PRN:		Course Code :	AMT 1702

Final Year B. Tech End Semester Examination Summer 2024

Optimization Techniques

Day and Date: 24 MAY 2024, Friday Max Marks: **100**

Time : @ 10:30 to 1:30 pm Duration: **03** hrs

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

			Marks	Bloom's Level	CO
Q.1		**Attempt the following**			
	a)	Define Operation Research? Explain methods of Operation Research.	08	L1	CO1
	b)	Explain history of Optimization Techniques?	08	L2	CO1
		OR			
	c)	Explain the applications of Optimization in Engineering?	08	L2	CO1
Q.2		**Attempt the following**			
	a)	Distinguish between active and inactive constraints in optimization with equality constraints.	08	L2	CO2
	b)	Elaborate the following concepts : - 1)Single Variable Optimization 2) Multi Variable Optimization	08	L2	CO2
		OR			
	c)	Explain the Kuhn-Tucker method and steps involved in it with an example.	08	L2	CO3
Q.3		**Attempt any two from the following**			
	a)	Solve the following LP problem Graphically Maximize $Z= 10x +8y$ Subject to $2x + y \leq 40$ $2x + 3y \leq 80$ Where $x, y \geq 0$	08	L3	CO3
	b)	Solve graphically the following LPP Maximize $Z= 3x_1 +4x_2$ Subject to $x_1 + x_2 \leq 450$ $2x_1 + x_2 \leq 600$ Where $x_1, x_2 \geq 0$	08	L3	CO3
	c)	Describe the pivotal reduction of general system of equations.	08	L5	CO3
Q.4		**Attempt any two from the following**			

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a) Solve the following assignment problem using Hungarian Method. 08 L3 CO4

Tasks

Men	I	II	III	IV
1	45	40	50	67
2	57	42	63	55
3	49	51	48	64
4	41	45	60	55

b) Solve the following travelling salesman problem. 08 L6 CO4

A salesman wants to visit cities A, B,C,D, E .He does not want to visit any city twice before completing his tour of all the cities and wishes to return to the point of starting journey. Cost of going from one city to another in rupees is given in table. Find the least cost route.

From City \ To City	A	B	C	D	E
A	0	2	5	7	1
B	6	0	3	8	2
C	8	7	0	4	7
D	12	4	6	0	5
E	1	3	2	8	0

c) Solve the following assignment problem 08 L5 CO4

Jobs

Persons	A	B	C	D	E
P1	27	18	-	20	21
P2	31	24	21	12	17
P3	20	17	20	-	16
P4	22	28	20	16	27
P5	0	0	0	0	0

Q.5 **Attempt any Two of the following**

a) Explain Transportation and Assignment problem 09 L4 CO5

b) Determine the initial basic feasible solution using NWCM. Also calculate the total transportation cost. 09 L5 CO5

		P	Q	R	S	Supply
	1	3	4	6	3	**30**
	2	3	5	7	10	**50**
	3	2	6	5	7	**70**
Demand		**22**	**41**	**44**	**43**	**150**

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c) Solve the Problem using VAM method and find optimum cost. 09 L3 CO5

	A	B	C	Supply
P	4	8	8	76
Q	16	24	16	82
R	8	16	24	77
Demand	72	102	41	

Q.6 **Attempt any Two of the following**

a) Find the saddle point and hence solve of the following game 09 L6 CO6

		Player B		
		I	II	III
Player A	I	-2	14	-2
	II	-5	-6	-4
	III	-5	20	-8

b) Solve the following game using principle of dominance and determine the value of game. 09 L3 CO6

		Player B		
Player A	I	II	III	IV
1	3	2	4	0
2	3	4	2	4
3	4	2	4	0
4	0	4	0	8

c) Define Game Theory. Analyze the types of game theory and define the two types among them. 09 L2 CO6

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