Reg. No.								

MBA Degree (FT&PT) III Semesters End Semester Examination- December-2022
21-371-0301/21-372-0302: MANAGEMENT SCIENCE

(Regular)

Time: 3 Hours **Max Marks: 50**

Course Outcomes: On completion of the course, the student will be able to:

CO1	To recall the quantitative models used in business decisions. How to translate business situation into quantitative models for optimal decision making
CO2	To develop an understanding of basic management science techniques and their role in managerial decision-making, create a scientific approach to formulation and problem solving under competitive environment
CO3	To develop mathematical models for a real life situation and problems in Business and Management; Conducting what if analysis and Scenario analysis to find the activities to optimize cost and time
CO4	To apply various Management Science techniques for Resource, time and cost Optimization in Business and Management
CO5	Evaluate the principles of construction of mathematical models of conflicting situations and mathematical analysis methods of Management Science
CO6	Have skills to develop Management Science objectives, mathematical methods , computer systems and analyzing different situations in the industrial/ business scenario Involving limited resources and finding the optimal solution within the constraints.

BL – Bloom's Taxonomy:(L1- Remember, L2 - Understand, L3 – Apply, L4-Analyse, L5-Evaluate, L6-Create)

PART A
(Answer ALL questions. Each question carries 2 marks)

Q. Nos.	Questions	Marks	BL	CO
1	List any four applications of Operation Research in Business and Industry.	2	1	CO1
2	Explain the terms: (a) Unbounded Solution (b) Saddle point	2	2	CO2
3	At a service Centre customers arrive at the rate of 10 per hour and are served at the rate of 15 per hour. Their arrival follows Poisson and service in exponential distribution. Find the average length and average waiting time in the system.	2	3	CO3
4	Distinguish between Transportation and Assignment problems	2	4	CO4
5	Define sequencing Problem.	2	5	CO5

(5X2=10 marks)

PART B

(Answer ANY FIVE Questions. Each question carries 4 marks)

Q. Nos.	Questions	Marks	BL	CO
6	Solve the following transportation problem (basic feasible solution) for maximum profit: Market **Warehouses** **A** **B** **C** **D** **X** 12 18 6 25 **Y** 8 7 10 18 **Z** 14 3 11 20 Availability at warehouses: X – 200 units, Y-500 units Z-300 units Demand in the market: A-180 units, B-320 units, C-100 units, D-400 units.	4	3	CO5
7	Obtain the optimal strategies for both players and determine the value of the game. **Player B** **B1** **B2** **B3** **Player A** **A1** 15 2 3 **A2** 6 5 7 **A3** - 7 4 0	4	6	C06
8	A man thinks of investing some amount initially in either Project A or Project B. For the Project 'A' he has to invest Rs.8000 and Rs.7000 for the Project 'B'. The completion of Project A has three states of nature; either there is a high demand (probability = 0.5) and yields a profit Rs.12000 or an average demand (probability = 0.3) with a profit Rs.8000 or a low demand giving a profit Rs.5000.The completion of Project B has three states of nature; either there is a high demand (probability = 0.6) and yields a profit Rs.10000 or an average demand (probability = 0.3) with a profit Rs.9000 or a low demand giving a profit Rs.5000. Construct the decision tree and take a choice giving maximum return.	4	6	CO6
9	Distinguish between CPM and PERT (any 8 comparisons)	4	4	CO4
10	A bakery shop keeps stock of a popular brand of cake. Previous experience indicates the daily demand as given below: Daily demand: 0 10 20 30 40 50 Probability: 0.01 0.20 0.15 0.50 0.12 0.02 Simulate the demand for next 10 days, using the following random numbers, 48, 78, 19, 51, 56, 77, 15, 14, 68, 09. Find out the stock	4	3	CO4

(5X4=20 marks)

	situation, if the owner of the bakery decides to make 30 cakes every day. Also calculate the daily average demand on the basis of simulated data			
11	Write down KENDALL'S NOTATION for representing Queuing models and explain the symbols used	4	2	CO5
12	Explain (a) Sensitivity Analysis in LPP (b) Integer Programming	4	2	CO2

PART C

(Answer ANY TWO questions. Each question carries 10 marks)

Q. Nos.	Questions	Marks	BL	CO
13	A firm makes products X and Y and has a total production of a Capacity of 9 tonnes per day. X and Y require the same production capacity. The firm has a permanent contract to supply at least 2 tonnes of X and at least 3 tonnes of Y per day to another company. Each tonne of X requires 20 machine hours production time and each tonne of Y requires 50 machine hours production time, the daily maximum possible number of machine hours is 360. All the firms output can be sold, and the profit made is Rs. 80 per tonne of X and Rs. 120 per tonne of Y. Formulate a mathematical Model of the above LPP and find its Optimal solution. Also obtain the dual of LPP.	10	5	CO5
14	Solve the following Assignment problem. Man▶ | **M 1** | **M 2** | **M 3** | **M 4** | **M 5** **Job A** | 1 | 3 | 2 | 3 | 6 **Job B** | 2 | 4 | 3 | 1 | 5 **Job C** | 5 | 6 | 3 | 4 | 6 **Job D** | 3 | 1 | 4 | 2 | 2 **Job E** | 1 | 5 | 6 | 5 | 4	10	3	CO3
15	Construct a Network diagram for the given activity and find the total project duration and critical path Activity: 1-2 1-3 2-3 2-4 3-4 3-5 4-5 t_o : 2 2 7 6 6 6 2 t_m : 6 3 11 14 7 7 6 t_p : 10 4 15 16 14 14 10 What duration shall have 99% confidence for project completion? (use Z: 2.33)	10	5	CO5

(2x10=20 marks)

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