



MACHAKOS UNIVERSITY

University Examinations For 2020/2021 Academic Year

SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES MANAGEMENT

DEPARTMENT OF ENVIRONMENTAL SCIENCES

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

MASTER OF ENVIRONMENTAL SCIENCE

ESU 802: ENVIRONMENTAL APPLIED STATISTICS

DATE: 14/6/2021

TIME: 8:30 – 11:30 AM

INSTRUCTIONS: Answer question ONE and any other THREE

QUESTION ONE (COMPULSORY) (15 MARKS)

- a) A random sample of university and High School graduates was selected to test whether they keep up with daily news mostly by reading Newspapers or mostly by watching Television. The table below shows the data that was obtained arranged in a 2 by 2 table.

Category of Graduates	Television	News paper
University graduates	47	62
High School graduates	58	39

Assuming the two groups were drawn from the same population, determine whether there is any relation between the level of education a person has and the method of keeping up with daily news. (8 marks)

- b) A fish factory produces three grades of fish, A, B and C, where C is rejects. Suppose over a number of years it has been observed that 65% is grade A, 30% is grade B, and C is 5%. A student goes to the factory in a day and picks 50 cans of fish at random, and gets 35 cans are grade A, 10 cans being grade B, and 5 cans as C. Determine whether this is a representative of what has been observed over a number of years. (7 marks)

QUESTION TWO (15 MARKS)

The table below shows results for an experiment involving six (6) treatments of fish feeds fed to juvenile fish to determine growth in weight (grams) over a period of two months. The experiment was carried out in four (4) randomized blocks of earthen ponds and the stocking density was same across all the blocks.

		TREATMENTS (A-F)					
BLOCK S (1-4)	1	A	C	B	D	E	F
		24.7	27.7	20.6	16.2	16.2	24.9
	2	C	B	A	D	F	E
		22.7	28.8	27.3	15.0	22.5	17.0
	3	F	D	A	C	B	E
		26.3	19.6	38.5	36.8	34.5	15.4
	4	E	B	A	D	C	F
		17.7	13.0	28.5	14.1	34.9	22.6

- a) Test whether there is any significant difference among the observations at 95% significance level. (10 marks)
- b) Test whether blocking was justified. (5 marks)

QUESTION THREE (15 MARKS)

Assuming that you are collecting data on the effects of cement manufacturing companies in Athi River Sub County, Machakos County, accomplish the following tasks:

- i) Outline three specific objectives for the study. (3 marks)
- ii) Formulate three null hypotheses related to the objectives of the study. (3 marks)
- iii) Discuss the use of questionnaires as a tool that you can apply in data collection in the study. (9 marks)

QUESTION FOUR (15 MARKS)

Discuss the key factors that influence the decision of which research design you would use for your Masters thesis.

QUESTION FIVE (15 MARKS)

- a) Using a suitable example, explain the concept of interaction between a factor and a covariate. (4 marks)
- b) A new dietary regime has been recommended for weight loss and you are tasked with identifying whether this dietary regime is more effective for men or women. How would you go about this study? (7 marks)
- b) Explain why replication is an important part of experimental design. (4 marks)