Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(CSE Engg.) (EI-III) (2015 to 2017) (Sem.–3)

OPTIMIZATION TECHNIQUES

Subject Code : MTCS-303

Paper ID : [74160]

Time : 3 Hrs. Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

Q1 a) Write down the dual of the following LPP : (10)

Maximize $z = 3x_1 + 2x_2$

Subject to constraints

$3x_1 + x_2 \leq 12$; $x_1 + x_2 \leq 6$; $5x_1 + 3x_2 \leq 27$

$0 \leq x_1, x_2$

b) Explain in detail how sensitivity analysis is performed. (10)

Q2 a) How are the alternative optimal and unbounded solutions indicated in the simplex procedure for a LPP? (7)

b) Use Simplex method to solve the following problem (7)

Maximize $Z = 2x_1 + 3x_2$

Subject to constraints

$-x_1 + 2x_2 \leq 4$

$x_1 + x_2 \leq 6$

$x_1 + 3x_2 \leq 9$

$0 \leq x_1, x_2$

c) Write down the dual of the following LPP : (6)

Maximize $Z = 5x_1 + 6x_2$

Subject to constraints

$x_1 + 2x_2 = 5$

$-x_1 + 5x_2 \geq 3$

$0 \leq x_1, x_2$

Q3 a) Formulate the following problem as a linear programming problem. (12)

An animal feed company must produce 200 kg of a mixture consisting of ingredients 1 X and 2 X daily. 1 X costs Rs. 3 per kg and 2 X Rs. 8 per kg. Not more than 80 kg of 1 X can be used and at least 60 kg of 2 X must be used. Find how much of each ingredient should be used if the company wants to minimize the cost.

b) What are the necessary and sufficient conditions for the existence of a feasible solution for a transportation problem? If it has no such solution, how will you solve the problem? (8)

Q4 a) A garment company forecasts the following demands during the next three months: 200, 260, 240. It costs Rs 300 to produce a pair of garments with regular time labor (RT) and Rs. 400 with overtime labor (OT). During each month regular production is limited to 200 pairs, and overtime production is limited to 100 pairs. It costs Rs20 per month to hold a pair of garments in inventory. Formulate a balanced transportation problem to minimize the total cost of meeting the next three months of demand on time. (10)

b) Describe the use of binary linear programming in solving problems by using an example. (10)

Q5 How probabilistic dynamic programming is different from the deterministic dynamic programming? Describe the relation between dynamic and linear programming problems. (20)

Q6 What is travelling salesman problem? Explain the solution of travelling salesman problem with detailed algorithm using the dynamic programming. (20)

Q7 What is transport problem? Explain the solution of transport problem for unbalanced transport situation with detailed algorithm. (20)

Q8 Write a short note on following : (20)

a) Assignment problem

b) Decision Theory