MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE

FOURTH YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN HOSPITALITY AND TOURISM MANAGEMENT

HTM 402– STATISTICS

DATE: 22/7/2019   **TIME: 8:30 – 10:30 AM**

INSTRUCTION:

Answer question ONE and any other TWO questions

QUESTION ONE (30 MARKS)

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

    (i)   Statistical estimation   (2 marks)

    (ii)   Null hypothesis   (2 marks)

b)   Differentiate between EACH of the following terms:-

        (i)   Acceptance and critical regions   (2 marks)

        (ii)   Type I and Type II errors   (2 marks)

c)   In a random sample of 64 customers in a fast moving restaurant, the meaning waiting time for being served is 3 minutes is with a standard deviation of 1.5 minutes. Construct a 99% confidence interval for the average waiting time in the restaurant.   (6 marks)

d)   A large Tour company believes that many of its employees are taking advantage of liberal absence policy by taking off a disproportionate number of Mondays and Fridays. The table below shows the number of employee absences by the day of the week

Monday	Tuesday	Wednesday	Thursday	Friday
57	39	37	54	63

At the $\alpha=0.05$ level of significance, test whether this set of data indicate that the company's suspicions are valid (6 marks)

e) 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)

f) 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 (5 marks)

2. a) 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)

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:

	Drive	Bus	Train
Women	25	100	125
Men	75	120	205

i)   State the null and alternative hypothesis.   (2 marks)

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

iii) Test whether there is any difference in the proportions using the different modes of transport based on gender at α =0.01 level of significance.

(6 marks)

3.   a)   A small 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.   (8 marks)

b)   Given the following set of data construct the ANOVA table and compare the F value calculated with the critical value at α=0.05 level of significance

A	B	C
15	18	6
10	20	15
15	22	10

(12 marks)

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 trial basis, management sets up new enclosed work station 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 5% level of significance, can one conclude that the new work stations represent a significant change   (10 marks)

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.   (10 marks)

5.   a)   Two waiters in a hotel are being compared to see whether one serves consistently more customers over the course of an hour. The supervisor collects the following data on the number of customers each waiter serves in the course of 1 hour periods.   (8 marks)

Craig	13	15	18	11	14	16	24	16	13	8	13	16	12	13
Ken	11	11	14	15	14	12	16	14	19	12	15	13	11	14

Based on this data, does Craig usually serve more customers per hour than Ken at the $\alpha = 0.05$ level of significance?   (8 marks)

b)   The following are Sales made by a Tour caravan (ksh'000)

Quarters	1	2	3	4
2010	40	37	25	31
2011	26	30	19	21
2012	25	25	14	18

(i)   By means of a 4-moving average, determine the trend and the seasonal adjustments.   (8 marks)

c)   Give the sales of Tour caravans for 2012 seasonally adjusted.