Register No.: ..... Name.: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER MBA DEGREE EXAMINATION (S), AUGUST 2023
(2020 Scheme)

Course Code : 20MBA110

Course Name: Operations Research

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

Special instruction: use of statistical table and Scientific calculator are permitted.

PART A

(Answer all questions. Each question carries 2 marks)

1. Write a short note on *Duality*, with an example.
2. How will you solve *Unbalanced Assignment Problems* in general?
3. Examine the managerial applications of *Decision Tree Analysis.*
4. Explain *EOQ model.*
5. Recall the steps in *CPM.*

PART B

(Answer any 3 questions. Each question carries 10 marks)

6. Solve the given linear programming problems using SIMPLEX Method:
   Maximize: $Z = 6x + 8y$
   Subject to: $30x + 20y \leq 300$,
   $5x + 10y \leq 110$,
   $x \geq 0, y \geq 0$

7. Determine the Initial *Basic Feasible Solution* to the following Transportation Problem using i) LCM and ii) NWCR.

	Distribution Centres				
Sources	D1	D2	D3	D4	*Supply*
S1	2	3	11	7	6
S2	1	0	6	1	1
S3	5	8	15	9	10
Requirements	7	5	3	2	

8. Customers arrive at a local AKSHAYA Center, according to a Poisson distribution with mean of 10 minutes and service time per customer is

exponential with mean of 6 minutes. The space in front of the main service area can accommodate only 3 customers including the serviced one. Other customers have to wait outside this space. Calculate the:

i) Traffic Intensity

ii) Probability that an arriving customer can walk directly to the space in front of the main service area

iii) Probability that an arriving customer will have to wait outside the directed space

iv) How long an arriving customer is expected to wait before getting the service?

9. The annual demand of an item is 3,200 units. The unit cost is Rs. 6 and inventory carrying charges are 25 per cent per annum. If the cost of one procurement is Rs. 150.
Calculate the following:
   i) EOQ
   ii) Number of orders per year.
   iii) Time between two consecutive orders.
   iv) The optimal cost.

10. Solve the game (using Principle of Dominance and then probability method) whose pay-off matrix is:

	Player B		
Player A	6	-3	7
	-3	0	4

PART C

(Compulsory question, the question carries 20 marks)

11. a) A small govt. project consists of the following jobs whose precedence relationships are given below:

Job	1-2	1-3	2-3	2-5	3-4	3-6	4-5	4-6	5-6	6-7
Duration(days)	15	15	3	5	8	12	1	14	3	14

i) Draw the *network diagram* of this project
ii) Find the *Total Float* for each activity
iii) Find the *Critical Path* and the *Project Length.*

Marks (10)

b) i) List out the steps used in MODI Method Marks (6)

ii) Critically discuss the importance of OR in Decision Making

Marks (4)

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