Department of Mathematical Sciences
Carnegie Mellon University

21-393 Operations Research II
Test 2

Name:_____

Problem	Points	Score
1	35	
2	35	
3	30	
Total	100	

Q1: (35pts)
Use the KKT conditions to solve

Minimise $(x_1 - 2)^2 + (x_2 - 2)^2$ subject to $x_1 + x_2 \leq 2, x_1 + 3x_2 \leq 5$.

Q2: (35pts)

Formulate the following as an integer program:

The Financial Aids office at Carnegie Mellon University is preparing its awards for the coming year. It has selected n students to receive awards, and wants to grant at least m_i dollars to Student i, $i = 1, 2, \ldots, n$. The office has s different scholarships available; Scholarship j confers the amount a_j on its recipient. The office may have to award several scholarships to an individual in order to provide the minimum it has decided that he/she will receive. The office cannot however reduce the amount of a scholarship award. If the office does not award a particular scholarship then it becomes available for next year. The office wishes to maximise the amount of money not spent in this way.

Q3: (30pts)
In an inventory system for a single product there is a fixed cost of A for making an order. No stockouts are allowed. The inventory cost per period is $Ih^{1/2}$ where h is the average amount of stock held. determine an optimal purchasing/stock strategy.