GS/ECON 5010 Assignment 4 F2004

due : Wednesday November 24 before class

Do all 5 questions. Each counts 20%.

1. What does the contract curve look like for a 2–person, 2–good exchange economy, if each person has the same preferences, represented by the utility function

$$u(x_1^i, x_2^i) = \ln x_2^i - \frac{1}{x_1^i}$$

where x_j^i is person i's consumption of good j?

2. What would the contract curve be in a 2–person, 2–good exchange economy, in which person 1 actually cared about person 2's well–being? That is, person 1's utility depends on her own consumption, but also on the consumption of person 2. In particular, let person 1's preferences be represented by the utility function

$$u^1(\mathbf{x}) = 10x_1^1 + 2\sqrt{x_1^2 x_2^2}$$

and person 2's by the utility function

$$u^2(\mathbf{x}) = 2\sqrt{x_1^2 x_2^2}$$

where x_j^i is person i's consumption of good j. (So here person 1 does not care about her own consumption of good #2, and person 2 has "standard" preferences, not caring about person 1's consumption.) Let the total endowment $\bar{e}$ of each good be $e_1 = 5$ and $e_2 = 200$.

3. What allocations would be in the core of an exchange economy containing 2 million people, 1 million of whom liked only good 1, and 1 million of whom liked only good 2, if each person were endowed with 1 unit of each good? Explain briefly.

4. How would the equilibrium prices of the goods vary with the people's endowments in a 2–person, 2–good exchange economy, if person 1 had preferences represented by the utility function

$$u^1((\mathbf{x}^1) = x_1^1 + \ln x_2^1$$

and person 2 had preferences represented by the utility function

$$u^2(\mathbf{x}^2) = x_1^2 x_2^2$$

where x_j^i is person i's consumption of good j?

5. What are the Pareto efficient allocations, and the competitive equilibrium allocations, for the following economy with externalities (so that the two fundamental theorems of welfare economics do not apply)? The are two people, 2 consumption goods, and one input. Each consumption good can be produced using the input : 1 unit of the input can produce 1 unit of good 1, or 1unit of good 2. Person i is endowed with z^i units of the input, where $z^1 + z^2 = 36$. Good 1 is food, and good 2 is cigarettes. Person 2 is a smoker, and person 1 is a non–smoker who is harmed by second–hand smoke. Person 1's utility function can be written

$$u^1(\mathbf{x}) = x_1^1 - (x_2^2)^2$$

and person 2's utility function can be written

$$u^2(\mathbf{x}) = x_1^2 + 5x_2^2 - (x_2^2)^2$$