**Group Assignment/Project (10 Marks)**

**Course: Supply Chain Simulations and Heuristics (MSOM188L)**

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| **Instructions:**  i. Each question (Q.1 and Q.2) carries 5 marks.  ii. This is a group assignment. So, each answer to be submitted in group through LMS/Email in separate files. **Maximum number of students in group should not exceed 12.**  iii. Each Student’s name (along with their email ids) to be mentioned in the answer sheet file  iv. Answer to Q1 to be essentially submitted in excel sheet. For Q.2, each important step (along with calculation) to be mentioned/described either in excel/word file. (Further instruction will be given during the class scheduled on 30th & 31st April)  iv. Submission deadline: **15th April 2021**  v. Members in each group should coordinate with each other and contribute collectively for given assignment works  vi. Written submission has 50% weightage and rest 50% weightage on viva/presentation.  vii. Presentation for each group will be conducted between **15th April to 22nd April.** Slot of the same will be communicated in 2nd week of April. |

**Q.1** Suppose that the demand for a medicine is governed by the following discrete random variable:

|  |  |
| --- | --- |
| **Demand** | **Probability** |
| 5000 | 0.20 |
| 15000 | 0.15 |
| 20000 | 0.35 |
| 50000 | 0.30 |

The medicine sells for Rs 120 and the variable cost of producing each medicine is Rs 80. Leftover medicine must be disposed of at a cost of Rs 40 per unit.

1. Simulate each possible production quantity (5,000, 15,000, 20,000, or 50,000) at least 100 times and determine order quantity that yields the maximum average profit over the 100 iterations (Create a two way data table)
2. Analyse the risk of taking decision for selected production quantity (Hint: Calculate mean and standard deviation of profits for all given production quantity)
3. Calculate the mean profit at 95% level of confidence.

**2. Case (Global Supply Chain Network Design for Short Life Cycle Product)**

Consider the case of a simplified version the PCC supply chain as described in the figure. The supply chain involves manufacturing disks and motherboards, assembling PCs and shipping them to the North American Market. The firm is trying to make location decisions for each of the three manufacturing locations. Relevant data for the problem are presented in Table. Measure the time and cost element in the chain and take appropriate decision.

**Production cost (Value Added) and Lead time data**

|  |  |  |  |
| --- | --- | --- | --- |
| **Product/Component** | **Location** | **Production Lead Time (PLT) in weeks** | **Value Added (VS in US$)** |
| PC Box | Canada | 2 | 50 |
| PC Box | Taiwan | 1 | 35 |
| Disk | Malaysia | 3 | 50 |
| Disk | Germany | 2 | 68 |
| Mother board | Mexico | 3 | 150 |
| Mother board | China | 2 | 130 |

**Transportation time and Transportation cost**

|  |  |  |  |
| --- | --- | --- | --- |
| **Component/Subassembly** | **Origin to Destination** | **Transportation Time (TLT) in weeks** | **Transportation Cost (TCST in US$)** |
| PC Box (PB) | Canada-USA | 1 | 8 |
| PC Box | Taiwan-USA | 3 | 20 |
| Disk (DK) | Malaysia-Canada | 2 | 7 |
| Disk | Malaysia-Taiwan | 1 | 4 |
| Disk | Germany-Canada | 2 | 5 |
| Disk | Germany-Taiwan | 1 | 3 |
| Mother board (MB) | Mexico-Canada | 1 | 5 |
| Mother board | Mexico-Taiwan | 2 | 10 |
| Mother board | China-Canada | 3 | 13 |
| Mother board | China-Taiwan | 1 | 5 |

**PC Supply Chain**

**PC BOX ASSEMBLY (Canada or Taiwan)**

**MOTHERBOARD (Mexico or China)**

**DISK (Malaysia or Germany)**

**MARKET (USA)**