BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: IMSC **SEMESTER : VI**
BRANCH: MATHS & COMP. **SESSION : SP/2024**

SUBJECT: MA309 OPTIMIZATION TECHNIQUES

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Two Graph paper to be supplied to the candidates in the examination hall.

		CO	BL
Q1a. Use the graphical method to solve the following LPP Min Z=3x+2y Subject to: 5x+y≥10 x+y≥6 x+4y≥12 x,y≥0	[5]	1	1,2,3
Q1b.Solve by two phase method the LPP Min Z=7.5x-3y Subject to 3x-y-z ≥3 x-y+z≥2 x,y,z≥0	[5]	1	1,2,3,I

Q.2 A manufacturer wants to ship 8 loads his product as shown below.The matrix gives the kilometers from origin to the destination [10] 2,1,2,3,II

		DESTINATION			
		A	B	C	Availability
ORIGIN	X	50	30	220	1
	Y	90	45	170	3
	Z	250	200	50	4
	REQUIREMENT	3	3	2	

Shipping costs are Rs. 10 per load per kilometer. What shipping schedule should be used? Apply VAM & MODI method.

Q.3.Use branch and Bound method to solve the following LPP [10] 3,1,2,3,III
Maximize Z=3x+2y
Subject to:
2x+5y≤9
4x+2y≤9
x,y≥0 and integer

Q.4.A project schedule has the following characteristics: [10] 4,1,2,3IV

Activity	1-2	1-3	2-4	3-4	3-5	4-9	5-6	5-7	6-8	7-8	8-10	9-10
Time(days)	4	1	1	1	6	5	4	8	1	2	5	7

Construct a network diagram. Compute earliest event time and latest event time.
Determine the critical path and total project duration.

PTO

Q.5 A manufacturing company processes 6 different jobs on two machines A and B. Number of units of each job and its processing times on A and B are given below. Find the optimal sequence, the total minimum elapsed time and idle time for either machine. [10] 5,1,2,3,V

Job No	Number of units of each job	Processing Time (in minutes)	
		Machine A	Machine B
1	3	5	8
2	4	16	7
3	2	6	11
4	5	3	5
5	2	9	7.5
6	3	6	14

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