SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech IV Year I Semester Supplementary Examinations June-2024
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 by using Big-M method Maximize $Z=2X_1+3X_2+4X_3$, Subjected to $3X_1+X_2+4X_3< 600$, $2X_1+4X_2+2X_3> 480$, $2X_1+3X_2+3X_3= 540$ and $X_1,X_2,X_3> 0$	L1	L4	12M

OR

2	Solve the following LPP using Simplex method Maximize $Z=3X_1+5X_2+4X_3$, Subjected to: $2X_1+3X_2 \leq 8$, $2X_2+5X_3 \leq 10$, $3X_1+2X_2+4X_3\leq15$ and $X_1,X_2,X_3\geq 0$	L1	L4	12M

UNIT-II

3   Solve the following transportation problem   L2   L3   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	

OR

4   Consider the problem of assigning five operators to five machines. The   L2   L2   12M
assignment costs are given in followingTable

	M1	M2	M3	M4	M5
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	a	State briefly the applications of queuing models.	L3	L1	6M
	b	What are the limitations for Applications of queuing Theory	L3	L1	6M

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 queuesize b).Probability that the queue size exceeds10. If the input of trains increases to an average of 33 per day what will be the change in (a) and (b).	L3	L4	12M

7   A project has the following schedule. Construct PERT network &   L4   L6   12M
     compute the total float for each activity. Find critical path and its
     duration. Also calculate Total Float, Free Float

Activity	1-2	1-3	2-4	3-4	3-5	4-9	5-6
Timein weeks	4	1	1	1	6	5	4
Activity	5-7	6-8	7-8	8-9	8-10	9-10	
Timein weeks	8	1	2	1	8	7	

OR

8   a   List similarities and differences between PERT and CPM.   L4   L1   6M
    b   State the rules for drawing network diagram.   L4   L1   6M

UNIT-V

9   Find the sequence that minimizes the total elapsed time required to   L5   L1   12M
     complete the following Tasks on the machines in the order1–2–3. Find
     also the minimum total elapsed time and the ideal times on the machines.

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

OR

10   a   What are the sequential steps involved in sequencing jobs.   L5   L1   6M
     b   Discuss briefly about Individual Replacement model.   L5   L6   6M

*** END ***