14.03 Final
Spring 1996

DO NOT OPEN THE EXAM UNTIL TIME IS ANNOUNCED!!!

Please box your answers when possible, so that they are easy to find.

You have three hours to complete this exam.

Points correspond approximately to minutes; there are 150 points on the exam, corresponding to 2 1/2 hours. This leaves you an extra 30 minutes to check your work, go back to difficult problems, etc.

Calculators are permitted.

Good luck!

Part I -- 36 pts.

True-False, and Why:

4 points each.

Instructions: YOU MUST defend your answer with one or two sentences and/or graphs. However, your answers should be CONCISE!

1. We observe a consumer making choices in two periods. In the first period, $P_x = 2$ and $P_y = 1$, and the consumer buys 3.5 units of X and 1.5 units of Y. In the second period, $P_x = 1$ and $P_y = 2$, and the consumer buys 2 units of X and 4 units of Y. This consumer's choices violate the weak axiom of revealed preference.
2. Economic theory predicts that a government-mandated increase in wages will always decrease employment relative to the case of no government intervention, although the magnitude of the change may depend on elasticities.
3. In the short run, free trade is always better for a country than imposing a tariff.
4. If we believe Fischel and Lazear's "crowding" theory of discrimination, instituting comparable worth in a "female" industry will hurt all women who work in that industry.
5. Consider an exchange economy with an initial endowment A. Let S_1 be the set of allocations which are Pareto superior to A. Let S_2 be the set of allocations which are competitive equilibria that can be reached by trading at competitive prices from A. Then, S_2 is a subset of S_1.
6. If a monopolist finds it profitable to implement a scheme for price discrimination (for example, any of the schemes we discussed in class), at least some consumers are always left worse off.
7. An economist is asked to judge if a given market is operating efficiently. The economist produces evidence that the firms in that market are earning zero economic profits. Thus, resources must be allocated efficiently.
8. In-kind transfers always provide strictly less utility for consumers than the cash equivalent.
9. In the RTE breakfast cereal market, the firms were accused of placing more brands on the market than a social planner would have chosen, thus creating an inefficiently large variety of cereals.

<u>Part II - 49 pts.</u>

<u>Short Answer</u>

Pts. given in brackets.

1. [10 pts.] Suppose that there are two goods in the economy, steak and chicken. A consumer has income \$1 in 1990. Prices change between 1990 and 1996. The government constructs a Paasche price index. Suppose that the consumer's income increases in proportion to the Paasche index, and denote the new income by X. Let Z be the amount that the consumer would need to be equally happy in 1996 as in 1990. Is X greater or less than Z? Prove your answer mathematically and with a diagram.

2. [12 pts.] Assume that we observe the choices of 1000 firms about organizational design decisions. In particular, we observe their choices about discretion afforded managers (d) and investments in computing equipment (c) for the managers which can be used to maintain a database. Firm i chooses c_i and d_i to maximize the following expression, taking P_{ci} and P_{di} as given: $g(c_i,d_i) - P_{ci}\, c_i - P_{di}\, d_i$.

   (a) Suppose that we cannot observe P_{ci} and P_{di} for each firm, but we have independent evidence which shows that P_{ci} is statistically indepedent of P_{di}. Yet, we find statistically significant evidence that c and d are positively correlated in the firms we observed. What, if anything, can we infer from this information about whether or not c and d are complementary?

   (b) How would your answer change if we knew that P_{ci} and P_{di} were positively correlated? negatively correlated?

3. [12 pts.]

   (a) Assume that all of the assumptions for perfectly competitive markets hold. Further, assume that a benevolent central planner can read minds, know production functions, and dictate actions of its citizens, and it can costlessly process any amount of information. In this case, can the centrally planned economy lead to a Pareto improvement over the decentralized free market?

   (b) Name two assumptions which can be relaxed which increase the desirability of free markets relative to central planning, and briefly explain why. [Note: In b and c, the criteria for desirability is Pareto efficiency.]

   (c) Repeat the exercise of (b) for two assumptions which increase the desirability of central planning relative to free markets.

4. [15 pts.] Krugman argued that competition between countries was different from competition between companies. For each of the following statements, support the statement with a graph and a brief argument, *where you use the tools of the course* to show explicitly that the statement is true in one of the models we analyzed. (For example, use things like production functions and indifference curves and diagrams of equilibrium determination). [Hint: once you have figured out which model matches the quote, your answers should be short and might be almost completely graphical.]

   (a) Countries cannot increase their market share in all industries at once.

   (b) Trade is not a zero-sum game.

   (c) Unlike price wars between firms (where firms undercut each others' prices to the benefit of consumers), trade wars between countries hurt consumers.

Part III -- 65 pts.

Problems

Pts. given in brackets.

1. [15 pts.] Consider a *small* country with identical consumers who have utility function $U(X,Y)$, and production possibilities frontier described by $g(X,Y) = z$. *For each of these parts, draw a graph and show or describe how each of your equations relates to the picture. For example, if an equation implies that a tangency condition will hold, indicate the relationship between the equation and the tangency in your picture.*

   (a) What are the conditions for a competitive equilibrium when there is no trade with the rest of the world?

   (b) Suppose that this country can with the rest of the world at a price ratio of R_{row}. What are the conditions for equilibrium?

   (c) Suppose that the country imposes an import tariff t. Now what are the conditions for equilibrium? Are consumers better or worse off?

2. [20 pts.] Suppose that the time it takes for a person to drive from Boston to Cape Cod on Hwy. 1 is given by $3 + .002\ X_1$, where X_1 is the total number of people on the highway. On Hwy. 2, the time is $4 + .001\ X_2$. There are 2000 people who want to go to the Cape for the weekend.

   (a) If a social planner wanted to minimize the total time spent getting all 2000 people to the beach, how many people would the social planner ask to drive on each highway?

   (b) If people decide to stay home if it will take more than 6 hours to get to the beach, but each individual makes his own personal decision taking as given the decisions of others, what is the equilibrium number of people who will take each road to the Cape?

   (c) Compare your answers to (a) and (b), and briefly comment on similarities and/or differences.

   (d) Suppose that the government could put in a toll on Hwy. 1. What amount of toll would induce the socially efficient number of people to take each highway, but still have all 2000 people make it to the Cape?

3. [30 pts.] Suppose that there are two types of T.V. watchers in the population, couch potatoes (CP's) and internet-surfers (IS's). CP's value for the q^{th} hour of premium channels is given by $8-.2q$, while IS's value for the q^{th} hour of premium channels is given by $5-.25q$. There are 1000 of each type in the MIT dorms. A cable company (which incurs zero marginal cost) annouces that it will provide cable access to the dorms, but the premium channels will be sold in bundles of time. Specifically, students can choose either the "Super" package, which gives Q^H hours of premium viewing at a price P^H, or they can choose the "Standard" package which gives Q^L hours of premium viewing at a price of P^L.

(a) If the cable company could identify customers, what would the profit-maximizing bundles (Q^H,P^H) and (Q^L,P^L) be? Does the monopolist provide more or less hours to each consumer than the (social) surplus-maximizing number of hours?

Now suppose that the company cannot distinguish between the consumers.

(b) Suppose that the cable company announces the following bundles: (35,$130) and (20,$50). What will revenue be?

(c) Suppose that the company instead offers (30,$70) and (20,$50). What will revenue be now? Will the company be better or worse off with (b) than (c)?

(d) Could the company increase revenue above what is earned in part (c) by offering the same quantities as in part (c), but by changing one of the prices? If so, which price, and by how much?

(e) If the company can choose to offer any two bundles it wants, will either or both of the two types of consumers end up consuming the (social) surplus-maximizing quantities? You don't need to derive these quantities, but give a short explanation.