GARISSA UNIVERSITY

UNIVERSITY EXAMINATION **2017/2018** ACADEMIC YEAR **THREE** **FIRST** SEMESTER EXAMINATION

SCHOOL OF BUSINESS AND ECONOMICS

FOR THE DEGREE OF BACHELOR OF BUSINESS MANAGEMENT

COURSE CODE: BBM 355

COURSE TITLE: OPERATIONS RESEARCH

EXAMINATION DURATION: 3 HOURS

DATE: 05/12/17   TIME: 2.00-5.00 PM

INSTRUCTION TO CANDIDATES

- **The examination has SIX (6) questions**

- **Question ONE (1) is COMPULSORY**

- **Choose any other THREE (3) questions from the remaining FIVE (5) 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 are experimental distribution, what is the probability that;

    i.   A customer shall be free within 3 minutes   **[5 marks]**

    ii.   A customer shall be serviced in more than 12 minutes   **[5 marks]**

(c) Outline and explain any methods for the measurement of investment worth.   **[5 marks]**

(d) Briefly explain the number of possibilities when picking up from the waiting line for service

[4 marks]

QUESTION TWO

(a) Briefly explain the steps contained in solving a transportation problem   **[6 marks]**

(b) Solve the following transportation problem. Obtain the initial solution by NW corner rule.

		TO				
		1	2	3	4	Supply
	A	7	3	8	6	60
From	B	4	2	5	10	100
	C	2	6	5	1	40
Demand		20	50	50	80	200

[14 marks]

QUESTION THREE

(a) Linear programming problem is based on specific assumptions. Highlight and explain these assumptions **[10 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 ≥ 0 **[10 marks]**

QUESTION FOUR

(a) Explain the elements of a decision problem **[6 marks]**

(b) A group of students raises money each year by selling souvenirs outside the stadium after a cricket match between Teams A and B. They can buy any of the three different types of souvenirs from a supplier. Their sales are mostly dependent on which team wins the match. A conditional pay off table is as under:

Teams	Type of Souvenir		
	I	II	III
Teams A Wins	Ksh.1200	Ksh.800	Ksh.300
Team B Wins	Ksh.250	Ksh.700	Ksh.1,100

   i. Construct the opportunity loss table **[6 marks]**

   ii. which type of souvenir should the students buy if the probability of team A's winning is 0.6 **[6 marks]**

   iii. Find out the cost of uncertainty. **[2 marks]**

QUESTION FIVE

(a) Outline and explain the general assumptions made to solve the sequencing problems **[10 marks]**

(b) Discuss the operating characteristics of queuing system **[10 marks]**

QUESTION SIX

(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.
	Press	60	75	40
Firm A	Radio	75	75	60
	T.V.	60	70	70

Find optimal strategies for both firms and expected percentage of market shares to firm A.

[14 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

[6 marks]