JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

UNIVERSITY EXAMINATION 2017

3rd YEAR 1ST SEMESTER EXAMINATION FOR THE DEGREE OF THE BACHELORS OF LOGISTICS

SCHOOL OF BUSINESS AND ECONOMICS

COURSECODE: BBM 3321

COURSE TITLE: OPERATIONS RESEARCH.

DATE:…………………………………TIME :…………………..

DURATION: TWO HOURS

INSTRUCTIONS

This paper contains FIVE (5) questions.

Answer questions one (1) and any other TWO questions.

Write all the answers in the booklet provided.

QUESTION ONE

a i)   Explain simulation as process modelling tool.

   ii)   Outline THREE advantages and THREE disadvantages of simulation   (8 marks)

b) The daily demand for radial types at Rachuonyo tyres over the past 100 days is shown   in the table 1

   Table 1

Demand of tyres						
	0	1	2	3	4	5
Frequency						
	5	10	20	30	20	15

Required:
Simulate the process for ten days using the following random numbers: 03, 91, 38, 55, 17, 46, 32, 43, 69, 72, 24, and 22 and determine;

     i)   Average daily demand due to probability

     ii)   Expected demand due to simulation   (8 marks)

c) Explain FOUR reasons why equipment may be considered for replacement in an industry or plant.   (4 marks)

  ii) A firm is using a machine whose purchase price is Kshs 13000. The installation charge

     amount to Kshs 3600 and the machine has scrap value of of only Kshs 1600, because

     the firm has monopoly of this type of job. The maintenance cost in various years is

     given in *table 1.*

Table1.

Year	1	2	3	4	5	6	7	8	9
Cost Kshs	250	750	1000	1500	2100	2900	4000	4800	6000

Required: Determine after how many years the machine should be replaced for economic consideration   (10marks)

QUESTION TWO:

    a) Outline SIX requirement of linear programming model   (6 marks)
    b) A firm produces three products X Y and Z with contributions of £20, £18 and £16

    respectively, the production data is given in **table 2**

Table 2:

Products	Machine Hours	Labour hours	Materials in Kgs
X	5	2	8
Y	3	5	10
Z	6	3	3
Total hours available	3000	2500	10000

Required:

Formulate the problem as an LPP and determine the optimal production schedule for this firm using simplex method. (14 marks)

QUESTION THREE

a) Explain the difference between sequencing and scheduling as applied in management of industrial logistics. (6 marks).

b) Seven jobs are required to be processed through two machines A and B. The processing time (in hours) for each job on the two machines is given in *table 3.*

Job	Processing time	
	Machine A	Machine
1	10	5
2	20	21
3	5	4
4	25	15
5	15	14
6	12	12
7	6	6

Required:
a) Suggest the optimal sequence of processing the jobs.

Calculate the total minimum elapse time (14marks

QUESTION FOUR

a) i) Explain what is meant by game theory in the business market mix competitive

advantage. (2 marks)

ii) Outline FIVE assumptions that are taken into accounts in game theory (5 marks)

b) Two companies are competing for a similar product. The pay off matrix in-terms of their plans is shown.

COMPANY B

		Large advert	Medium advert.	Small advert
COMPANY	Large advert	70	80	50
A	Medium advert	90	60	95
	Small advert.	105	90	65

Find the optimal strategy and the value of the game (13 marks)

QUESTION FIVE

a) Outline the following types of queuing models

      i) Probabilistic model
      ii) Deterministic model.   (4 marks)

 b) An average of 5 customers attends to pharmacist shop every hour. Determine the

    probability that exactly two customers will reach in a 30- minute period, assuming that

    the arrival will follow a poison distribution.   (6 marks).

c)   The following information was obtained in a service facility; arrival and service follows
    a poison distribution process; the customers arrive at a rate of 8 per hour, service rate is
    10 customers per hour. Determine

 i) The average number of customers waiting for service.

ii) The average time that the customer wait in the queue.

iii) The average time the customer should be in the service facility. (10 marks).