PRN: | Course Code : AMT1702

Final Year **B. Tech** End Semester Examination Winter 2023

Optimization Techniques

Day and Date: Thursday, 30/11/2023 Max Marks: **100**

Time : 2.00 to 5.00 pm Duration: **03** hrs

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

		Marks	Blooms Level	CO
Q.1	**Attempt the following**			
a)	Define OR?Describe various objectives of OR.	**08**	**L1**	**CO1**
b)	Explain and elaborate Optimization Techniques?	**08**	**L2**	**CO1**
	OR			
b)	Explain the applications of Optimization in Engineering?	**08**	**L2**	**CO1**
Q.2	**Attempt the following**			
a)	Explain the Kuhn-Tucker method and steps involved in it with an example.	**08**	**L2**	**CO2**
b)	Explain classical optimization techniques and their significance in problem-solving.	**08**	**L2**	**CO2**
	OR			
b)	Distinguish between active and inactive constraints in optimization with equality constraints.	**08**	**L4**	**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 steps involved in solving a linear programming problem using the Simplexmethod	**08**	**L5**	**CO3**

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Q.4 **Attempt any two from the following**

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 returnto the point of startingjourney. 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**

Persons \ Jobs	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) Distinguish between 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**

		Warehouse P	Q	R	S	Supply
Factory	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 calculate transportation cost. **09** **L3** **CO5**

	W1	W2	W3	W4	Supply
F1	23	27	16	18	**30**
F2	12	17	20	51	**40**
F3	22	28	12	32	**53**
Demand	**22**	**35**	**25**	**41**	**123**

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**

		PlayerB		
PlayerA	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, name the types of game theory and define the two types among them. **09** **L1** **CO6**

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