

**A12**

**Sreenidhi Institute of Science & Technology**

(An Autonomous Institution)

**Code No: 123MB12**

**MBA I - YEAR II – SEMESTER AUGUST 2015 (Supplementary)**

**QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS**

**Time: 3 Hours Max. Marks: 60**

**Note: No additional answer sheets will be provided.**

**Part – A**

**Max. Marks: 10**

**Answer all the QUESTIONS**

1. Write the standard form of the following LPP

Min Z = 3 x1 + 2 x2

Subject to constraints

2. Define Slack and Surplus Variables.

3. What is Routing Problem?

4. Explain Criterion of Pessimism**.**

5. Define Two-Person zero –sum games.

6. Describe the steps in the decision making.

7. What are pure strategies?

8. What are the basic elements of the queuing model?

9. What are the applications of transportation model?

10. Define tandem queues or series queues.

**Part – B**

**Max. Marks: 50**

**ANSWER ANY FIVE. ALL QUESTIONS CARRY EQUAL MARKS.**

1.Explain the following:

1. Write a short note on decision making environments.
2. Write briefly typical applications of Operations Research.
3. What are the limitations of game theory?

2. A manufacturing firm has discontinued production of a certain unprofitable product line, and this has created considerable excess production capacity. Management is considering to devote this excess capacity to produce one or more of three products 1,2 and 3. The available excess capacity on the machines which might limit output, is summarized in the following table:

|  |  |
| --- | --- |
| Machine Type | Available excess capacity ( in machine hours per week) |
| Milling machine | 250 |
| Lathe | 150 |
| Grinder | 50 |

The number of machine-hours required for each unit of the respective product is given below:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Capacity Requirement ( in machine-hours per unit) | | |
| Machine Type | Product 1 | Product 2 | Product 3 |
| Milling machine | 8 | 2 | 3 |
| Lathe | 4 | 3 | 0 |
| Grinder | 2 | 0 | 1 |

The per unit contribution would be Rs 20, Rs 6 and Rs 8 respectively for products 1, 2 and 3. Formulate the linear programming problem mathematically.

3. What is model? Discuss various classification schemes of models in operations research?

4. Assume that at a bank teller window the customers arrive in their cars at the average rate of twenty per hour according to a Possion distribution. Assume also that the bank teller spends an average of two minutes per customer to complete a service, and the service time is exponentially distributed. Customers, who arrive from an infinite population, are served on a first-come-first-served basis, and there is no limit to possible queue length.

(a)What is the expected waiting time in the system per customer?

(b)What is the mean number of customers waiting in the system?

(c)What is the probability of zero customers in the system?

(d)What value is the utilization factor?

5. Shruthi Ltd. has developed a sales forecasting function for its products and the products of its competitor ,Purnima Ltd. There are four strategies S1,S2,S3 and S4 available to Shruthi Ltd. and three strategies P1,P2 and P3 to Purnima Ltd. The pay-offs corresponding to all the twelve combinationa of the strategies are given below. From the table we can see that, for example, if strategy S1 is employed by Shruthi Ltd. and strategy P1 by Purnima Ltd., then there shall be a gain of Rs 30,000 in quarterly sales to the former. Other entries can be similarly interpreted. Considering this information, state what would be the optimal strategy of Shruthi Ltd. ? Purnima Ltd.? What is the value of the game? Is the game fair?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Purnima Ltd.’s Strategy | | |
|  |  | P1 | P2 | P3 |
| Shruthi Ltd.’s Strategy | S1 | 30,000 | -21,000 | 1,000 |
| S2 | 18,000 | 14,000 | 12,000 |
| S3 | -6,000 | 28,000 | 4,000 |
| S4 | 18,000 | 6,000 | 2,000 |

6. The Simple Engineering Company has a machine whose purchase price is Rs 80,000. The expected maintenance costs and resale price in different years are as given below:

|  |  |  |
| --- | --- | --- |
| Year | Maintenance Cost (Rs.) | Resale Value (‘ 000) (Rs.) |
| 1 | 1,000 | 75 |
| 2 | 1,200 | 72 |
| 3 | 1,600 | 70 |
| 4 | 2,400 | 65 |
| 5 | 3,000 | 58 |
| 6 | 3,900 | 50 |
| 7 | 5,000 | 45 |

After what time interval, in your opinion, should the machine be replaced?

7. Discuss the scope and application of operations research in modern management.

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