

Q.P. Code: 10ME524

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

B.Tech IV Year I Semester Supplementary Examinations February-2022
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 Problem by Graphical method Maximize $Z = 6X_1 + 10X_2$, Subjected to **12M**
 $X_1 + X_2 < 70$, $X_1 < 40$, $X_2 > 20$, $2X_1 + 3X_2 < 300$, $x_1, x_2 > 0$

OR

- 2 a Define operations research. How OR is useful for decision makers **6M**
b What are the limitations of linear programming technique **6M**

UNIT-II

- 3 Determine the basic Feasible solution to the following Transportation problem using **12M**
NWC, VCM and VAM

	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 What do you mean by balanced transportation problem, Explain with an example? **7M**
b What is travelling salesman problem **5M**

UNIT-III

- 5 a Find the saddle point following GAME **6M**

	Payer B					
	I	II	III	IV	V	
Player A	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 i) What is Queuing Theory and what are the elements of Queuing system? **6M**
ii) Explain Pure strategy and Mixed strategy

OR

- 6 a Solve the following GAME, using the Dominance Principle

6M

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

- b 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
- i) Expected queue size ii) 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 (i) and (ii).

6M

UNIT-IV

- 7 Determine the sequence for the jobs and the total elapsed time

12M

	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 List similarities and differences between PERT and CPM
- b State the rules for drawing network diagram.

6M

6M

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 are as given below. When should the machine be replaced?

12M

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

*** END ***