



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BUSINESS & ECONOMICS
UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF BUSINESS
ADMINISTRATION WITH IT -SCM OPTION Y4SI
KISII CAMPUS-PART TIME

COURSE CODE: ABA 402

COURSE TITLE: QUANTITATIVE METHODS IN BUSINESS II

EXAM VENUE: LR 17

STREAM: (BBA)

DATE: 22/12/16

EXAM SESSION: 9.00 – 11.00AM

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) Explain the following elements as used in queuing system.
- i) Arrival process
 - ii) Service system
 - iii) Speed service
 - iv) Queue discipline
- (4marks)

- b) A distribution system has the following constraints

Factory **capacity (IN UNITS)**

A 45

B 15

C 40

Warehouse **demand in units**

I 25

II 55

III 20

The transportation cost per unit in shillings allocated with each route are as follows

		I	II	III
From	A	10	7	8
	B	15	12	9
	C	7	8	12

Find the optimal transportation schedule and the minimum total cost of transportation using VAM method. (8marks)

- c) Discuss the advantages of simulation. (8marks)
- d) A bank has collected data on queuing time in minutes(V) and the number of tellers(X) 12 customers were randomly selected and the results were as below

X	2	3	5	4	2	6	1	3	4	3	3	2
Y	12	11	4	6	11	4	4	10	8	11	9	12

Required

- i) Coefficient of correlation and coefficient of determination. (4marks)
- ii) Interpret the results in I above. (1mark)

Question two

- a) Explain the assumptions of linear programming. (5marks)
- b) In the following table the advertising expenditure and sales revenue for 10 business firms is as shown (in kshs. Millions)

	Firm	A	B	C	D	E	F	G	H	I	J
Advertising exp(x)		57	54	49	42	38	32	30	24	20	18
Sales rev(y)		113	111	107	103	100	96	94	84	74	76

Required:

- a) Find the regression equation of sales revenue on advertising expenditure. (8marks)
- b) If the advertising expenditure is ksh. Is kshs 26 million estimate the sales revenue of the business. (2marks)

Question three

Solve the following using simplex method (10marks)

$$\text{Min } Z = x_2 - 3x_3 + 2x_5$$

s.t

$$x_1 + 3x_2 - x_3 + 2x_5 = 7$$

$$-2x_2 + 4x_3 + x_4 = 12$$

$$-4x_2 + 3x_3 + 8x_5 + x_6 = 10$$

$$x_i \geq 0 \quad j=1,2,\dots,6$$

- c) Define the following terms as used in simulation
 - i) State of a system
 - ii) Discrete system
 - iii) Model
 - iv) Statistic simulation (5marks)

Question four

ALM bank has received numerous complaints from its customers because of the time they take before being served. The bank has four counters for withdrawal and four teller clerks. The time taken in min to serve customers in any of the four counters

	Teller			
	Joan	jane	john	mercy
1	2	2.2	1.4	2.3
2	1.4	2.1	2	3.2
3	1.6	1.8	1.9	2.5
4	2.1	1.9	2.4	2.2

Determine

- i) The assignment of tellers to the counters in order to minimise the total time taken to serve by the tellers. (13 marks)

- ii) The minimum total time taken by the tellers to serve one customer each.(2marks)

Question five

- a) A change motor garage is able to install new car silencers at an average rate of three per hour or one every 20 min customer requiring this service arrive at the garage on an average of two customers per hour. The owner of the garage service realized that they were single channel . single phase system.

Determine :

- i) The average number of customers in the system
 - ii) The average time spent by a customer in the system
 - iii) The average number of customers in the queue
 - iv) The utilization factor of the service facility. (10marks)
- b) Highlight five uses of regression analysis as used in business. (5marks)