Code No.: **2B111** | **MR 12**

# MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)

Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad.-500 100.

## MBA II SEMESTER SUPPLEMENTARY EXAMINATIONS, AUGUST-2017

SUBJECT: **QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS**

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

**Answer any 5 questions** **5 X 12 Marks=60 Marks**

1. (a) Discuss the limitations and applications of Operations Research in Business Decisions.

(b) Solve the following LPP by using Simplex Method

Maximize $Z = 7x1+5x2$

Subject to the constraints

$x1+2x2 \leq 6$

$4x1+3x2 \leq 12$

$x1, x2 \geq 0$

2. (a) Solve the following assignment problem

Persons

| | | J1 | J2 | J3 | J4 | J5 |
|---|---|---|---|---|---|---|
| **Jobs** | A | 6 | 2 | 5 | 2 | 6 |
| | B | 2 | 5 | 8 | 7 | 7 |
| | C | 7 | 8 | 6 | 9 | 8 |
| | D | 6 | 2 | 3 | 4 | 5 |
| | E | 9 | 3 | 8 | 9 | 0 |
| | F | 4 | 7 | 5 | 6 | 8 |

(b) Solve the following Transportation Problem

| | **To warehouse** | | | | |
|---|---|---|---|---|---|
| **From plant** | **D** | **E** | **F** | **G** | **Supply** |
| A | 7 | 3 | 8 | 6 | 60 |
| B | 4 | 2 | 5 | 10 | 100 |
| C | 2 | 6 | 5 | 1 | 40 |
| Demand | 20 | 50 | 50 | 80 | |

3. (a) A firm is thinking to replacing a particular machine whose cost price is Rs.12,200. The scrap value of the machine is Rs.200. The maintenance costs are found to be as follows:

| **Year** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
|---|---|---|---|---|---|---|---|---|
| **Maintenance Cost in Rs.** | 220 | 500 | 800 | 1200 | 1800 | 2500 | 3200 | 4000 |

Determine when firm should get the machine replaced.

(b) A fleet owner finds form his past records that the cost per year of running a truck and resale values whose purchase price is Rs. 6000/- are given as under. At what stage the replacement is due?

| **Year** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
|---|---|---|---|---|---|---|---|---|
| **Running Cost in Rs.** | 1000 | 1200 | 1400 | 1800 | 2300 | 2800 | 3400 | 4000 |
| **Resale Value in Rs.** | 3000 | 1500 | 750 | 375 | 200 | 200 | 200 | 200 |

4. (a) The matrix given below illustrates a game, where competitors A and B are assumed to be equal in ability and intelligence. A has a choice of strategy 1 or strategy 2, while B can select strategy 3 or strategy 4. Find the value of the game.

| | | B | |
|---|---|---|---|
| | | 3 | 4 |
| A | 1 | +4 | +6 |
| | 2 | +3 | +5 |

(b) Write a note on Maximin and Minimax Principle with respect to game theory.

5. (a) ABC Corporation wants to launch one of its mega campaigns to promote a special product. The promotion budgets not yet finalized, but they know that some Rs. 55,00,000 is available for advertising and promotion.

Management wants to know how much they should spend for television spots, which is the most appropriate medium for their product. They have created five 'T.V. campaign strategies' with their projected outcome in terms of increase in sales. Find which one they have to select to yield maximum utility. The data required is given below.

| Strategy | Cost in lakhs of Rs. | Increased in Sales in lakhs of Rs. |
|---|---|---|
| A | 1.80 | 1.78 |
| B | 2.00 | 2.02 |
| C | 2.25 | 2.42 |
| D | 2.75 | 2.68 |
| E | 3.20 | 3.24 |

(b) Discuss decision making under risk and uncertainty scenario with suitable examples.

6. A newspaper boy has the following probabilities of selling a magazine. Cost of the copy is Rs. 0.30 and sale price is Rs. 50. He cannot return unsold copies. How many copies can he order?

| No of Copies Sold | Probability |
|---|---|
| 10 | 0.10 |
| 11 | 0.20 |
| 12 | 0.30 |
| 13 | 0.20 |
| 15 | 0.20 |
| Total | 1.00 |

7. (a) A T.V. Repairman finds that the time spent on his jobs have an exponential distribution with mean of 30 minutes. If he repairs sets in the order in which they come in, and if the arrival of sets is approximately Poisson with an average rate of 10 per 8 hour day, what is repairman's expected idle time each day? How many jobs are ahead of the average set just brought in?

(b) Define Simulation. Explain Classification of Simulation Models, Advantages and Limitations of Simulation.

8. (a) What are Random Numbers and Pseudo – Random Numbers? Explain the process of Generation of Random Numbers.

(b) A product manufacturing plant at a city distributes its products by trucks, loaded at the factory warehouse. It has its own fleet of trucks plus trucks of a private transport company. This transport company has complained that sometimes its trucks have to wait in line and thus the company loses money paid for a truck and driver of waiting truck. The company has asked the plant manager either to go in for a second warehouse or discount prices equivalent to the waiting time. The data available is:

Average arrival rate of all trucks = 3 per hour.

Average service rate is = 4 per hour.

The transport company has provided 40% of the total number of trucks. Assuming that these rates are random according to Poisson distribution, determine:

(a) The probability that a truck has to wait?

(b) The waiting time of a truck that has to wait,

(c) The expected waiting time of company trucks per day.