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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech IV Year I Semester Supplementary Examinations August-2021

OPERATIONS RESEARCH

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 Solve the following LPP by Dual Simplex method 12M
 Minimize $Z = X_1 + 2X_2 + 3X_3$,
 Subjected to $2X_1 - X_2 + X_3 > 4$, $X_1 + X_2 + 2X_3 < 8$, $X_2 - X_3 > 2$
 and X_1, X_2 & $X_3 > 0$

OR

- 2 A person requires at least 10 and 12 units of chemicals A and B respectively, for this garden. A liquid product contains 5 and 2 units of A and B respectively per bottle. A dry product contains 1 and 4 units of A and B respectively per box. If the liquid product sales for Rs.30 per bottle, dry product sales for Rs. 40 per box. How many of each should be purchased in order to minimize the cost and meet the requirements? Formulate the L.P.P. 12M

UNIT-II

- 3 The processing time in hours for the jobs when allocated to the different machines is indicated below. Assign the machines for the jobs so that the total processing time in min. 12M

	1	2	3	4	5
1	9	22	58	11	19
2	43	78	72	50	63
3	41	28	91	37	45
4	74	42	29	49	39
5	36	11	57	22	25

OR

- 4 Consider the problem of assigning five operators to five machines. The assignment costs are given in following Table 12M

	M 1	M	M	M	M 5
A	7	7	-	4	8
B	9	6	4	5	6
C	11	5	7	-	5
D	9	4	8	9	4
E	8	7	9	11	11

UNIT-III

5 Solve the following GAME, using the Dominance Principle

12M

Firm A	Firm B				
	4	6	5	10	6
	7	8	5	9	10
	8	9	11	10	9
	6	4	10	6	4

OR

6 Find the saddle point following GAME

12M

Player A	Payer B					
		I	II	III	IV	V
	I	9	3	1	8	0
	II	6	5	4	6	7
	III	2	4	4	3	8
IV	5	6	2	2	1	

UNIT-IV

- 7 a What is mean by sequencing Problem and Define total elapsed time.
 b Determine the sequence for the jobs and the total elapsed time

6M
6M

	A	B	C	D	E	F	G	H	I
Machine1	4	7	6	11	8	10	9	7	6
Machine2	8	10	9	6	5	11	5	10	13

OR

8 A project has the following schedule. Construct PERT network and compute the total float for each activity. Find critical path and its duration. Also calculate Total Float, Free Float, Construct PERT network and compute the total float for each activity. Find critical path with its duration

12M

Activity	Time in mon	Activity	Time in mon	Activity	Time in mon
1-2	2	3-6	1	6-9	3
1-4	2	4-5	5	7-8	3
1-7	1	4-8	8	8-9	3
2-3	4	5-6	4		

UNIT-V

- 9 a Explain the Bellman's principle of optimality.
 b Describe the various types of replacement situations and Explain about group replacement.

6M
6M

OR

10 A truck owner from his past records that the maintenance costs per year of a truck whose Purchase price is Rs.8000 areas given below. When should the machine be replaced?

12M

Year(n)	1	2	3	4	5	6	7	8
Running cost	1000	1300	1700	2000	2900	3800	4800	6000
Resale Price (Rs)	4000	2000	1200	600	500	400	400	400

*** END ***