



K25U 0868

Reg. No. :

Name :

**IV Semester B.A. Degree (C.B.C.S.S. – O.B.E. – Regular/Supplementary/
Improvement) Examination, April 2025
(2019 to 2023 Admissions)
COMPLEMENTARY ELECTIVE COURSE IN ECONOMICS/DEVELOPMENT
ECONOMICS
4C04 ECO/DEV ECO : Mathematical Economics – II**

Time : 3 Hours

Max. Marks : 40

PART – A

Answer **all** questions.

1. Who introduced the concept of Linear Programming ?
2. What does the shadow price in LPP indicate ?
3. What matrix represents inter-industry relationships in input-output model ?
4. Name the condition that ensures the viability of an Input-Output Model ?
5. What is the term for a strategy that provides the best outcome regardless of the opponent's move ?
6. What is a game theory concept where players do not communicate but still reach an optimal decision ? **(6×1=6)**

PART – B

Answer **any 6** questions.

7. State the Extreme Point Theorem.
8. What are slack and surplus variables ?
9. Find the dual of the problem :

Minimize $Z = 2x + 3y$

Subject to :

$$x + y \geq 4$$

$$4x + y \geq 4$$

$$2x + 3y \geq 6$$

$$x, y \geq 0$$

P.T.O.



10. What is the role of the Identity Matrix in Input-Output Analysis ?
11. Why are all values in the Technical Coefficients Matrix less than 1 ?
12. Define a two-person zero-sum game.
13. Solve the following game using the Maximin and Minimax strategies

$$\begin{bmatrix} 3 & -1 \\ 2 & 4 \end{bmatrix}.$$

14. How is Nash equilibrium different from a dominant strategy ?

(6×2=12)

PART – C

Answer **any 4** questions.

15. Explain the basic assumptions of LPP.
16. Find the solutions to the following LPP graphically.

Maximize $Z = 3x + 2y$

Subject to :

$$x + y \leq 4$$

$$2x + y \leq 5$$

$$x, y \geq 0$$

17. Describe the overall framework and key features of input-output analysis.
18. A three-sector economy has the input-output matrix :

$$\begin{bmatrix} 0.3 & 0.2 & 0.1 \\ 0.2 & 0.4 & 0.3 \\ 0.1 & 0.3 & 0.5 \end{bmatrix} \text{ Check if the Hawkins-Simon condition holds.}$$

19. Explain how to use linear programming to solve a game theory problem step-by-step.
20. A company is deciding between two advertising strategies while its competitor reacts. Use game theory to determine the best choice. (4×3=12)



PART – D

Answer **any two** question.

21. Solve the following LPP using simplex method.

Objective function (Profit Maximization) : $Z = 50x + 40y$

Subject to the Constraints

$$2x + 4y \leq 100$$

$$3x + 2y \leq 80$$

$$60x + 3y \leq 60$$

Non-negativity constraints, $x, y \geq 0$.

22. A country has three sectors with $A = \begin{bmatrix} 0.2 & 0.5 & 0.2 \\ 0.3 & 0.2 & 0.3 \\ 0.4 & 0.1 & 0.2 \end{bmatrix}$.

Final demand (including exports) : $D = \begin{bmatrix} 100 \\ 200 \\ 300 \end{bmatrix}$. Find the total output vector.

23. Discuss the differences between static and dynamic input-output models, providing examples to illustrate how each model captures economic activity over time.

24. Discuss the concept of Nash Equilibrium and its real-world applications. Find the Nash Equilibrium in the following payoff matrix : **(2×5=10)**

$$\begin{bmatrix} (2, 2)(4, 1) & (1, 4)(3, 3) \\ (2, 2)(1, 4) & (4, 1)(3, 3) \end{bmatrix}$$
