K23U 1012

Reg. No. : .....

Name : .....

IV Semester B.A. Degree (CBCSS – OBE – Regular/Supplementary/ Improvement) Examination, April 2023
(2019 Admission Onwards)
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** carries **one** mark.

1. What is a feasible region in an LPP ?
2. What is meant by the extreme point theorem ?
3. What is an input-output table ?
4. What are technical coefficients in input-output model ?
5. What is the meaning of payoffs in game theory ?
6. What are infinite games ? **(6×1=6)**

PART – B

Short Essay Type Questions. Answer **any six** questions. **Each** carries **two** marks.

7. A jewellery maker makes two items necklace and bangles. Necklace has a profit margin of Rs. 1200 and bracelet has Rs. 800. Necklace takes 3 hours for melting, 7 hours for setting and 4 hours for polishing whereas bangle takes 1 hour for melting, 3 hours for setting and 2 hours for polishing. The jewellery has 40 hours for melting, 60 hours for setting and 25 hours for polishing. Give a mathematical formulation for the above LPP.
8. What are the major assumptions of a Linear Programming Problem ?

P.T.O.

9. Find the duality of the following Linear Programming Problem.

   Maximise $Z = 200X + 350Y$

   Sub. to

   $21X + Y \leq 42$

   $30X + 15Y \leq 180$

   $12X + 40Y \leq 120$

   $X, Y \geq 0$

10. What are closed input-output model ?

11. The following table gives inter-industry transaction table. Construct the technology co-efficient matrix showing the direct requirements.

Industry	1	2	Final Demand	Total
1	700	1000	500	2200
2	1400	1300	400	3100

12. What are the two possible demand for each product of a sector as represented in input-output model ?

13. What are co-operative games ?

14. What is a pay-off matrix ? Give a suitable example. **(6×2=12)**

PART – C

Essay Type Questions. Answer **any four** questions. **Each** carries **three** marks.

15. Solve the following problem of Linear Programming by graphical method LPP

    $Z = 3X_1 + 4X_2$

    Subject to

    $5X_1 + 10X_2 \geq 800$

    $15X_1 + 10X_2 \geq 1200$

    $X_1 + X_2 \geq 100$

    and

    $X_1, X_2 \geq 0$

16. What is Input-output model ? What is the difference in Static and Dynamic input-output model ?

17. What is meant by Hawkins-Simon conditions in Input-Output model ?

18. What are the major characteristics of the dual problem ? Explain the economic interpretation of the duality.

19. Solve the following pay-off matrix :

$$\begin{bmatrix} 2 & 2 & 4 & 0 \\ 2 & 4 & 2 & 4 \\ 4 & 2 & 4 & 0 \\ 0 & 4 & 0 & 8 \end{bmatrix}$$

20. Elucidate the concept of Prisoner's dilemma. **(4×3=12)**

PART – D

Long Essay Type Questions. Answer **any two** questions. **Each** carries **five** marks.

21. Use the simplex algorithm to solve the following Linear Programming Problem

Maximise $\pi = 22X + 10Y$

Subject to $4X + 5Y \leq 200$

$6X + 3Y \leq 180$

$8X + 2Y \leq 160$

and

$X, Y \geq 0$

22. Suppose there are three industries in an economy and the output of each industry with the given input coefficient matrix and final demand are as follows. Determine the final output goals of each industry.

$$A = \begin{bmatrix} 0.3 & 0.2 & 0.2 \\ 0.2 & 0.1 & 0.5 \\ 0.2 & 0.4 & 0.2 \end{bmatrix}, F = \begin{bmatrix} 40 \\ 50 \\ 80 \end{bmatrix}$$

23. Distinguish between open and closed input output model. Explain the concept with the help of the set of equations representing the input-output transaction in open and closed input output model.

24. Examine the concept of mixed strategies in game theory, also explain in detail various methods on finding solutions to a mixed strategy game. **(2×5=10)**

———————