O.P.Code:23HS0852 | R23 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year II Semester Supplementary Examinations December-2025
OPTIMIZATION TECHNIQUES
(Common to CAI, CSM & CSIT)

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

PART-A
(Answer all the Questions **10 x 2 = 20** Marks)

1	a	Define Nature and Scope of OR.	CO1	L1	2M
	b	Define Optimization.	CO1	L1	2M
	c	Define Basic Feasible Solution.	CO2	L1	2M
	d	State the difference between Transportation problem and Assignment problem.	CO2	L2	2M
	e	Define Idle time on a machine.	CO3	L1	2M
	f	Define total elapsed time.	CO4	L1	2M
	g	Define Two person zero sum game.	CO5	L1	2M
	h	Define mixed strategy & pure strategy.	CO5	L1	2M
	i	Define Free float.	CO6	L1	2M
	j	Define Optimistic time.	CO6	L1	2M

PART-B
(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2		Solve the following Linear Programming Problem using Simplex method.Maximize $Z = 10x_1 + 15x_2 + 20x_3$ Sub. to $2x_1 + 4x_2 + 6x_3 \leq 24$ $3x_1 + 9x_2 + 6x_3 \leq 30$ $x_1, x_2 \text{ and } x_3 \geq 0$	CO1	L3	10M

OR

3		Solve the following Linear Programming Problem using Big-M method. Minimize $z = 2x_1 + 3x_2$ Sub. to $x_1 + x_2 \geq 6$ $7x_1 + x_2 \geq 14$ $x_1, x_2 \geq 0$	CO1	L3	10M

UNIT-II

4	a	Obtain the initial basic feasible solution by using NWCR to the following Transportation Problem	CO2	L5	5M

	D_1	D_2	D_3	Availability
O_1	2	7	4	5
O_2	3	3	1	8
O_3	5	4	7	7
O_4	1	6	2	14
Require	7	9	18	

	b	Explain about Hugarian algorithm for solving an assignment problem.	CO2	L2	5M

OR

5	Find the intial basic feasible solution using NWCR,LCM,VAM and compare total costs	CO2	L1	10M

	M1	M2	M3	M4	M5	Supply
P1	10	2	16	14	10	300
P2	6	18	12	13	16	500
P3	8	4	14	12	10	825
P4	14	22	20	8	18	375
Demand	350	400	250	150	400	

UNIT-III

6	Six jobs go first over machine I and then over the machine II. The following table gives the machine times in hours for six jobs and the two machines.	CO3	L5	10M

jobs	1	2	3	4	5	6
Time on Machine I	5	9	4	7	8	6
Time on Machine II	7	4	8	3	9	5

OR

7	Find the optimum sequence of the jobs on three machines A,B and C in the order ABC which minimizes the total elapsed time.also find idle time for machines A,B and C the Processing times are given below	CO4	L5	10M

Jobs	Processing times in hours		
	Machine-A	Machine-B	Machine-C
1	8	3	8
2	3	4	7
3	5	5	6
4	2	1	9
5	7	2	10
6	1	6	9

UNIT-IV

8	Player A and B play a game in which each player has three coins (20p, 25p and 50p) each of them selects a coin without the knowledge of the other person.if the sum of the values of the coin is an even number, A wins B'scoin.if the sum of an odd number B wins A's coin (a) Develop a payoff matrix with respect to player A(b) Find the optimal strategies for the players.	CO5	L5	10M

OR

9	Solve the following 3×5 game using dominance property	CO5	L5	10M

	Player A					
Player B		1	2	3	4	5
	1	3	0	6	-1	7
	2	-1	5	-2	2	1

UNIT-V

10 Draw the network diagram and identify critical path for the following data. **CO6 L5 10M**

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

OR

11 Consider the following table summarizing the details of a project **CO6 L5 10M**

(i) construct the project network

(ii) find the critical path and expected project completion time

(iii) what is the probability of completing the project on or before 22 weeks

Activity	predecessor	Duration(weeks)		
		O	M	P
A	-	5	6	7
B	-	1	3	5
C	-	1	4	7
D	A	1	2	3
E	B	1	2	9
F	C	1	5	9
G	C	2	2	8
H	E,F	4	4	10
I	D	2	5	8
J	H,G	2	2	8

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