

Microeconomic Theory: Part II  
FDPE Spring 2010  
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**Problem Set 5**

Due on March 10, 2010.

1. A dormitory has  $n \geq 3$  student residents and one common room. The students have to decide whether to keep background music on in the common room. An individual student  $i$  experiences a gross benefit from the common room of  $v_i(k, \theta_i) = \theta_i k$ , where  $\theta_i \in \mathbb{R}$  is the type of student  $i$  (which is private information) and  $k \in \{0, 1\}$  is the off/on decision for the background music. Students have additively separable preferences over money.

a) Describe a social choice function that would maximize students' aggregate welfare. Can it be implemented—why or why not?

b) Design a truth-revealing mechanism that results in the efficient volume decision (in dominant strategies). Explain why it works.

c) Suppose now that  $n = 3$ , and that  $\theta_i$  is distributed independently and uniformly in  $[-1/2, 1/2]$  for all  $i$ . What is the expected transfer payment for student 1 as a function of  $\theta_1$  under the mechanism you designed in part b)?

2. Same as questions 1.a and 1.b, but assume now that  $v_i(k, \theta_i) = \alpha_i k - \frac{\beta_i}{2} k^2$ , where  $k \in \mathbb{R}_+$  is the volume level for the background music and  $\theta_i = \{\alpha_i, \beta_i\} \in \mathbb{R}_{++}^2$ .

3. Problem 23.B.2 in MWG.