



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 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: 13/8/2021

TIME: 2:00 – 4:00 PM

INSTRUCTIONS

Answer 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) Descriptive and inferential statistics
 - (ii) Primary and secondary data
 - (iii) 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	3.4	3.0	2.8	2.4	2.9	2.9

Determine the rank correlation coefficient based on these data (6 marks)

- e) A study of 49 randomly chosen 8-year olds shows that watch television an average of 38 hours per week with standard deviation of 6.4 hours. Assuming normal distribution, construct a 99% confidence interval for the average time per week that all such children watch television (6 marks)

QUESTION TWO (20 MARKS)

- a) State and explain the four measurement scales for statistical data. (8 marks)
- b) A study is conducted to determine the relationship between a student's height and shoe size. The following set of data pairs is obtained
(66,9), (63,7), (67,8.5), (71,10), (62,6), (65,8.5), (72,12), (68,10.5), (60,5.5), (66,8).
- (i) Determine the equation of the regression line relating height to shoe based on this sample. (10 marks)
- (ii) Use the equation on (i) above to predict the most likely shoe size for a person who is 70 inches tall (2 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.

- (i) Construct a frequency distribution table with class interval by 45-49,...etc (6 marks)
- (ii) 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) 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 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 FIVE (20 MARKS)

- a) The following frequency distribution the lower quartile is 44.5. Determine the values of a and b

Class	Frequency
30-34	7
35-39	12
40-44	a
45-49	b
50-54	38
55-59	15
60-64	8
	$\Sigma f = 200$

(10 marks)

- 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>
	<u>100</u>

- (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)