22P205 (Pages: 2) Name: ……………………………

Reg. No: …………………………..

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2023

(CUCSS - PG)

(Regular/Supplementary/Improvement)

CC19P MTH2 C10 – OPERATIONS RESEARCH

(Mathematics)

(2019 Admission onwards)

Time: Three Hours Maximum: 30 Weightage

PART A

Answer ***all*** questions. Each question carries 1 weightage.

1. Define convex function with an example.
2. What is meant by canonical form of an LPP?
3. Define basic feasible solution.
4. What is meant by complementary slackness condition?
5. Show that for any feasible flow in a graph, the flow in the return arc is not greater than the capacity of any cut in the graph.
6. What is meant by parametric linear programming problem?
7. What is the difference between mixed and pure strategies in game theory?
8. Explain what is meant by zero sum game?

(8 × 1 = 8 Weightage)

PART B

Two questions should be answered from each unit. Each question carries 2 weightage

UNIT I

9. Let $f(x)$ be defined in a convex domain and be differentiable. Prove the necessary and sufficient condition for the function to be convex.
10. Explain simplex method to solve an LPP.
11. Prove that a vertex of S_F is a basic feasible solution.

UNIT II

12. Prove that the dual of dual is primal.
13. Show that the transportation problem has a triangular basis.
14. How to determine the spanning tree of minimum length?

UNIT III

15. How to determine spanning tree of minimum length?

16. Explain sensitivity analysis.

17. Explain notion of dominance in game theory.

(6 × 2 = 12 Weightage)

PART C

Answer any ***two*** questions. Each question carries 5 weightage.

18. Solve by method of simplex method.

$$Maximize\ y_1 + y_2 + y_3\ , subject\ to\ \ 2y_1 + y_2 + 2y_3 \leq 2, 4y_1 + 2y_2 + y_3 \leq 2, y_i \geq 0\ , i = 1,2,3$$

19. Explain the method of minimum path and prove.

20. Solve for minimum cost.

3	4	6	100
7	3	8	80
6	4	5	90
7	5	2	60
120	110	110	

21. State and prove the fundamental theorem of rectangular games.

(2 × 5 = 10 Weightage)

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