



Time:		Max.Marks: 100				
S.NO	Answer All Questions	Choice	Options	Marks	CO	CO BTL
1.	Explain convex optimization and give any two examples of a convex set	choice		10Marks	CO1	3
2.	Write down the standard form of LMI.			10Marks	CO1	3
3.	Illustrate Quadratic programming? Explain Wolfe's method for solving a quadratic programming problem.	choice		15Marks	CO1	3
4.	Solve the given quadratic problem using the Wolfe method $\text{Max } Z = 8x_1 + 10x_2 - 2x_1^2 - x_2^2$ subject to: $3x_1 + 2x_2 \leq 6$ and $x_1, x_2 \geq 0$			15Marks	CO1	3
5.	Solve the following Geometric Programming: $\text{Min } f(x) = 5x_1 + 20x_2 + 10(x_1)^{-1} (x_2)^{-1} \quad x_1, x_2 > 0$	choice		10Marks	CO2	3
6.	Write the standard form of Geometric programming problem. Give some examples of Monomials and Posynomials			10Marks	CO2	3
7.	Apply Separable Programming to solve the given optimization problem $\text{Maximize: } f(x) = 20x_1 + 16x_2 - 2x_1^2 - x_2^2 - (x_1 + x_2)^2$ Subject to: $x_1 + x_2 \leq 5$ $x_1 \geq 0, x_2 \geq 0$	choice		15Marks	CO2	3
8.	Solve the given Signomial Geometric programming problem $\text{Max } 5x_1^2 - x_2^2 x_3^4$ st $1.5x_2^{-1} x_3 - 2.5x_1^2 x_2^{-2} \geq 1$ $x_1, x_2, x_3 > 0$			15Marks	CO2	3

9.	Describe stochastic programming and its applications.	choice Q-10	10Marks	CO3	3														
10.	Analyse the Monte-carlo method with example		10Marks	CO3	3														
11.	Consider a farmer, who has 500 acres of land, and raise grain, corn and sugar beet. In winter he wants to decide how much land he should devote for each crop to get maximal profit in the next autumn. The farmer needs 200T of wheat and 240T of corn to feed his cattle. These amounts can be either raised by himself or bought from an external wholesaler. If more than this amount is produced, the exceeded part will be sold. Selling prices are 170\$ and 150\$ per ton of wheat and corn respectively. The purchase prices are 40% more than the selling price. Sugar beet sells at 36\$ per ton. However, there is a quota on sugar beet production, any amount in excess of the quota can be sold only at 10\$ per ton. The quota this year is 6000T. Based on experience, the farmer knows that the mean yield on his land is roughly 2.5T, 3T and 10T per acre for wheat, corn and sugar beets, respectively. And the planting costs are 150\$, 230\$ and 260\$ per acre respectively. Formulate the problem as a Linear Program.	choice Q-12	15Marks	CO3	3														
12.	A bakery keeps stock of a popular brand of cake. Daily demand based on experience is given below table. Consider the following sequence of random numbers 48, 78, 09, 51, 56, 77, 15, 14, 68, and 09. (i) Apply Monte Carlo method to solve the problem. (ii) Using the sequence simulate the demand for the next 10 days. (iii) Find the stock situation, if the owner of the bakery decides to make 35 cakes every day. (iv) Also estimate the daily average demand in the cakes on the basis of simulated data.		15Marks	CO3	3														
<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Daily demand</td> <td>0</td> <td>15</td> <td>25</td> <td>35</td> <td>45</td> <td>50</td> </tr> <tr> <td>Probability</td> <td>0.01</td> <td>0.15</td> <td>0.20</td> <td>0.50</td> <td>0.12</td> <td>0.02</td> </tr> </table>		Daily demand	0	15	25	35	45	50	Probability	0.01	0.15	0.20	0.50	0.12	0.02				
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13.	Describe the features of Evolutionary computation and its advantages.	choice Q-14	10Marks	CO4	3														
14.	Explain the steps involved in Particle Swarm Optimization.		10Marks	CO4	3														
15.	Analyze the steps involved in Simulated Annealing	choice Q-16	15Marks	CO4	3														
16.	Analyze the Double bridge experiment in Ant Colony Optimization.		15Marks	CO4	3														

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