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GAD-2326

Seat No._____

B. Sc. (Sem. V) Examination

November / December – 2013

CC-MAT-504-C : Operation Research - I

(New Course)

Time : 3 Hours] [Total Marks : 70

Instructions : (1) All questions are compulsory.
(2) Figures to the right indicate marks of the question.

1 (a) Prove that set of all feasible solution of a linear programming problem is a convex set. **10**

(b) Solve the given L.P.P. using Simplex method **10**

Minimize $Z = -5x_1 - 3x_2$

Subject to $x_1 + x_2 \leq 2$

$5x_1 + 2x_2 \leq 10$

$3x_1 + 8x_2 \leq 12$

$x_1, x_2 \geq 0$

OR

1 (a) Prove that an extreme point of the convex set of feasible solution is a basic feasible solution. **10**

(b) Solve the given L.P.P. using Simplex method. **10**

Maximize $Z = x_1 + x_2 + x_3$

Subject to $2x_1 + x_2 - x_3 \leq 2$

$-2x_1 + x_2 - 5x_3 \geq -6$

$4x_1 + x_2 + x_3 \leq 6$

$x_1, x_2, x_3 \geq 0$

2 (a) Define : 10

(i) Basic solution

(ii) Feasible solution.

(iii) Degenerate solution.

(iv) Artificial variable

(v) Convex set.

(b) Solve the following L.P.P. using Big M method. 10

Minimize $Z = 5x_1 + 3x_2$

Subject to $2x_1 + 4x_2 \leq 12$

$2x_1 + 2x_2 = 10$

$5x_1 + 2x_2 \geq 10$

$x_1, x_2 \geq 0$

OR

2 (a) Solve the following L.P.P. 10

Maximize $Z = 3x_1 + 5x_2$

Subject to $x_1 - 2x_2 \leq 6$

$x_1 \leq 10$

$x_2 \geq 1$

$x_1, x_2 \geq 0$

(b) Solve the following L.P.P. using two phase method : 10

Minimize $Z = -2x_1 - x_2$

Subject to $x_1 + x_2 \geq 2$

$x_1 + x_2 \leq 4$

$x_1, x_2 \geq 0$

3 (a) Prove that the dual of a dual is primal. **10**

(b) Solve the given integer programming problem using cutting plane method. **10**

Maximize $Z = x + 4y$

Subject to $2x + 4y \leq 7$

$5x + 3y \leq 15$

$x, y \geq 0$ and both are integers.

OR

3 (a) Prove that the value of the objective function $f(x)$ for any feasible solution of the primal is not less than the value of the objective function $\phi(y)$ for any feasible solution of the dual. **10**

(b) Solve the given L.P.P. using dual Simplex method.

Minimize $Z = 3x_1 + x_2$

Subject to $x_1 + x_2 \geq 1$

$2x_1 + 3x_2 \geq 2$

$x_1, x_2 \geq 10$

4 Attempt any **two** : **10**

(a) Solve the given L.P.P. using graphical method

Maximize $Z = 3x_1 + 4x_2$

Subject to $2x_1 + 5x_2 \leq 120$

$4x_1 + 2x_2 \leq 80$

$x_1, x_2 \geq 0$

(b) Classified the general relationship that exist between primal and dual of a L.P.P.

(c) Using two phase method solve the following L.P.P.

Maximize $Z = 5x + 3y$

Subject to $2x + y \leq 1$

$x + 4y \geq 6$

$x, y \geq 0$
