

EASTERN UNIVERSITY, SRI LANKA

FACULTY OF COMMERCE AND MANAGEMENT

FINAL YEAR SECOND SEMESTER EXAMINATION IN BACHELOR OF BUSINESS  
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MANAGEMENT/ SPECIALIZATION IN MARKETING MANAGEMENT/ B.COM  
SPECIALIZATION IN ENTERPRISE DEVELOPMENT 2007/2008 (MARCH 2009)

MGT 4214 OPERATION AND QUALITY MANAGEMENT

Answer All Questions

Time: 3 Hours

Q. 01

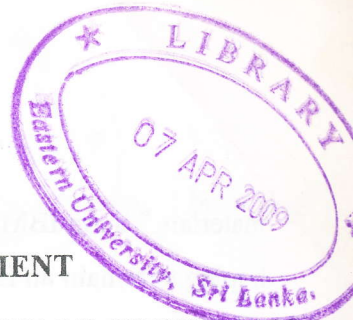
**TOTAL QUALITY MANAGEMENT AT SPECTRUM Inc.**

Spectrum Inc., was found in 1968 by Thomas L. Glenn L. and John R, three engineers who had met at Erie Technological Products Inc. in 16 years, the company grew from a Rs. 300, 000 start-up housed in an old hardware store to a solid, Rs. 22 million public company. Today, Spectrum has four manufacturing plants and some 1,500 customers. For the past three years, it has reported after-six returns of about 10 percent of sales.

In the early days, quality was not an issue. Thomas and Glenn designed and built Spectrum's sophisticated filters, while John marketed them. "There was not any point in making them wrong," Thomas said. But, as the company began to prosper and grow that kind of hands-on responsibility fell by the wayside.

Like most manufacturers Spectrum began to operate on the philosophy of acceptable-quality levels, or AQLs. The company regularly checked a sample of the product, then shipped the whole batch, so long as the number of bad units fell within accepted limits. If there were too many bad ones, the lot was rejected, or subject to 100 percent inspection, an expensive process.

Then, slowly, Spectrum's market place began to change. A Japanese company, Murata Manufacturing Co., purchased Erie Technological products with which Spectrum competed, and raised the specter of Japanese-style quality. Several of Spectrum's customers began to make noises about quality as well. "About two or three years ago," says Thomas, "Hewlett-Packard (HP) said that they were going to switch to the idea of 'zero defects - no defects in any inbound



materials." Soon IBM was joining the chorus—and implying, Thomas remembers, that a business hoping to remain an IBM supplier better begins thinking seriously about quality.

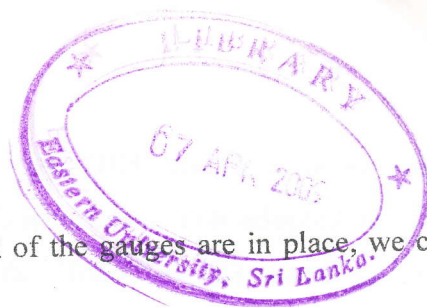
Thomas and other Spectrum managers began to examine likely strategies for attacking the newly discovered issue. They looked at some Japanese quality technique. They bought 40 copies of *Quality Is Free* by management consultant Philip Crosby, a book that IBM had been pushing and passed them out. They also bought and studied some videotapes featuring W. Edward Deming, the dean emeritus of statistical control of quality.

Thomas's plan was to use Crosby's *Quality Is Free* and routines to get things moving, then rely increasingly on Deming's techniques to control the process-modifying both whenever it seemed necessary, with approaches Spectrum's own design.

Some of the changes came easily, such as paying closer attention to customers' schedules. In the past, company had often shipped its components too early, and the customers simply shipped them back. The cost of such errors, says Thomas, was significant, particularly in the case of overseas deliveries—“Rs. 150 to Rs. 200 for shipping, and Rs. 300 for paperwork.” At the end of the pipeline, Spectrum installed new order-entry checking systems. “So we have seen tremendous improvement in our error rate there.”

For the most part, though, the improvements come slowly. Changing the habits and attitudes of Spectrum's workers was hard enough. But a systematic approach to quality involved the company's vendors and customers as well. Here the bushings were manufactured by three screw machine suppliers, inspected by Spectrum, sent to a plating vendor, and, once plated, inspected again. At that late date in the process, some 50 percent were rejected.

The solution, however, did not succeed to prevent product rejections. Only after endless hours of brainstorming and conferences with suppliers did Weunski hit on a strategy. During the initial inspection, he realized, Spectrum employed gauges that indicated only when bushings exceeded the correct dimension of the finished product; not until later, after another layer of metal had been added in plating, did other problems show up. So Weunski ordered Rs. 7000 worth of new gauges, one set to measure the raw bushing and another to measure the plated one, and donated duplicate sets of gauges to his vendors. “Before,” he says, “we would probably have put the burden of buying the gauges on them. Now, the attitude is much more cooperative.” And the



early results, he adds, are dramatic. "When all of the gauges are in place, we could be talking about a *doubling* of productivity."

Then there was the matter of Department Number Nine at the Electromagnetic Division, which produces, among other things, shielded windows. Although Number Nine already had been wrestling with the issues, Spectrum's quality initiative pushed it to take some radical steps, such as changing vendors.

Department Number Nine supervisors have also become aggressively receptive to suggestions from line personnel. "No one is really an expert except the person who's out there building that window," Ley concedes. "One of their suggestions actually increased our productivity by something like 50 percent."

Overall, there are few people, processes, or products that have not in some way been affected by Spectrum's quality movement. There is now a vendor-selection committee, for example, and the number active suppliers has been trimmed by 8 percent. The company is also more demanding of customers. When it felt that one client's specifications for a filter used in the B-1 bomber were unattainable, it said so, and lost the work, but promptly got it back when the competitor that got the job discovered that the unit could not be built as designed. Not even the company's outside directors have escaped the reeducation process: Thomas recently asked several of them to attend Crosby's Quality College. Believing that employees should have a fiscal, as well as a psychological, incentive to get involved in the program, Thomas earmarked about half of the savings realized for the company's profit-sharing plan.

1. What factors led Spectrum to undertake a total quality management program? (4 Marks)
2. Identify and describe the major components of Spectrum's TQM program. (6 Marks)
3. What role did employee training and education play in Spectrum's TQM program? (4 Marks)
4. Advise the Board of Spectrum the issues needed to create a quality culture within Spectrum. (8 Marks)
5. Discuss the relevant quality related methodologies available to Spectrum to achieve quality other than TQM. (6 Marks)

**(Total 28 Marks)**

**Q. 02**

1. Differentiate value-added services from core services?

(4 Marks)

2. What are the costs associated with quality?

(4 Marks)

3. You are the production manager of a new small company that has developed a new product using a labour intensive production process. You have been asked to explain your calculation of the labour time required for the budgeted output. In your calculations, you anticipated that the time taken for the first unit would be 40 minutes and that a 75% learning curve would apply for the first 30 units.

(a) Explain the concept of the learning curve and compare it with experience curve.

(b) Calculate the expected time for the 6th unit of output.

(c) Discuss the applications of the learning curve for the company given above.

Note: The learning index for a 75% learning curve is  $-0.415$ .

(10 Marks)

**(Total 18 Marks)**

**Q. 03**

1. A company purchases single inventory item with an e-mail ordering cost of Rs. 200, carrying cost rate of 20% of the cost of the item, and an annual demand of 100,000 units. Further information is given below:

<u>Order size</u>	<u>Cost per unit</u>
0 to 4,999 units	Rs. 50.00
5,000 to 9,999 units	Rs. 45.00
10,000 and up	Rs. 39.00

What quantity should be ordered to optimize cost? Justify your answer with relevant calculations and suggestions.

(6 Marks)

2. State the importance of capacity decisions.

(4 Marks)

3. You are the consultant of Healthy Hospital (HH) which is located in Batticaloa. The Board of HH recently heard that the businesses which adopted lean philosophy have made great success. Therefore, now the Board of HH wants to implement such a philosophy in Healthy Hospital businesses as well. But they do not have adequate knowledge about lean and its applicable areas in a service business like HH. You are required to provide the applications of lean philosophy in HH.

(8 Marks)

(Total 18 Marks)

Q. 04

1. List out the reasons to outsource an activity of a production organization? (4 Marks)
2. Differentiate made-to-stock and made-to-order and explain which of these facilitates more to just-in-time? And how? (4 Marks)
3. The following tasks must be performed on an assembly line:

Task	Seconds	Tasks that must precede
A	20	-
B	7	A
C	20	B
D	22	B
E	15	C
F	10	D
G	16	E,F
H	8	G

The workday is seven hours long. Demand for completed product is 750 per day.

- a) Draw the precedence diagram and find the cycle time?
- b) What is the theoretical number of workstations?
- c) Balance the line using sequential restrictions and the longest-operating-time rule.
- d) What is the efficiency of the line balanced as in c)?



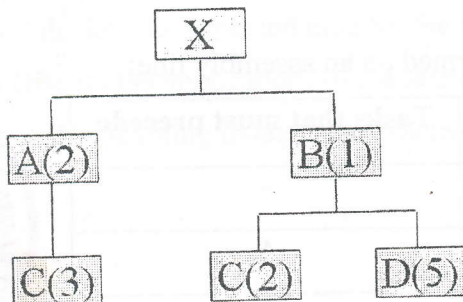
- e) Suppose that demand rose from 750 to 1000 units per day. What would you Show any amounts or calculations.

(10 Marks)

(Total 18 Marks)

**Q. 05**

- 1) What is meant by Ergonomics? And explain the need of it to a production organization? (4 Marks)
- 2) What is meant by Waste in Toyota Production System? And explain the waste reduction techniques used by Toyota production system. (5 Marks)
- 3) The following information was given by the Honda Company's Purchasing Department about material and components required.



Item	Lead Time (Weeks)
X	2
A	3
B	1
C	2
D	2

Requirements include 112 units of X in week 10

- a) Calculate the needed materials for each item.
- b) Prepare a material requirement plan for X.
- c) Calculate net requirements for each item of materials if you have the following amounts of stock On-Hand.

Item	On-Hand
X	50
A	75
B	25
C	10
D	20

(9 Marks)

(Total 18 Marks)