MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR
FIRST YEAR SECOND SEMESTER

SCHOOL OF SCIENCE AND INFORMATION SCIENCE
BACHELOR OF SCIENCE/BACHELOR OF ARTS

COURSE CODE: MAT 1100
COURSE TITLE: QUANTITATIVE SKILLS I

DATE: 4TH MAY, 2018 **TIME: 0830 - 1030 HRS**

INSTRUCTIONS TO CANDIDATES

*Answer **ALL** questions in **Section A** and **ANY** Other **TWO** questions from **Section B***

DO NOT MAKE ANY WRITING ON THIS QUESTION PAPER

*This paper consists of **SIX** printed pages. **Please turn over.***

SECTION A (30 MARKS)

QUESTION ONE (30 MARKS)

a. Define the following terms as used in statistics:
   i. Variable **(1 mark)**
   ii. Population **(1 mark)**
   iii. Random Sample **(1 mark)**
   iv. Inference **(1 mark)**

b. State five stages involved in any statistical enquiry. **(5 Marks)**

c. Prove the following properties of summation operator:
   i.

$$\sum_{i=1}^{n}(x_i \pm y_i) = \sum_{i=1}^{n} x_i \pm \sum_{i=1}^{n} y_i$$

(4Marks)

   ii.

$$\sum_{i=1}^{n} kx_i = k\sum_{i=1}^{n} x_i$$

(3 Marks)

d. Consider the following set of values for the two variables *x* and *y*: -

$x_1 = 3, \quad x_2 = 8, \quad x_3 = 1, \quad x_4 = 12$

$y_1 = 4, \quad y_2 = 12, \quad y_3 = 5, \quad y_4 = 20$

Find the value of each of the following expressions:

i.

$$\sum_{i=1}^{4} x_i$$

(2 Marks)

ii.

$$\sum_{i=1}^{4} y_i$$

(2 Marks)

iii.

$$\sum_{i=1}^{4} (x_i^2 + y_i^2)$$

(4 Marks)

e. By considering specific set of values for a variable *x* demonstrate that:

$$\sum_{i=1}^{n} x_i^2 \neq \left[\sum_{i=1}^{n} x_i\right]^2$$

(4 Marks)

f. State two main categories of measures of central tendency. **(2 marks)**

SECTION B (40 MARKS)
QUESTION TWO (20 MARKS)

A hardware store recorded the number of bags of cement sold on 52 consecutive Mondays as given below:

58	47	85	47	63	51	40	70	80	73	72	46	81
56	67	63	70	54	76	49	81	75	80	75	77	42
70	79	84	72	54	55	61	82	70	47	40	84	71
66	59	81	66	48	43	87	55	70	60	90	60	76

a. Select a suitable class (preferably interval 5) to prepare a grouped frequency distribution for the above data. **(10 marks)**

b. Use the grouped frequency distribution obtained above to construct a cumulative frequency distribution curve. **(10 marks)**

QUESTION THREE (20 MARKS)

a. Simplify the following expressions: -

i. $\frac{(3^{-4})(3^{2})(3^{5})}{(3^{6})(3^{3})}$ **(2 Marks)**

ii. $\sqrt{(36x)(9xy^{4})}$ **(2 Marks)**

b. Evaluate the following using a calculator: -

i. $\log\sqrt[3]{163.2}$ **(3 Marks)**

ii. $\log\frac{452.9}{0.00668}$ **(2 Marks)**

c. Define the following terms: -

i. Forecast **(1 Mark)**

ii. Time series **(1 Mark)**

iii. Time series plot **(1 Mark)**

iv. Stationary time series **(1 Mark)**

d. To illustrate a time series with a horizontal pattern, consider the 12 weeks of data in table 5.

Table 5: GASOLINE SALES TIME SERIES

WEEK	SALES (1000's of GALLONS)
1	17
2	21
3	19
4	23
5	18
6	16
7	20
8	18
9	22
10	20
11	15
12	22

i. Using table 5 above construct a time series plot for this data.**(4 Marks)**

ii. Calculate the average value or mean for this time series**(3 Marks)**

QUESTION FOUR(20 MARKS)

a. Given the following data,calculate the arithmetic mean:

Variable, *x*	1	2	3	4	5
Frequency, f	3	5	9	6	2

(4 Marks)

b. A helicopter flies around a square of length 100 miles. It covers a speed of 100 miles per hour the first side, 200 miles per hour the second side, 300 miles per hour the third side and at 400 miles per hour the fourth side. What is the average speed? **(4 Marks)**

c. Find the mode of the following distribution using the method of grouping:

Variable, *x*	3	4	5	6	7	8	9	10	11
Frequency, f	5	4	6	8	9	7	5	9	4

(6Marks)

d. Calculate the mean deviation from the mean for the following data.

Frequency, *f*	2	4	6	8	10	12	8
Variable, *x*	5	7	9	11	13	15	17

(6Marks)

******END******