

**CHUKA**



**UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF  
COMMERCE (MANAGEMENT SCIENCE OPTION)**

**BCOM 365: BUSINESS STATISTICS II**

**STREAMS: BCOM Y4S2**

**TIME: 2 HOURS**

**DAY/DATE: WEDNESDAY 08/04/2020**

**11.30 A.M. – 1.30 P.M.**

**INSTRUCTIONS:**

- **Answer question ONE and any other TWO questions.**

**QUESTION ONE (30 MARKS)**

- (a) Explain the meaning of decision theory and describe the decision making environments. (6 marks)
- (b) Explain the significance of the following components in the assessment of multiple linear regression model.
- (i) Regression sum of squares (2 marks)
- (ii) Sum of squared errors (2 marks)
- (c) A researcher has determined the following data from analysis of variance using multiple regression model. Total variability in the response variable
- (i) Use F-test to test the significance of the fitted regression equation at 5% level of significance (4 marks)
- (ii) What proportion of the total variability in Y is explained by the fitted model? Show relevant workings (4 marks)

- (d) The marketing department for the company has worked out payoffs (in sh. 000) in terms of yearly net profits for each of its strategies and under the three states of nature, with probabilities 0.1, 0.7 and 0.2 respectively.

	Strategies		
Es of nature			
	25	(10)	(125)
	400	440	400
	650	740	750

**Required:**

Which strategy would you selected based on;

- (i) Maximin criterion (3 marks)
- (ii) Laplace criterion (3 marks)
- (iii) Hurwicz criterion (Alpha = 0.6) (3 marks)
- (iv) Expected Monetary Value (3 marks)

**QUESTION TWO (20 MARKS)**

- (a) A milk processing factory is experiencing low output and as a result, the firm's management is considering three courses of action. To arrange for subcontracting (S), to begin overtime production (O), or to construct new facilities (C). Subcontracting will cost the firm Ksh. 15,000; Overtime production will cost Ksh. 33,000 while construction of new facilities will require investment of Ksh. 58,000. The correct choice depends largely upon the future demand, which may be low, medium or high. By consensus, management ranks the respective demand probabilities as 0.10, 0.50 and 0.40. A cost analysis reveals effect upon the profits (in Ksh.) as shown in the table below:

Demand	Course of action		
Low (L)	10,000	-20,000	150,000
Medium (M)	50,000	60,000	20,000
High (H)	50,000	100,000	200,000

- Show this decision situation in the form of a decision tree and indicate the most preferred decision and its corresponding expected net monetary value. (10 marks)

- (b) Ten bank employees were given training no use of technology in service delivery. Evaluation was conducted to determine effectiveness of training measured by average number of customers served daily in one month before and after training. The data obtained is tabulated below:

Before training	180	178	165	200	160	145	170	210	185	155
After training	174	181	157	198	152	150	160	205	178	160

Use the sign at 0.05 level of significance to test the claim that the training is effective. (10 marks)

**QUESTION THREE (20 MARKS)**

- (a) Outline the assumptions associated with non-parametric tests. (8 marks)
- (b) A car tyre dealer claims that the median life of a new brand tyre is more than 48 months. A random sample of 32 tyres revealed the following tread lives in months

56	62	61	54	52	32	24	35	50	42	52
49	26	31	31	54	38	36	45	53	37	40
38	31	29	25	45	52	48	39	30	38	

Use classical method of the Wilcoxon signed-rank test at 1% level of significance to verify the claim of the dealer. (12 marks)

**QUESTION FOUR (20 MARKS)**

- (a) Show that (4 marks)
- (b) A study was conducted to establish causal relationship between energy consumption, household income and size of household. The following is summary data relating to consumption (Y), Income sources and household size .

Y		
9	0	8
8	2	9
7	4	8

**Required**

- (i) Find the model specification matrix (2 marks)

- (ii) Find and (4 marks)
  - (iii) Find the matrix ( (6 marks)
  - (iv) Hence find the model parameters (4 marks)
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