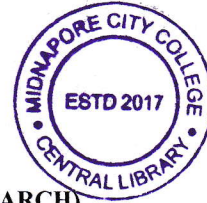


PG (CBCS)
M.Sc. Semester- III Examination, 2023
MATHEMATICS
PAPER: MTM 305 B



(ADVANCED OPTIMIZATION AND OPERATIONS RESEARCH)

Full Marks: 50

Time: 2 Hours

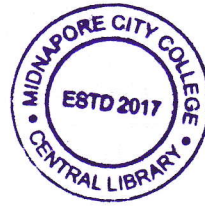
The figures in the right-hand margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **FOUR** questions from the following: 4×2=08
- Define goal programming problem.
 - Write the advantages of revised simplex method.
 - Write the limitations of Fibonacci searching method.
 - Write the condition when we have to apply dual simplex method to solve an LPP?
 - State the integer programming problem.
 - 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
- Explain the concepts of deviational variables in goal programming problems.
 - 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.
 - Write the steps of Davidson-Fletcher-Powell method.
 - 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 $n = 4$.
 - Explain the effect of adding of an existing variable from the optimal result of an LPP.
 - Explain the concepts of deviational variables in goal programming problems.
3. Answer any **TWO** questions from the following: 2×8=16
- Solve the following IPP using branch-and-bound method

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