CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF DIPLOMA IN PROCUREMENT AND LOGISTICS MANAGEMENT

DPLM 0161: OPERATION RESEARCH

STREAMS: DPLM (Y1S2) **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 11/12/2019 **11.30 A.M. – 1.30 P.M.**

INSTRUCTIONS:

- **Answer question ONE and any other TWO questions**
- **Do not write anything on the question paper**

QUESTION ONE

(a) Discuss five limitations of using operation research techniques in organizations [10 marks]

(b) Operation research uses models to solve problems. Discuss any five benefits of using models to solve problems. [10 marks]

(c) A project consist of the following activities

Activity	Preceding activity	Duration in weeks
A	-	3
B	-	2
C	A	3
D	B	4
E	A	6
F	DE	5
G	B	2
H	C, F	2
I	G, H	3

Required:

(i) Draw a network diagram for the project [6 marks]

(ii) Determine the critical path and project duration [4 marks]

QUESTION TWO

(a) Discuss any five assumptions of linear programming techniques in solving business problems [10 marks]

(b) An electronic company manufactures two types of electronic devices X and Y through three main stages: Assembly, inspection and testing and packaging

The following table gives the breakdown of time required for each stage for each device

Device	Assembly (hours)	Inspecting and testing (minutes)	Packaging (minutes)
x	1	7.5	3
y	2	30	20

In a week, there are 600 hours available for assembly, 100 hours for inspection and testing and 60 packaging hours. For engineering reasons, not more than 500 units of x can be made each week.

The contribution of x is sh. 100 per unit and on y is sh. 150 per unit. The company wants to use linear programming technique to maximize its weekly profits

Required:

Formulate the problem as a linear programming problem [6 marks]

(c) Explain two limitations of using graphical method in solving linear programming problems [4 marks]

QUESTION 3

(a) Biashara ltd has four plants namely P, Q, R, S and manufacturers four products $A_1, A_2, A_3 \; and \; A_3$. Each of the plants can manufacture any of the four products. The following data relates to the cost of producing each product

Plant	**Product**			
	A_1	A_3	A_3	A_4
P	330	400	430	320
Q	450	280	310	230
R	420	290	360	290
S	270	420	440	380

(i) Allocate each plant to each product in a way that will minimize total cost [8 marks]

(ii) Calculate the total cost of the final assignment [2 marks]

(b) Discuss any five reasons why organizations hold stock [10 marks]

QUESTION FOUR

(a) Discuss the assumptions in the calculation of the economic order quantity (EOQ) [5 marks]

(b) The following information relates to material B2 for the month of Dec 2014

Maximum consumption	12,000 units
Normal consumption	9000 units
Minimum consumption	6000 units
Reorder period	4 – 6 weeks
Reorder quantity	60,000 units

Calculate:

(i) The reorder level [3 marks]

(ii) Minimum stock level [2 marks]

(iii) Maximum stock level [2 marks]

(iv) Average stock level [3 marks]
