MACHAKOS UNIVERSITY

University Examinations 2016/2017

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

THIR YEAR SECOND SEMESTER SPECIAL EXAMINATIONS FOR BACHELOR OF SCIENCE IN HOSPITALITY AND TOURISM MANAGEMENT

SHT 310 – STATISTICAL METHODS IN HOSPITALITY AND TOURISM

Date: 7/7/2017 **Time: 11.00-1.00PM**

Answer question ONE and any other TWO questions

SECTION A

QUESTION ONE (30 MARKS)

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

(i) Null hypothesis (1 mark)

(ii) Test-statistics (1 mark)

(iii) Significance level (1 mark)

ii) Differentiate between EACH of the following terms:-

(i) Point and interval estimation (2 marks)

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

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

(b)(ii) A stock broker keeps track of the number of stock purchase orders she receives from her client during a certain week.

Monday	Tuesday	Wednesday	Thursday	Friday
41	51	46	54	38

Test if there is any difference in the number of orders received based on the day of the week at α=0.05 level of significance (7 marks)

(c)(i) 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)

(ii) 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	12	13	12	15	16	16

Determine the rank correlation coefficient based on these data (5 marks)

SECTION B: ANSWER ANY OTHER TWO QUESTIONS

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 $\alpha = 0.01$ level of significance. (6 marks)

3 (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)

Agnes	13	15	18	11	14	16	24	16	13	8	13	16	12	13
Betty	11	11	14	15	14	12	16	14	19	12	15	13	11	14

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

(b) A small company is interested in analyzing the effects of advertising on its sales. Over a 5-month period the results are as follows

Money spend on advertising (sh. 000')	Total sales (sh. '000')
5	6
8	15
10	20
15	30
22	39

(i) Calculate the correlation coefficient between sales and advertising. (6 marks)

(ii) Derive the linear regression line for sales as a function of advertising. (6 marks)

4 The manager of a 5-star is conducting a study of the number of customers who pay by personal cheque, by cash, and by bank credit card. During the course of five different days, she records the following number of purchases made by each method

Cheque	Cash	Bank credit card
28	35	33
21	42	38
30	32	31
18	25	42
23	27	29

Using ANOVA test if there is any difference in the mean number of purchases made with each method at the α=0.01 significance level (20 marks)

5 (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 Sales made by a Tour van (ksh'000)

Quarters	1	2	3	4
2003	40	37	25	31
2004	26	30	19	21
2005	25	25	14	18

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

(iii) Give the sales of tour caravans for 2005 seasonally adjusted.

(4 marks)