JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BUSINESS AND ECONOMICS

UNIVERSITY EXAMINATIONS FOR DEGREE OF BACHELOR IN LOGISTICS & SUPPLY CHAIN MANAGEMENT

3RD YEAR 2nd SEMESTER 2018/2019 ACADEMIC YEAR

KISUMU CAMPUS

COURSE CODE: BBM 3321

COURSE TITLE: OPERATIONS RESEARCH

DATE _____ **TIME: _____**

DURATION: 2 H0URS

INSTRUCTIONS:

I. This paper contains **Five** questions

II. Answer question **ONE** and any other **TWO** questions

III. Question one is **COMPULSORY**

IV. Candidates are advised not to write on the question paper

V. Candidates must hand in their answer booklets to the invigilator while in the examination room

Question One (**30marks**)

a) Differentiate between Scheduling and Loading. (**4marks**)

b) A person deposits a sum of Ksh150, 000 at an interest rate of 18% compounded annually for 5 years. Find the maturity value after 5 years (**4marks**)

c) List any Two Sequencing priority rules (**2marks**)

d) Explain the meaning of the following terms

i) Transportation model

ii) Assignment model (**4marks**)

e) Explain any Five performance measures in queuing model (**5marks**)

f) Outline three areas of application of simulation for integrated logistics (**3marks**)

g) Explain three advantages of game theory (**3marks**)

h) Outline five assumptions of linear programing model (**5marks**)

Question Two (**20marks**)

a) Explain Five assumptions of a single-server model in the queuing theory (**10marks**)

b) A typist receives on average 20 letters per day for typing. The typist works for 8 hours a day and takes on average 22minutes to type a letter.

Required:

i) The typist utilisation rate

ii) Expected number of letters waiting to be typed (**10marks**)

Question Three (**20marks**)

a) Graphically show the feasible region given the constraints below and clearly state co-ordinates of its feasible points on the graph (**10marks**)

$5x + 4y \leq 60$

$3x + 7y \leq 84$

$x + y \leq 18$

$x, y \geq 0$

b) Table 1 below contains information concerning six jobs that are awaiting processing at a work centre

JOBS	PROCESSING TIME (DAYS)	DUE DATE (DAYS)
A	2	7
B	8	16
C	4	4

Table 1

D	10	17
E	5	15
F	12	18

Based on the Due Date (DD) rule, determine

i) The sequence of jobs

ii) Total Flow time

iii) Tardiness

iv) Make span

v) Average number of jobs (**10marks**)

Question Four (**20marks**)

a) The annual demand for an item is known to be 2, 000 units which are uniformly distributed over the year. The unit cost of the item is Ksh200 and the holding cost is 10% of the value. The cost per order is Ksh100.

Determine:

i) The EOQ

ii) The change in EOQ when the ordering cost change to Ksh400

iii) The total cost of holding stock in (i) and (ii) above (**10marks**)

b) Solve the following transportation problem using the least cost method (**10marks**)

From	TO			Supply
	D	E	F	
A	40	10	20	800
B	15	20	10	500
C	20	25	30	600

Question Five (**20marks**)

a) A firm is considering two mutually exclusive investments with cash flows as follows

Year	0	1	2	3	4	5
Project A	(80,000)	18,000	20,000	25,000	38,000	450,000
Project B	(120,000)	30,000	50,000	50,000	50,000	150,000

Cost of capital 15%

Required:

i) NPV for both projects

ii) Advice the management on which project to undertake using the method in (i) above

(**10marks**)

b) Highlight Five procedures used in graphical solution method of linear programming (**10marks**)