

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS
RESIT/SPECIAL EXAMINATION
**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN
ANIMAL SCIENCE**
ANSC 372: DESIGN AND ANALYSIS OF ANIMAL EXPERIMENTS**STREAMS: BSC ANSC****TIME: 2 HOURS****DAY/DATE: THURSDAY 04/02/2021****8.30 A.M – 10.30 A.M.****INSTRUCTIONS**

- This examination has two sections i.e. Section A and B
 - Section A has 30 marks and Section B 40 marks
 - Answer ALL questions in Section A and TWO questions in Section B
 - You are allowed to use a calculator. Statistical tables are provided
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Section A. Answer all questions

1. The following is data on maize yield per acre from a research experiment:

20.0	26.2	23.9	22.7	23.5	25.8	23.7	21.8	24.2	22.7
30.0	26.7	25.9	29.3	25.0	24.7	30.2	24.1	28.5	26.6
21.6	23.6	26.9	26.0	28.7	23.4	25.2	26.7	23.0	25.9
17.2	36.8	22.9	23.6						

Use the data to determine the following statistics:

- a. The mean
- b. The standard deviation
- c. The standard error of the mean
- d. The *z-score* for the value 29.6
- e. Construct the 95% confidence interval for the sample mean

[15 marks]

2. A researcher designs a study to test the hypotheses $H_0: \mu = 0.02$ versus $H_a: \mu > 0.02$. A random sample of 50 measurements from the population of interest yields $\bar{x} = 0.03$ and $s = 0.005$. Using t , what conclusions can you make about the hypotheses based on the sample? [5 marks]

3. The data below gives the levels of pesticide residues in banana fruits after harvest. Levels above 0.02 grams per kg are known to have an adverse effect on human health. From these data can we conclude that the mean residues in the harvest are above 0.02 gms? [10 marks]

0.04	0.03	0.04	0.03	0.02	0.01	0.03	0.03	0.03	0.02	0.03
0.03	0.04	0.03	0.03	0.03						

4. An experiment was conducted to compare the effects of two manure maturing methods on maize yield. Equal quantities of manure were applied on two adjacent plots and the same variety of maize were grown. The experiment was replicated 10 times. The table below gives the yields from the experiment:

Method A	16	15	16	16	13	17	13	9	16	13
Method B	12	23	17	19	16	13	10	13	9	9

Use the data to determine whether the differences in yields from the two methods are statistically different at 0.95 confidence (assume the independent samples and equal variances).

Section B. Answer TWO questions

5. An experiment was conducted to compare the yield of maize when two fertilizers with different amounts of nitrogen are applied. Maize yields from two plots where the fertilizers were applied in kgs are shown below:

Fertilizer A	11.15	10.94	8.40	12.22	7.47	11.98	12.08	7.54	8.69	11.74	9.90
Fertilizer B	13.02	14.55	18.56	12.12	14.93	12.55	16.07	12.13	15.29	14.39	13.44

Fertilizer A	7.48	7.25	8.95	9.58
Fertilizer B	14.28	17.8	15.45	11.67

- a. Construct a 0.95 confidence interval for the mean of Fertilizer A [3 marks]
- b. Test the hypothesis that the mean productivity of maize when Fertilizer B is applied is greater than 13.0 kgs [6 marks]
- c. Determine from these data whether the in yields were equal (i.e., $\mu_A = \mu_B$) when the different fertilizers were applied at . Assume that the samples are independent. [6 marks]

6. A recently discovered pest known as HM13 infects growing maize causing retarded growth. A researcher has developed two pesticides for the control of HM13. To test the potency of the two pesticides the researcher set an experiment such that 6 maize plants were grown on plots that were known to be infested with MH13 and each plot was treated with the fungicides. the researcher then measured the height of the maize after maturity. The data from the experiment is shown below:

Control	66	67	74	73	75	64
Fungicide A	85	84	76	82	79	86
Fungicide B	91	93	88	87	90	86

- a. Use the data to run an analysis of variance to detect whether there are differences among the maize height for the three groups. Use F . [10 marks]
- b. Draw your conclusions. [5 marks]

7. A study was carried out to compare the yield of two new bean varieties (B and C) to the existing variety (A) in terms of yield per acre. The data below presents the yields (in bags per acre) for the different varieties from 10 trials.

<u>A</u>	<u>B</u>	<u>C</u>
16	16	10
11	14	9
11	16	6
6	17	16
12	12	9
11	16	13
12	14	9
13	13	17
16	14	11
<u>9</u>	<u>15</u>	<u>5</u>

- a. What was the experimental design used in this study? [2 marks]
- b. Write the statistical linear model for the design [3 marks]
- c. At determine whether the yields from the different varieties are statistically different. [10 marks]
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