OPERATIONS RESEARCH

PRE-TEST EXAM January 14, 2019

IMPORTANT: READ CAREFULLY

The score on the pre-test does not enter the final evaluation .

You answer by crossing the correct answer on the answer paper which is the only you give us back.

Minimum score 5 to be admitted to the written exam.

Given the problem (P)

$$\begin{aligned} \max \quad & f(x) = \frac{x_1 + 3x_2}{2x_1 + x_2} \\ & (x_1 + x_2)^2 \geq 1, \\ & 2x_1 + 3x_2 \leq 2, \\ & x_1 \geq 0 \\ & x_2 \geq 0 \end{aligned}$$

1. The problem (P) is a Linear Problem **True** **False**
2. The feasible region of problem (P) is a polyhedron **True** **False**
3. Candidates to be minimizers of problem (P) are those satisfying gradients of the Lagrangian $\nabla L = 0$ **True** **False**
4. The point $\widehat{x} = (1,\ 0)^T$ is feasible **True** **False**
5. In the point $\widehat{x} = (1,\ 0)^T$ we have two active constraints **True** **False**
6. The gradient $\nabla f(x)$ is a vector with two components **True** **False**

Given the problem (P_1)

$$\begin{aligned} \min \quad & x_1 - 2x_2 + 5x_3 \\ & 3x_1 + x_2 - 2x_3 = 1 \\ & 2x_1 - x_2 + x_3 = 2 \\ & x_i \geq 0, i = 1, 2, 3 \end{aligned}$$

7. The direction $d = (2,\ 0,\ -1)^T$ is a descent direction **True** **False**
8. The submatrix $\begin{pmatrix} 1 & -1 \\ -2 & 1 \end{pmatrix}$ is a basis for A **True** **False**
9. The dual problem has two variables **True** **False**
10. The problem (P_1) is linear **True** **False**