



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BUSINESS & ECONOMICS
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF
LOGISTICS AND SUPPLY CHAIN MANAGEMENT
3RD YEAR 2ND SEMESTER 2015/2016 ACADEMIC YEAR
SPECIAL EXAM

COURSE CODE: BLM 3321

COURSE TITLE: OPERATIONS RESEARCH.

EXAM VENUE:

STREAM: (BLSM)

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) Define simulation and outline FOUR areas of application in management. (8 marks)

ii) Outline the SEVEN basic steps involved in simulation. (7 marks)

b) The daily demand for Cycle tyres at Kogelo cycle dealers over the past 200 days is given in

Table 1.1

Table 1.1 Demand for tyres in 200days

Demand for tyres	0	1	2	3	4	5
Frequency	10	20	40	60	40	30

i) Calculate conventionally the expected daily demand (2 marks)

ii) Using Monte Carlo simulation processes, estimate the demand per day in the next ten days. (3 marks)

c) i) Explain SIX requirement of linear programming model (6 Marks).

ii) Outline the FOUR assumptions in Linear programming model (4mark)

QUESTION TWO:

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

(13 marks)

QUESTION THREE:

- a) Explain assignment model and outline three areas of application in operations or manufacturing management (5marks)
- b) Explain the three types of replacement decision that a company may face in order to organize its objectives for competitive advantage (3 marks).
- c) A machine M_1 costing Kshs 9000 has a maintenance cost of Kshs 200 in the first year of its operation, which rises by Kshs 2000 in each of the successive years. Assuming that the machine replacement can only be done at the end of the year. Determine the best age at which the machine can be replaced (6 marks)
- d) There is an offer to replace machine M_1 in question 1(b) above which is a year old, by another machine M_2 which costs Kshs 8000. The machine M_2 needs Kshs 2000 to be spent on installation, it has got no salvage value and requires Kshs 400 on maintenance in the first year followed by an increase of Kshs 800 per annum in the yearly expenditure on maintenance.

Required; determine whether machine M_1 should be replaced by machine M_2 if so, after what duration (6 marks)

QUESTION FOUR:

- a) i) Explain what is meant by game theory in the business market mix competitive advantage.
- ii) Outline FIVE assumptions that are taken into accounts in game theory (7marks)
- b) Two firms are competing for a similar market share. The payoff matrix in terms of their advertising plans is shown below ; **Table 4.1**

		ELTON LTD		
		<i>Large advert</i>	<i>Medium advert</i>	<i>Small advert</i>
CLASSIC LTD	<i>Large advert</i>	70	80	50
	<i>Medium advert</i>	90	60	95
	<i>Small advert</i>	105	90	65

Required:

- i) Find the optimal strategy
- ii) The value of the game (13 marks)

QUESTION FIVE:

Kamarin 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 5.1*.

Calculate the shipping schedule for the transport company.

Table 5.1

To mills/	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. (8 marks)
- ii) The minimum transport cost of shipping the bath tabs to the various warehouses in Kenya shillings. (12 marks)