Simulation: Simulation is a process which replicates the original process. It is nothing but a method of forecasting. It is done by generation of random numbers. Monte Carlo simulation.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Daily demand | 0 | 10 | 20 | 30 | 40 | 50 |  |  |  |
| Probability | 0.01 | 0.2 | 0.15 | 0.5 | 0.12 | 0.02 |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Daily Demand | Probability | Cumulative Probability | Random Number Interval |
| 0 | 0.01 | 0.01 | 00 |
| 10 | 0.2 | 0.21 | 01-20 |
| 20 | 0.15 | 0.36 | 21-35 |
| 30 | 0.5 | 0.86 | 36-85 |
| 40 | 0.12 | 0.98 | 86-97 |
| 50 | 0.02 | 1.00 | 98-99 |
|  |  |  |  |

|  |  |  |
| --- | --- | --- |
| Serial No. | Random Number | Demand |
| 1 | 25 | 20 |
| 2 | 39 | 30 |
| 3 | 65 | 30 |
| 4 | 76 | 30 |
| 5 | 12 | 10 |
| 6. | 05 | 10 |
| 7. | 73 | 30 |
| 8. | 89 | 40 |
| 9. | 19 | 10 |
| 10 | 49 | 30 |
| total |  | 240 |

|  |  |  |  |
| --- | --- | --- | --- |
| Production/day | Probability | Cumulative Probability | Random Number Interval |
| 196 | 0.05 | 0.05 | 00-04 |
| 197 | 0.09 | 0.14 | 05-13 |
| 198 | 0.12 | 0.26 | 14-25 |
| 199 | 0.14 | 0.40 | 26-39 |
| 200 | 0.20 | 0.60 | 40-59 |
| 201 | 0.15 | 0.75 | 60-74 |
| 202 | 0.11 | 0.86 | 75-85 |
| 203 | 0.08 | 0.94 | 86-93 |
| 204 | 0.06 | 1.00 | 94-99 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Days | Random Number | Production/day | No of Motor Cycles Waiting | Empty Space in the lorry |
| 1 | 82 | 202 | 2 | ----- |
| 2 | 89 | 203 | 5 | ----- |
| 3 | 78 | 202 | 7 | ----- |
| 4 | 24 | 198 | 5 | ----- |
| 5 | 53 | 200 | 5 | ……. |
| 6 | 61 | 201 | 6 | …. |
| 7 | 18 | 198 | 4 | ----- |
| 8 | 45 | 200 | 4 | ------ |
| 9 | 04 | 196 | ----- | ----- |
| 10 | 23 | 198 | ---- | 2 |
| 11 | 50 | 200 | ---- | ---- |
| 12 | 77 | 202 | 2 | --- |
| 13 | 27 | 199 | 1 | --- |
| 14 | 54 | 200 | 1 | --- |
| 15 | 10 | 197 | --- | 2 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Annual Demand |  | S.P per unit |  | Investment required |  |
| Units | Probability | $ | Probability | $ | Probability |
| 20000 | 0.05 | 3 | .1 | 17,50,000 | 0.25 |
| 25000 | 0.1 | 5 | .2 | 20,00,000 | 0.50 |
| 30000 | 0.2 | 7 | .4 | 25,00,000 | 0.25 |
| 35000 | 0.3 | 9 | .2 |  |  |
| 40000 | 0.2 | 10 | .1 |  |  |
| 45000 | 0.1 |  |  |  |  |
| 50000 | 0.05 |  |  |  |  |

Return on Investment= (S.P per unit\* Number of units)/Investment

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Trials | Random No. for Demand | Simulated Demand | Random no. for S.P | Simulated S.P | Random No. for Investment | Simulated Investment | ROI |
| 1 | 28 | 30000 | 19 | 5 | 18 | 17,50,000 |  |

ROI=[( 30000\*5)/17,50,000]\*100=8.57