

PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)
III B.Tech I Semester Supplementary Examinations, May - 2024

OPERATIONS RESEARCH
(Common to CE and EEE)

Time: 3 hours**Max. Marks: 70 M**

Answer ONE Question from each Unit
 All Questions Carry Equal Marks

Q. No.		Questions	BTL	CO	Marks
UNIT – I					
1.	a)	Explain in detail about the phases of operations research	K2	CO1	7M
	b)	Describe briefly the types of operations research models	K2	CO1	7M
OR					
2.	Solve the linear programming problem by using simplex method Max $Z = 3X_1 + 2X_2$ Subjected to $4X_1 + 3X_2 \leq 12$ $4X_1 - X_2 \leq 8$ $X_1, X_2 \geq 0$		K3	CO1	14M
UNIT – II					
3.	Solve the following transportation problem by Northwest corner rule, least cost and Vogel’s approximation method and compare them		K3	CO2	14M
OR					
4.	5 machines are to be assigned for 5 jobs. The cost of assigning each job to each machine is given in the following matrix. Which machine to be assigned to which job to minimize the total cost of assignment		K3	CO2	14M
UNIT – III					
5.	a)	Discuss in brief, replacement procedure for the items that deteriorate with time	K2	CO3	7M
	b)	A truck owner finds from his past records that the maintenance cost per year of a truck whose purchase price is Rs.8000, are given below	K3	CO3	7M

OR

6.	a)	Explain in detail about the procedure involved in n jobs through 3 machines	K2	CO3	7M																								
	b)	<p>We have 5 jobs each of which must go through the machines A, B and C in the order A-B-C. Determine sequence for job that will minimize the total elapsed time and idle time for each machine</p> <p style="text-align: center;">Processing time in hours</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr> <td>A</td><td>5</td><td>7</td><td>6</td><td>9</td><td>5</td></tr> <tr> <td>B</td><td>2</td><td>1</td><td>4</td><td>5</td><td>3</td></tr> <tr> <td>C</td><td>3</td><td>7</td><td>5</td><td>6</td><td>7</td></tr> </table> <p style="text-align: center;">Job Number</p>		1	2	3	4	5	A	5	7	6	9	5	B	2	1	4	5	3	C	3	7	5	6	7	K3	CO3	7M
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UNIT – IV

7.		<p>A self-service store employee has one cashier at its counter. Nine customers arrive on an average every five minutes while the cashier can serve 10 customers in 5 minutes. Assuming poisson distribution for arrival rate. Find</p> <p>i) Average number of customers in the system. ii) Average number of customers in queue. iii) Average time a customer spends in the system. iv) Average time a customer waits before served</p>	K3	CO4	14M
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OR

8.	a)	Explain in detail about the applications of dynamic programming	K2	CO4	7M
	b)	Describe briefly the bellman's principle of optimality	K2	CO4	7M

UNIT – V

9.	a)	An automobile factory manufactures a particular type of gear within factory. This gear is used in the final assembly. The particulars of this gear are: demand rate = 14000 units/year, production rate = 35,000 units/year, set-up cost, C_o = Rs.500 per set-up and carrying cost, C_c = Rs.15/unit/year. Find EOQ and Cycle time	K3	CO5	7M
	b)	What are costs that are involved in carrying inventory? Explain them in detail	K2	CO5	7M

OR

10.	a)	Describe the EOQ problem with multiple price breaks	K2	CO5	7M
	b)	An aircraft company uses rivets at a constant rate of 2,500 per year. Each unit costs Rs. 30. The company personnel estimate that it costs Rs.130 to place an order, and that the carrying cost of inventory is 10 percent per year. How frequently should orders be placed? Also determine the optimum size of each order	K3	CO5	7M