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PG (CBCS)
M.SC. Semester- III Examination, 2023
MATHEMATICS
PAPER: MTM 305 B
(ADVANCED OPTIMIZATION AND OPERATIONS RESEARCH)

Full Marks: 50 **Time: 2 Hours**

The figures in the right-hand margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

1. Answer any FOUR questions from the following: **4×2=08**

a) Define goal programming problem.
b) Write the advantages of revised simplex method.
c) Write the limitations of Fibonacci searching method.
d) Write the condition when we have to apply dual simplex method to solve an LPP?
e) State the integer programming problem.
f) Explain the deletion of an existing variable from the optimal table of an LPP

2. Answer any FOUR questions from the following: **4×4=16**

a) Explain the concepts of deviational variables in goal programming problems.
b) Is it possible to obtain the optimal integer solution of an IPP after neglecting integer restrictions and round-off the optimal solution of the corresponding LPP? Justify.
c) Write the steps of Davidson-Fletcher-Powell method.
d) Maximize $f(x) = \begin{cases} 2x/3, & x \leq 3 \\ 5-x, & x > 3 \end{cases}$ in the interval $[0,4]$ by Golden Section method using $n = 4$.
e) Explain the effect of adding of an existing variable from the optimal result of an LPP.
f) Explain the concepts of deviational variables in goal programming problems.

3. Answer any TWO questions from the following: **2×8=16**

a) Solve the following IPP using branch-and-bound method

$$\begin{aligned} &Maximize\ z = 2x_1 + 2x_2 \\ &subject\ to\ 5x_1 + 3x_2 \leq 8 \\ &\qquad x_1 + 2x_2 \leq 4 \\ &x_1, x_2 \geq 0\ and\ are\ integers \end{aligned}$$

b) Minimize $f(x) = \begin{cases} 2\sqrt{x}, & x \leq 1 \\ 3-x, & x > 1 \end{cases}$ in the interval $[0,4]$ by Fibonacci method using $n = 7$. 6+2

c) Write down the procedure of Golden section method.

d) Derive the conditions of the range of discrete changes of the component of cost vector of the LPP

Maximize $Z=CX$
subject to $AX=b$
and $X\geq 0$

such that the optimal solution does not alter.

[Internal Assessment- 10 Marks]

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