

CHUKA



UNIVERSITY

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EXAMINATION FOR THE AWARD OF DIPLOMA IN PROCUREMENT AND LOGISTICS MANAGEMENT

DPLM 0161: OPERATIONS RESEARCH

STREAMS: DPLM

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 06/12/2017

11.30 A.M. – 1.30 P.M.

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

1. (a) Briefly define the following terms
 - (i) Operations research [2 marks]
 - (ii) Linear programming [2 marks]
 - (iii) Inventory [2 marks]
 - (iv) Economic order quantity [2 marks]
 - (v) Activity [2 marks]
- (b) State and explain the various types of inventory cost. [8 marks]
- (c) The Raketa racing team is new to motor racing. They have been practicing their pit stop producers and their performance is detailed below:

Activity	Description	Procedure	Duration (seconds)
A	Guide driver to the pit	-	3
B	Jack up the car	A	2
C	Remove the old wheels	B	5
D	Fit the new wheels	C	5
E	Refuel the car	B	16
F	Wipe the drivers visor	B	2
G	Release and clear Jack's	DF	2
H	Check all clear	EG	2
I	Signal	H	1

Required:

Draw a network for the pit stop procedure and find the critical path. [12 marks]

QUESTION TWO

- (a) The standard weight of a special purpose brick is 5 kg and it contains 2 basic ingredients B_1 and B_2 . B_1 costs ksh 5 per kg and B_2 cost ksh 8 per kg. the strength considerations dictate that the brick contains not more than 4 kg of B_1 and minimum of 2 kg of B_2 . Since the demand for the product is likely to be related to the price of the brick; find out the following
- (i) Formulate a linear programming problem to find the units of ingredients that each brick should contain to minimize cost. [7 marks]
 - (ii) Find out graphically minimum cost of the brick satisfying the above condition. [6 marks]
- (b) The inventory management of Ushirika Company finds it necessary to hold stock. Briefly outline 7 (seven) reasons why they do so. [7 marks]

QUESTION THREE

- (a) Today life has become more and more complex and due to growth, decision making has become a big problem because it involves cost and affect many people. Some formal system like operation research is needed to assist in decision making but implementation of their models has become a very difficult and delicate task. Explain. [10 marks]
- (b) The following data relates to a given stock item
- Normal usage = 1200 units per day
 - Minimum usage = 800 units per day
 - Maximum usage = 2000 units per day
 - Lead time = 15 – 20 days
 - EOQ = 30,000
- Calculate the following
- (i) Re-order level [3 marks]
 - (ii) Maximum stock level [3 marks]
 - (iii) Maximum stock level [2 marks]
 - (iv) Average stock [3 marks]

QUESTION FOUR

- (a) A good model is one that has few and simple assumptions. Clearly explain the basic assumptions of a linear programming model. [10 marks]
- (b) Technology has made complex operations to become more simpler in enhancing efficiency and effectiveness in any organization. With this regard, researchers have resulted in using softwares in dispensing their duties. What do you think are the roles of computers in operations research. Discuss. [10 marks]
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