

PGDM, 16-18

Supply Chain Management (DM-404)

Trimester-IV, End Term Examination, September 2017

Time allowed: 2 hr 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**. In case of rough work, please use answer sheet.

Section A: Short answer questions (Five marks each. Attempt any three; total marks 15)

- A1. Your competitive strategy demands that you have a highly responsive supply chain. What implications does this have for the three logistical drivers of the supply chain? State just one point for each of the three drivers.
- A2. One of the implications of the recently implemented GST regime in India is that postponement and delayed differentiation, both of which require the final configuration of the product closer to points of consumption, has become easier to implement. State two advantages of postponement and delayed differentiation.
- A3. The cycle service level (CSL) is set by a company as a policy. What factors need to be considered for setting the CSL? For any number of ordering cycles, the CSL will likely be lower than the item fill rate (IFR). Why?
- A4. In what way can improper incentives lead to a lack of coordination in a supply chain? What countermeasures can be used to offset this effect?
- A5. Mattel, the famous toy manufacturer, has to plan 'single period inventory management' for most of its toy models. Mattel has historically allowed toy retailers to place two orders, with an interval of two months, for the holiday shopping season. Mattel is considering allowing retailers to place only one order. What impact will this have on retailer orders? What impact will this have on supply chain profits?

Section B: 10 marks each. Attempt any 2; total marks 20

- B1. Croma is an Indian retail chain for consumer electronics. The company currently has 25 stores located in major metropolitan areas. Weekly demand for smartphones at each store is normally distributed, with a mean of 300 and a standard deviation of 300. The supplier currently takes four weeks to fulfil a replenishment order, which is placed separately by each store. Croma is targeting a CSL of 95% and monitors its inventory continuously.
 - a. How much safety inventory of smartphones should Croma carry at each retail store? (2 marks)

- b. Croma is considering moving smartphones to the online channel, where they would be stored in a single national warehouse. Assume that there is no loss of demand because of this move. How much reduction in safety inventory can Croma expect from going online if demand across stores is independent? (4 marks)
- c. How much reduction in safety inventory can Croma expect from going online if demand across any pair of stores has a correlation coefficient of $\rho = 0.5$? (4 marks)
- B2. Weekly demand for gaming consoles at Liverpool, a Mexican department store chain, is normally distributed with a mean of 1,000 and a standard deviation of 400. The replenishment lead time from the supplier is four weeks. Liverpool is targeting a CSL of 95 percent and uses a periodic review policy under which it reorders consoles every eight weeks.
- a. How much safety inventory of consoles should Liverpool carry? (4 marks)
- b. What should its order up to level be? (3 marks)
- c. How much safety inventory would be required if Liverpool switched to a continuous review policy? (3 marks)
- B3. A retailer is contemplating to place order for fashion items for the coming season. To avail bulk discount the retailer plans to order only once for the entire season which lasts for barely three months. The average retail selling price of a garment is Rs. 1500 per unit. The wholesale price paid by the retailer to the concerned manufacturer is Rs. 900 per unit. Unsold stock can be disposed off at the end of the season at a discount store for Rs. 250 per unit. The manufacturer incurs a fixed production cost of Rs. 2,40,000 for the order and a variable production cost of Rs. 600 per unit. All other costs are not considered.

From the past experience the retailer estimates the demand to be:

Sr. No.	Demand in units	Probability
1.	1000	0.15
2.	2000	0.15
3.	3000	0.20
4.	4000	0.30
5.	5000	0.20

- a. Below what quantity would it not make sense for the manufacturer to accept an order? (2 marks)
- b. What is the mean or expected demand? (1 mark)
- c. Given the data in this question, what is the critical ratio for the retailer? How much quantity should the retailer order to maximize its expected profitability? (3 marks)
- d. Mention two ways in which the overall profitability (total supply chain profitability) can be increased in this case? (2 marks)
- e. If the manufacturer offers to buy back the unsold garments from the retailer for Rs. 450 per unit, what would be the new critical ratio for the retailer? How much should the retailer order now? (2 marks)

Section C: Case study; 15 marks

Amazon India increased the area under its fulfilment centres by 60% to 4 million sq ft in the first quarter of 2017 from a year ago by opening seven new warehouses.

The US-headquartered retailer opened new fulfilment centres in Telangana, Haryana, Maharashtra, Madhya Pradesh, Uttar Pradesh and Andhra Pradesh at a time when rival Flipkart raised another \$1.4 billion amid the continuing battle over market share.

During the earnings call at the end of the quarter, Amazon CEO Jeff Bezos said that the marketplace is one of the fastest-growing platforms in India. "The team has increased Prime selection by 75% since launching the programme nine months ago, increased fulfilment capacity for sellers by 26% already this year..." he said.

Amazon India plans to double the capacity at its Ahmedabad warehouse and expand its fulfilment centre in Delhi six fold to meet the increased requirement from these regions.

The marketplace, which had announced setting up of seven warehouses dedicated to handling sale of large appliances and furniture in April, said that the new fulfilment centres will be operational by June. This raises the overall number of centres run by Amazon India to 41, with 14 additions this year, compared to Flipkart's 31 warehouses.

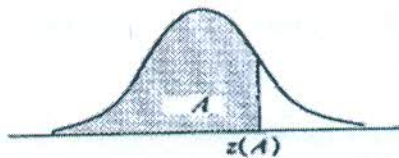
Flipkart had earlier this year announced setting up of 10 new fulfilment centres focused on storing and handling bulky goods, as it chases high margin and high average sale price categories, especially large appliances and furniture.

"We have seen the number of sellers on 'Fulfilled by Amazon' going up. We are moving to a larger facility in Delhi due to the growth in the number of orders," said Akhil Saxena, vice-president, customer fulfilment at Amazon India.

- a. Amazon started its e-retail business with few large centrally located warehouses. What was the competitive strategy of Amazon at the beginning when it started e-retail operations? What was the corresponding supply chain strategy? To answer this, think about the implied uncertainty in the demand for the items sold online at that time. (3 marks)

- b. How did Amazon use the logistical drivers of supply chain in achieving the supply chain strategy referred to in part a? (4 marks)
- c. Over the years, Amazon's fulfillment centres have increased manifold. What would have been the reason for this change in strategy? How has Amazon's supply chain strategy changed? Why? (4 marks)
- d. Bulky items like furniture and large appliances have unique implications for supply chain management. They occupy more space, require careful handling, and are not easy to return. Delivery of such items has to be scheduled according to the convenience of the customer. How would these implications impact the level of service and the relevant supply chain costs? Explain. (4 marks)

Entry is area A under the standard normal curve from $-\infty$ to $z(A)$



z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998