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PRESIDENCY UNIVERSITY

BENGALURU

Mid - Term Examinations - March 2026

Date: 12- 03- 2026

Time: 09:30am - 11.00am

School: SOCSE	Program: B. Tech.	
Course Code: MAT3406	Course Name: COMPUTATIONAL OPTIMIZATION METHODS	
Semester: VI	Max Marks: 50	Weightage: 25%

CO - Levels	C01	C02	C03	C04	C05
Marks	12	12	26		

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2 marks.

5Q x 2M = 10M

1	Define operations research.	2 Marks	L1	C01
2	Define "solution" and "basic solution."	2 Marks	L1	C02
3	What is the transportation problem?	2 Marks	L1	C03
4	Write the differences between balanced and unbalanced transportation problems.	2 Marks	L2	C03
5	List the methods used to arrive at an initial basic feasible solution for a transportation model.	2 Marks	L1	C03

Part B

Answer the Questions. (6th Question is compulsory)

Total Marks 40M

6	a	Give Outline of Linear Programming Problem	8 Marks	L1	C02
	b	A TV company has to decide on the number of 27' inch and 20' inch TV sets to be produced at one of its factories. Market research indicates that at most 40 27' inch TV sets and at most 10 20 inch TV sets can be sold per month. The maximum number of work hours available is 500 hours/month. A 27' inch TV	7 Marks	L3	C02

		requires 20 work hours and a 20'inch TV requires 10 work hours. Each 27'inch TV sold produces a profit of Rs.120. and 20'inch TV sold produces a Rs.80. A wholesaler agrees to purchase all the TV set produced if the number do not exceed the maximum indicated by market research. Formulate this problem as LP Model.			
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Or

7	a	Write the steps involved in solving linear programming problem by using graphical method	7 Marks	L1	CO2
	b	Solve the following LPP by Graphical Method Maximize $Z = 5x + 4y$ Subject to the constraints $6x + 4y \leq 24$ $X + 2y \leq 6$ $-x + y \leq 1$ $y \leq 2$ and $x, y \geq 0$	8 Marks	L3	CO2

8	Find the initial solution for the given transportation problem by using any two methods of your choice.						15 Marks	L3	CO3	
		I	II	III	IV	V				Availa bility
	A	3	4	8	8	9				20
	B	2	10	1	5	8				30
	C	7	11	20	40	3				15
	D	2	1	9	14	16				13
Requir ement	40	6	8	18	6					

Or

9	A company has factories at A, B and C which supply warehouses at D, E, F, and G. The monthly factory capacities are 160, 150 and 190 units, respectively. Monthly warehouse requirements are 80, 90, 110 and 160, respectively. Unit shopping costs (in rupees) are as follows:					15 Marks	L3	CO3	
		To							
	From		D	E	F				G
	A	42	48	38	37				
B	40	49	52	51					
C	39	38	40	43					
Determine the Initial basic feasible solution by using Vogel's Approximation Method for this company to minimize shipping costs.									

10	a	Define assignment Problem	3 Marks	L1	CO3
	b	A company produces a single product and sells it through five agencies in the different cities. All of a sudden, there is a demand for the product in five more cities that do not have any agencies	7 Marks	L3	CO3

for the company. The company is faced with the problem of deciding how to assign the existing agencies to dispatch the product to the additional cities in such a way that the traveling distance is minimized. The distances (in km) between the surplus and the deficit cities are given in the following distance matrix:

To city	I	II	III	IV	V
From city					
A	160	130	175	190	200
B	135	120	130	160	175
C	140	110	155	170	185
D	50	50	80	80	110
E	55	35	70	80	105

Determine the optimum assignment schedule.

Or

A travelling salesman has to visit 5 cities. He wishes to start from a particular city, visit each city once and then return to his starting point. Cost of going from one city to another city shown below. You are required to find the least cost route.

		To city				
		A	B	C	D	E
From city	A	∞	4	10	14	2
	B	12	∞	6	10	4
	C	16	14	∞	8	14
	D	24	8	12	∞	10
	E	2	6	4	16	∞

11

10 Marks

L3

CO3