EXADEMY

ONLINE NATIONAL TEST

Course: LPP - Mathematics Optional

Time: 2 hours

Total Marks: 100

Candidates are required to answer all questions.

Q1. Solve by Simplex Method the following LPP: - max, L = $5x1 + x_2$ Subject to constraints

$3x_1 + 5x_2 \leq 15$,

$5x_1 + 2x_2 \leq 10$ and

x_1 , $x_2 \geq 0$.

[12 M]

Q2. For each hour that Ashok studies maths. It yields him 10 marks and for each hour that he studies physics, it yields him 5 marks. He can study at most 14 hours a day and he must get at least 40 marks in each. Determine graphically how many hours a day he should study maths and physics each in order to maximize his marks?

[12 M]

Q3. Prove that the set of all feasible solutions of a linear programming problem is convex set.

[10 M]

Q4. Consider the following LPP, Maximize $Z = 2x_1 + 4x_2 + 4x_3 - 3x_4$, Subject to constraints

$x_1 + x_2 + x_3 = 4$,

$x_1 + 4x_2 + x_4 = 8$ and

$x_1, x_2, x_3, x_4 \geq 0$.

Use the dual problem to verify that the basic solution (x_1, x_2) is not optimal.

[12 M]

Q5. Standard Form: Maximize $z = 5x_1 + 3x_2$,

$s.t \ \ 3x_1 + 5x_2 \leq 15$,

$5x_1 + 2x_2 \leq 10$,

$x_1, x_2 \geq 0$

[12 M]

Q6. Objective function: Maximize: 2x + y, Subject to constraint

$4x + 3y \leq 12$,

$4x + y \leq 8$,

$4x - y \leq 8$,

$x, y \geq 0$.

[12 M]

Q7. Find all optimal solutions using simplex method, Max $z = 30x_1 + 24x_2$ subject to,

$5x_1 + 4x_2 \leq 200$,

$x_1 \leq 32$,

$x_2 \leq 40$,

$x_1 , x_2 \geq 0$.

[15 M]

Q8. A manufacturer wants to maximize his daily output of bulbs which are made by two processes P1 and P2. If x_1 is the output by process P1 and x_2 is the output of process P2, then the total hours is given by $2x_1 + 3x_2$ and this can't exceed 130, the total machine time is given by $3x_1 + 8x_2$ which can't exceed 300 and total raw material is given by $4x_1 + 2x_2$ and this can't exceed 140, what should x_1 *and* x_2 be so that the total output $x_1 + x_2$ is maximum ? Solve by Simplex Method only.

[15 M]