UNIVERSITI SAINS MALAYSIA
Master of Business Administration

First Semester Examinations
Academic Session 1998/99

August/September 1998

AGW617 - OPERATIONS STRATEGY

Time: [3 hours]

Instructions:
Please ensure that this examination paper contains FOUR (4) printed pages before you begin.

Answer Question 1 and any 3 (THREE) others.

1. For the GE's case given at the end of this paper answer the following questions:

   a. What factors in the product development process caused this disaster? Which individuals were responsible?

   b. How might this disaster have been prevented? What lessons do you think GE has learned for the future?

   c. On what basis was GE attempting to achieve a competitive advantage? How did they fail?

   (40 marks)

2. a. "Operations can play two roles in corporate strategy – it can provide *support* for the overall strategy of a firm, and it can serve as a firm's *distinctive competencies.*" Explain.

   b. Strategic decisions in operations involve the following:

   - Product and services,
   - Processes and technology,
   - Capacity and facilities,
   - Human resources,
   - Quality,
   - Sourcing, and
   - Operating systems.

2/...

Briefly discuss the various strategic issues for any THREE (3) of the above.

(20 marks)

3. a. The Hosha Electronics Company has been receiving a lot of customer complaints and returns of a front-loading video cassette recorder (VCR) that it manufactures. When a video-tape is pushed into the loading mechanism, it can stick inside with the door open; the recorder cannot run, and it is difficult to get the tape out. Consumers will try to pull the tape out with their fingers or pry the tape out with an object such as a knife, pencil, or screwdriver, frequently damaging the VCR, tearing up the tape cartridge, or hurting themselves. What are the different costs of poor quality and cost of quality assurance that might be associated with this quality problem?

(10 marks)

b. Hosha has always purchased a certain component part from a supplier for RM50 per part. The supplier is reliable and has maintained the same price for years. Recently improvements in operations and reduced product demand have cleared up some capacity in Hosha own plant for producing component parts. This particular part could be produced at RM40 per part, with an annual fixed investment of RM25,000. Currently Hosha needs 300 of these parts per year.

i. Should Hosha make or buy the component part?
ii. Would your decision change if Hosha demand increased to 2,000 parts per month?

(10 marks)

4 a. What does cellular layout attempt to achieve? What are its advantages?

(10 marks)

b. A final assembly plant for Dictatape, a popular dictation company, produces the DT, a hand-held dictation unit. There are 400 minutes available in the final assembly plant for the DT, and the average demand is 80 units per day. The final assembly requires six separate tasks as follows:

TASK	PERFORMANCE TIME (min)	PREDECESSOR(S)
A	1	-
B	1	A
C	4	A, B
D	1	B, C
E	2	D
F	4	E

What tasks should be assigned to various workstations, and what is the overall efficiency of the assembly line?

(10 marks)

3/...

5. B&B Electronics, a supplier in the telecommunications industry, has a problem. Demand is down but competitive pressure for better quality, at a reduced price are up. Customers who used to order in large lots with plenty of lead-time now want daily deliveries of small quantities. Contracts use terms such as "statistical evidence of quality" and "just –in-time delivery". More and more customers are requiring supplier certification with standards that B&B cannot meet. Plant manager Mr. Weng has to take action.

"If JIT is good enough for our customers, it's good enough for us," he declared, and called in one of his managers, Mr. Sambu.

"Mr. Sambu, I can always rely on you to get us out of a jam, so don't let me down this time. I want you to implement JIT on the circuit board assembly line. Create a success story to show other employees how great this JIT stuff is. You've free rein ... not much money, but free rein to change anything you want in the system. Oh, and I want some results by next month."

"Okay, boss," replied Mr. Sambu shakily. "What's your philosophy on JIT? I mean what do you consider its most important points?"

"My philosophy? JIT is cutting inventory, squeezing your suppliers, and using those kanban card things. My philosophy is just do it!"

"I get the picture," said Mr. Sambu as he retreated to his office to study up on JIT.

a. What do you think of the plant manager's view of JIT?

b. If you were Mr. Sambu, how would you go about the task ahead of you? What parts of JIT would you try to implement first? Last? Why?

(20 marks)

4/...

CASE:
GENERAL ELECTRIC (GE) ROTARY COMPRESSOR[1]

In 1981, market share and profits for GE's appliance division were falling. The company's technology was antiquated compared to foreign competitors. For example, making refrigerator compressors required 65 minutes of labor in comparison to 25 minutes for competitors from Japan and Italy. Moreover, GE's labor costs were higher. The alternatives were obvious: Either purchase compressor from Japan or Italy or design and build a better model.

By 1983, the decision to build a new rotary compressor in-house was made, along with a commitment for a new USD 120 million factory. GE was not a novice in rotary compressor technology; it had invented the technology and had been using it in air conditioners for many years. A rotary compressor weighed less, had one-third fewer parts, and was more energy efficient than the current reciprocating compressors. The rotary compressor took up less space, thus providing more room inside the refrigerator and better meeting customer requirements.

Some engineers argued to the contrary, citing the fact that rotary compressors run hotter. This is not a problem in most air conditioners because the coolant cools the compressor. In a refrigerator, however, the coolant flows only one-tenth as fast, and the unit runs about four times longer in one year than an air conditioner. GE had problems with the early rotary compressors in air conditioners. Although the bugs had been eliminated in smaller units, GE quit using rotaries in larger units due to frequent breakdowns in hot climates.

GE managers and design engineers were concerned about other issues. Rotary compressors make a high pitched whine, and managers were afraid that this would adversely affect consumer acceptance. Many hours were spent on this issue by managers and consumer test-panels. The new design also required key parts to work together with a tolerance of only 50 millionths of an inch. Nothing had been mass-produced with such precision before, but manufacturing engineers felt sure they could do it.

The compressor they finally designed was nearly identical to that used in air conditioners, with one change. Two small parts inside the compressor were made out of powdered metal, rather than the hardened steel and cast iron used in air conditioners. This material was chosen because it could be machined to much closer tolerances, and it reduced machining costs. Powdered metal had been tried a decade earlier on air conditioners but did not work. The design engineers who were new to designing compressor did not consider the earlier failure important.

A consultant suggested that GE consider a joint venture with a Japanese company that had a rotary refrigerator compressor already on the market. The idea was rejected by management. The original designer of the air conditioner rotary compressor, who had left GE, offered his services as a consultant. GE declined his offer, writing him that they had sufficient technical expertise.

About 600 compressors were tested in 1983 without a single failure. They were run continuously for two months under elevated temperatures and pressures that were supposed to simulate five years' operation. GE normally conducts extensive field testing of new products; its original plan to test models in the field for two years was reduced to nine months due to time pressure to complete the project.

The technician who disassembled and inspected the parts thought they did not look right. Parts of the motor were discolored, a sign of excessive heat. Bearings were worn, and it appeared that high heat was breaking down the lubricating oil. The technician's supervisors discounted these findings and did not relay them to upper levels of management. Another consultant who evaluated the test results believed that something was wrong because only one failure was found in two years and recommended that the test conditions be intensified. This suggestion was also rejected by management.

By 1986, only two and a half years after board approval, the new factory was producing compressors at a rate of ten per minute. By the end of the year, more than 1 million had been produced. Market share rose and the new refrigerator appeared to be a success. But in July 1987, the first compressor failed. Soon after, reports of other failures in Puerto Rico arrived. By September, the appliance division knew it

[1] SOURCE: James Dean and James Evans, *Total Quality (St. Paul: West Publishing, 1994) pp 256-257*

had a major problem. In December, the plant stopped making the compressor. Not until 1988 was the problem diagnosed as excessive wear in the two powdered-metal parts that burned up the oil. The cost in 1989 alone was USD 450 million. By mid-1990, GE had voluntarily replaced nearly 1.1 million compressors with ones purchased from six suppliers, five of them foreign.

-oooooOOooooo-