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

B.Tech IV Year I Semester Regular Examinations February-2022

OPERATIONS RESEARCH

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

PART-A

(Answer all the Questions 5 x 2 = 10 Marks)

- | | | | |
|---|--|----|----|
| 1 | a Explain the procedure to solve the LPP. | L2 | 2M |
| | b What is the importance of Travelling salesman problem. | L1 | 2M |
| | c Discuss the importance of Queuing Theory. | L2 | 2M |
| | d Explain the Activities and Events. | L2 | 2M |
| | e Explain the Failure mechanism of items. | L2 | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

- | | | | |
|---|--|----|-----|
| 2 | Solve the following LPP by Simplex method.
Minimize $Z = 3X_1 + 2X_2 + 5X_3$, Subjected to $X_1 + 2X_2 + X_3 < 430$, $3X_1 + 2X_3 < 460$,
$X_2 + 4X_3 < 420$ & X_1, X_2 & $X_3 > 0$ | L3 | 10M |
|---|--|----|-----|

OR

- | | | | |
|---|---|----|-----|
| 3 | Solve the following problem by using Big-M-method Maximize $z = X_1 + 2X_2 + 3X_3 - X_4$
subjected to : $X_1 + 2X_2 + 3X_3 = 15$, $2X_1 + X_2 + 5X_3 = 20$, $X_1 + 2X_2 + X_3 + X_4 = 10$ and x_1, x_2, x_3, x_4
≥ 0 | L3 | 10M |
|---|---|----|-----|

UNIT-II

- | | | | |
|---|--|----|-----|
| 4 | Solve the following transportation problem to maximize profit. | L3 | 10M |
| | | L5 | |

	A	B	C	D	SUPPLY
P	40	25	22	23	100
Q	44	35	30	30	30
R	38	38	28	30	70
DEMAND	40	20	60	30	

OR

- | | | | |
|---|---|----|-----|
| 5 | A department has 5 employees and five jobs are to be performed. The time each man will take to perform each job is given in the following table below. How the job should be Allocated one per employee, so as to minimize the total man-hours. | L1 | 10M |
|---|---|----|-----|

<u>MACHINES</u>	A	B	C	D	E
JOBS					
1	9	3	10	13	4
2	8	17	13	20	5
3	5	14	8	11	6
4	11	13	9	12	3
5	12	8	14	16	7

UNIT-III

6 a Find the saddle point following GAME

L1 5M

Player A		Player 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

b Find the optimal strategy of following GAME

L1 5M

Player A		Player B		
		I	II	III
	I	-3	-2	6
	II	2	0	2
III	5	-2	-4	

OR

7 a State briefly the applications of queuing models.

L1 5M

b What are the limitations for Applications of queuing Theory?

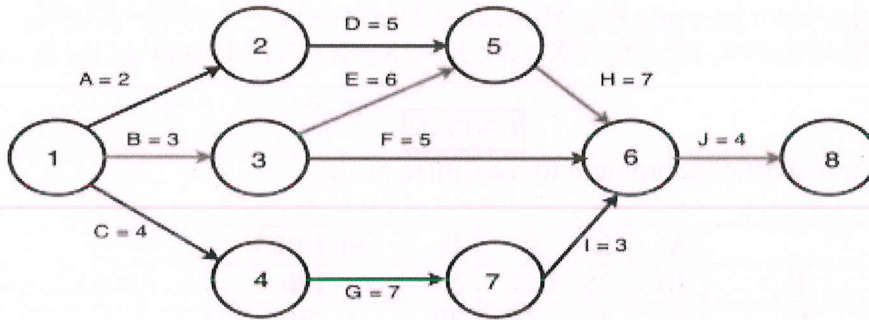
L1 5M

UNIT-IV

8 Find the critical path and calculate the Total float ,Free float

L1 10M

L6



OR

9 a Explain the following i) critical event ii) critical activity iii) Total float iv) Free float

L1 5M

b What is meant by critical path and explain the main features of critical path.

L6 5M

UNIT-V

10 A manufacturer finds from his past records that cost per year associated with a machine with a purchase price of Rs 50,000/- are as given below. Determine the optimum policy.

L5 10M

YEAR	1	2	3	4	5	6	7	8
Running cost (MC) in Rs.	15000	16000	18000	21000	25000	29000	34000	40000
Scrap value	35000	25000	17000	12000	10000	5000	4000	4000

11 a Explain the Bellman's principle of optimality.

L2 5M

b Describe the various types of replacement situations and Explain about group replacement.

L2 5M

END