MACHAKOS UNIVERSITY

University Examinations 2019/2020 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

FOURTH YEAR SPECIAL /SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN HOSPITALITY AND TOURISM MANAGEMENT

HTM 402–4: STATISTICS

DATE: 21/1/2021   **TIME: 2.00-4.00 PM**

INSTRUCTION: *Answer question one and any other two Questions*

SECTION A

QUESTION ONE (30 MARKS)

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

    (i)   Null hypothesis   (2 marks)

    (ii)   Significance level   (2 marks)

b) Differentiate between EACH of the following terms:-

    (i)   Point and Interval estimation   (2 marks)

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

a) In the course of an audit it was found that from a simple random sample of 200 bad debts that the mean debt was £48.50 with a standard deviation of £6.50.Calculate a 95% interval for the mean debt   (6 marks)

b) A fire department in a 5-star hotel keeps track of the number of false alarms revived 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   (6 marks)

c)   Determine the values of a, b, c, d, e from the following ANOVA Table   (5 marks)

	Sum of Squares	Degrees of Freedom	Mean Squares	F-Ration
Factor	127.40	b	c	e
Error	a	16	d	
Total	1432.10	18		

f)   A college collects the following set of data on the number of credits A that a randomly
      selected group of students carry and the number of hours B that they work during the week

B	20	25	30	50	20	23
A	12	13	12	15	16	16

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

SECTION B
QUESTION TWO (20 MARKS)

a)   At a large departmental store, the average amount of all sales is $78.On a special holiday
      promotion day, the total purchase amount of 80 different randomly selected sales has a
      mean of $92 with a standard deviation 0f $62.Test if the mean sale amount on a promotion
      day is higher than on a regular day at the $\alpha=0.1$ significance level.   (7 marks)

b)   A consumer research organization conducts a survey of hotel specialist to determine if there
      is any difference in their choice of brands of Laptops based on their gender. These are
      results:

	Toshiba	Dell	Hp
Women	70	80	150
Men	40	60	100

      i.   State the null and alternative hypothesis.   (1 mark)
      ii.   Construct the corresponding cross-tabular contingency table for the expected
            frequencies.   (6 marks)
      iii. Test whether there is any difference in the proportions of hotel specialist who prefer a
            particular brand based on gender at $\alpha =0.01$ level of significance.   (6 marks)

QUESTION THREE (20 MARKS)

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	5	8	10	15	22
Total sales	6	15	20	30	39

Use the data to determine correlation coefficient between the money spend on adverting and total sales (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=0.01 level of significance

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

(12 marks)

QUESTION FOUR (20 MARKS)

a) Managers of a diet plan advertise that the mean weight loss for people on their plan is at least 45 pounds in 6 months. A sample of 28 people on this diet plan loses an average of 35 pounds with a standard deviation of 20 pounds. Test at α=0.01 level of significance, if the claim is too high (10 marks)

b) A supermarket owner is studying how the average waiting time in minutes for customer checkout depends on the number of checkout clerks working. The results are shown below

No of clerks on duty	3	4	5	5	6	7
Waiting time	9	6	6	4	2	1

Determine the linear least squares regression equation for waiting time as a function of the number clerks on duty. (10 marks)

QUESTION FIVE

a) Two tellers in a bank are being compared to see whether one serves consistently more customers over the course of an hour. The head teller collects the following data on the number of customers each tellers 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 student has a choice of driving to college either by a highway (which is often clogged with traffic during morning rush hours) or by back roads. Over the course of several weeks, he tries both routes and times his trip takes. the following is the set of data for the number of minutes the trip takes

A (Highway)	34	28	46	42	56	85	48	25	37	49
B (back roads)	43	49	41	55	39	45	65	50	47	51

Use the rank-sum test to determine if there is any difference in the average time for his commute at the 5% level of significance (12 marks)