Problem Set #3

Economics 661 Spring 2006

1. Consider a vertical relationship between a manufacturer and retailer where the retailer not only sets a retail price but also provides a level of service s at per unit cost of $\Phi(s)$. Retail demand is decreasing in price p and increasing in the level of service s. For the model, I showed in class that RPM was not sufficient to replicate the integrated outcome. However, show that a linear wholesale price in combination with "quantity forcing" (i.e., forcing the retailer to sell a particular quantity) is sufficient to yield the integrated level of profit.

2.

(a) Using the case of binary uncertainty presented in class, under what conditions will the regulator have the firm produce no output when high costs are realized. Describe the contract that the regulator offers in such a case.

(b) Also using the case of binary uncertainty show that the regulator can implement a policy as close as she pleases to the optimal policy when she has the opportunity to purchase a signal that is correlated with the firm's costs. **Hint:** Show that the regulator's optimal policy involves her never buying the signal when the low cost is announced and purchasing the signal with a probability arbitrarily close to zero when the firm announces a high cost.

3. Instead of cost uncertainty assume that the monopolist has private information about demand in the market. Suppose inverse demand is $(\theta - x)$ where θ is known to the monopolist and unknown to the regulator and x is output. The regulators beliefs about θ are described by the distribution function F with density f and support $[\underline{\theta}, \overline{\theta}]$. The monopolist's cost function is $c(x) = \frac{1}{2}x^2$. Find the optimal regulatory scheme where the monopolist is asked to announce θ and in response is allowed to sell quantity $x(\theta)$ at the market clearing price and must pay a tax of $T(\theta)$. In formulating the optimal regulatory scheme the regulator seeks to maximize a weighted average of consumer surplus plus the tax payment and the profits of the monopolist where the weight on the monopolist's profits are less than the weight on consumer surplus and the tax payment.