**PRODUCTION PLANNING PROBLEM**

A company is making a single product. The demand for the next 4 months is

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| Month 1: 1000 | Month 2: 800 | Month 3: 1200 | Month 4: 900 |

The company has regular time production and over time production

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| --- | --- | --- |
|  | Cost | Capacity |
| REGULAR TIME | Rs. 20/unit/month | 800 units/month |
| OVER TIME | Rs.25/unit/month | 200 units/month |

Apart from this, the company can produce more than the required units in a month i.e., carry the excess to the next month and these extra items have Holding cost/carrying cost/Inventory cost

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| --- | --- |
| INVENTORY COST | Rs 3/unit/month |

**Problem:**

Demand should be met every month, no shortages allowed.

Note: You are allowed to have a carryover of produced items.

**Formulation:**

**Solution:**

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| **Constraints:** | **Decision variables** | **COST FUNTION** |
| **Month 1 => X1 + Y1 =1000+ I1**  **Month 2 => I1+ X2+Y2 = 800 + I2**  **Month 3 => I2+ X3+Y3=1200 + I3**  **Month 4=> I3+X4+Y4 = 900**  **Xj<= 800**  **Yj<=200** | Xj => Quantity produced using regular time production  Yj=> Quantity produced using overtime production | MINIMIZE  4 4 3  (20 ∑Xj + 25 ∑Yj + 3∑Ij )  j=1 j=1 j=1  Where Xj, Yj, Ij >= 0 & j represents month |

**Note:** A problem can have any number of formulations but the end result of all the formulations should be same. A problem formulation with less number of decision variables is superior