

QP CODE: 25050581



Reg No :

Name :

MSc DEGREE (CSS) EXAMINATION, DECEMBER 2025

First Semester

M Sc OPERATIONS RESEARCH AND COMPUTER APPLICATIONS

Core Courses - CE020102 - LINEAR PROGRAMMING AND SIMULATION

2019 Admission Onwards

EEE822E3

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

Weight 1 each.

1. What is convex set in LPP?
2. Define feasible and Infeasible solution.
3. What is duality and dual simplex method?
4. What is integer programming used for?
5. How do you use solver?
6. What is simplex method in linear programming?
7. State different methods to obtain the initial basic feasible solution.
8. What is Travelling Salesman Problem explain with example?
9. Briefly explain generation of pseudo random numbers by mid-square method.
10. Why do we use simulation models?

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

Weight 2 each.

11. What are the extreme points of a feasible region and why are they important? How do you find extreme points?
12. Define product Mix Model in LPP and formulate with an example.
13. Write the algorithm to solve LPP using Simplex method for maximization of profit.





14. Solve the following Assignment Problem

	A	B	C	D	E	F
1	13	13	16	23	19	9
2	11	19	26	16	17	18
3	12	11	4	9	6	10
4	7	15	9	14	14	13
5	9	13	12	8	14	11

15. What do you mean by cutting plane method? Explain *Gomory's cutting plane method*.

16. Explain branch and bound method. What is the basic principle of branch and bound technique?

17. What are the advantages and disadvantages of simulation models?

18. What is : I) single server queuing system?

II) the key assumption for the single server queue model?

(6×2=12 weightage)

Part C (Essay Type Questions)

Answer any **two** questions.

Weight 5 each.

19. How do you calculate Two phase Method in linear programming?

Solve the following problem by using Two phase Method.

$$\text{Maximize } Z = 3X_1 + 2X_2 + 5X_3$$

Subject to

$$X_1 + 2X_2 + X_3 \leq 430$$

$$3X_1 + 2X_3 \leq 460$$

$$X_1 + 4X_2 \leq 420$$

$$X_1, X_2, X_3 \geq 0$$

20. A manufacturer of three products tries to follow a policy of producing those which continue most to fixed cost and profit. However, there is also a policy of recognising certain minimum sales requirements currently, these are:

Product: X1 X2 X3

Units per week: 20 30 60

There are three producing departments. The production times in hour per unit in each department and the total times available each week in each department are:

Departments	Time required per production in hours			Total hours available
	x ₁	x ₂	x ₃	
1	0.25	0.20	0.15	420
2	0.30	0.40	0.50	1048
3	0.25	0.30	0.25	529

The contribution per unit of product X1, X2, X3 is Rs. 10.50, Rs. 9.00 and Rs. 8.00 respectively. The company has scheduled 20 units of X1, 30 units of X2 and 60 units of X3 for production in the following week, you are required to state:

1. Whether the present schedule is an optimum one from a profit point of view and if it is not, what it should be?

2. The recommendations that should be made to the firm about their production facilities.





21. A company has factories at F1, F2 & F3 which supply warehouses at W1, W2 and W3. Weekly factory capacities are 200, 160 and 90 units respectively. Weekly warehouses requirements are 180, 120 and 150 units respectively. Unit shipping costs (in rupees) are as follows:

Warehouse

Factory w1 w2 w3 Supply

F1 16 20 12 200

F2 14 8 18 160

F3 26 24 16 90

Demand 180 120 150

Determine the optimum distribution for this company to minimize the shipping cost.

22. Solve the following transportation problem to find its optimal solution using MODI Method.

	W1	W2	W3	W4	Supply
P1	190	300	500	100	70
P2	700	300	400	600	90
P3	400	100	400	200	180
Demand	50	80	70	140	

(2×5=10 weightage)

