Course name:	**Intermediate microeconomics**
Course code:	**EC2101**
Type of exam:	**Retake exam**
Examiner:	**Adam Jacobsson**
Number of credits:	**7,5 credits**
Date of exam:	**Saturday 28 April 2018**
Examination time:	**5 hours (09:00-14:00)**

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

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.**

Please answer in English.

The exam consists of 5 questions. Questions 1-3 are worth 25 points each, question 4 is worth 15 points and question 5 is worth 10 points. The maximum score on the exam is 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.
If you have the course credit you do not answer question 5.

Your results will be made available on your Ladok account **(**www.student.ladok.se) within 15 working days from the date of the examination.

Good luck!
…and may the force be with you!

Question 1

After having had his Death star blown up, Mr Vader wants to console himself by buying a used space ship. Just like all other buyers of used space ships on the perfectly competitive market he is willing to pay 30000 SEK for a lemon (a bad used space ship) and 60000 SEK for a plum (a nice used space ship). The sellers are prepared to sell lemons for a minimum of 30000 SEK and plums for 50000 SEK. The buyers cannot distinguish the lemons from the plums when purchasing a spaceship while the sellers know what they are selling. The buyers' and the sellers' valuations of the spaceships are common knowledge.

a) Assuming that the proportion of lemon space ships is 40% (the buyers know this), what would the market equilibrium price for a used spaceship be?   (8 points)

b) Is the market outcome efficient? Explain!   (4 points)

c) If the buyers actually could distinguish lemons from plums, what would the market price be for each type of spaceship? Would this be an efficient market outcome?
(4 points)

d) Assume, as under a) and b) that buyers cannot distinguish between lemons and plums and the proportion of lemons is still 40%. Assume further that there is a professional spaceship expert, "Jabba the honest", that offers to sell guarantees to plum owners stating that their space ship is, indeed, a plum and not a lemon. Let us also assume that Jabba knows whether a ship is a plum or not and that everybody believes in Jabba's guarantee. What is the maximum price that Jabba can charge for his guarantee?
(9 points)

Question 2

Recent galactic conflict has boosted demand for new spaceships. Consider the firm ACME which uses capital, K, and labour, L, to produce spaceships according to the following production function: $f(K, L) = K^{\frac{1}{3}}L^{\frac{1}{3}}$. Let r and w be the prices of capital and labour respectively. P is the price of new spaceships. The markets for new spaceships, capital and labour are all perfectly competitive.

a) Does the production function exhibit increasing-, decreasing- or constant returns to scale? Motivate your answer mathematically.   (5 points)

In the short run, the level of capital is fixed at $K = \bar{K}$.

b) Set up the short run profit maximization problem. Calculate the short run optimal level of labour.   (5 points)

In the long run, ACME can vary both K and L.

c) Set up ACME's long run cost minimization problem by using the Lagrange method. (Hint: fix output at the level $\bar{y}$.) What are the cost minimizing levels of K and L in the long run?   (10 points)

d) Derive ACME's long run cost function (hint: use your answer form c).
(5 points)

Question 3

Consider the market for the homogenous good "space dust" with the following inverse demand function: $p(y) = 12 - y$ where y is total sold quantity of the good on the market and $p(y)$ is the price for which it sells. Due to Imperial regulations and restrictions there are only two firms on this market, "Lando inc" and "Jabba enterprises", who both produce this homogenous good. Lando's cost function is $c_L(y_L) = 2y_L$ and Jabba's cost function is

$c_J(y_J) = 2y_J$. The two firms set their production quantities simultaneously without knowing the choice of their opponent, but both firms know the inverse demand function and each other's cost function.

    a) Derive both firms' best response functions and draw these in a diagram.   (10 points)

    b) What quantities will each firm produce in the equilibrium? Illustrate these quantities in the diagram from a). What is the total quantity produced and what is the equilibrium price?   (8 points)

The same two firms are also active in another market, the market for intergalactic "internet access" (this is also a completely homogenous good). This market is characterized by price competition, that is, either firm can supply the entire market demand if called upon to do so. The market demand function for internet access is $z(p) = 12 - p$ where z is total sold quantity of internet access and p is the market price of internet access. Customers will buy from the firm with the cheapest internet access. Should the firms offer the same price, they will then share the market equally. Lando's cost function is $c_L(z_L) = 2z_L$ and Jabba's cost function is $c_J(z_J) = 2z_J$.

    c) What quantities of internet access will the firms produce in equilibrium? What is total quantity sold and what is the equilibrium price? Explain any possible differences between the "space dust" and the "intergalactic internet access" markets.   (7 points)

Question 4

C-3PO, a rational but a quite worried and also risk averse droid, is considering investing in a few financial assets. There are two possible future states of the world, each equally likely: either the Empire wins or the Rebel alliance wins. The financial assets have the same purchase cost and have the following payoffs (costs have been deducted from the payoffs below) in either state of the world:

Asset (one share in firm)	Payoff Empire wins	Payoff Rebels win
White armour polish inc	10 SEK	2 SEK
Rebel music enterprises	2 SEK	10 SEK
Galactic tea company	4 SEK	4 SEK

    a) What is the expected monetary value and what is the variance of the payoffs of each asset?   (5 points)

    b) C-3PO can buy 4 assets in total. What will he buy? Explain!   (5 points)

    c) C-3PO is then reprogrammed so he becomes completely risk neutral. Will his choice of 4 assets change? Explain why/why not!   (5 points)

Question 5
If you have the course credit, do not answer this question.

    a) A market has the following demand function: $p(y) = 100 - 5y$ where y is total sold quantity of the good on the market and $p(y)$ is the price for which it sells for. What is the price elasticity of demand at y=10?   (4 points)

    b) True or false? A Nash equilibrium is always a subgame perfect Nash equilibrium. Explain!   (3 points)

    c) Explain what third-degree price discrimination is and under which circumstances it is likely that it can occur.   (3 points)