Time allowed: 2 Hrs 30 Min
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.** All other instructions on the reverse of Admit Card should be followed meticulously.

There are **two sections**. From **Section A**, attempt any three questions (3*10 marks) out of any 5 questions. **Section B** is based on a case study and is compulsory. Attempt both of the questions given at the end of a case study (20 marks).

Section A (30 Marks)

1(a) Define Supply Chain Management integration and describe strategies involved in SCM integration. (CO1)

1(b) Why Vendor Managed Inventory (VMI) is recognized as an effective strategy for combating irregularities in the supply chain? (CO3)

2(a) Describe four distinct phases of benchmarking for Supply chain management. (CO1)

2(b) Discuss how batch ordering contributes to words increase in variability in the supply chain. (CO1)

3. Which is more important Inbound or Outbound logistics in a supply chain? Justify with suitable examples. (CO2)

4 (a) Explain Push-Pull Supply Chain System. Why is it called an Ideal Mix? (CO2)

4 (b) What are the advantages of using Bar-Code and scanning systems in Retail Industry? Describe the activities included in Reverse Logistics. (CO1 &2)

5. National Solar Mission aspires to establish India as a global leader in solar energy. But challenges are quite high. The mission depends on use of various electronics related equipments and costly material like silicon, have been significantly dependent of China. But due to recent development factors, make-in-India programme is making efforts and attracts the solar energy based investment flows in the country from other Asian and European markets.

A German based manufacturer produces solar panels, to illustrate the power of the decision tree analysis methodology for designing global supply chain networks while accounting for uncertainty. D-Solar faces a plant location decision in a global network with fluctuating exchange rates and demand uncertainty.

Please Turn Over

The company sells its products primarily in Europe. Demand in the Europe market is currently 100,000 panels per year and each panel sells for €70. While panel demand is expected to grow, there are some downside risks if the economy slides. From one year to the next, demand may increase by 20 percent with probability 0.8 or decrease by 20 percent with probability 0.2.

The company has to decide whether to build a plant in Europe or India. In either case, the company plans to build a plant with a rated capacity of 120,000 panels. The fixed and variable costs of the two plants are shown in the following Table.

European Solar Plant		Indian Solar Plant	
FC	VC	FC	VC
1 Million / Year	40/ Panel	80 Million / Year	340/ Panel

Observe that the fixed costs are given per year rather than as a one-time investment. The European plant is more expensive but will also have greater volume flexibility. The plant will be able to increase or decrease production anywhere in the range of 60,000 to 150,000 panels while maintaining its variable cost. In contrast, the Indian plant is cheaper (at the current exchange rate of 86 Rs./euro) but will have limited volume flexibility and can produce only between 100,000 and 130,000 panels. If the Indian plant is built, the company will have to incur variable cost for 100,000 panels even if demand drops below that level and will lose sales if demand increases above 130,000 panels. Exchange rates are volatile, and each year the India is expected to rise 10 percent with a probability of 0.7 or drop 10 percent with a probability of 0.3.

You assume that the sourcing decision will be in place over the next three years and the discount rate used by the company is $k= 0.1$. All costs and revenues are assumed to accrue at the beginning of the year, allowing us to consider the first year as period 0 and the following two years as periods 1 and 2. (CO1, 2 & 3)

(a) Evaluating the Options Using DCF and Expected Demand and Exchange Rate. If required, you may make relevant assumptions.

(b) Also provide a list of your ideas for making global supply chain design decision under uncertainty in practice.

Section –B (20 Marks)

Read the following case study on Supply Chain Management and answer the questions given at end of the Case. **(CO1, 2 & 3)**

The Nuts and Dry fruit is the world's biggest producer of dried fruits and a little over a decade ago, found that while it was managing distribution operations well, high production costs were inflating end-to-end supply chain expenditure. When the leadership at company looked into the company's production cost issues, recognition soon dawned that the distribution network was at least partly behind the problems. As a result, the company looked at how it could redesign the network to take out some of the production costs.

Please Turn Over

Later, it became apparent that although a redesign would yield some benefits, one of the most significant issues was in the approach to demand forecasting. The company was using a manual forecasting approach, with spreadsheets being the only technology involved. The inefficiencies of this approach proved not only to hamper effective forecasting and production planning, but the knock-effect was an excess of warehouses in the network—so forecasting proved to be both a driver of production cost, and a key to improving the distribution network.

As in a number of the studies on supply chain management and its design, technology played a large part in solving Nuts and Dry fruit's problems. After evaluating some 30 different software solutions, the company finally settled on a supply chain planning suite, and planned its improvement program to make use of each of the solution's modules in sequence, allowing ROI to be realized in phases as each module was implemented and leveraged.

At the same time, Nuts and Dry fruit implemented a sales and operations planning program (S&OP) that once established, enabled plant resource requirements to be anticipated months—rather than weeks—in advance. As the overall improvement plan passed through its five phases, positive results accumulated and as hoped, software ROI reached 100% even before the company completed its full implementation.

Of course, the objective of Nuts and Dry fruit's improvement program was not merely to achieve a 100% return on investment in its supply chain planning platform. Here, the aim was to reduce production costs, and although the company hasn't published hard figures to quantify the total financial gain, it has claimed the following wins:
- A 15 to 20% increase in forecasting accuracy
- A reduction in overtime from 25% to 8% in production facilities
- A 30% reduction in finished-goods spoilage
- Number of warehouses in the United States cut from 28 to just eight
- A transportation cost-per-unit that remained static for two years despite increased utilization of costly refrigerated transport and rising fuel costs

Based on the above case of Nuts and Dry fruit, answer the followings questions
1. How company tackled the challenges of Supply Chain Cost Reduction?
2. Comment on company's path to cost reduction.
3. Comments on warehousing and transportation cost in this case.
4. Identify significant SCM elements in the case. What kind of strategy for effective SCM would you suggest to the company?

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