CHUKA **UNIVERSITY**

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF
BACHELOR OF SCIENCE, BIOMEDICAL TECHNOLOGY

BOTA 302: BIOSTATISTICS

STREAMS: BSC, BIOMED

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 31/3/2021 **2.30 PM – 4.30 PM**

INSTRUCTIONS:
- Answer ALL Questions in Section A and any other Two in Section B
- Do not write on the question paper
- Answer each question on a fresh page

SECTION A: SHORT ANSWER QUESTIONS (30 MARKS)

1. Differentiate between the following terms as used in biostatistics. [5 Marks]
   a) Factor and treatment
   b) Inferential statistics and descriptive statistics
   c) Nominal scale and ratio scale
   d) Independent variables and confounding variables
   e) T-test and F-test

2.a) Describe the randomized complete block design (RCBD) [4 Marks]
   b) List three advantages of the RCBD research design method. [3 Marks]

3. The weight of 800 pigs in a piggery is normally distributed with a mean of 70.0kg and a standard deviation of 12kg. A pig from this group is selected at random:-
   (i) Calculate the probability that the weight of the pig is greater than 75 kg. [2 Marks]
   (ii) Find the probability that the weight of the pig is less than 50 kg. [2 Marks]
   (iii) Determine the probability that the weight is between 50 and 80kg. [2 Marks]
   (iv) Approximately, how many pigs have weight greater than 80kg? [2 Marks]

4. Two samples from normal distribution gave respectively means of 4.29 and 4,18 and a variance of 6.89 and 2.55 based on 10 and 12 observations. Determine whether the samples come from distribution with the same mean.   [5 Marks]

5.a) What is data transformation?   [2 Marks]

  b) Explain the three major data transformation methods.   [3 Marks]

SECTION B: ESSAY QUESTIONS (40 MARKS)
6. The following table gives production yield in kg. per hectare of wheat of 50 farms in a
    village.
51, 52, 52, 53, 53, 53, 53, 54, 54, 54, 54, 54, 55, 55, 55, 55, 55, 55, 55, 56, 56, 56, 56,
56, 56, 56, 56, 56, 56, 57, 57, 57, 57, 57, 57, 58, 58, 58, 58, 58, 59, 59, 59, 59, 60, 60,
 60, 61, 61, 62

a) Create a frequency distribution table.   [2 Marks]

b) Use the data to calculate the:
        i. Arithmetic mean   [4 Marks]
        ii. Mean deviation.   [4 Marks]
        iii. Variance   [3 Marks]
        iv. Standard deviation   [2 Marks]
        v. Coefficient of variation.   [1 Mark]

c) List four limitations of the mean as the measure of central tendency.   [4 Marks]

7. The productivity of three varieties of rice were tested in the field, the grain yield data is
    shown in the table below:-

Variety 1 (kg)	Variety 2 (kg)	Variety 3 (kg)	Variety 3 (kg)
21.0	20.8	21.0	23.0
20.1	21.2	20.0	18.9
21.2	19.8	22.4	20.4
22.0	22.6	19.4	20.5
23.1	20.6	22.1	22.8

Test whether there were differences in yield among the three rice varieties.   [20 Marks]

8.a) Describe the steps in hypothesis testing during data analysis stage.   [12 Marks]
b. Outline the importance of biostatistics in biological research.   [8 Marks]

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