Wilfrid W. Csaplar Jr., Ph.D. Economics 477 Exam #1 of 1 2010/9/30

Write your name on the cover of the test booklet and nowhere else. Failure to follow these directions will cost you 1 point. The test has 150 points (to be scaled up to 200 points) and is scheduled to take 75 minutes. Therefore, expect to spend 1 minute for every 2 points. For example, a 12-point question should take 6 minutes. I will allow some extra time, but I will not allow much.

Show all work on all questions.

1) (8 points) Do EITHER Part A OR Part B.
A) When we do a Lagrangian for maximizing utility subject to a budget constraint, what is the economic interpretation of λ?
B) What is the economic reason why must utility functions have $U''_{XX} < 0$?

2) (12 points) Do EITHER Part A OR Part B.
A) Compare the final results of an industry which is Cournot vs. the same industry as a Von Stackelberg industry. In other words, what happens to the output of the two firms, output of the industry, price charged, and profits of the two firms? Briefly explain your logic.
B) Is the $U(X, Y) = 12X^{1/3}Y^{1/3}$ a legitimate utility function? Prove your answer is true using the formal proof.

3) (24 points) Find all Nash equilibria in the following matrix. Prove that you found all and prove they are Nash equilibria. Does either firm have a dominant strategy? Find the cooperative equilibrium. Explain how you found it. What are the two players' secure strategies? How did you find them?

Payoff Matrix		Patriots		
		High price	Medium Price	Low Price
Steelers	High Price	35 9	23 6	34 33
	Low Price	7 8	24 21	30 35

4) (32 points) Suppose your utility function is $U(W, C) = 4W^{1/4}C^{1/2}$. The price of wine is \$10/bottle and the price of caps is \$5/cap. Find the utility maximizing consumption of wine and caps if you're your income is \$300. Show all work. Do NOT worry about λ.

5) (36 points) Suppose that both firms are facing the following demand and total cost functions: $P = 60.25 - \frac{1}{4}(Q_1 + Q_2)$ and $TC_i = 6 + (Q_i)/4 + (Q_i^2)/8$. Use this to derive the best response function for Firm 1 and the equilibrium output for each firm, assuming that the firms are Cournot style firms. What are the outputs of the two firms and the market price? Show all work.

6) (42 points) Suppose that labor costs \$8/hour and capital costs \$27/unit and the firm's production function is given by $Q = 6K^{1/3}L^{1/3}$. Derive the total cost function which maximizes profits for a given output Q . What is the value of λ. What are the marginal cost and average total cost functions? Show all work.