CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

FOURTH YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF AGRIBUSINESS MANAGEMENT AND BACHELOR OF AGRICULTURAL ECONOMICS

AGEC 415/AGBM 416: OPERATIONS RESEARCH

STREAMS: **TIME: 2 HOURS**

DAY/DATE: TUESDAY 10/04/2018   **8.30 A.M – 10.30 A.M**

INSTRUCTION:

- **Answer question one and any other two questions**

1.   (a) Mathematical models is one class of models that are used very much in solving business problems. State and explain any five advantages that mathematical models posses over the other class of modes.   [10marks]

     (b) What are the limitations of using operations research techniques in solving business problems.   [10marks]

     (c) A company has four employees to do the four jobs that are available. The time that each employee can take to do a particular job is as shown in the following table:

Job

		A	B	C	D
Employee	1	15	20	18	24
	2	12	17	16	15
	3	14	15	19	17
	4	11	14	12	13

Required:

Assign each employee one job to minimize the total time of doing the jobs.
[10marks]

2.   (a) Discuss the limitations of using the reorder level system of inventory control to manage inventories.   [10marks]

(b) A camera shop expects to sell approximately 450 cameras of a certain type in one year. It costs and 12 to carry a camera in inventory for one year. The stock procurement costs is and 48 per order.

Required :

(a) Economic order quantity   [5marks]
(b) Number of orders per year.   [2marks]
(c) Annual total inventory costs.   [3marks]

3.   (a) State any five benefits of using the network analysis technique in managing projects.
                                                                                                                      [5marks]

(b) A project consists of the following activities

Activity	Preceding activity	Duration in days
A	-	9
B	-	4
C	-	7
D	B,C	8
E	A	7
F	C	5
G	E	10
H	E	8
I	D,F,H	6
J	E	9
K	I,J	10
L	G	2

Required :

(i)   Draw a network diagram for the project.   [6marks]
(ii)   Determine the critical path and project duration.   [4marks]
(iii)   Effect of delaying activity F and G by five days each.   [5marks]

4.   (a) State and explain any five limitations of using the linear programming technique to solve business problem.   [6marks]

(b) A medical prescription is made from three compounds I,II and III . Prescription should contain minimum 270 units of vitamin A,100 units of vitamin B and 190 units of

vitamin C. Compound I contains 2 units of each vitamin and costs ksh 5 per millimeter. Compond II contains 3 units of vitamins A, I unit od vitamin B and 6 units of vitamin C and costs ksh 6 per Millimetre. Compound III contains 3 units of vitamin A, I unit of vitamin B, and 6 units of vitamin C and cost ksh 8 per millimeter.

Required :

(i)   Formulate the problem as a linear programming problem.   [5marks]

(ii)   Write the problem in standard form.   [3marks]

(iii)   Identify the leaving variable, entering variable and pivot element.   [6marks]