203

(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MMUST MAIN CAMPUS

UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER EXAMINATIONS
FOR BACHELOR OF SCIENCE ECONOMICS

COURSE CODE: ECO 203

COURSE TITLE: ECONOMIC STATISTICS II

DATE: TUESDAY 19-04-2022 **TIME: 8:00-10:00**

INSTRUCTIONS TO CANDIDATES

Attempt **QUESTION ONE** and **ANY OTHER TWO QUESTIONS**

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over.

QUESTION ONE

a) Differentiate the following concepts as used in economic statistics

i) Mutually exclusive events and collectively exhaustive events

ii) Null hypothesis and Alternative hypothesis

iii) Confidence coefficient and level of significant

iv) Heteroscedasticity and Autocorrelation

v) Z test and student t test (10 marks @ 2 marks each)

b) MMUST discovered that it can accommodate a few extra students. Enrolling those additional students would provide a substantial increase in revenue without increasing the operating costs of the collage. From past experience, the collage knows that 40% of those students admitted will actually enroll.

i) What is the probability that at most 6 students will enroll if the collage offers admissions to 10 more students? (3 marks)

ii) What is the probability that up to 4 students will enroll if the college offers admissions to 6 more students? (3 marks)

iii) If 50% of those students admitted actually enroll, what is the probability that at least 2 out of 5 admitted students will actually enroll? (3 marks)

iv) Find the mean and variance of the distribution in (i) above? (3 marks)

c) A random sample of 250 homes were taken from a large population of older homes to estimate the proportion of homes with unsafe wiring, if , in fact, 30% of the homes have unsafe wiring, what is the probability that the sample proportion will be between 25% and 35%. (5 marks)

d) Why do statisticians sample the population? (3 marks)

QUESTION TWO

The mean length of a small counterbalance bar is 43 millimeters. There is concern that the adjustments of the machine producing the bars have changed. The null hypothesis to be tested at the 0.02 level is that there has been no change in the mean length ($\mu=43$). The alternative hypothesis that there has been a change ($\mu\neq43$).

Twelve bars ($n=12$) were selected at random and their lengths recorded. The lengths are (in millimeters) 42,39,42.45,43,40,39,41,40,42,43 and 42. Has there been a statistically significant change in the mean length of the bars? (20 marks)

QUESTION THREE

Write briefly explanatory notes on the following topics

a) Properties of the χ^2 distribution
b) Criteria for judging estimators
c) Poisson distribution
d) Characteristics of 't' distributions (20 marks @ 5marks each)

QUESTION FOUR

a) A sample of the employees of MMUST regarding acceptance of a new pension plan revealed the following:

Age	Opinion regarding new pension plan				
	Superior	Very good	Good	Fair	Unsatisfactory
20-29	19	27	25	52	81
30-39	10	17	15	29	41
40-49	51	40	31	21	27

50 and older	142	81	16	9	8

Is there a relationship between age and an employee's opinion of the new plan?

Test at the 0.05 level. Use the chi- square five step hypothesis-testing procedure. (16 marks)

b) Define the following concepts as used in multiple regression and correlation

i) Multicollinearity

ii) Homoscedasticity

iii) Error term

iv) Autocorrelation (4 marks)

QUESTION FIVE

The accurate machine company uses precision grinders manufactured by four different firms. There is interest in determining if there is any overall difference in the performance of the four grinders. Sample measurement, to the nearest ten of an inch obtained from each of the four machines follow. At the 0.05 significant level, is there a difference among the four grinders? Apply the usual five step hypothesis testing procedure.

Machine			
Deltz	Arvis	Millicon	Hunt
8	8	9	6
7	9	9	7
9	6	6	9
	5	4	4
		7	