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(Do not write anything on question paper except Roll No.)
[This paper consists of FOUR Pages]

Jagan Institute of Management Studies
End-Term Examination, September-October, 2017
Trimester IV – PGDM 2016-18

Supply Chain Management
ET_PG_SCM_0310

Time: 3 Hrs.   *M. Marks: 70*

INSTRUCTIONS: Attempt any FIVE questions including Q1 & Q7 which are compulsory.

Q 1   Attempt any **FOUR** of the following:

a) What are the various design options for a distribution network? Explain the "Manufacturer Storage with direct Shipping" or "Retail storage with customer pick up".

b) Various strategies of Capacity expansion.

c) Discuss the various Internet Technologies and Electronic Commerce in SCM.

d) Explain i) Material Handling Equipment, ii) Reverse Logistics and JIT iii) 3PL and 4PL logistics.

e) Explain i) Milk Run ii) Hub and Spoke iii) RFID

f) The forecast for five years for two types of books being published are as follows:

	Demand of books ('000) Year wise				
	1	2	3	4	5
X	420	570	750	900	1100
Y	915	1815	2715	3165	3555

Publishing of Book X takes place on a machine 'P' of which two are available. The production rate is 4,50,000 of Book X per machine. The labour requirement is 2 per machine. The Book Y is published on machine 'Q' of which 4 are available. The production rate is 7,50,000 of Book Y per machine. The labour requirement is 3 per machine. Project labour and machine requirement for the next 5 years.   **16**

Q 2   The information regarding the sale of books at one of Amazon's outlets, for the 4 quarters for the past 3 years is as follows:

Year	Quarter	Sale of Books ('000)
2013	**Qtr 1**	8
	Qtr 2	43
	Qtr 3	77
	Qtr 4	17

2014	Qtr 1	13
	Qtr 2	46
	Qtr 3	75
	Qtr 4	24
2015	Qtr 1	14
	Qtr 2	50
	Qtr 3	87
	Qtr 4	26

a) Explain the interdependence of Forecasting and Planning in SCM. How important is it in reducing demand uncertainty? **4**

b) Decompose the time series data according to a multiplicative model $Y = T \times S$ and forecast for the next four quarters of the next year. **8**

Q 3 The management at Amazon has given you the following details of one of the suppliers. The supplier has asked you to make an aggregate plan for them to plan production for full year for its plant that will publish new set of books:- The demand forecast is spring 20,000, summer 10,000; fall 15000; winter 18000. At the beginning of spring they have 70 workers and 1,000 units in inventory. The union contract specifies that you may lay off workers only once a year, at the beginning of summer. Also, you may hire new workers only at the beginning of fall to begin regular work in the fall. The workers in fall shall continue to work till the end of winter. The number of worker laid off at the beginning of summer and the number hired at the beginning of fall should result in planned production levels for summer and fall that equals the demand forecasts for summer and fall, respectively (i.e. demand is met in summer and fall) If demand exceeds supply, use overtime in spring only. No overtime in winter. Which means that backorders could occur in winter? You are given these costs; hiring, $100 per new worker; layoff, $200 per worker laid off; inventory holding, $20 per unit-quarter; straight-time labor, $10 per hour; overtime, $15 per hour; backorder, $8 per unit. Productivity is 0.5 unit per worker hour (i.e 1 unit in 2 worker hour), eight hours per day, 50 days per quarter. Find the total cost of this plan. (Separate Aggregate Planning sheets are enclosed which may be attached/stapled with the Answer sheets)? **12**

Q 4 a) What are the various costs involved in inventory management. What is P-type and Q-type inventory management system? **4**

b) A book publisher sells books to Amazon it has found that for this particular book a) its demand is 27000 books per annum and is uniformly distributed over the year, b) its cost price is $ 50 per unit, c) its ordering cost is $ 50 per order, d) the inventory carrying cost is 9% per annum of the average dollar inventory. The Number of Working **4**

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days is 300 in a year and the lead time by is 2 days. Determine i) The economic ordered quantity (EOQ) ii)The total cost with the policy of ordering an amount equal to EOQ. iii) No. of orders iv) Time period between orders v) daily demand rate vi) ROL. {Formulas EBQ = $\sqrt{(2D*C_o/C_h)}$, Total Cost;- $(D*C)+(D*Co/Q)+(\frac{1}{2}*Q*C_h)$)).

c) Amazon has ordered from publisher particular books whose demand is at 2500 books annum. The book costs $ 30. The holding cost is $ 4 per unit per annum. The setup cost for the machine which publishes this book is estimated to be $ 250 per setup. The annual production rate of the machine is estimated to be 4800 units. Lead Time=2 days, Number of Working Days= 300 days, Analyze the Inventory system.{Formulas EBQ = $\sqrt{(2D*C_o/C_h)}(p/(p-d))$, Total Cost;- $(D*C)+(D*Co/Q)+(\frac{1}{2}*Q*C_h(1-(d/p))$, time period of production run= $t_p=Q/p$, Maximum Inventory Level = $t_p*(p-d)$}. **4**

Q 5 a) Explain the factors that determine the Location of facility in a Supply Chain. If Amazon wants to open its retail outlet for books; what factors do you think would be more important? **6**

b) Of the 4V's of operation, "volume" and "variety" are most important. Explain. Explain the various "process types" and "layout types" in an operations unit. Why do you think is it important decision in supply chain? **6**

Q 6 a) Explain the various Transportation Modes available to Amazon India; the pros and cons of the mode. What mode they would use in case they send books from there warehouse in Bangalore to i) 20 books to Delhi Canada ii) One Container of books to London (in bulk). **6**

b) Explain Warehouse operations, strategic storage, warehouse functionality, Warehouse operating principles, decisions, selection, developing warehouse resources. **6**

Q 7 Read the case and answer the questions given at the end.
Amazon.com sells books, music and other items over the internet and is one of the pioneers of consumer e-business. Amazon, based in Seattle, started by filling all orders using books purchased from a distributor in response to customers order. This practise defers from that of a traditional bookstore, which usually purchased directly from publishers and stocks books in anticipation of customer orders. Today, Amazon has six warehouses where it holds inventory. Amazon stocks best- selling books, though it still gets other titles from distributors of publishers. It uses the US postal Services and other package carriers such as UPS and Fedex to send books to customers.

Amazon has continued to expand the set of products that it sells online. Besides books and music, Amazon has added many product categories such as toys, apparel, electronics, jewellery and shoes. After several years of losses, Amazon has been profitable since 2003.

Several brick-and-mortar players including traditional booksellers such as Borders and Barnes & Noble have also started selling using the internet channel. Banns & Noble has setup Barnes&Noble.com as a separate company, whereas Borders uses Amazon to fulfil its online orders after initially trying to operate an online business. In the case of Barnes & Noble, the retail store and online supply chains share warehousing in transportations to some extent. This is a departure from the company's original strategy, when Barnes& Noble.com was not visible in any Barnes & Noble bookstore.

Questions:

a)   Explain the Drivers of SCM to management of Amazon and at least two metrics for anyone of the drivers.

b)   Explain to the Management of Amazon the **recent trends** in the supply chain management.

c)   i) Why is Amazon building more warehouses as it grows?
ii) What advantage and disadvantage does selling books via the internet provide over the traditional bookstore?
iii) Should Traditional Booksellers like Barnes and Noble integrate E-Commerce into their current supply chain or manage it as a separate supply chain.   **18**

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