Department of Economics

Course name:	**Intermediate Microeconomics**
Course code:	**EC2101**
Semester:	**Spring 2015**
Type of exam:	**RETAKE**
Examiner:	**Jonas Vlachos**
Number of credits:	**7,5 credits (hp)**
Date of exam:	**Sunday, May 3, 2015**
Examination time:	**5 hours (09:00-14:00)**

Write your identification number on each paper and cover sheet (the number stated in the upper right hand corner on your exam cover).

Use one cover sheet per question. Explain notions/concepts and symbols. If you think that a question is vaguely formulated, specify the conditions used for solving it. Only legible exams will be marked. **No aids are allowed.**

The exam consists of 4 questions, 100 points in total. For the grade E 45 points are required, for D 50 points, C 60 points, B 75 points and A 90 points.

Your results will be made available on your "My Studies" account (www.mitt.su.se) on the 25th of May at the latest.

Good luck!

1. Consumption (25). Please answer in English!

Adam can consume two goods, x_1 and x_2, that cost p_1 and p_2, respectively. Adam is a well-behaved person with well-behaved preferences. His utility function is given by $u(x_1, x_2) = x_1 x_2^3$. Adam's income is m.

a) Derive Adam's Marshallian demand functions (functions of prices and income) for the two goods by solving the utility maximization problem.

b) Calculate the price elasticity of good 2. (Hint: Use the demand function derived in a).)

c) Is good 1 an ordinary good? Ie, does demand increase when prices fall? (Hint: Explain by using the demand function derived in a).)

d) Now assume that the price of good 1 increases from p_1 to p'_1. The increase in price has two effects on demand for good 1. What are these two effects called? Provide a verbal explanation for these two effects.

e) Illustrate these two effects when p_1 increases to p'_1 in a graph, with the quantities of the goods on each axis.

f) Explain why not all goods have to be ordinary and the conditions under when it is more likely when they are not.

2. Imperfect competition (25). Please answer in English!
Consider a market with two firms, A and B. They provide an identical good to a market and they do not collaborate. Rather, they compete in Cournot fashion (quantity competition). The inverse demand for the good is $P = 100 - 2Q$, where P is price and Q is the total quantity ($q_A + q_B$). Firm A has a marginal cost of $12 and firm B of $20. There are no fixed costs. (You are allowed to round you answers if necessary.)

a) Determine each firm's reaction curve (also known as best response function) and illustrate them in a graph.

b) How many units will each firm produce in Cournot equilibrium?

c) What will the market price be?

d) How much profit will each firm earn?

e) How much would firm A be willing to pay for firm B assuming that it could then use its low cost production technology to serve the whole market? Would firm B accept this offer?

3. Asymmetric information (25). Please answer in English!

Suppose that there are two types of workers in the world: Ambitious types (A) and Lazy types (L). Under perfect information, the market would pay $70000 for type A workers and $20000 for type L workers. The problem is that the market does not know who is A and who is L. One way to separate the A.s and the L:s is to require workers to have a college degree. It is easy for A-types to get such a degree (it takes four years and the cost is $40000), but more difficult for L-types (it takes 6 years and costs $60000). Assume that a college degree has no effect on the productivity of workers. (All costs and wages are in present value terms.)

a) Suppose a company just offers everybody $45000, with no degree requirements, and no other attempts to screen the applicants (basically it is running a lottery among those who apply). Which types of workers would be most likely to apply for a position?

b) Suppose that the company announces that it will pay $70000 to those with a degree and $20000 to those without. What is the net benefit of a college education to A-types? To L-types? Does this hiring policy allow the firm to filter out L-types?

c) Now suppose that the government gives a subsidy that reduces the cost of a college degree for L-types to $46000. What is the net benefit to of a degree to A-types? To L-types? Under this subsidy, does the degree requirement allow the firm to filter out L-types?

d) In the light of your answers in b) and c), discuss the following statement: *To be effective, a signal must be costly, but it must be more costly for low-productivity types.*

e) Many schools and universities are accused of grade inflation. Some US colleges have even outlawed the grade F (fail). In the light of your answer in d), discuss the impact of this practice on the signaling value of a degree. Is this practice good for students? Does this depend on the type of the student?

4. Shorter questions (25). Please answer in English!

a) Anna's wealth consists of a bike that is worth 1000 SEK. She faces a probability $\pi = 0{,}2$ of her bike being stolen (in which case her wealth will be zero). Her utility function is given by $u(x) = x^2$, where x denotes her wealth. State Anna's expected utility function and calculate her expected utility (hint: $1000^2 = 1000000$.) . For an insurance that pays her K in case her bike is stolen, Anna has to pay an actuarily fair premium of $0{,}2K$. Explain in words (no calculations!) how much insurance Anna will buy.

b) Two persons both like fireworks, but to a different degree. Debbie has a marginal benefit MB_D=70-Q, where Q is the number of firecrackers. The marginal benefit to Clive is MB_C=40-2Q. Assume that the marginal cost of fireworks is equal to 80. What is the total marginal benefit of fireworks and what is the optimal amount of fireworks?

c) A firm has the production function $f(K, L) = K^2 L^{1/2}$, where K denotes capital and L denotes labor. Let r and w denote the prices of capital and labor, respectively. Let p denote the price of the good that is being produced. State the *long-run cost minimization problem*, set up the Lagrangian function and derive the first-order conditions (you do not have to do more than that!).

d) Consider a situation where firm A is a pharmaceutical company that has developed a new drug against obesity (kraftig övervikt). Firm B is specializing in copying drugs developed by other companies. If A releases the drug, B might attempt to copy it and sell it at a lower price than A (assume for the time being that there are no patent laws). If A does not release the drug, A earns 10 in profits and B earns 4. If A releases the drug and B does not copy it, A earns 100 and B earns 4. If A releases the drug and B does copy it, A earns -10 in profits (i.e., it makes a loss) and B earns 20.

    i)   Show the above situation in a game tree. Should A release the drug if its aim is to maximize profits?

    ii)   If B told A that it would not copy the drug, would this change your answer?

    iii)   Would your answer change if B signed a contract specifying that it would pay A 10 if it did copy the drug?

    iv)   Would your answer in i) change if there were patent laws protecting the drug developed by A, making it illegal to copy the drug.