PGDM (16-18)

Logistics & Warehousing Management

DM – 442 / IB – 416

Trimester – IV, End-Term Examination: September 2017

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.** 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	2*10 = 20
C	Compulsory Case Study	15 Marks	15
		Total Marks	**50**

SECTION A

A1. **What** role are warehouse operators playing in postponement strategies? [5 marks]

A2. **Dunkin'** Donuts joined many other service providers by centralizing its manufacturing. **Donut** making in a geographical area is now done centrally for many stores, and the **donuts** are trucked to stores in the early morning. Imagine the decision of the **franchisee**: jelly-filled, sprinkle doughnuts cost $0.10 from the central facility, and sell for **$0.60 each**, and demand past 10 days has been 50, 38,27,45,62, 44, 44, 29,31,39. Day **old donuts** are thrown out (hopefully). How many donuts should be ordered? [5 marks]

A3. **There** are seven economic drivers that influence transportation cost. Select a specific product and discuss how each factor impacts determination of a freight rate.
[5 marks]

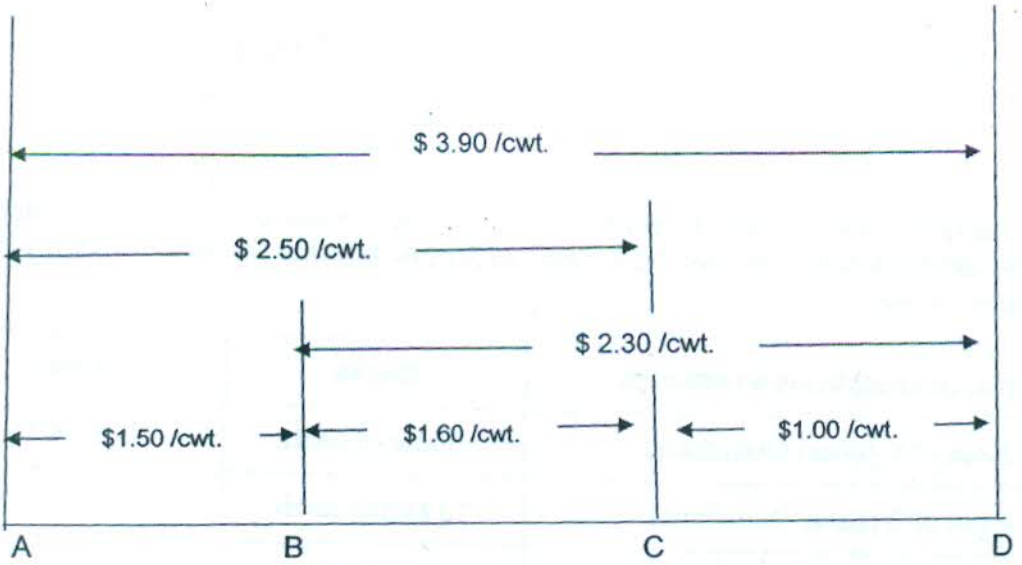
A4. Income at agricultural firm Nuziveedu Seeds Limited for the period February to July was as follows:

Month	February	March	April	May	June	July
Income (in $thousand)	70.0	68.5	64.8	71.7	71.3	72.8

Use trend adjustment exponential smoothing to forecast the firm's August income. Assume that the initial forecast average for February is $65,000 and the initial trend adjustment is 0. The smoothing constant selected are $\alpha = 0.1$ and $\beta = 0.2$
[5 marks]

A5. Hilton is working as a transportation manager in a MNC firm. He has two options in scheduling a truck to make multiple pickups and deliveries. The pickup-delivery problem is shown pictorially in the figure below. Hilton can ship the accumulated volumes as

single shipments between the designated points or can use the stop-off privilege at $ 34 per stop for any or all portions of the trip ***(including destination D)***. Hilton wishes to minimize shipping costs, therefore, as a consultant you have to suggest a best route to minimize the cost. Assume that the final destination point incurs the stop-off charge.



Origin –Load 25000 lb for C and D	Pick up 15,000 lb for C	Drop off 18,000 lb from A or B	Final Destination Drop off 22,00 lb from A

1 Hundredweight (cwt.) = 100 pound (lb.)

[5 marks]

SECTION B

B1. Grace Greenberg, production planner for Science and Technology Labs, in Florida, has developed material requirement planning schedule for eight weeks.

Period (weeks)		1	2	3	4	5	6	7	8
Order Size (Units)		200	650	100	450	750	600	600	300
Scheduled receipt					?				
Quantity on Hand (Ending)	1250	1050	400	300					
Planned purchase order releases									

Annual demand = 2600 units per year
Carrying cost = 30% per year
Year = 365 days / 52 weeks
Production downtime cost = $ 185 per day per unit
Item Price = $ 42 per unit
Purchase order preparation cost = $ 120 per order
Purchase lead time = 1 week

Lead time is normally distributed with an average of 21 days and a standard deviation of 5 days.

a. How much time should be allowed of scheduled receipt for the release of orders?

b. In a period 4, a scheduled receipt is needed to maintain safety inventory of 250 units. Using part period cost balancing technique, what is the economic order release size?

[10 Marks]

B2. The Blue Berry Inc. supplies air-cooling systems to Mitchell distributor Inc. on a delivered-price basis. Blue Berry Inc. has the responsibility for providing transportation. The transportation manager has three transportation service choices for delivery – Ocean, rail and truck. He has compiled the following information.

Transport Mode	Transit Time (Days)	Rate $/Unit	Shipment Size, Units
Ocean	15 Days	$15.00	1000 Units
Rail	7 Days	$ 18.00	700 Units
Truck	3 Days	$ 30.00	500 Units

Mitchell distributor purchases 10, 000 units per year at a delivered contract price of $200 per unit. Inventory-Carrying cost for both companies is 35 percent per year.

a. Which mode of transportation should Blue Berry Inc. select? [4 marks]

Further, Blue Berry Inc. is opening a new plant in Orlando, Florida. Ron Lane, distribution manager, has been asked to find the lowest cost outbound logistics system. Given an annual sales volume of 30,000 air-cooling systems, determine the costs associated with each option below.

b. Build a private warehouse near the plant for $350,000. The variable cost, including warehouse, maintenance and labor, is estimated at $7 per unit. Contract carrier transportation costs $15 per unit on average. No external transportation services are necessary for shipment of air-cooling systems from the plant to the warehouse in this scenario. The fixed warehouse investment can be depreciated evenly over 8 years. [1.5 marks]

c. Rent space in a public warehouse 11 miles from the plant. The public warehouse requires no fixed investment but has variable costs of $ 12 per unit. Outbound contract carrier transportation would cost $14.50 per unit on average. The carrier at charges $7 per unit to deliver the air-cooling systems to the warehouse from the plant. [1.5 marks]

d. Contract the warehousing and transportation services to the Tracxn Logistic Company, an integrated logistics firm with a warehouse location 20 miles from the plant. Tracxn requires a fixed investment of $175,000 and charges $ 18 per unit for all services originating at the plant. The fixed investment covers a 12-year agreement with Tracxn. [1.5 marks]

e. Name a few advantages aside from cost that the low-cost alternative above may have over the other alternatives.

[1.5 marks]

B3. There are six operational objectives that are prime determinants of logistical performance. Select one of the six objective, and provide an example of how a firm will develop logistics competency to achieve this objective. [10 marks]

SECTION C

Mr. Stan has recently finished a course in logistics management and now realizes that there are significant costs linked with ordering and maintaining inventory at the warehouse. Mr. Stan oversee the distribution of sports watch in India and Europe. In India, the annual demand of sports watch was 2000 units and they were sold to retail customers. Mr. Stan was uncertain how many sports watch should he order at any time. There are two cost associated with sports watch: order-processing cost, which is $ 60 per order without regard to size, and the warehousing costs, which is $1 per year per unit. This means Mr. Stan had to rent a constant amount of warehouse space for the entire year. Mr. Stan was not concerned about the maintaining safety stocks, because the outward flow of sports watch was so even.

i. Consider that all conditions of EOQ model hold, except that Mr. Stan' suppliers offers a quantity discount in the form of absorbing all or part of Mr. Stan 's processing costs. If order size is 750 or more units, the supplier will absorb all the order processing costs, for orders between 249 and 749 units, the suppliers will absorb half. What should be the order size? [4 Marks]

ii. Suppose the average purchase lead time for purchase of sports watch from the manufacturer is normally distributed with an average of 14 days and standard deviation of 2 days. The cost for delaying the shipment is $ 50 per day for each sports watch that is not available when needed. If sports watch arrive ahead of the schedule, Mr. Shan has to incur holding cost of $5 per unit per day. How much time should be allowed ahead of scheduled receipt of the sports watch? [3 marks]

iii. In Europe, Mr. Shan sells sports watch in many retail outlets. Typical total sells for all the retail outlets are projected to be 1,50,000 units per year. The selling price of sports watch is $120 per unit, however the retail outlets will offer a $ 6 discount if a buyer will place a special order of at least 15,000 units. The buyers' carrying cost is 25 percent per year and the cost to prepare purchase order is $60 per order. Transportation cost are already included in price.

   a. What should be the special order size if the buyer accept the discount? [2 marks]

   b. If the special order is placed, how long will the order size need to be held in inventory? [2 marks]

iv. Mr. Hilton, a local store owner at Scotland, realized that sale of sports watches in his store follow the following pattern: 25% of the days, 90 are sold; 45% of the days, 100 are sold; and the remaining days, 110 are sold. If 100 are stocked each day by Mr. Hilton, what demand fill rate is the Mr. Hilton targeting? [4 marks]

Table 1: Table of the Standard Normal Cumulative Distribution Function $\Phi(z)$

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.4	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
-3.3	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003
-3.2	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
-3.1	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007
-3.0	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
-0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998