Hall Ticket Number:

Code No. : 16110 N(G)

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (CBCS) VI-Semester Main Examinations, May-2019

Optimization Methods for Engineers

(Open Elective-VII)

Time: **3** hours Max. Marks: **70**

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

Q.No.	Stem of the question	M	L	CO	PO
	Part-A (10 × 2 = 20 Marks)				
1.	Define basic solution.	2	1	1	5
2.	List the special cases in linear programming problems.	2	1	1	5
3.	Differentiate between simplex and dual simplex method.	2	1	2	9
4.	Write the dual form for the following L.P.P. $Maximize\ z = 8x_1 + 12x_2 + 3x_3$ *subjected to conditions* $x_1 + 8x_2 + 2x_3 \geq 90$ $6x_2 + 12x_3 \leq 84$ $x_1, x_2, x_3 \geq 0$	2	3	2	9
5.	What is an unbalanced transportation problem and how to solve it?	2	1	3	5
6.	State the condition for degeneracy in a transportation problem.	2	2	3	5
7.	What is the importance of float?	2	3	4	11
8.	Classify multi-dimensional constrained optimization problems and suggest solution methods for each of them.	2	1	4	9
9.	How many basic solutions are possible if m equations with equality constraints and n variable and n is more than m?	2	3	1	5
10.	State the advantages of direct substitution method for a multi dimensional optimization problem.	2	1	4	5
	Part-B (5 × 10 = 50 Marks)				
11.	Solve the following LPP by simplex method Maximize $Z= 5X_1+8X_2$, subject to the constraints: $3X_1+2X_2 \geq 3$, $X_1+4X_2 \geq 4$, $X_1+X_2 \leq 5$ and $X_1, X_2, \geq 0$	10	1	1	5
12.	Solve the following LPP by dual simplex method Maximize $Z= -2X_1-3X_2$, subject to the constraints: $X_1+X_2 \geq 2$, $2X_1+4X_2 \leq 10$, $X_1+X_2 \leq 8$ and $X_1, X_2, \geq 0$	10	2	2	5

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13.	Determine the optimum solution to the following transportation problem. Cost matrix is shown below:	10	3	3	9

	A	B	C	D	E	AVAILABLE
I	12	4	9	5	9	55
III	8	1	6	6	7	45
III	1	12	4	7	7	30
IV	10	15	6	9	1	50
REQUIRED	40	20	50	30	40	

14	Construct network diagram and identify the critical path for the following project. i) If the activity 5-6 is delayed by 2 days what is the affect on project completion.? ii) Find the float for an activity 2-5,4-6, 6-7.	10	3	4	11

Activity	1-2	1-3	2-3	2-5	3-4	3-6	4-5	4-6	5-6	6-7
Duration (weeks)	15	25	3	5	8	12	1	14	3	14

15. a)	How do you identify alternative optimal solution in Graphical method, show by graph with a suitable example and Simplex method.	6	1	1	5
b)	Define the term duality and explain how duality is helpful with an example.	4	2	2	9
16. a)	Find the initial solution by least cost method for the following transportation problem.	5	2	3	5

		D1	D2	D3	D4	Supply
Plant	P1	12	7	10	10	40
	P2	10	9	7	10	30
	P3	14	12	9	12	30
	Demand	30	25	15	20	

b)	Minimize $f(x_1,x_2)= x_1^2+ (x_2-1)^2$ Subjected to $-2 x_1^2+ x_2=4$	5	2	4	5
17.	Answer any ***two*** of the following:				
a)	Solve the following LPP by graphical method Minimize $Z= 80X_1+120X_2$, subject to the constraints: $X_1+X_2 \leq 9$, $2X_1+5X_2 \leq 36$, $X_1 \geq 2$ $X_2 \geq 3$ and $X_1, X_2 \geq 0$	5	1	1	5
b)	Explain the Modi method by taking a suitable example.	5	2	3	9
c)	Use Univariate method to minimize $f(x_1,x_2)= x_1-x_2+2x_1^2+2x_1x_2+x_2^2$ with starting point (0,0) and probe length $\Theta = 0.01$	5	2	4	9

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

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	72.64
2	Knowledge on application and analysis (Level-3 & 4)	27.36
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	--