Code No: P18MEE03

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
III B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH/APRIL - 2023
OPERATIONS RESEARCH
(ME Branch)

Time: 3 hours Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answer all the questions in Part-A (5X2=10M)

Q.No.		Questions	Marks	CO	KL
1.	a)	Characteristics of OR	[2M]	1	
	b)	Explain Group Replacement	[2M]	2	
	c)	Write formulation of transportation problem.	[2M]	3	
	d)	Write the classification of Queuing models	[2M]	4	
	e)	Explain tools for project management	[2M]	5	

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	C	KL
		UNIT-I			
2.		Solve the following LPP by using Simplex method. Max. $Z = 3x_1 + 2x_2 + 5x_3$ Subject To $x_1 + 2x_2 + x_3 \leq 430$ $3x_1 + 2x_3 \leq 460$ $x_1 + 4x_2 \leq 420$ $x_1, x_2, x_3 \geq 0$	[10M]	1	
		OR			
3.		Use Big-M method to solve the following LPP Max. $Z = 4x_1 + 5x_2 - 3x_3$ Subjected To $x_1 + x_2 + x_3 = 10$ $x_1 - x_2 \geq 1$ $2x_1 + 3x_2 + x_3 \leq 30$ $x_1, x_2, x_3 \geq 0$	[10M]	1	
		UNIT-II			
4.	a)	Briefly explain what you mean by "individual and group replacement policy".	[5M]	2	
	b)	Explain the types of failures in replacement of items.	[5M]	2	
		OR			
5.		Machine A costs Rs. 45000 and its operating costs are estimated to be Rs. 1000 for the first year increasing by Rs. 10000 per year in the second and subsequent years. Machine B costs Rs. 50000 and operating costs are Rs. 2000 for the first year, increasing by Rs. 4000 in the second and subsequent years. If at present we have a machine of type A, should we replace it with B? If so when? Assume that both machines have no resale value and their future costs are not discounted.	[10M]	2	
		UNIT-III			

6. Solve the following Transportation problem to find optimal cost. [10M] 3

Factory	Profit/Rs Unit				Supply
	A	B	C	D	
1	21	16	25	13	**11**
2	17	18	14	23	**13**
3	32	27	18	41	**19**
Demand	**06**	**10**	**12**	**15**	

OR

7. Solve the following assignment problem [10M] 3

	J_1	J_2	J_3	J_4
W_1	10	15	24	30
W_2	16	20	28	10
W_3	12	18	30	16
W_4	9	24	32	18

UNIT-IV

8. a) In a public telephone booth the arrivals are on average 15 per hour. A call on the average takes 3 min. If there is just one phone find (I). Expected number of callers in booth at any time. (II). Proportion of the time the booth is expected to be idle. [5M] 4

b) Explain the applications of waiting line theory. [5M] 4

OR

9. Solve the Game with the payoff matrix using dominance principle [10M] 4

	B_1	B_2	B_3	B_4
A_1	3	2	4	0
A_2	3	4	2	4
A_3	4	2	4	0
A_4	0	4	0	8

UNIT-V

10.		The following are the time estimates and the precedence relationships of the activities in a project network Draw the project network diagram. Determine the critical path, the project completion time, Total float, Free float and Independent float.	[10M]	5	

Activity	1-2	1-3	1-4	2-5	3-6	3-7	4-6	5-8	6-9	7-8	8-9
Time estimate (weeks)	2	2	1	4	8	5	3	1	5	4	3

OR

11.		The time estimates (in weeks) and other characteristics of a project are given below. Determine (i) Draw the network and find Critical path (ii) Expected to complete the project and also prepare activity schedule.	[10M]	5	

Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6
Optimistic time	1	1	2	1	2	2	3
Most likely time	1	4	2	1	5	5	6
Pessimistic time	7	7	8	1	14	8	15

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