



# MACHAKOS UNIVERSITY

University Examinations 2017/2018

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF FASHION DESIGN AND MARKETING

THIRD YEAR SECOND SEMESTER EXAMINATION FOR  
BACHELOR OF SCIENCE(COMMUNITY RESOURCE MANAGEMENT)  
BACHELOR OF SCIENCE (FASHION DESIGN AND MARKETING)

HCU 301-INTRODUCTION TO STATISTICS

DATE: 11/12/2017

TIME: 11.00-1.00 PM

**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) Null hypothesis (4 marks)
- b) Differentiate between EACH of the following terms:
- i. Type I error and Type II error (2 marks)
  - ii. Point and interval estimation (2 marks)
- c) The table below shows goals scored by teams in a competition

Goals scored	1	3	4	5	6
Frequency	6	10	25	11	2

Calculate the mean and standard deviation (6 marks)

- d) In the course of an audit it was found that from a simple random sample of 200 bad debts that the mean debt was £48.50 with a standard deviation of £6.50. Construct a 95% confidence interval for the mean debt. (5 marks)
- e) A marketing research group reports that a typical supermarket shopper spends an average of ksh 1400 per week on groceries. A sample of 50 randomly selected shoppers spends an average of ksh 1540 with a standard deviation of ksh 620 per week. At 5% level of significance, tests if the report is correct? (6 marks)
- f) Determine the values of a, b, c, d, e from the following ANOVA Table

	Sum of Squares	Degrees of Freedom	Mean Squares	F-Ration
Factor	a	2	c	e
Error	1750	b	d	
Total	2572.22	8		

(5 marks)

**QUESTION TWO (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
- (i) the mode (3 marks)
  - (ii) the median (3 marks)
  - (iii) the quartile deviation (8 marks)

**QUESTION THREE (20 MARKS)**

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

- (i) Random sampling
- (ii) Stratified sampling
- (iii) Quota sampling
- (iv) Cluster sampling

(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

Determine the linear regression equation for number of credits as a function of number of hours worked during the week. (12 marks)

**QUESTION FOUR (20 MARKS)**

(a) 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 advertising and total sales (8 marks)

(b) A survey is conducted among workers in a certain city to determine if there is any difference between proportions of women, men who drive, take a bus, or take a train to work. The results are as shown below:

	<b>Drive</b>	<b>Bus</b>	<b>Train</b>
<b>Women</b>	25	100	125
<b>Men</b>	75	120	205

- (i) Construct the corresponding cross-tabular contingency table for the expected frequencies. (6 marks)

- (ii) Determine the value of the chi-square statistic. (6marks)

**QUESTION FIVE (20 MARKS)**

- (a) Explain the meaning of each of the following terms as used in probability theory.
- (i) Random experiment
  - (ii) An event
  - (iii) Mutually exclusive events
  - (iv) Independent events. (8 marks)
- (b) The mean weight of a consignment of 500 barrels of second hand shoes is 151kg and a standard deviation of 15kg. If the weight are normally distributed determine how many barrels weigh
- (i) Between 120kg and 155kg (4 marks)
  - (ii) More than 185kg (4 marks)
  - (iii) Less than 128kg (4 marks)