

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF MASTER OF SCIENCE
IN ENVIRONMENTAL SCIENCE

MIHM 841/MATH 800: STATISTICS IN HOSPITALITY AND
TOURISM/BIOMETRY

STREAMS: MSc. (ENSC); MIHM Y1S2

TIME: 3 HOURS

DAY/DATE: WEDNESDAY 07/07/2021

02.30 P.M. – 5.30 P.M.

INSTRUCTIONS:

- Answer question ONE and any other TWO
- Do not write anything on the question paper

1. In the following questions

(a) Explain how statistics can be applied in any four ways in environmental science.

(8

marks)

(b) You are presented with the number of six different types of livestock owned by five different farmers in Ndagani area farmers in Chogoria. You want to determine whether there is a relationship between the number of livestock owned in the two areas

(i) Discuss factors you would consider before settling on the appropriate test statistics. (10 marks)

(ii) With explanation, identify the best test for the relationship. (2 marks)

2. a) The concentration of chromium from tannery effluent from three points in the waste water treatment plant in a factory is shown below.

Point 1	12	10	8	14	15	9	10		
Pont 2	8	9	5	4	10	6	6	7	4

Point 3	4	6	3	4	2	3	5	2	
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Using Analysis of variance test, determine whether there are differences between the three sampling points. (12 marks)

b) Discuss any four requirements for performing analysis of variance test. (8 marks)

3. a) In testing a particular pesticide that is expected to make the pest less active, a population of whiteflies was divided into two groups where one was exposed to the pesticides and the other to the placebo. The following day the treatments were reversed for the two groups. The active time for each whitefly during the time observation was recorded for the two treatments.

White fly	Pesticide (min)	Placebo (min)
A	10	12
B	15	14
C	12	16
D	18	15
E	16	12
F	14	17
G	12	15
I	17	14
J	13	15

By use of a paired t-test determine whether the pesticide was working. (12 marks)

b) The following data represent the height of trees in a woodlot

Weight (m) (x)	11-15	16-20	21-25	26-30	31-35
Frequency (f)	25	40	45	35	10

Calculate

- (i) The specific mode of the height of trees in a woodlot (4 marks)
 (ii) The specific median height (4 marks)

4. a) In the testing of a drug that is supposed to alleviate pain from severe arthritis, a population of was given the drug and required to walk, later they were given a placebo and required to walk. The distance they were able to cover in 30 minutes was recorded.

With drug (m)	18	22	17	19	16	15	20	18	16	21
With placebo (m)	20	16	17	13	12	17	14	15	15	18

Using the Wilcoxon test, determine whether drug had any significant effect to distance covered.

(10

marks)

- b) For the following data representing the height of trees.

<i>Weight (m) (x)</i>	11-15	16-20	21-25	26-30	31-35
<i>Frequency (f)</i>	25	40	45	35	10

Determine the confidence interval limits of the mean.

(10 marks)

Note: $t = \frac{\bar{D}}{\sqrt{\frac{S_D^2}{N}}}$, $S_D^2 = \sum iii$

Attached statistical tables: t; Wilcoxon, Anova

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