nd C), each at three
atrons. The library
eractions BX C is
p an appropriate
(16)

of TQM relevant to
(2 + 6 = 8)

th functioning of a
(8)

process for a Hotel
(4 + 12 = 16)

G 6282

M.E. DEGREE EXAMINATION, MAY/JUNE 2007.

Second Semester

Industrial Engineering

IE 1654 — SUPPLY CHAIN MANAGEMENT

(Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How supply chain processes can be broken down into four process cycles?

2. How a company achieves strategic fit between its supply chain strategy and its competitive strategy?

3. Identify major drivers of supply chain performance.

4. Identify managerial levers that reduce lot size and cycle inventory in a supply chain, without increasing cost.

5. Explain how a reduction in lead-time can help a supply chain to reduce safety inventory, without hurting product availability.

6. Identify the role of E-business in a supply chain in terms of transactions over the Internet.

7. What is the bullwhip effect, and how does it relate to lack of coordination in the supply chain?

8. How gravity location model is used in facility network design?

9. What modes of transportation are best suited for large, low-value shipments, why?

10. What is collaborative planning, forecasting and replenishment?

PART B — (5 × 16 = 80 marks)

11. (a) Present six different network structures available for designing transportation networks and discuss strengths and weaknesses for each option.

Or

(b) Compare the following methods used for routing and scheduling in transportation :

(i) The savings matrix method

(ii) The generalized assignment method.

12. (a) (i) Explain the different types of Internet B2B exchanges used for E-procurement and how do they improve the supply chain performance?

(ii) How CPC and PDM are used in product design and how they enhance the time to market?

Or

(b) A manufacturer of printing inks has five manufacturing plants world-wide (P1, ..., P5). The plants capacities and cost of producing per ton of ink at each facility are shown in the following table. The major markets for the inks are (M1, ..., M5), with the demands at each market as shown in the table. Transportation costs from each plant to each market are also shown in the following table.

Plants/Markets	Transportation cost per unit ($)					Capacity	Production
	M1	M2	M3	M4	M5	Tons/Year	Cost/Ton (1000s of $)
P1	6	12	13	20	17	185	10
P2	13	14	6	14	13	475	15
P3	20	21	14	3	9	50	18
P4	12	8	14	21	21	200	13
P5	22	23	13	10	8	80	40
Demand tons/year	220	190	200	120	100		

Management has to come up with a production plan, deciding how much each plant should produce and which markets should each plant supply. (No plant can run below 50 percent of capacity)

Present an appropriate Mathematical Model.

What is forward buying in a retail supply chain?

The DD-super market chain sells Nut flakes, a popular cereal manufactured by the M/s TC Company. Demand for nut flakes is 1000 boxes per week. M/s DD has holding cost of 25% and incurs a fixed trucking cost of $ 200 for each replenishment order it places with TC. Given that TC normally charges $ 2 per box of nut flakes, how much M/s DD should order in each replenishment lot?

TC runs a trade promotion lowering the price of nut flakes to $ 1.80, for a month. How much should the DD to order, given the short-term price reduction?

Or

(b) Weekly demand for ABC cellular phones at M/s BB store is normally distributed with a mean of 300 and a standard deviation of 200. M/s ABC takes 2 weeks to supply a BB order. M/s BB is targeting a cycle service level of 95% and monitors its inventory continuously. What level of safety inventory of cellular phones should BB carry? What should its reorder point be?

The store manager has decided to follow a periodic review policy to manage inventory of cellular phones. She plans to order every three weeks. Given a desired cycle service level of 95%, how much safety inventory should the store carry? What should its order-up to level be? (Consider Z value at CSL 95% = 1.645).

(a) Identify the factors affecting the optimal level of product availability. How do you arrive at optimal cycle service level for seasonal items and for continuously stocked items?

Or

(b) (i) Briefly explain the tradeoffs among transportation cost, inventory cost, and customer responsiveness.

(ii) Present a network optimization model for minimizing the total cost of facilities, transportation and inventory while deciding on factory locations and allocating demand to the open factories. State assumptions made in the model.

15. (a) State how each supply chain driver uses information and how different information technologies that are used in a supply chain have changed overtime?

Or

(b) List obstacles to coordination in a supply chain and how various managerial levers increase total supply chain profit?
