Written Exam for the B.Sc. in Economics, Winter 2010/2011 RE

**Microeconomics B**

Final Exam

Date  21/2 2011

(3-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by "eksamen på dansk" in brackets, you must write your exam paper in Danish.

If you are in doubt about which title you registered for, please see the print of your exam registration from the students' self-service system.

# Question 1
Which of the following are true in a graph of isoquants (with capital on the vertical and labor on the horizontal) assuming a given wage and rental rate.
a. All long-run cost minimizing input bundles lie on a ray from the origin.
b. (a) is true only if the production technology is homothetic.
c. All short-run cost minimizing input bundles lie on a horizontal line.
d. (c) is true only if the production technology is homothetic.
e. (a) and (c) are true.
f. (b) and (c) are true.
g. (a) and (d) are true.
h. None of the above.

# Question 2
Consider an example of a *Principal-Agent* case, where the principal is looking for a way of making the agent behave in accordance with a given behavior. You may think of a situation where the Principal can offer a payment schedule to the agent.´

a) What type of conditions must the Principal consider?
b) A specific type of payment schedule is to use a kind of profit sharing to induce a specific behavior of the agent. Describe when this is a good idea and when it is perhaps not such a good idea after all.

# Question 3
a) Arrow proved a very powerful result that is often disregarded in practical policy formulations. Explain what his result was and why it is so important.
b) In modern democracies pair wise majority voting is the applied principle for making joint decisions. This violates one of Arrows basic conditions that must be satisfied by a social decision rule. Explain what this condition is and why this violates the condition, you may illustrate this by an example.
c) Another way of making decisions is ranking alternatives. However, this also violates one of the conditions. Which condition and why? Again you may illustrate using an example.

# Question 4
a) Consider a monopoly firm, which can exercise price discrimination. Is it possible that the profit maximising choice of this firm is also efficient?
b) If the firm is facing two types of customers – wealthy and poor – but cannot distinguish between them, how should the firm then behave if it can price discriminate? Is this behaviour also efficient?

# Question 5
Consider an economy with two consumers Arthur and Beatrice, and two commodities: a private consumer good and a public good. Arthur and Beatrice can consumer positive quantities of the two goods. Arthur's endowment is $\omega_A > 0$ of the private consumer good and Beatrice has´ $\omega_B > 0$. Arthur has preferences that can be represented by the utility function $u_A(x_A, G) = x_A^\alpha G^{1-\alpha}$, where $x_A$ is his consumption of the public good, $G$ is the quantity of the public good, and $0 < \alpha < \frac{1}{2}$. Beatrice correspondingly has $u_B(x_B, G) = x_B^\beta G^{1-\beta}$ where $0 < \beta < \frac{1}{2}$.

From the beginning we do not have any of the public good, but it can be produced by using $x$ units of the consumer good to give $x$ units of the public good, where $x \geq 0$.

a) Let each of the two consumers choose their own contribution $g_i \geq 0$ from their endowment $\omega_i$, as a donation to the production of the public good, where we now will consider the equilibrium (a Nash equilibrium). Is it possible that a free-rider case can arise? You should prove your case either by an example or a proof.

In the next questions we assume that both consumers have equal endowments of the private good (i.e. $\omega_A = \omega_B = \omega > 0$)

b) How much of the public good is produced in an equilibrium where the contributions from the two are voluntary?

c) Find the Pareto optimal quantity of the public good assuming that Arthur has to pay for the entire quantity. Do the same when it is Beatrice who must finance all of the public good. Compare the two results and comment.

d) In the special case where $\alpha=\beta$ the quantity of the public good is smaller than the Pareto optimal quantity if based on voluntary contributions. Show this.

e) How can a regulator ensure (that is what instruments are available to a regulator) that we get the Pareto optimal quantity of the public good?