CHUKA **UNIVERSITY**

UNIVERSITY EXAMINATIONS

CHUKA, EMBU & THARAKA

SECOND YEAR EXAMINATIONS FOR THE AWARD OF DIPLOMA IN PROCUREMENT AND LOGISTICS MANAGEMENT

DPLM 0161: OPERATIONS RESEARCH

STREAMS: DPLM **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 08/8/2018 **11.30 A.M. – 1.30 P.M.**

INSTRUCTIONS: Answer question ONE and any other TWO questions

Q1. (a) Operations research uses models to solve problems. Discuss any five benefits of using models to solve problems [10 marks]

(b) Operations research techniques are not widely used in Kenya to solve problems. Give five reasons to explain this. [10 marks]

(c) A secretarial bureau has five computers that can type any report. The bureau has five typists who can do any of the required jobs. The following table shows the time in minutes that each typist can take to type a report

		Reports				
		I	II	III	IV	V
Typist	A	18	24	25	18	22
	B	20	25	14	21	22
	C	22	24	17	21	24
	D	20	21	25	21	25
	E	24	27	30	23	27

Required:

Each typist is given only one report to type at a time. Determine the optimal assignment to minimize the time of typing of the reports. [10 marks]

2. (a) Explain any five benefits of using the reorder level system to manager inventories

    [10 marks]

    (b) The following data relates to the usage of a particular commodity in an organization:

    Normal usage 500 per day

    Minimum usage 200 per day

    Maximum usage 700 per day

    Lead time 15 – 20 days

    Economic order quantity 10,000 units

    Required:

    Calculate

    (i) The reorder level   [3 marks]

    (ii) The minimum level   [2 marks]

    (iii) The maximum level   [2 marks]

    (iv) Average stock level   [3 marks]

3. (a) State and explain any five rules or guidelines that assist in drawing the correct structure of a network diagram.   [10 marks]

    (b) A project consists of the following activities

Activity	Preceding activity	Duration in weeks
A	-	5
B	-	14
C	A	9
D	A	15
E	A	8
F	B, C	9
G	D	4
H	E, F, G	5

    Required:

    (i) Draw a network diagram for the project   [5 marks]

    (ii) Determine the critical path and project duration   [5 marks]

4.　(a)　Discuss any five assumptions that are made in using the linear programming technique to solve problems　　　　　　　　　　　　[10 marks]

　　(b)　A company produces and sells two different products A and B. The two products are produced in the same production process and are sold in two different markets. The production process has a total capacity of 45000 machine hours in a period. It takes 5 hours to produce one unit of product A and 3 hours to produce one unit of product B. The market has been surveyed and the marketing department has estimated that the maximum number of product A that can be sold is 7,000 and that of B is 10,000. Product A gives a profit contribution of ksh 600 per unit and ksh 400 per unit of product B. All what is produced is sold immediately

Required:

　　　　(i)　Formulate the problem as allnear programming problem　　[6 marks]

　　　　(ii)　Write the problem in (i) above in standard form　　　　[4 marks]