



**UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF CHEMICAL AND BIOENGINEERING
TECHNOLOGY**

**FINAL EXAMINATION
OCTOBER 2025 SEMESTER**

COURSE CODE	: CCB40402
COURSE NAME	: MANAGEMENT AND MARKETING FOR CHEMICAL ENGINEERS
PROGRAMME NAME	: BACHELOR OF CHEMICAL ENGINEERING WITH HONOURS
DATE	: 25 JANUARY 2026
TIME	: 09.00 AM – 12.00 PM
DURATION	: 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read CAREFULLY the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper contains a total of FOUR (4) questions. Answer ALL questions.
4. Answer ALL questions in English language only.
5. Please write your answers on the answer booklet provided.

THERE ARE 5 PAGES OF QUESTIONS AND APPENDICES, EXCLUDING THIS PAGE.

(Total: 100 marks)

INSTRUCTION: Answer ALL questions

Please use the answer booklet provided.

QUESTION 1

(a) The AIDA model is a classic marketing model that describes the stages a customer goes through before making a purchase. It's a useful framework for understanding how marketing and advertising can influence consumer behaviour.

i. Describe the stages represented by the acronym AIDA in the context of marketing.

(12 marks)

ii. Identify **ONE (1)** advantage of employing the AIDA model.

(1 mark)

(b) Different schemes can be introduced by sellers to encourage customers to purchase their products, especially those customers who have shown a positive disposition to the products sold by marketers. For each of the following, examine how the scheme is implemented, using appropriate examples.

i. Early-bird discounts

(3 marks)

ii. Free trials

(3 marks)

iii. One-on-one offers

(3 marks)

iv. Referral systems

(3 marks)

QUESTION 2

- (a) One of the bases for market segmentation is demographics, which can be further divided into several subcategories. Identify **FIVE (5)** subcategories under demographic segmentation and give **TWO (2)** examples of products or services available in the market for each subcategory.

(15 marks)

- (b) In marketing, a differentiation strategy is the process of distinguishing a product or service from others to make it more attractive to a particular target market. The goal of differentiation is to create a perceived difference in the minds of consumers. While there are six primary bases for differentiation, identify any **FIVE (5)** and provide **ONE (1)** example for each.

(10 marks)

QUESTION 3

- (a) A manufacturing process at Samuel Manufacturing Corp. is displayed in Figure 1. The drilling operation occurs separately from and simultaneously with the sawing and sanding operations. The product only needs to go through one of the three assembly operations (the assembly operations are “parallel”).

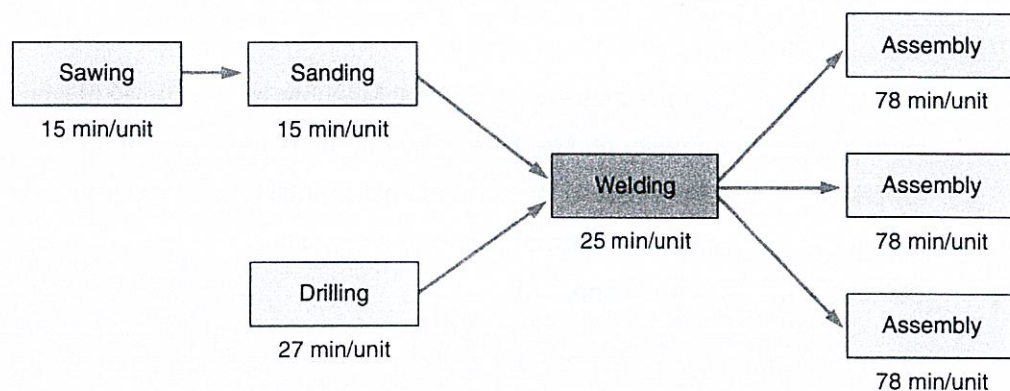


Figure 1. A process flow for a manufacturing process at Samuel Manufacturing Corp.

- i. Define a bottleneck in throughput accounting.
(2 marks)
 - ii. Identify which operation is the bottleneck for the process shown in Figure 1.
(3 marks)
 - iii. The throughput time is defined as the time it takes for a unit to go through production from start to end, with no waiting. Based on this definition, determine the throughput time for the overall system.
(3 marks)
 - iv. Determine the monthly capacity of the manufacturing process, if the firm operates 8 hours per day, 22 days per month.
(3 marks)
 - v. Suppose that a second drilling machine is added, and it takes the same time as the original drilling machine. Determine the new bottleneck time of the system.
(2 marks)
- (b) A company manufactures a single product, which is processed in turn through three machines: Machine type A, Machine type B and Machine type C. The current maximum output capacity per week for the existing machinery is as follows:

Machine type A: 1,800 units/week

Machine type B: 1,600 units/week

Machine type C: 1,500 units/week

The company could purchase an additional Machine type C for \$8 Million which would increase output capacity on Machine C by 600 units per week. It could also purchase an additional Machine type B that would cost \$5 Million and increase output capacity by 300 units per week. An increase in output capacity is worth (in present value terms) \$50,000 per unit of additional output.

Determine whether the company should buy only one or both the additional machines. Show calculations, if any.

(12 marks)

QUESTION 4

Malaya Dairy Industries (MDI) has expanded its production to include four lines: UHT Chocolate Milk (CM), Cultured Milk Drinks (CD), Premium Durian Ice Cream (IC), and Organic Greek Yogurt (GY). All four products must pass through the Flash Sterilization Unit, which is the company's only bottleneck.

Table 1. Material costs, selling prices, and units per bottleneck hour for products manufactured by Malaya Dairy Industries (MDI).

Product	UHT Chocolate Milk (CM)	Cultured Milk Drinks (CD)	Premium Durian Ice Cream (IC)	Organic Greek Yogurt (GY)
Material Cost (RM/unit)	1.50	0.80	13.50	4.00
Selling Price (RM/unit)	4.50	2.20	18.00	9.00
Units per Bottleneck Hour	2000	3500	500	1000

Total operating expenses (labor, utilities, and rent) are RM 32,000 per day.

- (a) Calculate the throughput per unit for each product.
(3 marks)
- (b) Calculate the total daily profit if the factory produces 8,000 units of CM, 15,000 units of CD, 1,000 units of IC, and 4,000 units of GY.
(4 marks)
- (c) Calculate the throughput accounting ratio (TPAR) for each of the four products.
(12 marks)
- (d) In the absence of demand restrictions, provide **THREE (3)** recommendations to Malaya Dairy Industries' management on the optimal production plan.
(6 marks)

END OF EXAMINATION PAPER

Appendices:

$$TPAR = \frac{\text{Throughput per factory hour}}{\text{Operating costs per factory hour}}$$

$$\text{Operating costs per factory hour} = \frac{\text{Total factory costs}}{\text{Total units of bottleneck resource}}$$