MACHAKOS UNIVERSITY

University Examinations for 2022/2023 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF ARTS

ACU 201-INTRODUCTION TO STATISTICS IN SOCIAL SCIENCES

DATE: **TIME:**

INSTRUCTION: Attempt question ONE and any other TWO questions

QUESTION ONE (COMPULSORY) (30 MARKS)

a)   Explain the meaning of the following terms as applied in Statistics

     (i)   Population

     (ii)   Variable

     (iii)   Data   (6 marks)

b)   Differentiate between each of the following terms:

     i)   Nominal and Ordinal measurement

     (ii)   Primary and secondary data   (4 marks)

c)   The data below shows the performance of students in a mathematics examination:

Score in %	50 -59	60 - 69	70 – 79	80 - 89	90 – 99
No of Students	3	5	6	8	8

     Calculate:-

     (i)   The mean   (4 marks)

     (ii)   The standard deviation   (4 marks)

d)   The following data give floor space per employee and turnover for firms

Firm	A	B	C	D	E	F	G	F
Floor space (ma)	60	55	40	30	70	60	65	50
Turnover (£1000)	22	20	17	18	25	23	21	19

     Calculate the rank correlation coefficient   (6 marks)

e) A random sample of 100 patrons at a public library who check out books take an average of 4.6 books with standard deviation of 2 hours. Determine a 95% confidence interval for the average number of books taken out by all such library patrons.   (6 marks)

QUESTION TWO (20 MARKS)

The weights in pounds of a group of people signing up at a health club are

135,175,166,148,183,206,190,128,147,156,166,174,158,

196,120,165,189,174,148,225,192,177,154,140,180,172

(a) Tabulate a frequency distribution table with class intervals by 120-134, … etc

(7 marks)

(b) Use the table in 3(a) above to calculate the:

(i) Mean   (3 marks)

(ii) Mode   (5 marks)

(iii) Median   (5 marks)

QUESTION THREE (20 MARKS)

a) Explain the meaning of the following sampling techniques:-

(i) Simple Random sampling

(ii) Stratified sampling

(iii) Judgmental sampling

(iv) Cluster sampling

(v) Multistage sampling   (10 marks)

b) A small company is interested in analyzing the effects of advertising on its sales Over a five week period as shown below:

Money spend on advertising	2	5	7	10	11
Total sales	10	20	35	50	65

Use the data to determine correlation coefficient between the total sales and the money spend on adverting.   (10 marks)

QUESTION FOUR (20 MARKS)

(a)   The median of the following frequency distribution is 59.5 and the ninetieth percentile is 79.5.Determine the values of *a, b and c*

Class	Frequency
30-39	14
40-49	a
50-59	40
60-69	b
70-79	19
80-89	c
	$\sum f=150$

(8 marks)

(b)   A college collects the following set of data on the number of credits that a randomly selected group of students carry and the number of hours they work during the week

Hours worked per week	20	25	30	50	20	23
Number of credits	12	13	12	15	16	16

(i)   Determine the linear least squares regression equation for number of credits as a function of the number of hours worked during the week   (10 marks)

(ii)   Use the equation in (a) above to predict the number of credits for a student who worked for 40 hours per week   (2 marks)

QUESTION FIVE (20 MARKS)

a)   State and explain the FOUR methods of collecting data.   (8 marks)

b)   The following table shows the number of rooms in dwelling in Mombasa County in

2010

Number of rooms	Percentage of dweling
1	1
2	2
3	8
4	21
5	33
6	26
7	5
8 or more	4
	100

(i)   Calculate the mean and standard deviation of the number of households.

(7 marks)

(ii)   Assuming the data is based on a single random sample of 8120 dwellings; calculate a 95% confidence interval for the mean number of dwellings in Mombasa county   (5 marks)