the stages in sampling process. [6 marks]

2. (a) Discuss two non-parametric procedures, giving their parametric statistical equivalents. [6 marks]

   (b) Outline the steps in hypothesis testing. [2 marks]

3. The population of the elephants in Mount Kenya is divided into five strata such that $N_1=500, N_2=500, N_3=450\ N_4=850¿\ N_5=1250$. Show how a sample size of n=213 should be allocated to the five strata if proportionate sampling was adopted. [5 marks]

4. It is claimed by the laboratory technician that accidents in university laboratories are equally influenced by student carelessness, misuse of apparatus, outdated apparatus, improper techniques, and ignorance. A random sample of 100 reports indicate that the following results.

Type of fault	Number of accidents
Student carelessness	28
Misuse of apparatus	24
Outdated apparatus	19
Improper techniques	16
Ignorance	13

Does the observed information agree with the expected ratios at 5% significance level? [6 marks]

SECTION II (40 MARKS)

5. (a) A pathologist claims that it is faster to test a certain disease using kit A than kit B. To test the claim, eight technicians of proven ability were assigned each to the two kits and the time taken to test the disease was recorded as follows:

Technician	1	2	3	4	5	6	7	8
Kit A	21	33	35	17	27	33	31	41
Kit B	29	39	39	23	23	37	29	43

At a 5% level of significance, determine if the geneticist's claim is valid. [6 marks]

(b) Using the following data fit a regression model and obtain a correlation coefficient. [12 marks]

X	1	2	3	4	5	6	7	8
Y	18	32	37	57	73	95	115	131

6. (a) The following set of measurements was taken from a normally distributed population: 35,42,60,22,39,75,52,78,56,36,17,69,25,32,48,53,46 and 26. Construct a 95% and 99% confidence interval for the population mean.

[8 marks]

(b) Using the following data set. Calculate the mean, mode, median, standard deviation, coefficient of variation and Pearson measure of skewness of successive sale of a given firm.

[12 marks]

Number of sales	0-4	5-9	10-14	15-19	20-24	25-29
Number of salesmen	4	24	44	62	50	34

7. The following data was obtained from an experiment conducted to investigate effects of anthropogenic increase in carbon dioxide on plant defense against invasive insects using four species of trees.

	Number of plants with a compromise defense		
Tree species	Block 1	Block 2	Block 3
A	42	42	37
B	49	38	40
C	37	39	43
D	36	39	38

Perform analysis of variance and test an appropriate at 5% significance level. [20 marks]
