

UNIVERSITI SAINS MALAYSIA
First Semester Examinations
Academic Session 1999/2000

September 1999

AGW617 OPERATIONS STRATEGY

Time: [3 hours]

Instructions:

Please ensure that this examination paper contains 4 printed pages before you begin.

Answer Question 1 and any 3 (THREE) others.

1. Read the case given at the end of this paper, and answer the following questions.

- a. What action would you recommend to the Board of ICC?
- b. How would ICC go about making a strategic decision such as this?
- c. Do you recommend that ICC go ahead with the MBA program? Why or why not.

(40 marks)

2a. Explain the strategic role played by inventory in supporting the operations strategy. What are some of the possible reasons for an organization to maintain inventory?

(10 marks)

2b. Consider the following two items that you have in stock.

	Item A	Item B
Annual demand	500	5000
Price of the item	RM5,000	RM10
Ordering cost	RM250	RM25
Holding cost	5%	2%
Lead time	20 weeks	5 weeks
Demand rate	highly uncertain and fluctuating	constant

Assume that there are 50 weeks in a year.

- i. For each of items A and B, determine the economic order quantity, reorder level, and the maximum number of outstanding orders at any one time.
- ii. For each of the items above, you have the option of using either a fixed-order quantity policy or a fixed-period policy. Which inventory policy would you use for each of the item? Why?

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- iii. Suppose for item B, the weekly demand is normally distributed with a standard deviation of 5 unit. What is the safety stock level required to guarantee a 90% service level?

(Note: The Economic order quantity model is given as follows:

$$EOQ = \sqrt{\frac{2C_o D}{C_h}} \text{ where } C_o = \text{Cost of Ordering; } C_h = \text{cost of holding; and } D = \text{annual demand}$$

$$\text{Safety Stock} = z \cdot \sigma_L \text{ where } \sigma_L = \text{standard deviation of total demand during lead time}$$

(10 marks)

- 3a. BBMB Credit Card Center has a toll-free, 24-hour customer service number. Describe the input and the final product. What quality related costs might be associated with this function, and how might a quality management program impact this area?

(10 marks)

- 3b. Raja Properties (RP), a real estate development company, is considering several alternative development project – building an leasing an office park, purchasing a parcel of land and building an office building to rent, buying and leasing a warehouse, building a shopping center, and building and selling condominiums. The financial success of these projects depends on interest rate movement in the next 5 years. These projects and their financial return (in million of RM) given that the interest rates will decline, remain stable, or increase are shown below.

Project	Interest rates		
	decline	stable	increase
Office park	0.5	1.7	4.5
Office building	1.5	1.9	2.4
Warehouse	1.7	1.4	1.0
Shopping centre	0.7	2.4	3.6
Condominiums	3.2	1.5	0.6

- i. Determine the best investment if
- RP is very optimistic?
 - RP is very pessimistic?
- ii. If it known that the probabilities of interest rates will decline, remain stable or increase are 0.3, 0.5 and 0.2 respectively, what will be the best project? What is the value of perfect information regarding the interest rates movement?

(10 marks)

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4a. List five or more objectives of a facility layout decision. Briefly explain how does this choice of layout support the competitive priorities of the firm.

(10 marks)

4b. Professional Briefcases is an exclusive producer of handcrafted, stylish briefcases. It prides itself on its reputation and assembles each case with care and attention to detail. This laborious process requires six work elements as shown below.

Work element	Predecessor	Performance time (minutes)
A: Tan leather	-	30
B: Dye leather	A	15
C: Shape case	B	10
D: Mold hinges and fixtures	-	5
E: Install hinges and fixtures	C,D	10
F: Assemble case	E	10

- i. Draw and label a precedence diagram for the production process.
- ii. If the demand is 50 cases per 40-hour week, compute the cycle time for the process.
- iii. Compute the lead time required to assemble one briefcase.
- iv. How would you balance this line?
- v. Compute the line efficiency and balance delay.
- vi. Calculate the theoretical minimum number of workstations. Can a better arrangement be determined?

(10 marks)

5a. Some researchers argue that Just-in-Time (JIT) is a philosophy whilst some others would argue that JIT is an integrated management system. Briefly comment on both these perspectives of JIT.

(10 marks)

5b. JIT systems can be seen to be composed of the following elements:

- i. Flexible resources
- ii. Cellular layout
- iii. Pull production system
- iv. Kanban production control
- v. Small-lot production
- vi. Quick setups
- vii. Uniform production levels
- viii. Quality at source
- ix. Total productive maintenance
- x. Supplier networks

For any two of the above elements, provide a brief explanation as to what each element is and its impact.

(10 marks)

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**CASE:
WITHER AN MBA AT INTERNATIONAL EDUCATION CENTRE (ICC)**

International Computer Centre is a small private computer school located near Kulim, approximately 30 km from Penang and about 40 km from Sungai Petani. As with most institution of higher learning, ICC's costs are rising, and its enrollments are decreasing. In an effort to expand its student base, build valuable ties with the businesses in the area, and simply survive, the Board of ICC is considering establishing an MBA program.

Currently, no undergraduate degree is given in business, although business courses are taught. The director of ICC visualizes the MBA as an inter-disciplinary program emphasizing problem solving, communication and global awareness. The faculty expertise would be supplemented by instructors from local industry. The use of such faculty would better connect the university with the business community and provide opportunities for employment of the program's graduates.

In terms of competition, Unviersiti Sains Malaysia (USM) in Penang, and Universiti Utara Malaysia (UUM) in Sungai Petani offer MBA program. Penang, also host a number of private educational institutions offering an MBA program, such as those by Management Institute of Management (MIM) and Frontier Management. These private educational institutions offer MBA programs by twinning with foreign universities. Both USM and UUM are major state-funded institutions. ICC hopes that government cutbacks and perceptions of overcrowded classrooms and overworked professors at public institution will open the door for a new entrant into the market. The Board of ICC also feels that the centre's small size will allow ICC to tailor the MBA program more closely to the area business needs.

Several members of the Board are concerned about recent reports of the dwindling value of an MBA and are wondering if a better niche could be found with another graduate degree, perhaps a masters of science in business or something in the education or health-care field.

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