Reg. No



Time: 2 hrs

GIET UNIVERSITY, GUNUPUR – 765022

M. Sc (Third Semester) Examinations, December' 2020

CE 303 / MTPE 303 – Optimization Techniques-I

(Mathematics)

Maximum: 50 Marks

 $(2 \times 10 = 20)$

Marks

(6)

(The figures in the right hand margin indicate marks.)

Q.1. Answer ALL the questions

- a. Explain the uses of Gomory's Algorithm for pure integer linear programs?
- b. What are the uses of Branch and Bound method when compare with other integer methods?
- c. Define linear programming problem and give two examples.
- d. Write the proof of "If *f* is differentiable at x belongs to T and x is a local minimal of prob-1 then gradient of $f(x)^T d \ge 0$ for all d belongs to closure of x"
- e. Let f be a pseudo convex function on a open convex set T is subset of \mathbb{R}^n , Also let gradient of f(x) = 0 for some $x \in T$, then x is global minimum of f over T.

f. Max
$$Z = 10x_1 + 8x_2$$

Subject to $15x_1 + x_2 \le 5$, $x_1 + 20x_2 \ge 6$, $2x_1 - 21x_2 \ge 16$; x_2 , $x_2 > 0$.

Introduce slack, surplus and artificial variables for given constraints.

- g. Define Hessian Matrix. Give two examples
- h. What are the differences between Lagrange's method and Kuhn-Trucker conditions?
- i. In game theory, what is role of minimax and maximin principle. Explain the uses of it?
- j. Define convex programming problem and convex set. Give one example each.

PART – B (6 x 5 = 30 Marks)

Answer ALL the questions

- 2. Write the step by step working procedure of Gomory's Algorithm for pure integer linear (6) programs?
- 3. Solve the following LPP using graphical method

Maximize $Z = 6X_1 + 8X_2$

Subject to $5X_1 + 10X_2 \le 60$, $4X_1 + 4X_2 \le 40$ and $X_1, X_2 \ge 0$.

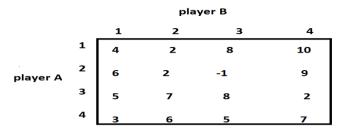
- 4. Solve the non linear programming problem by using Lagrange's multiplier method (6) Maximize Z = 5X₁ - 3X₁² + 6X₂ - 2X₂² Subject to 2X₁ + 3X₂ = 12.
- 5. Solve the following LPP using dual Simplex method (6) Maximize $Z = 6X_1 + 8X_2$

Subject to $5X_1 + 10X_2 \le 60, 4X_1 + 4X_2 \le 40$ and X1, X2 ≥ 0

6. Write the proof of "Every local minimum of the convex programming is a global (6) minimum".

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- 7. Explain the proof of "The set of all optimal solutions to the convex programming is (6) convex".
- 8. Consider the 4x4 game played by players A and B as shown in below matrix. Solve it (6) optimally.



9. Write the step by step procedure of Dominance principal?

(6)

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