B.Sc. III B.327 Linear Programming 1/2

Q.1. In sensitivity analysis we deal with change in the optimal solution due to discrete variations in the parameters:

(a) c_i (b) a_{ij} (c) b_i (d) all of these

Q.2 To maintain optimality of current optimal solution for a change Δc_k in the coefficient c_k of non-basic variable x_k, we have:

(a) $\Delta c_k = z_k - c_k$ (b) $\Delta c_k \le z_k - c_k$

(c) $\Delta c_k > z_k - c_k$ (d) none of these

Q.3. Addition of a new constraint to the existing constraints of a L.P.P. will cause:

(a) a change in the objective function coefficients

(b) no change in the objective function coefficients

(c) a change in the existing optimal solution if it satisfying the new constraint

(d) none of these

Q.4. If the optimal solution to the L.P.P.

Max $Z = -x_1 + 2x_2 - x_3$, subject to $3x_1 + x_2 - x_3 \le 10$, $-x_1 + 4x_2 + x_3 \ge 6$ and $x_2 + x_3 \le 4$ $x_1, x_2, x_3 \ge 0$, find the range of b_1 constraint with optimal solution (given) $X_B = (6, 4, 10)$, $B^{-1} = \begin{bmatrix} 1 & 0 & -1 \\ 0 & 0 & 1 \\ 0 & -1 & 4 \end{bmatrix}$

and $x_1 = 0$, $x_2 = 4$, $x_3 = 0$ Max $Z = 8$.

(a) $4 \le b_1 < \infty$ (b) $-6 \le b_1 \infty$

(c) $-\infty < b_1 \le 16$ (d) none of these

Q.5. If the optimal solution to L.P.P.

Max $Z = 10x_1 + 3x_2 + 6x_3 + 5x_4$, subject to. $x_1 + 2x_2 + x_4 \le 6$, $3x_1 + 2x_3 \le 5$, $x_2 + 4x_3 + 5x_4 \le 3$ and $x_1, x_2, x_3, x_4 \ge 0$; be $x_1 = 5/3$, $x_2 = \frac{56}{27}$, $x_3 = 0$, $x_4 = 5/27$ then the limits for a_{23} so that new solution remains optimal feasible are (give that $a_{23} \notin B$, $\Delta_3 = -\frac{82}{27}$, $\beta_2 = \left[\frac{-5}{27}, \frac{1}{3}, \frac{1}{27}\right]$ and $c_{B_1} = 3$. $c_{B_2} = 10$, $c_{B_3} = 5$ in the last iteration)

(a) $\frac{39}{40} \le a_{23} < \infty$ (b) $-\frac{41}{10} \le a_{23} < \infty$

(c) $0 \le a_{23} \le \frac{81}{25}$ (d) none of these.

Q6. The advantages of dual simplex algorithm is that
(a) It starts with a basic feasible solution (b) Artificial variable involve in it
(c) No Artificial variable involves in it (d) None of these

Q7. If any variable of primal L.P.P is unrestricted in sign, the corresponding constraint in dual will be
(a) An equality (b) An inequality
(c) unrestricted in sign. (d) none of these

Q8. If the primal has an unbounded solution, the dual has either no solution or!
(a) an unbounded solution (b) bounded solution
(c) feasible solution (d) basic feasible solution

Q.9. If the standard primal problem is of minimization, all the constraints involve sign:
(a) $\geq$ (b) $\leq$ (c) $=$ (d) none of these

Q10. The relation between the objective function of primal and dual problem of L.P.P is
(a) $\text{Max } Z_p = -\text{Min } Z_D$ (b) $\text{Max } Z_p = \text{Min } Z_D$
(c) $\text{Min } Z_p = -\text{Max } Z_D$ (d) none of these

Q.11 An integer programming problem can be solved by!
(a) Gomory's cutting plane method (b) Hungarian method
(c) lowest cost entry method (d) none of these

Q.12. Branch and Bound method to solve I.P.P. was developed by!
(a) R.E. Gomory (b) Charnes and Cooper
(c) A.H. Land and A.G. Doig (d) none of these

Q.13. Gomory's cutting plane method may be used for solution of!
(a) all integer programming problem (b) mixed I.P.P.
(c) both (a) & (b) (d) none of (a) & (b)

Q.14. Branch and Bound technique may be used for solution of!
(a) all integer programming problem (b) mixed integer programming pro.
(c) both (a) & (b) (d) none of (a) & (b)

Q15. For the solution of I.P.P. by Gomory method. The Gomory constraint equation is!
(a) $\sum_{j \in R} f_{ij} x_j + x_{Gi} = -f_{Bi}$ (b) $-\sum_{j \in R} f_{ij} x_j + x_{Gi} = -f_{Bi}$
(c) $\sum_{j \in R} f_{ij} x_j + x_{Gi} = f'_{Bi}$ (d) none of these.