

D 142913

(Pages : 5)

Name.....

Reg. No.....

**FOURTH SEMESTER M.A. DEGREE (REGULAR/SUPPLEMENTARY)
EXAMINATION, APRIL 2026**

(CBCSS)

Econometrics

ECM 4C 13—LINEAR PROGRAMMING AND ITS APPLICATIONS IN ECONOMICS

(2020 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

Part A (Multiple Choice Questions)*Answer all **fifteen** questions.**Each question carries 1/5 weightage.*

1. Linear programming is a :
 - a) Technique for economic allocation of limited resources.
 - b) Constraint optimization technique.
 - c) Mathematical technique.
 - d) All of the above.
2. The major feature of LP mode is :
 - a) The relationship among variables is linear.
 - b) The relationship among variables is non linear.
 - c) The value of decision variable is non negative.
 - d) All of the above.
3. An optimization model :
 - a) Provides the best decision.
 - b) Provides the best decision within its limited context.
 - c) Both a) and b).
 - d) None of the above.

Turn over

4. Feasible region in the set of points which satisfy :
- a) Some of the given constraints.
 - b) Objective function.
 - c) All of the given constraints.
 - d) None of the above.
5. In LPP, the original problem is called :
- a) Dual.
 - b) Primal.
 - c) Primal - dual pair.
 - d) None of the above.
6. Which among the following statements are true regarding the dual of LPP ?
- a) It is an associated problem.
 - b) It is the original problem.
 - c) Both a) and b).
 - d) None of the above.
7. How many of the following points satisfy the inequality $2x - 3y > -5$?
 $(1, 1), (-1, 1), (1, -1), (-1, -1), (-2, 1), (2, -1), (-1, 2)$ and $(-2, -1)$
- a) 4.
 - b) 5.
 - c) 6.
 - d) 7.
8. The maximum value of $z = 3x + 4y$ subject to conditions $x + 2y \leq 8, 3x + 2y \leq 12, x \geq 0, y \geq 0$ is at _____ point and value is _____.
- a) $(0, 1) 1$.
 - b) $(0, 2) 2$.
 - c) $(2, 3) 18$.
 - d) $(2, 4) 18$.
9. The final solution of the objective function satisfies :
- a) Some of the constraints.
 - b) All the constraints.
 - c) Any of the constraints.
 - d) None of the above.
10. The linear function of two or more variables that have to be maximised or minimised under the given restriction is called :
- a) Feasible solution.
 - b) Objective function.
 - c) Optimal solution.
 - d) None of the above.

11. In simplex method, if the non basic variable in the final simplex table showing the optimal solution to a problem, has a net zero contribution, then the condition of _____ Arises.
- a) Unbounded solutions.
 - b) Multiple solutions.
 - c) Degenerated solutions.
 - d) None of the above.
12. Transportation model aims at :
- a) Minimising cost of material handling.
 - b) Profit maximisation.
 - c) Both a) and b).
 - d) None of the above.
13. The solution to a transportation problem with m rows and n columns is feasible if number of positive allocation are :
- a) $m + n$.
 - b) $m \times n$.
 - c) $m - n$.
 - d) none of the above.
14. In the optimal solution, more than one empty cells have their opportunity cost as zero, it indicates
- a) The solution is optimum.
 - b) Wrong solution.
 - c) The problem has alternate solution.
 - d) None of the above.
15. The assignment problem will have alternative solution :
- a) When there is a tie between zero opportunity cost cells.
 - b) If two diagonal elements are zero.
 - c) If all the diagonal elements are zero.
 - d) None of the above.

(15 × 1/5 = 3 weightage)

Turn over

Part B (Very Short Answer Questions)

*Answer any **five** questions out of eight questions.*

Each question carries 1 weightage.

16. Define quotient space.
17. What do you mean by linear independence of vectors ?
18. Define optimal solutions.
19. What is Degeneracy ?
20. What is dual price in LPP ?
21. Define Orthogonality.
22. What is pure strategy in games ?
23. Define game theory.

(5 × 1 = 5 weightage)

Part C (Short Answer Questions)

*Answer any **seven** questions out of ten questions.*

Each question carries 2 weightage.

24. What do you mean by vector space ? Explain.
25. What is a direct sum of subspace ? Discuss.
26. Write a brief note on artificial variable technique.
27. What are the decision variables in LPP ? Explain.
28. What are the different types of constraints in LPP.
29. Distinguish between integer programming and linear programming.
30. Briefly discuss the branch and bound technique for problem solving.
31. Write a brief note on the travelling salesman problem.
32. Explain the fundamental theorem of game theory.
33. What is transportation method in linear programming ?

(7 × 2 = 14 weightage)

Part D (Essay Questions)

Answer any **two** questions out of four questions.

Each question carries 4 weightage.

34. Discuss the two person's zero - sum game in linear programming.
35. Briefly discuss the duality in linear programming problem.
36. Elaborate the sensitivity analysis in linear programming problem.
37. Solve :

Minimize $4a + 5b + 6c$ subject to

$$a + b \geq 11$$

$$a - b \leq 5$$

$$c - a - b = 0$$

$$7a \geq 35 - 12b$$

$$a \geq 0 \ b \geq 0 \ c \geq 0.$$

(2 × 4 = 8 weightage)