

**Fourth Semester FYUGP Degree (Reg) Examination April
2026**

KU4SECCMT201 - LINEAR PROGRAMMING PROBLEMS

2024 Admission onwards

Time : 1.5 hours

Maximum Marks : 50

Section A

Answer any 6 questions. Each carry 2 marks.

1. How can you identify alternative optimal solutions from the Simplex table?
2. What is the difference between unique optimal solution and alternative optimal solution?
3. When do we use the Big M method instead of the standard simplex method?
4. What is meant by an infeasible solution in the context of Big M method?
5. Define basic feasible solution of an LP.
6. How to identify outgoing basic variable in a simplex algorithm of a maximization problem.
7. What is meant by non-negativity restriction?
8. State true or false and justify : For an LP to be unbounded, the LP's feasible region must be unbounded.

Section B

Answer any 4 questions. Each carry 6 marks.

9. Write simplex algorithm for a maximization problem.
10. Write the initial simplex table and identify the incoming and outgoing basic variables in this table for the LP

$$\max Z = 4x + 3y \quad (1)$$

$$x + y \leq 40 \quad (2)$$

$$2x + y \leq 60 \quad (3)$$

$$x, y \geq 0 \quad (4)$$

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11. Write the initial and first simplex table and identify the incoming and outgoing basic variables in each of these tables for the linear programming problem

$$\min Z = 2x - 3y \quad (5)$$

$$x + y \leq 4 \quad (6)$$

$$x - y \leq 6 \quad (7)$$

$$x, y \geq 0 \quad (8)$$

12. Graphically determine two optimal solutions to the LP

$$\min Z = 3x + 5y \quad (9)$$

$$3x + 2y \geq 36 \quad (10)$$

$$3x + 5y \geq 45 \quad (11)$$

$$x, y \geq 0 \quad (12)$$

13. Solve graphically

$$\max Z = 3x + y \quad (13)$$

$$2x + y \leq 6 \quad (14)$$

$$x + 3y \leq 9 \quad (15)$$

$$x, y \geq 0 \quad (16)$$

14. Solve graphically

$$\max Z = 8x + y \quad (17)$$

$$x + y \leq 40 \quad (18)$$

$$2x + y \leq 60 \quad (19)$$

$$x, y \geq 0 \quad (20)$$

Section C

Answer any 1 questions. Each carry 14 marks.

15. Show that the given LP has alternative optimal solutions and find three of them

$$\max Z = -3x + 6y \quad (21)$$

$$5x + 7y \leq 35 \quad (22)$$

$$-x + 2y \leq 2 \quad (23)$$

$$x, y \geq 0 \quad (24)$$

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16. Use Big M method solve the LPP

$$\min Z = 2x + 3y \quad (25)$$

$$2x + y \leq 16 \quad (26)$$

$$x + 3y \geq 20 \quad (27)$$

$$x + y = 10 \quad (28)$$

$$x, y \geq 0 \quad (29)$$