KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

(SEP - DEC 2023)

COOP 300: QUANTITATIVE ANALYSIS FOR CO-OPERATIVE MANAGEMENT I

INSTRUCTIONS:

1. Do not write anything in this paper
2. Answer Question **ONE** and any other **THREE** questions.

QUESTION ONE (15MKS)

a) Explain what is meant by quantitative techniques. (3mks)

b) Illustrate the steps involved in quantitative techniques. (4mks)

c) Explain the role of quantitative techniques in cooperative management. (4mks)

d) Write short notes on the following (6mks)

i). Stratified sampling.

ii) Multi – Stage sampling

iii) Judgement sampling

iv) Quota sampling

e) Briefly discuss how a bias can be introduced during sampling. (4mks)

f) Explain the importance of forecasting (4mks)

QUESTION TWO (15mks)

b) HJ Sigmoids logistics provides a third transport and storage services. It usually signs long term contracts to develop close working relationship with customers. Recently it bid for a contract to move newspapers and magazines from point of printing works to wholesalers. This distribution market is dominated by two major companies and it might be useful area for expansion. The whole decision was complicated. The probabilities of the newspaper sales and profit ($ 1000) are summarized below.

Newspaper Sales

Alternative	Decrease	Stay the same	Increase
	P= 0.4	P= 0.3	P=0.3
Low tender	10	15	15
Medium tender	5	20	10
High tender	18	10	-5

Required:

Which is the best alternative among the tenders. Discuss. (5mks)

b). A hotel is going to set a cream tea stall at a local gala. On the morning of the gala she visits the wholesale market and has to decide to buy large, medium, or small quantities of strawberries, scones, cream and other materials. Her matrix gain in ($ 1000) for different weather conditions is given below:

Alternative to buy	Event Weather is		
	Good	Average	Poor
Large Quantity	10	4	-2
Medium Quantity	7	6	2
Small Quantity	4	1	4

What quantity of material should she buy? Explain (4mks)

QUESTION THREE (15mks)

a). The following details are available regarding a project.

Activity	Predecessor Activity	Duration (Weeks)
A	-	4
B	-	7
C	-	3
D	A	6
E	B	4
F	B	7
G	C	6
H	E	10
I	D	3
J	F, G	4
K	H, I	2

Determine the critical path, the critical activities and the project completion time. (7mks)

b) i. Describe the queuing system. (1mks)

ii) The arrival rate of a customer at a banking counter follows a poison distribution with a mean of 60 per hour. The service rate of the customer of the counter clerk also following a poisson distribution with a mean rate of 115 per hour.

iii) What is the probability of having zero customers in the queue? (2mks)

iv) What is the probability of having 15 customers in the queue? (2mks)

v) Find Ls, Lq, Ws and Wq (3mk)

QUESTION FOUR (15mks)

a) The quality development of a wire manufacturing components periodically selects a sample of wire specimens in order to test for breaking strengths. Past experience has shown that the breaking strength of a certain type of wire are normally distributed with standard deviation of 200Kg. A random sample of 64 specimens gave a mean of 6200Kg. Find the population mean at 95% level of confidence. (7mks)

b). Briefly explain the criteria of a good estimators.   (8mks)

QUESTION FIVE (15mks)

a) Using the North West Method determine the feasible solution for the following transportation problem. (10mks)

	Destinations				
Origin	**1**	**2**	**3**	**4**	**Capacity**
1	20	22	17	4	130
2	24	37	9	7	70
3	32	37	20	15	50
Replacement	**60**	**40**	**30**	**110**	**240**

b). The quality department of a wire manufacturing company periodically select a sample of a wire   specimen in order to test for their breaking strengths. Past experience has shown that the breaking strengths of a certain type of a wire are normally distributed with standard deviation of 900Kg. A random sample of 81 specimens gave a mean of 2500Kg. Find out the population mean at 95% level of confidence.   (5mks)