Exam #2
14.03: Intermediate Applied Microeconomics
Spring 1998, Professor Robin Wells

There are three sections of this exam. Write Section I in one blue book, and clearly write your name and "Section I" on the Cover. Write Sections II and III in another blue book, and clearly write your name and "Sections II and III" on the cover.

Section I: Do any 2 of the 3 following questions. Each is worth 25 points:

Question 1: Suppose the demand for frisbees is given by

$$Q_d = 100 - 2P$$

and the supply by

$$Q_s = 20 + 6P.$$

a. What will be the equilibrium price and quantity for frisbees?

b. Suppose the government levies a tax of $4 per frisbee. Now what will be the equilibrium quantity, the price consumers will pay, and the price firms will receive?

c. What is the total tax collected? How is this tax burden shared between consumers and producers?

d. How would your answers to parts (a), (b) and (c) change if the supply curve were instead

$$Q_s = 70 + P?$$

What do you conclude by comparing these two cases?

Question 2: Suppose two individuals (Jerry and George) each have 10 hours of labor to devote to producing either good X or good Y. Jerry's utility function is given by
$$U_J = X^{0.5} Y^{0.5}$$
whereas George's utility function is given by
$$U_G = X^{0.3} Y^{0.7}.$$

The individuals do not care whether they produce X or Y, and the production function for each good is given by

$$X = 2L$$
$$Y = 3L,$$

where L is the total labor devoted to the production of each good. Using this information,

a. What is the Production Possibility Frontier? What is the Rate of Product Transformation? What must the price ratio, P_x/P_y, be?

b. We know that the demand functions for utility functions of the form $U = X^a Y^b$ are given by $X = aI/P_x$ and $Y = bI/P_y$. Use this and the price ratio found in (a) to calculate how much X and Y Jerry and George will demand. Assume that the wage rate for labor is equal to 1.

c. How should labor be allocated between X and Y to satisfy the demand calculated in part (b)?

Question 3: The people of New England can go shark fishing on the Charles and Mystic rivers. Each person can catch 1 shark, and sell it at a price of $5. The cost of fishing on the Charles is given by

$$2 + 0.001X_c$$

The cost of fishing on the Mystic is given by
$$3 + 0.001X_m$$
where X_c and X_m are the total number of people fishing in each river.
a. Find the equilibrium levels of X_c and X_m.
b. What are the efficient levels of X_c and X_m?
c. Suppose the government can levy a tax t_c for fishing in the Charles river, and a tax t_m for fishing in the Mystic river. What should these taxes be so that the efficient levels of X_c and X_m may be acheived in equilibrium?

Section II: Do any 3 of the 4 following questions. Each is worth 12 points:

Question 1: The demand elasticity for widgets is 3 percent. A new, superior technology is introduced that decreases the minimum average cost by 10 percent and increases the minimum efficient scale by 20 percent. What is the percentage increase (approximately) in the number of firms in the long run?

Question 2: Smith and Ricardo consume only two goods, X and Y, in a pure exchange economy. Smith's utility function is given by $U_s = 2X_s + 5Y_s$, and Ricardo's utility function is given by $U_r = 2(6X_r + 15Y_r)^{1/2}$. In the Edgeworth box constructed for Smith and Ricardo, what is the set of Pareto optimal allocations?

Question 3: *True or False*. Take a competitive pure exchange economy represented by an Edgeworth box with two consumers A and B, and two goods X and Y. Now suppose that the initial endowments of X and Y to A and B (represented by (X_A, Y_A) and (X_B, Y_B)) lie on the contract curve. Then, in equilibrium, no trade will take place between A and B. Explain your answer. Is this a refutation of the Coase Theorem?

Question 4: Suppose that when the country of Paradiso is completely closed to international trade that the price of chocolate is P_D, and that when Paradiso opens itself to trade that it can now purchase chocolate on the world market at a price $P_W < P_D$.
(i) Show graphically the gains and losses from international trade. Who, in particular, gains in Paradiso and who in Paradiso loses?
Now assume that due to political pressure that a specific tariff of amount t is placed on imports of chocolate, where $P_R = P_W + t < P_D$.
(ii) In a second graph, show graphically who gains and losses from this policy. Is the social welfare of Paradiso increased or decreased by the tariff?

Section III: Answer the following question clearly and concisely. The question is worth 14 points.

Rent control was instituted in several American cities post-World-War II in response to rapidly rising rents during the boom economy of the late 1940s.
(1) Show graphically the short-run and long-run effect of rent control on the equilibrium allocation of rental apartments. Show the distribution of winners and losers from this policy.
(2) What explains the persistence of rent-control in such places as New York City in economic terms?

(3) Devise an economically-superior scheme for solving the problem of social dislocation caused by rising rents. Make sure you specify exactly what makes your scheme superior to rent-control.