



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BUSINESS & ECONOMICS
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF BUSINESS
ADMINISTRATION WITH IT
4TH YEAR 1ST SEMESTER 2013/2014 ACADEMIC YEAR
BUSIA LC

COURSE CODE: ABA 402

COURSE TITLE: QUANTITATIVE METHODS II

EXAM VENUE:

STREAM : (BBA-ACCOUNTING OPTION)

DATE:

EXAM SESSION:

TIME: 2 HOURS

Instructions:

- 1. Answer Question ONE (COMPULSORY) and ANY other 2 questions**
- 2. Candidates are advised not to write on the question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

QUESTION ONE:

a)

i) Outline FIVE requirements that are supposed to be met to apply linear programming in solving mathematical models in management (5 marks)

ii) A retired person wants to invest up to an amount of Kshs 30,000 in fixed income

Securities. His broker recommends investing in Standard Chartered bond and Family Bank bond. Standard Chartered bond yields 7% and Family Bank bond yields 10%. After some consideration he decided to invest at most Kshs 12,000 in Family Bank bond and 6,000 in Standard Chartered bond. He also wants to invest equal amount on both bonds. What should the broker recommend if the investor wants to maximize his return on investment? Solve the Linear programming model by use of a graph. (12 marks)

b) The demand for sweets is correlated to the price of sugar. The past data is given in **Table 3**

Table 1.

<i>SNo.</i>	<i>Price of sugar (Kshs per kg)</i>	<i>Demand (kg per month)</i>
1	10.00	440
2	10.80	420
3	12.20	380
4	12.60	320
5	13.20	300
6	14.00	260
7	14.50	250
8	15.00	200
9	15.40	180
10	16.10	120

Required:

- Formulate the regression equation
- Forecast the demand if the price of sugar is Kshs 16.50 (13 marks).

QUESTION TWO.

a) i) Explain the difference between deterministic and probabilistic queuing model

ii) Outline the conditions for single channel modelling (7 marks)

b) The average time between successive arrivals to a repair shop, which works 8 hours a day is 30 minutes. The shop has one mechanic who can repair the incoming vehicles at an average rate of 3 vehicles per hour. The mechanic is paid Kshs 140 per hour while the cost of waiting time in terms of customer dissatisfaction and loss in goodwill is Kshs 200 per hour of the time spent waiting in the queue. The owner is contemplating

to replace the mechanic by another one who demands Kshs 180 per hour and can repair 4 vehicles on the average.

Required; under condition of single server model calculate:

- i) The total cost per day with present mechanic
- ii) The cost if the present mechanic is replaced
- iii) Advice the owner of the garage whether it is prudent to replace the current mechanic or not. (13 marks)

QUESTION THREE.

Kogelo transport company ships truck loads of grain from 3 silos in Kisumu, Eldoret and Kitale to four mills in Busia, Kakamega, Homabay and Migori. The supply (in truck loads) and the demand (also in truckloads) together with the unit transportation cost per truck load on the different routes are summarized in *table 2*.

Calculate the shipping schedule for the transport company.

Table 2.

To mills/ From silos	MILLS				SUPPLY
	Busia	Kakamega	Homabay	Migori	
Kisumu	10	3	20	11	20
Eldoret	12	7	9	25	30
Kitale	4	14	16	18	10
DEMAND	10	15	15	20	60

Using the North West corner rule method determine the following:

- i) The routes that will result into optimal cost of shipping.
- ii) The minimum transport cost of shipping the bath tabs to the various warehouses in Kenya shillings. (20 marks)

QUESTION FOUR

- a) A small retailer has studied the weekly receipts and payments for over the past 200 weeks and has developed the following set of information.

Table 3.

<i>Weekly receipts(Kshs)</i>	<i>Probability</i>	<i>Weekly payments(Kshs)</i>	<i>Probability</i>
3000	0.20	4000	0.3
5000	0.3	6,000	0.4
7000	0.4	8000	0.2
12,000	0.1	10,000	0.1

The following random numbers are given for the simulation;

For receipts: 03, 91, 38, 55, 17, 46, 32, 43, 69, 72, 24, and 22

For payments: 61, 96, 30, 32, 03, 88, 48, 28, 88, 18, 71, and 99

Required;

- i) Simulate the weekly pattern of payments and receipts for 12 weeks of the next quarter.
- ii) If the beginning balance is Kshs 8000 what would be the estimated balance at the end of 12 weeks.
- iii) What is the highest weekly balance during the quarter
- iv) What is the average weekly balance (20 marks).

QUESTION FIVE:

- a) Explain assignment as a linear programming model and outline how it can be used to facilitate human resource capital optimization. (6 marks).
- b) The following cost matrix is given for a machine shop that produces parts for sugar factories in western Kenya as illustrated in **Table 4**.

Table 4.

Machinist	Job				
	1	2	3	4	5
A	10	3	3	2	8
B	9	7	8	2	7
C	7	5	6	2	4
D	3	5	8	2	4
E	9	10	9	6	10

Required; Determine:

- i) The optimal job assignment
- ii) The cost of assignment (14 marks }