

**PGDM, PGDM-IB, 2020-22**  
**Logistics & Warehousing Management**  
**DM-441/IB-441**  
**Trimester – IV, End-Term Examination: September 2021**

Time allowed: 2 Hrs 30 Min  
Max Marks: 50

Roll No: _____
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**Instructions:** Students are required to write Roll No on every page of the Answer Sheet. Attempt all questions. Internal choices are given within.

**Section A (30 Marks)**

**A1.** Discuss uncertainty as it relates to the overall logistical performance cycle. Discuss and illustrate how performance cycle variance can be controlled? [5 marks] (CILO 1)

**A2.** Compare and contrast speed, consistency, and flexibility as operational performance activities. In some situations, is one activity more critical than others? [5 marks] (CILO 1)

**A3. (a)** In what ways can customer service performance be improved by incorporating flexible distribution operations into a logistical system design? [5 marks] (CILO 2)

**<OR>**

**A3. (b)** What is the difference between minimum total cost and short-range profit maximization policies in system design? [5 marks] (CILO 2)

**A4.** A museum of natural history opened a gift shop two years ago. Managing inventories has become a problem. Low inventory is squeezing profit margins and causing cash flow problems. One of the top selling items in the container group at the museum's gift shop is a bird feeder. Sales are 18 units per week, and the supplier charges Rs 60 per unit. The cost of placing an order with the supplier is Rs 45. Annual holding cost is 25 per cent of a feeder's value, and the museum operates 52 weeks per year. Management chose a 390-unit lot size so that new orders could be placed less frequently.

- (a) What is the annual cost of the current policy of using a 390-unit lot size?
- (b) Calculate EOQ and its total cost.
- (c) How frequently the orders be placed if the EOQ is used?
- (d) If we mistakenly calculate the inventory holding cost to be Rs 30/unit/year, what is the new order quantity? How much is the percentage change from the old EOQ of 75 units?
- (e) With this new order quantity how much is the total cost?

[2\*5=10 marks] (CILO 1)

**A5. (a)** Seven economic drivers that influence transportation cost were presented. Select a specific product and discuss how each factor will impact determination of a freight rate. [5 marks] (CILO 3)

**<OR>**

**A5. (b)** Illustrate the relationship between the size and shape of a distribution warehouse and the materials handling system. Why do some warehouses have square design while others are rectangular?

[5 marks] (CILO 3)

### Section B: Case Study (20 Marks)

Dream Beauty (DB) Company is a manufacturer of consumer beauty supplies and cosmetics. Based out of Money City, Nevada, the company services its customers across the U.S. Recently, a supply chain expert was elected to the board of directors. With his insight into supply chain operations, heightened attention was turned toward that area. The costs in this area have been increasing, and management became very concerned about the issue. The company annual sales reached \$1 30,000,000 for the first time since inception. Management believed that some of the increase in supply chain costs may be attributed to additional sales, but they were confident that other factors existed that needed to be addressed. The situation had management's full attention, especially since supply chain costs (and savings for that matter), flow directly to the bottom line.

DB supplies its products through three distinct channels: retail stores (direct), convenience stores, and mass merchants. Each channel is considered an independent profit center with full financial responsibilities for income statement and balance sheet. From DB sales, retail accounted for 50 percent, convenience stores for 30 percent, while mass merchants picked up the remaining sales. Cost of goods sold accounted for 40 percent of sales. All three channels seem to be profitable, and contribute equally to DB, according to the company's cost accountant. The order fulfilment cycle at DB consists of four areas:

	<b>Total Cost</b>
Order Processing	\$10,000,000
Packaging	8,000,000
Labeling	2,000,000
<u>Delivery</u>	<u>\$30,000,000</u>
<b>Total Supply Chain-Related Costs</b>	<b>\$50,000,000</b>

The total order fulfilment averages 3 days. All orders are processed through a central location, and delivered from distribution centers located across the U.S. Usually retail and convenience store orders are shipped unlabelled on standard non mixed pallets. Mass merchants, on the other hand, have placed a lot of pressure on DB and want the company to take an active role in helping them manage their inventory. To accommodate this channel, DB has assumed some of the jobbers' functions in the store and started labeling the orders for mass merchants. To accomplish that, the company recently purchased a labeling machine that can process labels at a speed of 30 labels/second. The machine's historical value was determined to be \$10,000,000. The company usually depreciates similar equipment on a straight-line basis over a period of 5 years.

The company has a discount policy for all three channels that it services. The net is due in 30 days. While this policy is explicitly stated on all DB's invoices, retail stores are the only ones that pay according to invoice terms. Mass merchants usually pay within 15 days, while convenience stores usually pay within 45 days. The company's cost accountant reported that all sales were sold on credit. Cash sales and C.O.D. sales were rare; therefore, they can be ignored for the purpose of this analysis. DB does not engage in any barter transactions.

The company received a total of 3,600 orders. Retail orders amounted to 1,000; convenience stores to 2,500; and mass merchants had 100 orders. Each order has a corresponding delivery that is usually completed within the 3-day fulfilment cycle. The company's practice has been to allocate logistics-related costs to its three channels based on their relative percentage of sales volume. The orders were shipped in 2,000 packages, with retail accounting for 800 packages, convenience stores for 1,100 packages and mass merchants for 100 packages. Packaging cost is estimated to be the same regardless of size. To service these orders, the

company has maintained an inventory safety stock so that it can meet the level of service that it promises its customers (the 3-day fulfilment cycle). It is estimated that the company holds an average of 90 days' inventory for retail, 60 days' inventory for convenience stores, and 40 days' inventory for mass merchants. The company's cost accountant estimated the total carrying costs of inventory to be approximately 15 percent of total average annual inventory. These costs also include the cost of capital. The company's customer base in convenience stores includes 13 different stores located in major U.S. cities. Table 1 provides a breakdown of sales per store, as well as the number of orders, and packages for each store.

<b>Store Name</b>	<b>Sales</b>	<b>Orders</b>	<b>Packages</b>
Love Your Style	\$5,000,000	300	50
Looking Good	\$1,500,000	75	10
Wild by Nature	\$3,000,000	200	100
Beautyss Bliss	\$10,000,000	450	150
Cosmo Naturelle	\$3,500,000	60	30
Beautee Fatale	\$1,000,000	100	100
La Belle Femme	\$5,000,000	200	20
Le Beau Monsieur	\$2,500,000	320	200
Fruity Beauty	\$1,500,000	120	120
Tuti Fruity	\$2,000,000	250	200
L'Air Du Jour	\$1,000,000	150	75
Make-up Galore	\$2,000,000	175	10
Nuttin' Homely	\$1,000,000	100	35

Historically, DB has offered its customers a level of service that is of the highest standards. One of the fulfilment managers has been quoted, "We do not discriminate between customers; our 3-day fulfilment cycle in my opinion is becoming an industry benchmark, and I like it that way. I do not think that our strategy should change in that regard." The board has some second thoughts about this strategy, and what type of value-added it is generating to the company. On your first day, you get accustomed to your surroundings, and you become familiar with the computer system. On your second day, the vice president for supply chain (and your hiring manager) comes up to you. He proceeds to brief you on a high-level meeting that he just concluded with the top brass at the company. He states that management wants to know why supply chain costs seem skewed, as well as a full analysis of the three logistical channels that the company employs. Management would like you to answer the following questions:

1. Analyze the way that current costs are being allocated; what potential changes can you recommend to make the system more efficient and more accurate? (CILO 3)
2. What is the profitability level and return on investment by distribution channel, both under the current and the recommended allocations? (CILO 3)
3. What are your recommendations regarding the company policy of offering all its customers the same service level (3-day fulfilment cycle)? (CILO 1)

Note: The company's cost of capital for both borrowing and lending can be estimated at 9 percent. Ignore tax effects on all transactions.

[7+7+6 = 20 Marks]

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