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MT-610

M.A./M.Sc. MATHEMATICS (MAMT/MSCMT)

(Mathematical Programming–II)

4th Semester Examination, 2024 (June)

Time : 2:00 Hrs. Max. Marks : 70

Note* :–** This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these Sections according to the detailed instructions given therein. ***Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

Section–A

(Long Answer Type Questions) 2×19=38

***Note* :–** Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any *two* (02) questions only.

1. Solve the following NLPP using the Kuhn-Tucker conditions :

   Maximize $z = 8x_1 + 10x_2 - x_1^2 - x_2^2$

   Subject to constraints :

   $$3x_1 + 2x_2 \leq 6$$

   $$x_1 \geq 0,\ x_2 \geq 0$$

2. Solve the following LPP by dynamic programming :

   Maximize $z = y_1.y_2.y_3$

   Subject to constraints :

   $$y_1 + y_2 + y_3 = 5$$

   $$y_1, y_2, y_3 \geq 0$$

3. Use Beal's method to solve the following quadratic problem :

   Maximize $z = 4x_1 + 6x_2 - 2x_1^2 - 2x_1x_2 - 2x_2^2$

   Subject to :

   $$x_1 + 2x_2 \leq 2$$

   $$x_1 \geq 0,\ x_1 \geq 0$$

4. A positive quantity c is to be divided into n parts in such a way that the product of the n parts is to be maximum. Obtain the optimal subdivision.

5. Use Wolfe's method to solve the following quadratic problem :

Maximize $z = 8x_1 + 10x_2 - x_1^2 - x_2^2$

Subject to :

$$x_1 + 2x_2 \leq 6$$

$$x_1 \geq 0,\ x_2 \geq 0$$

Section–B

(Short Answer Type Questions) 4×8=32

***Note* :–** Section 'B' contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

1. Give the computational procedure in dynamic programming.

2. Solve the following dynamic pogramming problem.

Minimize $z = y_1^2 + y_2^2 + y_3^2$,

Subject to constraints $y_1 + y_2 + y_3 \geq 15$

$$y_1, y_2, y_3 \geq 0.$$

3. Discuss about duality in quadratic programming.

4. Write algorithm for constrained non linear programming problem.

5. Write five applications of dynamic programming problem.

6. Solve the Non Linear Programming Problem :

   Maximize $z = 10x_1 - 2x_1^2 + 2x_1^2 + 4x_2 - x_2^2$,

   Subject to :

   $$2x_1 + x_2 \leq 5$$

   and $x_1, x_2 \geq 0$

7. Write algorithm of Beale's method to solve Quadratic programming problem.

8. Discuss Convex Separable programming also write its algorithm.

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