O.P.Code: 20ME0336 | R20 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech IV Year I Semester Regular Examinations February-2024
OPERATION 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 Minimize Z= X1- 3X2+3X3 Subjected to 3X1-X2+2X3 < 7, 2X1+4X2 > -12 ,-4X1+3X2+8X3 < 10 and X1,X2, X3 > 0	CO1	L1	12M

OR

2	Solve the following Problem by Graphical method Maximize Z = 6X1 + 10X2 ,Subjected to X1+X2 < 70, X1 < 40, X2 > 20, 2X1 +3X2 < 300 .	CO1	L3	12M

UNIT-II

3	Solve the following transportation problem	CO2	L3 L5	12M

	A	B	C	D	AVAILABLE
P	4	6	8	13	50
Q	13	11	10	8	70
R	14	4	10	13	30
S	9	11	13	8	50
REQUIRED	25	35	105	20	

Determine the Shipping scheme by the Northwest corner Rule and Test the above solution for Optimality

OR

4	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.	CO2	L1	12M

MACHINES / JOBS	A	B	C	D	E
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

5	a	State briefly the applications of queuing models.	CO3	L1	6M
	b	What are the limitations for Applications of queuing Theory	CO3	L1	6M

OR

6	Solve the following game, using the Dominance Principle.	CO3	L3	12M

Firm A	Firm B					
	B1	B2	B3	B4	B5	B6
A1	4	2	0	2	1	1
A2	4	3	1	3	2	2
A3	4	3	7	-5	1	2
A4	4	3	4	-1	2	2
A5	4	3	3	-2	2	2

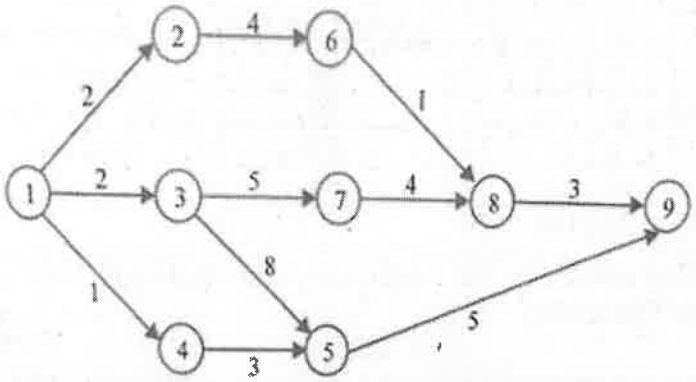
UNIT-IV

7	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 withits duration.	CO4	L1	12M

Activity	Time in month	Activity	Time in month	Activity	Time in month
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		

OR

8	Find the critical path and calculate the slack time for each event for the following PERT diagram.	CO4	L1 L6	12M



UNIT-V

9	a	What is mean by sequencing Problem and Define total elapsed time.	CO4	L1	6M
	b	Determine the sequence for the jobs and the total elapsed time.	CO4	L3	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

10	Find the sequence that minimizes the total elapsed time required to complete the following Tasks on the machines in the order 1 – 2 – 3. Find also the minimum total elapsed time and the ideal times on the machines.	CO4	L1 L3	12M

Tasks time on Machines		A	B	C	D	E	F	G
	1	3	8	7	4	9	8	7
	2	4	3	2	5	1	4	3
	3	6	7	5	11	5	6	12

*** END ***