VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
Accredited by NAAC with A+-- Grade
B.E. IV-Semester Advanced Supplementary Examinations, Aug./Sept.-2023
Optimization Methods (OE-II)

Time: **3 hours**

Max. Marks: **60**

Note: *Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	In minimization of LPP, when the problem is said to be optimal?	2	2	1	1
2.	Define optimization.	2	1	1	1
3.	What is infeasible solution?	2	1	2	1
4.	Explain when dual simplex method is used.	2	1	2	1
5.	Explain the method how to convert minimization problem to maximization in transportation.	2	2	3	1
6.	What is critical path?	2	1	3	1
7.	Show local minima and global minima relatively with figure.	2	1	4	1
8.	Classify single variable NLPP methods.	2	1	4	1
9.	Differentiate single variable and multi variable optimization.	2	1	5	1
10.	List few methods for multivariable optimization of NLPP.	2	1	5	1

Part-B (5 × 8 = 40 Marks)

		M	L	CO	PO
11. a)	Solve using simplex method Max Z= $3X_1 - 2X_2$ stc $$X_1 + X_2 \leq 5$$ $$X_2 \leq 1 \text{ where } X_1, X_2 \geq 0$$	6	3	1	4
b)	Explain (a) optimal basic feasible solution (b) Basic feasible solution	2	2	1	4
12. a)	Use Dual simplex method to Minimize $P = 5X_1 + 6X_2$ subject to $$X_1 + X_2 \geq 2$$ $$4X_1 + X_2 \geq 4 \qquad \text{and} \qquad X_1, X_2 \geq 0$$	6	3	2	4
b)	Explain (a) multi optimal solution (b) unbounded solution	2	2	2	4
13. a)	Find IBFS using Vogels approximation method.	6	3	3	4

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	2	3	11	7	6
	1	0	6	1	1
	5	8	15	9	10
demand	7	5	3	2	

b)	Explain the rules to draw network diagram.	2	2	3	4
14. a)	Find the minimum of $f(x) = X(2X-3)/2$ in the interval (0,1) using Fibonacci method, take n=6.	6	4	4	4
b)	Explain monotonic function with graphs.	2	2	4	4
15. a)	Use Steepest descent method to minimize $f(X_1,X_2)= 4 \cdot X_1^2+3X_2^2-5X_1X_2-8X_1$ starting from (0,0).	6	4	5	4
b)	Explain the two steps involved in Hook Jeeves pattern search method.	2	2	4	4
16. a)	Solve Graphically $\quad$ Max $Z=5X_1+2X_2$ $$STC \qquad\qquad 2X_1 + 4X_2 \leq 4$$ $$5 X_1 + 10 X_2 \geq 20 \quad \text{and} \quad X_1, X_2 \geq 0$$	4	3	1	4
b)	Find dual for the following LPP $$MAX\ Z = 2X_1 - 3X_2 \text{ subject to}$$ $$3 X_1 +2 X_2 \leq 8$$ $$4X_1 - X_2 \leq 10$$ $$\text{and } X_1, X_2 \geq 0$$	4	3	2	4
17.	Answer any **two** of the following:				
a)	Explain how to convert maximization problem to minimization in transportation with an example.	4	2	3	4
b)	Minimize $f(x) = x^2+(54/x)$ in the interval (0,5) using exhaustive search method.	4	2	4	4
c)	Minimize $f(X_1,X_2) =- X_1-X_2+6X_1^2-6X_1X_2+2X_2^2$ using univariate method with starting point (0,)) and the probe length 0.01	4	2	5	4

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	32.5%
iii)	Blooms Taxonomy Level – 3 & 4	47.5%

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