

## 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: 4<sup>TH</sup> 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)

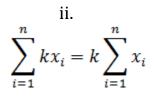
- b. State five stages involved in any statistical enquiry.
- c. Prove the following properties of summation operator:

i.  

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

(4Marks)

(5 Marks)



#### (3 Marks)

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

$$x_1 = 3,$$
  $x_2 = 8,$   $x_3 = 1,$   $x_4 = 12$   
 $y_1 = 4,$   $y_2 = 12,$   $y_3 = 5,$   $y_4 = 20$ 

Find the value of each of the following expressions:

i.

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

(2 Marks)



(2 Marks)

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

(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 <sup>3</sup>√163.2(3 Marks)
  - ii. log<sup>452.9</sup>/<sub>0.00668</sub>(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.

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

Table 5: GASOLINE SALES TIME SERIES

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, <i>x</i>	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, <i>x</i>	5	7	9	11	13	15	17
							( ( ) )

(6Marks)

\*\*\*\*END\*\*\*\*