K24U 0768

Reg. No. : ....

Name : ....

IV Semester B.A. Degree (C.B.C.S.S. – O.B.E. – Regular/Supplementary/Improvement) Examination, April 2024
(2019 to 2022 Admissions)
Complementary Elective Course in Economics/Development Economics
4C04 ECO/DEV ECO : MATHEMATICAL ECONOMICS – II
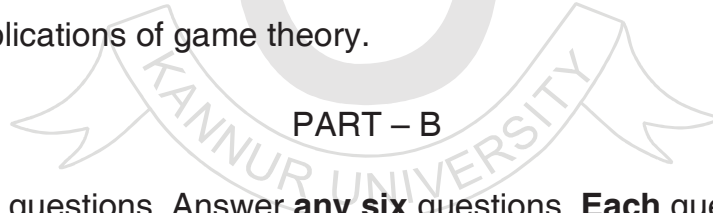
Time : 3 Hours

Max. Marks : 40

PART – A

Short Answer type questions. Answer **all** questions. **Each** question carries **one** mark.

1. Optimal solution

2. Duality in LPP

3. Extensive game

4. What are the limitations of input-output model ?

5. Simplex method

6. Economic applications of game theory.   **(6×1=6)**

PART – B

Short Essay type questions. Answer **any six** questions. **Each** question carries **two** marks.

7. Distinguish between finite and infinite games.

8. Solution to LPP with bounded and unbounded feasible region.

9. Distinguish between closed and open input-output model.

10. Surplus variable in simplex method.

11. Minimax strategy

12. Saddle point

13. Shadow prices

14. Limitations of graphic method for solving LPP. **(6×2=12)**

PART – C

Essay type questions. Answer **any four** questions. **Each** question carries **three** marks.

15. Economic meaning of Hawkins-Simon conditions.

16. Two-Person Zero sum games.

17. Based on the following information, construct input-output matrix and the external demand vector.

Production of	Total output = Internal consumption + External demand		
Farming Industry (in tons)	X	= 0.05x + 0.5y	+ 8000
Transportation sector (in 1000 kilometers)	Y	= 0.01x	+ 2000

18. Based on the following information, formulate a linear programming problem. Professor Smith is on a low cholesterol diet. During lunch at the college cafeteria he always chooses between 2 meals – vegetarian and non-vegetarian. The table below lists the amount of protein, Carbohydrates and vitamins each meal provides. He needs at least 200 grams of protein, 960 grams of carbohydrates and 40 grams of vitamins each month. Over this time period how many days of veg meal and non-veg meal should he have so that he gets the adequate amount of protein, carbohydrates and vitamins and at the same time minimize his cholesterol levels ?

19. Discuss the simplex criterion.

20. Assumptions of linear programming problem. **(4×3=12)**

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PART – D

Long Essay type questions. Answer **any two** questions. **Each** question carries **five** marks.

21. Maximize Z = 4X + Y

    Subject to constraints

    X + Y ≤ 50

    3X + Y ≤ 90

    X ≥ 0, Y ≥ 0

    Solve the LPP graphically.

22. Determine the total output of industries given the matrix of technical coefficients (A) and the final demand vector (D)

    Given $A = \begin{bmatrix} 0.4 & 0.3 & 0.1 \\ 0.2 & 0.2 & 0.3 \\ 0.2 & 0.2 & 0.2 \end{bmatrix} D = \begin{bmatrix} 140 \\ 220 \\ 180 \end{bmatrix}$

23. Explain Nash equilibrium. With the help of pay-off matrix discuss the possibilities of multiple Nash equilibria (the case of at least 2 equilibria).

24. Write the dual of the following primal linear programming problem.

    Minimize $Zx = 7x_1 + 3x_2 + 8x_3$

    Subject to $8x_1 + 2x_2 + x_3 \geq 3$

    $3x_1 + 6x_2 + 4x_3 \geq 4$

    $4x_1 + x_2 + 5x_3 \geq 1$

    $x_1 + 5x_2 + 2x_3 \geq 7$

    and x_1, x_2 and $x_3 \geq 0$ **(2×5=10)**

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