



GARISSA UNIVERSITY

UNIVERSITY EXAMINATION **2017/2018** ACADEMIC YEAR **ONE**
SECOND SEMESTER EXAMINATION

SCHOOL OF BUSINESS AND ECONOMICS

FOR THE DEGREE OF BACHELOR OF BUSINESS ADMINISTRATION

COURSE CODE: MBA 817

COURSE TITLE: OPERATION RESEARCH

EXAMINATION DURATION: 3 HOURS

DATE: 10/04/18

TIME: 09.00-12.00 PM

INSTRUCTION TO CANDIDATES

- The examination has FIVE (5) questions
- Question ONE (1) is COMPULSORY
- Choose any other THREE (3) questions from the remaining FOUR (4) questions
- Use sketch diagrams to illustrate your answer whenever necessary
- Do not carry mobile phones or any other written materials in examination room
- Do not write on this paper

This paper consists of FOUR (4) printed pages

please turn over



QUESTION ONE (COMPULSORY)

(a) Briefly explain the following terms

- i. Objective function [2 marks]
- ii. Constraints [2 marks]
- iii. Optimum solution [2 marks]

(b) The manager of a bank observes that on the average 18 customers are served by a cashier in a hour. Assuming that the service time has an exponential distribution, what is the probability that;

- i. A customer shall be free within 3 minutes [3 marks]
- ii. A customer shall be serviced in more than 12 minutes [3 marks]

(c) Briefly explain the number of possibilities when picking up from the waiting line for service [3 marks]

QUESTION TWO

A company manufactures around 150 mopeds. The daily production varies from 146 to 154 depending upon the availability of raw materials and other working conditions.

Production per Day	Probability
146	0.04
147	0.09
148	0.12
149	0.14
150	0.11
151	0.10
152	0.20
153	0.12
154	0.08



The finished mopeds are transported in a specially arranged lorry accommodating only 150 mopeds. Using following random numbers 80, 81, 76, 75, 64, 43, 18, 26, 10, 12, 65, 68, 69, 61, 57, simulate the process to find out:

- (a) What will be the average number of mopeds waiting in the factory?
- (b) What will be the average number of empty spaces on the lorry **[15 marks]**

QUESTION THREE

- (a) Linear programming problem is based on specific assumptions. Highlight and explain these assumptions **[6 marks]**

- (b) Solve graphically the following LPP

Maximize $Z = 4x + 5y$

Subject to constraints

$$2x + 3y \leq 12$$

$$2x + y \leq 8$$

And $x, y \geq 0$

[9 marks]

QUESTION FOUR

- (a) Two firms are competing for business. Whatever firm A gains, B firm loses. The table given below shows advertising strategies of both the firms and utilities to firm A for various market shares in percentages (assuming this to be a zero sum game):

		Firm A's Utility		
		Firm B		
		Press	Radio	T.V.
Firm A	Press	60	75	40
	Radio	75	75	60
	T.V.	60	70	70



Find optimal strategies for both firms and expected percentage of market shares to firm A. **[8 marks]**

(b) Determine the break-even sales in the following case:

	Product		
	A	B	C
Sale (Units)	5000	6000	4000
Unit selling price (Ksh.)	10	15	18
Unit variable cost (Ksh.)	6	4	13
Fixed cost (Ksh)	4000		

[7 marks]

QUESTION FIVE

(a) Outline and explain the general assumptions made to solve the sequencing problems **[7 marks]**

(b) Discuss the operating characteristics of queuing system **[8 marks]**

