

# NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY



## FACULTY OF INDUSTRIAL TECHNOLOGY

### DEPARTMENT OF INDUSTRIAL AND MANUFACTURING ENGINEERING

#### Master of Engineering in Manufacturing Engineering/Systems and Operations Management

#### Main Examination

**COURSE : OPERATIONS MANAGEMENT**  
**CODE : TIE 6134**  
**DATE : JANUARY 2013**  
**DURATION : 3 HOURS**

#### INSTRUCTIONS AND INFORMATION TO CANDIDATE

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1. Answer any four (4) **questions**.
  2. Each questions carries **25 marks**.
  3. This paper contains six (6) questions.
  4. There are three (3) printed pages.
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### **QUESTION 1**

- a) Outline the factors that affect Production and Operations Management today. [10]
- b) Discuss the main Productive System Characteristics in relation to a Fast Moving Consumer Goods Manufacturing Company of your choice in Zimbabwe. [15]

### **QUESTION 2**

- a) What relationship exists between a Business Strategy and an Operations Strategy? [3]
- b) Explain how the following Decision Making levels interact in an organisation. (Strategic, Operating and Control decisions). [4]
- c) Discuss the six (6) main elements of an Operations Strategy. [18]

### **QUESTION 3**

A company manufacturing bread has two (2) lines that feed into one packaging line. The output of Line 1 is 1000 loaves per hour and Line 2 is 750 loaves per hour. The packaging line has an output of 2000 loaves per hour. Each machine is given 4 hours of scheduled maintenance per week. The organisation operates 6 days per week and maintenance is scheduled on the 7<sup>th</sup> day of the week.

- a) Calculate the Capacity of this plant with reference to monthly periods and under the following conditions (Operation is for 24hours. Line 1 is dedicated to bread only and line 2 runs bread for 50% of the time). [10]
- b) Discuss the factors that need to be considered in order to calculate the Rated Capacity of such a plant. [8]
- c) What is the Customer Order Decoupling Point (CODP) and how does it apply to bread manufacturing in this example? [3]
- d) How does evaluating capacities of the “entire Network” help in Strategic Capacity Planning? [4]

### **QUESTION 4**

- a) Define the term “Aggregate Production Planning”. [1]
- b) Discuss the inputs and the nature of outputs of Aggregate Production Planning. [8]
- c) Air Zimbabwe is making a comeback into its business operations. Develop a detailed outline of what the Management at the airline need to consider when developing an appropriate Aggregate Plan. [16]

### **QUESTION 5**

- a) Explain the Optimized Production Technology (OPT) principle. [5]
- b) A company has three components that go into its final assembly process. It requires two units of component B and three units of component C to make one unit of component A, and one unit of component A to make one unit of final assembly.

Table Q5 indicates cost, demand, and lead time information for the components.

Table Q5a. Cost, demand, and lead time information

	Component A	Component B	Component C
Average Demand (units/week)	30	60	90
Ordering Cost (\$/order)	100	540	400
Carrying Cost (\$/unit-week)	2	2	1.80
Lead Time (weeks)	2	1	2
Initial Inventory (units)	72	130	150

The final assembly master schedule is as shown in Table Q5

Table Q5b: Final assembly master schedule

	WEEK							
	1	2	3	4	5	6	7	8
Demand	47	16	34	25	50	40	16	12

- i. Develop a Material Requirements Plan for components A, B and C using the lot-for-lot method. [12]
- ii. Prepare an MRP for Component A using the economic Order Quantity (EOQ) Policy. [8]

### **QUESTION 6**

- a) Compare and contrast Material Requirements Planning (MRP) and Just In Time (JIT) principles. [9]
- b) Discuss the 5 major tasks that need to be changed in order to impact positively on Supply Chain Management. [16]

**END OF EXAM**