



MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE

THIRD YEAR SECOND SEMESTER SPECIAL/ SUPPLEMENTARY EXAMINATION FOR BACHELOR OF SCIENCE IN HOSPITALITY AND TOURISM MANAGEMENT

SHT 310 – STATISTICAL METHODS IN HOSPITALITY AND TOURISM

DATE:

TIME:

INSTRUCTIONS

Answer question ONE and any other TWO questions

SECTION A: (COMPULSORY)

QUESTION ONE (30 MARKS)

- a) Explain the meaning of the following terms as applied in Statistics:-
- (i) Statistical estimation (1 mark)
 - (ii) Null hypothesis (1 mark)
 - (iii) Significance level (1 mark)
- b) Differentiate between EACH of the following terms:-
- (i) Acceptance region and critical region (2 marks)
 - (ii) Type I and Type II errors (2 marks)
- c) In the course of an audit it was found out that from a simple random sample of 200 bad debts that the mean debt was £48.50 with a standard deviation of £6.50. Construct a 99% confidence interval for the mean debt. (6 marks)
- d) A fire department in a 5-star hotel keeps track of the number of false alarms received over a period of one week.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
22	12	15	8	14	27	35

At the $\alpha=0.01$ level of significance, test if there is any difference in the number of calls received based on the day of the week (7 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	354.67	b	c	e
Error	a	9	d	
Total	676.67	11		

(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)

SECTION B: ANSWER ANY OTHER TWO QUESTIONS

QUESTION TWO (20 MARKS)

- a) 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 hour. Test if the new system is significantly better than the old one at the 5% level of significance. (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
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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)

QUESTION THREE (20 MARKS)

- a) A small Tour 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 advertizing. (8 marks)

- b) Given the following set of data construct the ANOVA table and compare the F value calculated with the critical value at $\alpha = 0.01$ level of significance

A	B	C
12	10	8
14	8	20
9	12	12

(12 marks)

QUESTION FOUR (20 MARKS)

- 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)

QUESTION FIVE (20 MARKS)

- 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) 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)

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

(4 marks)