Stockholm University
Department of Economics
Course name: Microeconomics
Course code: EC7110
Examiner: Ann-Sofie Kolm
Number of credits: 7,5 credits
Date of exam: Thursday, October 29, 2015
Examination time: 3 hours

Write your identification number on each paper and cover sheet (the number stated in the upper right hand corner on your exam cover). Do not write answers to more than one question in the same cover sheet. Explain notations/concepts and symbols. Only legible exams will be marked. No aids are allowed.

The exam consists of 5 questions. One can get 100 points in total. For the grade E 40 points are required, for D 50 points, C 60 points, B 75 points and A 90 points.

Question 1 is a credit question. If you have received 12 credit points on your assignments, then you should not answer question 1. If you have received 8 credit points on your assignments, then you should answer question 1i but not question 1ii and 1iii. If you have received 4 credit points on your assignments, then you should answer question 1i and 1ii but not question 1iii. If you have received no credit points on your assinments, then you should answer all questions.

Credit	**Solve these questions**
0 points	1i, 1ii, 1iii
4 points	1i, 1ii
8 points	1i
12 points	- (don't solve question 1)

If you think that a question is vaguely formulated: specify the conditions used for solving it.

Results will be posted Thursday, November 19, at the latest

Good luck!

Problem 1 (credit question, see above) (12 points) Carefully define the following terms and show formally how they can be derived based on preferences captured by a strictly quasi-concave utility function.

i Marshallian demand function.

ii Hicksian demand function.

iii Indirect utility function.

Problem 2 Assume an individual with preferences given by the following utility function: $u(c,h) = \ln c - \frac{h^{1+\delta}}{1+\delta}$, where h is hours of work and δ is a positive parameter. Total time (t) is allocated between leisure (l) and market work (h) as $t = l + h$. Consumption (c) depends on taxes paid and is given by $c = wh - T(wh)$ where $T(wh)$ is a non-linear tax schedule and w denotes the hourly wage. There is no exogenous income and all functions are differentiable. Assume interior solutions and that the second order conditions hold.

i (6 points) Derive an expression for the slope of the indifference curve in consumption (c) and leisure (l) space. Also, show that the indifference curves are convex.

ii (6 points) Derive an expression for the slope of the budget line in consumption (c) and leisure (l) space. What requirement is needed for the tax schedule in order for the budget line to be negatively sloped?

iii (6 points) What requirement is needed for the tax schedule in order for the budget line to be concave in consumption (c) and leisure (l) space?

iv (6 points) Show that the first order condition(s) for a utility maximizing individual implies that we have a tangency point between the budget line and the indifference curve in consumption (c) and leisure (l) space.

v (7 points) Derive the labour supply and discuss how changes in the tax system are likely to affect the labour supply.

Problem 3 Assume a firm producing a good y with the use of two factors of production, z_1 and z_2. The production function $y = f(z_1, z_2)$ is twice differentiable and strictly concave, $f_i > 0, i = 1, 2$. Let P denote the product price, and p_i, $i = 1, 2$, the factor prices.

i (6 points) Differentiate through the production function and consider a proportional increase in the use of the two inputs. Then rewrite this expression to derive an expression for the elasticity of scale (E) that depends on the marginal and average costs facing a firm.

ii (6 points) Show how the elasticity of scale is related to the economies of scale. Motivate.

In the rest of the excercise consider the following CES production function: $y = B\left[\delta z_1^{-\alpha} + (1-\delta) z_2^{-\alpha}\right]^{-\frac{\theta}{\alpha}}$.

iii (6 points) Determine the Elasticity of Scale (E) for this firm.

iv (6 points) Define the concept of the expansion path (EP). Derive the EP for this firm.

Problem 4 Consider an economy with two goods and two agents. The two individuals' preferences are captured by $u^1(x_1^1, x_2^1)$ and $u^2(x_1^2, x_2^2)$. The utility functions are twice differentiable and strictly quasi-concave. The initial endowments are given by $\bar{x}_1^1 = \bar{x}_2^1 = \bar{x}_1^2 = \bar{x}_2^2 = \bar{x}$. The price on good 1 is denoted p_1 and the price on good 2 is denoted p_2.

i (7 points) Derive the Walrasian equilibrium price, p_2/p_1.

ii (7 points) Show that $p_1 z_1(p_1, p_2, \bar{x}) + p_2 z_2(p_1, p_2, \bar{x}) = 0$, where $z_i(p_1, p_2, \bar{x})$, $i = 1, 2$, is the excess demand. That is, show that Walras law holds.

iii (7 points) Show that market clearing in one market implies that also the other market clears.

Problem 5 Shortly explain the following terms:

i (3 points) Median voter theorem.

ii (3 points) Single peaked preferences.

iii (3 points) Unitary model.

iv (3 points) Rotten kid theorem.