



MACHAKOS UNIVERSITY

University Examinations 2021/2022 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

FOURTH YEAR SPECIAL /SUPPLEMENTARY EXAMINATION FOR
BACHELOR OF SCIENCE (COMMUNITY RESOURCE MANAGEMENT)

ASC 102: SOCIAL STATISTICS I

DATE: 14/3/2022

TIME: 8.30-10.30 AM

INSTRUCTIONS TO CANDIDATES

Answer question **ONE (compulsory)** and any other **TWO** questions

QUESTION ONE (30 MARKS)

- a) Explain the meaning of the following terms as applied in Statistics
- Population
 - Sample
 - Variable
 - Data
- (8 marks)
- b) Differentiate between each of the following terms:
- Descriptive and inferential statistics
 - Primary and Secondary data
 - Point and interval estimation
- (6 marks)
- c) The table below shows marks scored by students in a statistics examination

Class	40-44	45-49	50-54	55-59	60-64
Frequency	6	10	25	11	2

Calculate the mean and standard deviation

(6 marks)

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

H	20	25	30	50	20	23
C	12	13	12	15	16	16

Determine the rank correlation coefficient based on these data (5 marks)

- e) In a random sample of 64 customers in a computer service company, the mean waiting time for being served is 3 minutes with a standard deviation of 1.5 minutes. Construct a 95% confidence interval for the average waiting time in the company. (5 marks)

QUESTION TWO (20 MARKS)

- a) Explain the meaning of the following sampling techniques:-
- Simple Random sampling
 - Stratified sampling
 - Judgmental sampling
 - Cluster sampling
 - Multistage sampling (10 marks)
- b) A small company is interested in analyzing the effects of advertising on its total sales, over a 5-month period. The results are as follows

Advertising	2	5	7	10	11
Sales	10	20	35	50	65

Calculate the correlation coefficient between total sales and advertising. (10 marks)

QUESTION THREE (20 MARKS)

The following are the speeds, in miles per, of a group of cars on a high-way as measured with radar gun

58,62,59,53,61,55,57,54,59,53,66,60,58,60,61,58,56,60,58,62,57,55,53,55,61,57,52,58,49,54,52,55,57,60,64,67.

- a) Construct a frequency distribution table with class interval by 45-49,...etc (6 marks)
- b) use the table in (a) above to calculate
- the mode (3 marks)
 - the median (3 marks)
 - the quartile deviation (8 marks)

QUESTION FOUR (20 MARKS)

- a) State and explain the four measurement scales for statistical data as outlined by Stevens (1946) (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) 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 (10 marks)

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

- b) The following table shows the number of rooms in dwellings in Mombasa county in 2006

Number of rooms	Percentage of dwellings
1	1
2	2
3	8
4	21
5	33
6	26
7	5
8 or more	<u>4</u>
	100

- i. Calculate the mean and standard deviation of the above distribution. (6 marks)
- ii. Assuming the data is based on a single random sample of 8120; calculate a 95% confidence interval for the mean number of dwellings in Mombasa county (4 marks)