MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE

FIRST YEAR SUPPLEMENTARY EXAMINATION FOR
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY
SIT 110- INTRODUCTION TO STATISTICS

DATE: 26/9/2019 **TIME: 2:00 – 4:00 PM**

***Instructions to the Candidate*:**

Answer question ONE and any other TWO questions

QUESTION ONE (30 MARKS) COMPULSORY

a) Explain the meaning of the following terms as applied in Statistics

i. Population

ii. Sample

iii. Variable (3 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) A set of cards, identical in size and shape, is numbered 1 to 15 inclusive. A card is drawn at random from the pack and its number n is noted

A is the event: n is prime

B is the event: n is≤ 10

Calculate (i) P(A),(ii) P(B),(ii) P(A∧B) (5marks)

d) 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
	$\sum f = 200$

(7 marks)

e) A company has a computer system that can process 1200 bills per hour. A new system is installed that can process an average of 1260 bills per hour with a standard deviation of 215 bills in a sample of 40 hours. Test if the new system is significantly better than the old one at the 5% level of significance. (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)

SECTION B: answer any other two questions

2 (a)The following table shows the number of household members in certain town in 2010.

No of House hold Members	Percentage
1	18
2	32
3	20
4	19
5	7
6 or more	4

(i) Calculate the mean and standard deviation of the number of households. (5 marks)

(ii) Assuming the data is based on a single random sample of 445; calculate a 95% confidence interval for the mean household size. (5 marks)

(b) A small IT company is interested in analyzing the effects of advertising on its sales Over a five week period as shown below:

Money spend on advertising	2	5	7	10	11
Total sales	10	20	35	50	65

Use the data to determine correlation coefficient between the total sales and the money spend on adverting. (10marks)

3 (a) Explain the meaning of the following terms as used in probability theory:

(i) An event

(ii) Random experiment

(iii) Mutually exclusive events

(iv) Independent events (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. (10marks)

(ii) Use the equation on (i) above to predict the most likely shoe size for a person who is 70 inches tall (2marks)

4 (a) A large Tour company finds that the typical office worker spends an average of 13 minutes per hour on non-work related activities. On a trial basis management sets up new enclosed work stations for a randomly selected group of 12 workers and finds that the average number of minutes lost per hour is 11.3 with a standard deviation of 3.7. At the 5% level of significance can we conclude that the new work stations represent a significant change?
(8 marks)

(b) 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 (6marks)

(ii) use the table in (i) above to calculate the quartile deviation (6marks)

5 (a) Perform an analysis of variance calculation for the data given below at the =0.05 level of significance.

Levels of factor

A	B	C
25	30	40
25	40	50
50	60	80

(10marks)

(b) A consumer research organization conducts a survey of drivers to determine if there is any difference in their choice of brand of Japanese-made car based on their gender. These are results:

	Toyota	Mtsubishi	Subaru
Women	70	80	150
Men	40	60	100

Test whether there is any difference in the proportion of drivers who prefer a particular brand based on gender at α=0.05 level of significance. (10marks)