

**MBA**  
**(SEM II) THEORY EXAMINATION 2022-23**  
**QUANTITATIVE TECHNIQUES FOR MANAGERS**

Time: 3 Hours

Total Marks: 100

**Note:** Attempt all Sections. If require any missing data; then choose suitably.

**SECTION A**

1. Attempt *all* questions in brief. 2 x 10 = 20
- a. State the scope of Operations Research.
  - b. Define uncertainty in business.
  - c. What is LPP in OR?
  - d. Define Vogel's method in transportation Problem.
  - e. State about Assignment Model.
  - f. What is Two-person zero-sum game?
  - g. What is Sequencing Problem in operations research?
  - h. Define Queue model.
  - i. What is replacement concept?
  - j. Define CPM for network.

**SECTION B**

2. Attempt any *three* of the following: 3 x 10 = 30
- a. Discuss two Operations Research Methods to solve industrial management problems.
  - b. Describe steps involved in North West Corner method for solving Transportation Problem.
  - c. Explain Hungarian Algorithm for Assignment Problem with example.
  - d. Discuss the applications of Johnsons Algorithm for Sequencing problem.
  - e. What do you understand by Project Management? Also discuss the drawing of network diagrams.

**SECTION C**

3. Attempt any *one* part of the following: 10 x 1 = 10
- a. What are the three Operations Research techniques for managerial decisions?
  - b. Discuss Decision tree approach and its importance in management.
4. Attempt any *one* part of the following: 10 x 1 = 10
- a. Solve the following linear programming problem by graphical method:  
Maximize  $Z = 6L_1 + 11L_2$   
Subject to:  
 $2L_1 + L_2 \leq 104$   
 $L_1 + 2L_2 \leq 76$   
and  $L_1 \geq 0, L_2 \geq 0$ .
  - b. Discuss the steps for initial feasible solution of Transportation Problem by using Least Cost Method.

5. Attempt any one part of the following:

10 x 1 = 10

- a. Find two optimal solutions to the assignment problem of machines to jobs for the cost matrix given below:

	J <sub>1</sub>	J <sub>2</sub>	J <sub>3</sub>	J <sub>4</sub>
m <sub>1</sub>	12	8	7	8
m <sub>2</sub>	6	6	4	8
m <sub>3</sub>	3	5	7	4
m <sub>4</sub>	1	3	5	4

- b. What is Game Theory? Also Discuss the steps involved in Two-person zero-sum game.

6. Attempt any one part of the following:

10 x 1 = 10

- a. An insurance company has three claims adjuster in its branch office. People with claims against the company are found to arrive in a Poisson fashion, at an average rate of 20 per 8-hour day. The amount of time that an adjuster spends with a claimant is found to have an exponential distribution, with mean service time 40 minutes. Claimants are processed in the order of their appearance.

- (i) How many hours a week can an adjuster expect to spend with claimants?  
(ii) How much time, on an average, does a claimant spend in the branch office?

- b. Explain the Applications of Poisson distribution for Queuing model with example.

7. Attempt any one part of the following:

10 x 1 = 10

- a. Explain Replacement of assets which fail suddenly with example.  
b. An office construction was analysed as follows where v<sub>j</sub> stands for a job.

- (i) v<sub>1</sub> and v<sub>2</sub> can start simultaneously, each one taking 10 days to finish.  
(ii) v<sub>3</sub> can start after 5 days and v<sub>4</sub> after 4 days of starting v<sub>1</sub>.  
(iii) v<sub>4</sub> can start after 3 days of work on v<sub>3</sub> and 6 days of work on v<sub>2</sub>.  
(iv) v<sub>5</sub> can start after v<sub>1</sub> is finished and v<sub>2</sub> is half done.  
(v) v<sub>3</sub>, v<sub>4</sub> and v<sub>5</sub> take respectively 6, 8 and 12 days to finish.

Find the critical path and the minimum time for completion for above illustrations.