Econ 393
Quiz 6

Instructions: You need paper (lined if possible) and a pen or a pencil to write this quiz. You may answer the questions in any order you like. You should start each question on a new page. You must write your answers; typed answers will not be accepted. When you are finished answering the questions, please order the pages so your answer to question 1 are first, then your answer to question 2, and then your answer to question 3. Then, in a single email message, send an image of each page to me at jburbidge@uwaterloo.ca. Please put Econ 393, your name and your id number in the subject line of your email. The deadline for submitting your answers is 6:00 pm Tuesday June 30th, Toronto time. The marks allocated to each question are shown in brackets.

1. (i) (2 marks) What is Paul Samuelson’s definition of a pure public good? (ii) (3 marks) Derive the Samuelson condition for efficient provision of a pure public good. Assume one public good, one private good, and two people. Denote the total supply of the private good by $Y$ and the quantity supplied of the public good by $G$; let $F(G, Y) = 0$ characterize the efficient production technologies.

2. Ann and Bruce live together. Their utility functions are:

   $$u^A (m^A, t) = m^A - (t - 20)^2$$
   $$u^B (m^B, t) = m^B - (t - 24)^2,$$

where $m$ is dollars spent on private goods per day and $t$ is the temperature in the apartment in degrees Celsius. Assume Ann and Bruce each have 40 dollars to spend per day and the landlord pays any heating or cooling costs. As precisely as you can, describe the Pareto-efficient allocations in two settings: (i) (2 marks) Ann has the right to set temperature; (ii) (2 marks) Bruce has the right to set temperature.

3. Four identical people go out to a restaurant. Each has 72 dollars to spend on food and other goods and each has strictly convex preferences. The price of food is 12 per unit of food.

   (i) (2 marks) In scenario A each pays her own bill and each buys 2 units of food. In an Econ 290 type diagram draw this equilibrium with food on the horizontal axis and dollars spent on other goods on the vertical axis.
(ii) (2 marks) In scenario B, they split the total bill evenly between them. In the same diagram you drew for part (i), draw the equilibrium for scenario B as precisely as you can.