



MACHAKOS UNIVERSITY

University Examinations for 2017/2018

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF ECONOMICS AND FINANCE

EES 405: PARAMETRICS AND SEMI PARAMETRICS STATISTICS

DATE: 11/12/2017

TIME: 8:30 – 10:30 AM

INSTRUCTIONS:

Answer question one and any other two questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Clearly explain four issues that need to be considered when using a dummy as an explanatory **variable** (4 marks)
- b) Non-Parametric techniques do not rely on the distribution of the data and the interpretation does not depend on the population fitting any parameterized distributions. The following table summarizes applications of non parametric tests (10 marks)

Type of Test	Application
i) Run test	
ii) Mann-Whitney test and Wilcoxon rank sum test	
iii) Kruskal Wallis	
iv) Spearman Rank Test	
v) Sign Test	

Fill the table by specifying the situations when each test is applicable

- c) An Account manager sought to find out the time it takes for three of its major customers to settle their accounts. Several purchases for each of the three customers are selected at random along with the corresponding days each took to settle the respective accounts. The details are provided in the table below

Purchase	Customers		
	1	2	3
1	28	26	22
2	19	20	17
3	13	11	16
4	28	14	15
5	29	22	29
6	22	21	
7	21		

Required:

Determine whether there exists a significant difference among payment duration for the three customers. Use $\alpha=5\%$ (10 marks)

- d) Distinguish between

- i) Parametric and Non Parametric Statistics (3 marks)
- ii) Linear probability and probit model (3 marks)

QUESTION TWO (20 MARKS)

- a) The sales manager of a cement company feels that the quantity demanded for cement in tones follows uniform distribution. The observed frequencies of demanded cement values are summarized below

Demand in Tones	Observed Frequency
30	2
31	3
32	1
33	4
34	2
35	2
36	4
37	2
38	4
39	1

Using kolmogorov –Smilnov test check whether the data follow uniform distribution at $\alpha = 5\%$ (10 marks)

- b) The personnel manager of a firm is recruiting graduate trainees using a aptitude test. The performance on a scale of 0 to 10 of the trainees follows non normal distribution. The personnel manager feels that the performance index of the trainees is more than 8. To test his intuition he has selected a sample of 40 trainees whole performance index are as follows

5	7	8	9	9
6	9	6	3	8
9	6	10	6	5
4	9	7	7	4
2	5	7	6	7
5	2	10	9	9
5	4	8	2	8
7	5	9	9	10

Test the intuition of the personnel manager using sign test at 0.01 significance level

(10 marks)

QUESTION THREE (20 MARKS)

- a) Students are randomly admitted to 3 different modes of study (regular, Distance learning and evening programme). The following are the final examination scores of samples students from the three groups

Regular	94, 88, 91, 74, 86, 97
Distance learning	85, 82, 79, 84, 61, 72, 80
Evening	89, 67, 72, 76, 69

Using kruskal – Walis test, determine if students from the three groups have different performance (10 marks)

- b) A supermarket sales manager wishes to determine if there are any significant differences between regions in terms of the degree of acceptance of the new product. Using a sample he obtained the following information

Region			
Degree of acceptance	East	South	West
<i>Poor</i>	22	35	5
<i>Moderate</i>	84	55	24
<i>Strong</i>	25	17	12

Required

Assuming the sales manager allows 5% error test whether the degree of acceptance varies from region to region significantly (10 marks)

a) The following arrangement of Males (M) and Women (W) lined up to purchase tickets for a football match

Test for randomness at 0.05 level of significance (10 marks)

- | | |
|---------|---|
| Brand 1 | 17.2, 18.1, 19.3, 21.1, 14.4, 13.7, 18.8, 15.2, 20.3, 17.5, |
| Brand 2 | 13.6, 19.1, 11.8, 14.6, 14.3, 22.5, 12.3, 13.5, 10.9, 14.8, |

QUESTION FIVE (20 MARKS)

- After estimating the model using a sample of 34 employees, the following results were obtained

Standard errors; 10000 40 300 3000 500

- i) Interpret the coefficients of the regression line (3 marks)
- ii) Determine the variables that are statistically at 5% level of significance (6 marks)
- iii) Assume an employee is male, non African and has got an education level of 14 years, determine his estimated salary (2 marks)
- iv) Assume that as education level changes; the increment is different depending on the gender of the employee. Explain how that can be incorporated into our above model (2 marks)