CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF MASTERS OF SCIENCE IN OPERATIONS MANAGEMENT

MSOM 811: PRODUCTION AND OPERATION MANAGEMENT

STREAMS: MSOM **TIME: 2 HOURS**

DAY/DATE: MONDAY 10/12/2018 **2.30 PM – 5.30 PM**

INSTRUCTIONS:

1. Read the case below and then answer the questions that follow

Spare Parts Inventory Important After-Sales Service Strategies

More than likely, at one time or another you've had trouble getting "spares and repairs" for some product you own. Perhaps the proper service facility was hard to locate, or you found the facility only to be told the spare part you needed was out of stock. In the larger picture, the stockout could result from unexpected demand, an unexpectedly long delivery lead time or some combination of the two. For the consumer, though, an out-of-stock spare part is simply frustrating. At times, we become convinced that the manufacture is out of touch with customer needs. We become irritated at the manufacture for failure, at the service facility for poor service, and at anyone else we can blame for our misfortune!

In establishing after-sales service strategies, firms consider design, manufacturing, qualified service (repair) persons, and spare parts inventories. There is a clear relationship between perceived product quality and after-sales service. While adequate spare parts inventories are an important ingredient to a successful service strategy, managing these inventories often posses distinct challenges. Spare parts are often at the bottom of a multiechelon inventory system, a system that focuses first on purchased or manufactured parts, assembly, finished goods, and warehousing. To the contrary, firms that are best-in-class generally demonstrate a spare parts service strategy that provides them a competitive edge, even when their products are excellent before and during use. Examples of these best-in-class companies are Caterpillar and IBM-companies that thrive on their service image.

Let's consider IBM's National Service Division (NSD), a service group for some 1,000 different IBM products – in service with an installed population of tens of millions of individual items. These 1,000 products require over 200,000 numbered parts stored (1) in two central automated

warehouses, (2) for 21 field distribution centers, (3) for 64 parts stations, (4) for 15,000 outside locations. Moreover, NSD's 15,000 customer engineers store spare parts in their car trunks and tool boxes. Managing spare parts inventory at IBM is a large, complex operations management task.

To help simplify the task, IBM developed Optimizer, a system for flexible and optimal control of service levels and spare parts inventory. The system handles over 15 million part-location combinations and billions of dollars in inventory. Though enormous in scope, the system is founded on a straightforward model that encompasses a reorder point and order-up-to a set level operating doctrine. The system allows alternative ordering for each part if demand and lead time require emergency backup and stock.

IBM's 1986 pre-implementation test led to changes that ensured later success. During 1987, implementation became a reality. Optimizer recommended stocking policies 20 to 25 percent below existing inventory and service levels – a potential inventory reduction of $500 million. Management decided to realize half this potential in cost savings, and half in improved service levels. Inventory was reduced by $250 million, but that still left room for some buffer stock to avoid stockouts and, hence, better service levels. The result was an operational savings of some $20 million per year, and a 10 percent improvement in parts available at the lower echelons.
To you and me, these results mean a decrease in downtime on our IBM computers. If they fail, we can expect the right parts to be available to us through our local customer service engineer. At the same time, operational savings should ensure IBM's competitive position in the marketplace and that could mean lower prices as well.

Required:

(i) Discuss any five causes of stock outs of inventories in organization. [10 marks]

(ii) What are the consequences of stockouts to an organization. [10 marks]

(iii) Explain any fie applications of the ABC analysis in the control and management of inventories. [10 marks]

(iv) Discuss the approaches that organization use to effectively manage inventories. [10 marks]

2. (a) One key factors in strategic capacity planning is capacity sharing. Discuss the disadvantages of capacity sharing using suitable examples. [10 marks]

(b) Designing a service system posses some special challenges that may not be encountered in designing production of a physical good. Discuss any five guidelines that assist in designing a service system. [10 marks]

3. (a) Small scale firms in Kenya have proved to be relatively inefficient in their operations although such firms are expected to be highly efficient for various

logistical reasons. Explain the factors that may account for inefficiency in such firms. [10 marks]

(b) A lot of time can be wasted during machine set up especially in the batch production system man-machine operational system. State and explain the ways by which this set up time can be minimized. [10 marks]

4. (a) Discuss the circumstances under which a manufacturing organization would choose to redesign its production process. [10 marks]

(b) Explain the various ways by which the operation manager may reduce the costs of plant maintenance. [10 marks]

5. (a) Explain the reasons that make operations managers choose to use mathematical models in decision making. [10 marks]

(b) Some organizations especially in the service sector have adopted a cellular or group production system. Give five reasons that may have led to the adoption of this production system. [10 marks]

6. (a) Discuss any five methods that organization use to increase the life of their products in the market. [10 marks]

(b) State and explain any five challenges that are associated with the fixed position plant layout systems. [10 marks]
