SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. IV Year I Semester Regular & Supplementary Examinations December-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 $Z = X_1 - 3X_2 + 3X_3$ Subjected to $3X_1 - X_2 + 2X_3 \le 7$, $2X_1 + 4X_2 \ge -12$, $-4X_1 + 3X_2 + 8X_3 \le 10$ and $X_1, X_2, X_3 \ge 0$	CO1	L3	12M

OR

2	a	Describe the applications of Operations Research.	CO1	L1	6M
	b	Explain the types of operation Research models.	CO1	L2	6M

UNIT-II

3 Determine the basic Feasible solution to the following Transportation problem using NWC, VCM and VAM?   CO2   L5   12M

	A	B	C	D	E	SUPPLY
P	2	11	10	3	7	4
Q	1	4	7	2	1	8
R	3	9	4	8	12	9
DEMAND	3	3	4	5	6	

OR

4	a	Interpret the concept of balanced transportation problem.	CO2	L2	6M
	b	Describe the travelling salesman problem.	CO2	L1	6M

UNIT-III

5 Solve the following GAME, using the Dominance Principle.   CO3   L3   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 In a railway marshalling yard, goods trains arrive at a rate of 30 trains per day, assuming that the inter-arrival time follows an exponential distribution and the service time distribution is also exponential with an average of 36 minutes. Calculate a).Expected queue size b).Probability that the queue size exceeds 10. If the input of trains increases to an average of 33 per day what will be the change in (a) and (b).   CO3   12M

7   A project has the following schedule. Construct PERT network &compute the total float foreach activity. Find critical path and its duration .Also calculate Total Float, Free Float.   CO4   L5   12M

Activity	1-2	1-3	2-4	3-4	3-5	4-9	5-6
Time in weeks	4	1	1	1	6	5	4
Activity	5-7	6-8	7-8	8-9	8-10	9-10	
Time in Weeks	8	1	2	1	8	7	

OR

8   a   Explain the Forward Pass computations for Earliest Event Time in detail.   CO4   L2   6M

    b   Describe the following :   CO4   L1   6M

      i) critical event   ii) critical activity   iii) Total float   iv) Free float

9   The cost of a machine is Rs6100 and its scrap value is Rs.100.The maintenance costs found From experience are as follows. When should the machine be replaced?   CO5   L5   12M

Year (n)	1	2	3	4	5	6	7	8
Running M/C Cost in Rs	100	250	400	600	900	1200	1600	2000

OR

10   a   Explain the Bellman's principle of optimality.   CO5   L2   6M

     b   Describe briefly about Individual Replacement model.   CO5   L1   6M

*** END ***