

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF COMMERCE

BCOM 263: OPERATIONS RESEARCH 1

STREAMS: BCOM Y2S2 (ODEL)

TIME: 2 HOURS

DAY/DATE: TUESDAY 05/10/2021

8.30 A.M – 10.30 A.M.

INSTRUCTIONS:

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

QUESTION ONE (30 MARKS)

- (a) The objective of a model is to provide means for analysing the behaviour of a system for the purpose of improving its performance. Discuss the characteristics of operations research models. (10 marks)
- (b) Discuss the reasons for slow implementation of operations research models in Kenya despite their role in system analysis. (10 marks)
- (c) A company has machines that can do any of the required jobs with different costs of doing the jobs. The following table shows the costs that each machine will take to do the jobs

	JOB				
	A	B	C	D	D
Machine 1	60	20	50	30	60
2	20	50	80	70	70
3	70	80	60	90	80
4	60	20	30	40	50
5	90	30	80	90	70
6	40	70	40	60	80

Required:

Assign the machines to the jobs, so as to minimize the total costs of doing the jobs and hence determine the minimum cost. (10 marks)

QUESTION TWO (20 MARKS)

- (a) Discuss the basic assumptions of linear programming model. (10 marks)
- (b) A company produces three products A, B and C. The unit contribution of the products are Ksh. 5, 10 and 8 respectively. Each unit of A requires 3 Kgs of material, 4 machine hours and 2 labour hours. Each unit of product B requires 5 Kgs of material, 4 machine hours and 4 labour hours and each unit of product C requires 2 Kgs of material, 4 machine hours and 5 labour hours. The company has 60 Kgs of material, 72 machine hours and 100 labour hours available.

Required:

- (a) Formulate the problem as a linear programming problem. (6 marks)
- (b) Write the problem in standard form. (4 marks)

QUESTION THREE (20 MARKS)

- (a) Discuss the basic rules while constructing a network diagram. (8 marks)
- (b) The following activities to a project that is to be implemented soon

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

Required

- (i) Draw a network diagram for the project (7 marks)
- (ii) Determine the critical path and the project duration (5 marks)

QUESTION FOUR

- (a) Discuss five reasons that explain why an organization would hold stocks of different classes of inventories in its warehouse. (10 marks)

(b) Johma Enterprises Ltd is a company that consumes 10,000 units of a product per annum. The consumption of the product is fairly constant throughout the year. The cost of the item is Ksh 120 when purchased in large quantities. The cost of placing and receiving the order is Ksh 300. It takes on average 45 days to receive delivery from the date of the order. The carrying cost is estimated to be 20% of the average inventory.

Required:

- | | | |
|-------|-------------------------------|-----------|
| (i) | The economic order quantity | (3 marks) |
| (ii) | The number of order per year | (2 marks) |
| (iii) | Reorder level for the company | (2 marks) |
| (iv) | Total inventory cost | (3 marks) |
-