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(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
(MMUST)
MAIN CAMPUS

UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER EXAMINATIONS

FOR THE DEGREE
OF
MASTER OF BUSINESS ADMINISTRATION

COURSE CODE: MBA 804

COURSE TITLE: QUANTITATIVE ANALYSIS

DATE: MONDAY, 19TH /12/2022 TIME: 2:00 – 5:00PM

INSTRUCTIONS TO CANDIDATES

1. This paper contains TWO Sections: Sections I and II
2. Answer Question ***ONE*** and Any other ***THREE*** Questions in the Answer Booklets Provided
3. All rough work must be done in the Answer Booklet and Cancelled
4. Normal, Chi square, ANOVA, t distributions tables are provided.

TIME: 3 HOURS

MMUST observes ZERO tolerance to examination cheating

SECTION I: COMPULSORY (40 MARKS)

(Answer ALL Questions from this Section)

QUESTION ONE

a) Describe with clear illustrations the relevance of quantitative analysis in decision making in business management (10 marks)

b) In a certain supermarket in Nairobi customers arrive randomly at an average rate of 3.4 per minute. Assuming the customer arrivals form a Poisson distribution, calculate the probability that:

i) No customers arrive in any particular minute (03 marks)

ii) Exactly one customer arrives in any particular minute (03 marks)

iii) One or more customers arrive in any 30 second period (04 marks)

c) According to the Ministry of Cooperative Societies and MSMEs Affairs, the number of loan application is SACCOs is 20% higher in December than in November. In 2021 a random sample of 6 SACCOs were chosen their percentage December loan application increases were listed as follows:

19.2 18.4 19.8 20.2 20.4 19.0

Assuming a normal population distribution; test the null hypothesis that the true mean percentage increase in loan application is 20% against aa two-sided alternative at 10 percent level of significance (10 marks)

d) Below is the distribution of reports the volume of sales by 120 salespersons in the month of September 202:

Sales (Sh.)	Number of Salespersons
100,000 to 149,000	8
150,000 to 199,000	14
200,000 to 249,000	16
250,000 to 299,000	18
300,000 to 349,000	20
350,000 to 399,000	17
400,000 to 449,000	15
450,000 to 499,000	12

Required:

i) Choosing a suitable assumed mean calculate the mean (06 marks)

ii) Calculate the standard deviation of the distribution (04 marks)

SECTION II (60 MARKS)

(Answer Any THREE Questions from this Section)

QUESTION TWO

Independent random samples of rental rates of houses in four cities estates were taken. The rental rates in thousands of shillings are shown below:

Milimani	Otiende	Amalemba	Kifingo
73	85	97	61
63	59	86	67
89	84	76	84
78	70	78	67
70	80	76	69

Required:

a) Construct an Analysis of Variance (ANOVA) table (15 marks)

b) Test if there is any significant difference in rental rates within the estates and between the estates at $\alpha = 0.01$ level of significance (05 marks)

QUESTION THREE

a) A certain farmer in Kakamega County has decided to apply two brands of fertilizer namely, Calcium Ammonia Nitrate (CAN) and Urea in his maize farm. The farm needs at least 16 kilograms of Nitrogen and 24 Kilogram of Phosphate. CAN costs KES 6000 per bag and Urea KES 3000 per bag. The following information on chemical contribution is provided.

Brand	Nitrogen Kilogram/ Bag	Phosphate Kilogram/ Bag
CAN	2	4
Urea	4	3

Required:

How much of each brand should the farmer buy to minimize total cost of fertilizer provided (16 marks)

b) Highlight the significance of linear programming in decision making in the firm (04 marks)

QUESTION FOUR

a) Compute the correlation coefficient for the bivariate observation below:
$\{(X, Y)\} = \{(2, 5) (3, 10) (6, 9) (7, 7) (9, 12) (10, 9)\}$ (10 marks)

b) A certain company uses two machines, that is, Machine A and Machine B to process certain items. The cost functions for the two machines are as follows:

Machine A: $y = 15 + 3x$
Machine B: $y = 18 - x + x^2$

Where y refers to the cost of producing item in KES. x refers to the number of items produced in hundreds.
If the maximum speed at which both machines can run is 400 items per hour.
Required:

i) Plot the graph of two machines on the same axis (04 marks)

ii) Use the graph to find the range of production for which each item is produced more cheaply using Machine A and Machine B (03 marks)

iii) Use the graph to find the total cost during 1 hour for producing 150 items for Machine A and producing 350 items on Machine B (03 marks)

QUESTION FIVE

A study on the relationship between education level and marital stability was conducted where marital stability was classified as low, medium, and high. The findings are in the contingency table

Education Level	Marital Stability		
	Low	Medium	High
Primary	20	18	22
Secondary	50	46	44
College	48	63	59
University	34	43	73

Test at $\alpha = 0.01$ level of significance if the marital stability is related to education level using Chi square distribution (20 marks)

QUESTION SIX

a) The following are the number of suits made by a sample of employees in factories A and B of a company in six months:

Factory A:	27	31	28	29	40	35	33	32	36	37	43
Factory B:	34	24	38	28	30	34	37	42	41	44	

Test whether the average is the same for employees in both factories using Mann- Whitney test 5 percent significance level (10 marks)

b) The data of the promotion status and academic qualification regarding 100 employees of a firm is as follows:

Promotional Status	Degree Holders	Non- Degree Holders	Total
Promoted	12	60	72
Not Promoted	18	10	28
Total	**30**	**70**	**100**

At random one employee is picked up. What is the probability that an employee selected?

i) Is a degree holder (02 marks)

ii) Is promoted (02 marks)

iii) Is promoted given that he/she is a degree holder (03 marks)

iv) She/ He is a degree holder given that she/he is not promoted (03 marks)