Time allowed: 2.5 Hours

Max Marks: 50

Roll No: _____

Instruction: Students are required to write Roll No on every page of the question paper, writing anything except the Roll No will be treated as **Unfair Means**. In case of rough work please use answer sheet.

Sections	No. of Questions to attempt	Marks	Marks
A	3 out of 5 (Short Questions)	5 Marks each	3*5 = 15
B	2 out of 3 (Long Questions)	10 Marks each	3*10 = 20
C	Compulsory Case Study	15 Marks	15
		Total Marks	50

SECTION A

Q1. Containerization and Multi – modal transportation is supplementing forces and has transformed the transportation methodologies adopted by firm. Comment?

Q2.
1. Suppose we know the following, the average number of SKUs in the pipeline is 102.5; the throughput of the supply chain system is 67.5 SKU per day. How long a SKU stay in the pipeline?
2. Little's Law and can be applied in any system in which the mean waiting time, mean line length (or inventory size), and mean throughput (outflow) remain constant. Discuss?

Q3. Differentiate between ECR and QR approach in managing demand driven supply chain?

Q4. Records show that the demand for dishwasher detergent during the lead time is normally distributed, with an average of 250 boxes and demand (σ) = 22. What safety stock should be carried for a 99 percent cycle-service level? What is R, when lead time is 1 week (z at 99% service level is 2.33)?

Q5. Why variability of aggregated demand is lower than total variability of individual demands? It is considered that warehouse is a "necessary evil". Give your comment on this statement?

SECTION B

Q1. "The connections between industry activities within a chain can be described along a continuum extending from the market, characterized by "arm's-length" relationships, to hierarchical value chains illustrated through direct ownership of production processes. Between these two extremes are three network-style modes of governance: modular, relational, and captive-Discuss?

Q2. "As the dynamics of supply chain and consumer demand patterns change, CPFR needs to adjust accordingly. There have been signs that in the retail industry the dominance of the biggest players increases and the supply chain becomes more complex. This has implications to the suppliers that are often fragmented into numerous different smaller suppliers" suggest what are the next steps for CPFR?

Q3.

A. Consider the case of the distributor and owner of retail chain stores of white-line goods in NCR which orders from manufacturer and sells to retailers also. He is trying to evolve inventory model for its chain of refrigerators. Its cost of placing order comes to Rs. 40000 which is independent of its order size. The average cost of refrigerators to distributors is Rs. 15000 and annual inventory cost holding cost is about 15% of the product cost. Replenishment time is about 4 weeks. We are providing the sales data for refrigerators sold to retailers in each of last 12 months, ensuring 98% service level. Please set the ROL and Ordered quantity they must order.

Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug
210	252	180	220	187	260	251	298	196	209	198	256

[$z = 1.90$ at 98% service level]   Calculator can be used.

B. M/s Steel India Ltd. is trying to evolve its modern trade business by forward integrating into retail format. It has four stage supply chain (given below). Following are the abstract from the MIS of the company's supply chain department. Its average weekly demand is 45 with a standard deviation of 32. At each stage of supply chain they are trying to maintain service level of 97% (z value 1.80), That the lead time between each stage is 1 week, its fixed cost pertaining to ordering is given in the table below, also its carrying cost for each unit each week is also depicted in the table. Please help in developing the multi stage inventory control policy by determining the quantity to be ordered and the reordering point.

Stages	Ordering cost	Carrying cost	Average demand
Retailer	200	1.2	45
Wholesaler	250	.50	45
Distributor	340	.9	45
Manufacturer	520	.8	45

SECTION C

Case study: ZeST—Distribution and supply chain innovation.

In 1983, 18-year-old Michael ZeST left college to work full-time for the company he founded as a freshman, providing hard-drive upgrades to corporate customers. In a year's time, ZeST's venture had $6 million in annual sales. In 1985, ZeST changed his strategy to begin offering built-to-order computers. That year, the company generated $70 million in sales. Five years later, revenues had climbed to $500 million, and by the end of 2000, ZeST's revenues had topped an astounding $25 billion. The meteoric rise of ZeST Computers was largely due to innovations in supply chain and manufacturing, but also due to the implementation of a novel distribution strategy. By carefully analyzing and making strategic changes in the personal computer value chain, and by seizing on emerging market trends, ZeST Inc. grew to dominate the PC market in less time than it takes many companies to launch their first product.

Disintermediation:

ZeST started out as a direct seller, first using a mail-order system, and then taking advantage of the Internet to develop an online sales platform. Well before use of the Internet went main-stream, ZeST had begun integrating online order status updates and technical support into their customer-facing operations. By 1997, ZeST's Internet sales had reached an average of $4 million *per day*. While most other PCs were sold preconfigured and pre-assembled in retail stores, ZeST offered superior customer choice in system configuration at a deeply discounted price, due to the cost-savings associated with cutting out the retail middleman. This move away from the traditional distribution model for PC sales played a large role in ZeST's formidable early growth. Additionally, an important side-benefit of the Internet-based direct sales model was that it generated a wealth of market data the company used to efficiently forecast demand trends and carry out effective segmentation strategies. This data drove the company's product development efforts and allowed ZeST to profit from information on the value drivers in each of its key customer segments.

Virtual integration:

On the manufacturing side, the company pursued an aggressive strategy of "virtual integration." ZeST required a highly reliable supply of top-quality PC components, but management did not want to integrate backward to become its own parts manufacturer. Instead, the company sought to develop long-term relationships with select, name-brand PC component manufacturers. ZeST also required its key suppliers to establish inventory hubs near its own assembly plants. This allowed the company to communicate with supplier inventory hubs in real time for the delivery of a precise number of required components on short notice. This "just-in-time," low-inventory strategy reduced the time it took for ZeST to bring new PC models to market and resulted in significant cost advantages over the traditional stored-inventory method. This was particularly powerful in a market where old inventory quickly fell into obsolescence. ZeST openly shared its production schedules, sales forecasts and plans for new products with its suppliers. This strategic closeness with supplier partners allowed ZeST to reap the benefits of vertical integration, without requiring the company to invest billions setting up its own manufacturing operations in-house.

Innovation on the assembly floor:

In 1997, ZeST reorganized its assembly processes. Rather than having long assembly lines with each worker repeatedly performing a single task, ZeST instituted "manufacturing cells." These "cells" grouped workers together around a workstation where they assembled entire PCs according to customer

specifications. Cell manufacturing doubled the company's manufacturing productivity per square foot of assembly space, and reduced assembly times by 75%.

ZeST combined operational and process innovation with a revolutionary distribution model to generate tremendous cost-savings and unprecedented customer value in the PC market.

Q1. Highlight the key lessons from the story of ZeST's incredible rise?

Q2. What type of supply chain model is depicted by this case? Highlight the operational intricacies of this case while answering the former part of the question?

Q3. Identify the governance model of this value chain and suggest the determinants of this model? Also recommend the next possible shift in the identified model based on the determinant identified by you?