

KISII UNIVERSITY
UNIVERSITY EXAMINATIONS
MAIN CAMPUS
FOURTH YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF
BACHELOR OF SCIENCE IN ECONOMICS AND STATISTICS
SEPTEMBER - DECEMBER 2023
COURSE TITLE: DESIGN AND ANALYSIS OF EXPERIMENTS
COURSE CODE: MATH 444
STREAM Y4S1 **TIME: 2HRS**
DAY..... **DATE**

Instructions

1. Do not write anything on this question paper
2. Answer question ONE and any other THREE questions.

QUESTION ONE

a) Define the following terms

i) Treatment

ii) Experimental units

iii) Levels

iv) Blocks

(4mks)

b) Discuss the principles of experimental design

(4mks)

c) State and explain three types of variations

(6mks)

d) Given the following data

T ₁	T ₂	T ₃	T ₄
8	12	18	13
10	11	12	9
12	9	16	12
8	14	6	16
7	4	8	15

Analyze the data at (i)5% and (ii)1% levels to significance and draw statistical inferences. (7mks)

e) Explain the requirement in the analysis of variance (4mks)

QUESTION TWO

		TREATMENT			
		1	2	3	4
BLOCKS	1	12	20	13	11
	2	2	14	7	5
	3	8	17	13	10
	4	1	12	8	3
	5	7	17	14	6
	6	4	15	16	8

Analyze the data at 5% and 1% level of significance and draw statistical conclusions (15mks)

QUESTION THREE

Consider the following latin square design

		Columns				
		1	2	3	4	Totals
Row	1	B(1.640)	D(1.240)	C(1.435)	A(1.345)	5.650
	2	C(1.475)	A(1.183)	B(1.290)	B(1.290)	5.350
	3	A(1.670)	C(0.710)	D(1.180)	D(1.180)	5.225
	3	D(1.565)	B(1.290)	C(0.660)	C(0.660)	5.170
	Total	6.350	6.145	4.475	4.475	21.393

Required:

- a) When is this design appropriate and when can it fail
- b) Formulate the hypothesis to be tested
- c) Write the usual statistical model used
- d) At 5% and 1% significance level analyze the experiment completely and draw statistical inferences (15mks)

QUESTION FOUR

Given the following data, analyze the experiment completely at (i)1% and ii)5% levels of significance and draw statistical conclusions.

T ₁	T ₂	T ₃	T ₄	T ₅	T ₆
7	10	12	10	7	9
9	13	13	12	8	10
10	15	15	13	10	11
12	15	17	15	10	12
12	17	18	15	10	13

(15mks)

QUESTION FIVE

a) Discuss the assumptions of designing and experiment

(5mks)

b) Discuss the following as used in the analysis of variance with appropriate illustrations

i) Standard form (reduced)latin square

ii) Conjugate latin square

iii) Composite latin square

iv) Orthogonal latin square

(7mks)

c) State the mathematical model for the CRD and explain the variables

(3mks)