

Written Exam for the B.Sc. in Economics autumn 2012-2013

Microeconomics C

Final Exam

January 11

(2-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.

PLEASE ANSWER ALL QUESTIONS.
PLEASE EXPLAIN YOUR ANSWERS.

1. (a) Solve the normal-form game below by iterated elimination of strictly dominated strategies. Describe briefly each step.

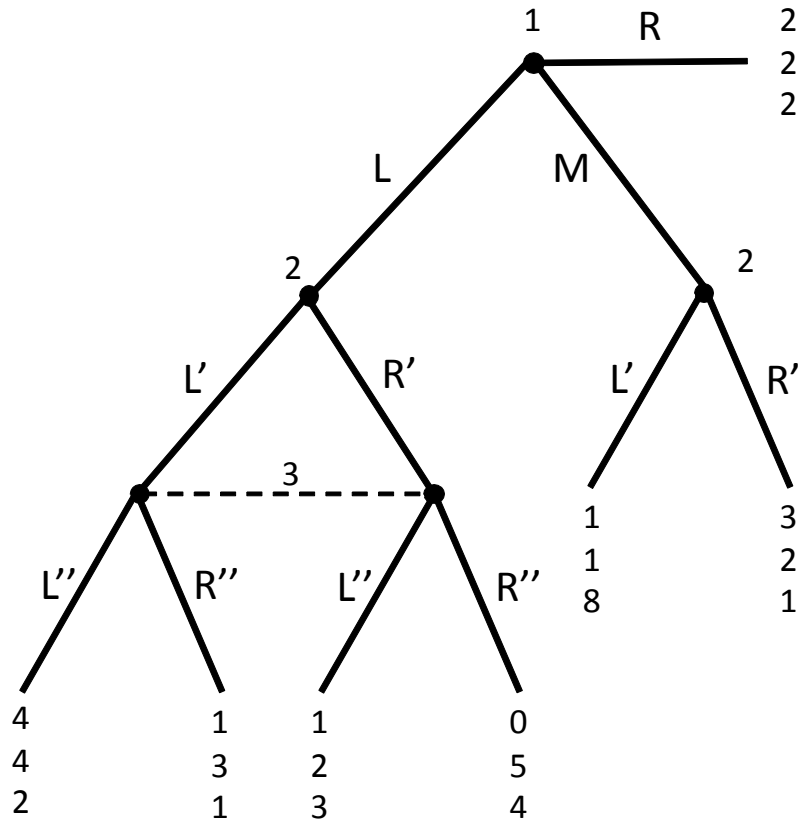
	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>
<i>A</i>	8, 5	1, 6	3, 6	5, 4	6, 7
<i>B</i>	7, 4	9, 2	2, 3	6, 3	4, 3
<i>C</i>	6, 8	2, 1	4, 3	6, 7	5, 4

- (b) Consider the following normal-form game:

	<i>L</i>	<i>R</i>
<i>U</i>	4, 2	2, 3
<i>D</i>	1, 4	3, 1

Find the mixed strategy Nash equilibrium. In this equilibrium, what is the probability that the outcome will be (U, R) ? Calculate the expected utility for player 1 in the equilibrium.

2. Consider the dynamic game given by the game tree below:



- Is it a game of perfect or imperfect information? How many subgames are there in the game (do not count the game itself as a subgame)? Write down the set of strategies for each player.
- Find all pure strategy subgame perfect Nash equilibria.
- Find a pure strategy Nash equilibrium that is not subgame perfect and in which player 1 plays L .

3. Two profit maximizing firms ($i = 1, 2$) produce a homogeneous product. The quantity produced by firm i is $q_i \geq 0$. The inverse demand function is

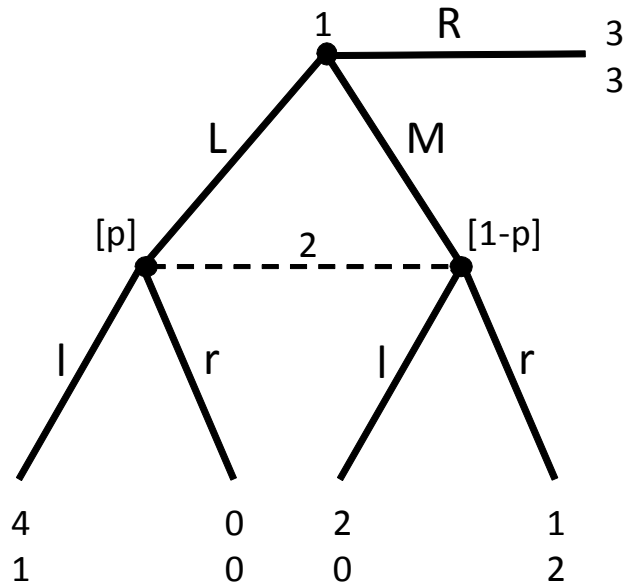
$$P(Q) = 12 - x \cdot Q,$$

where $Q = q_1 + q_2$ and $x > 0$ is a constant. The marginal cost of firm 1 is $c \in (0, 6)$. Firm 2's marginal cost is 1. There are no fixed costs.

- (a) Write down the profit functions and derive the best response functions for the two firms.
- (b) Let $x = 1$. Find the Nash equilibrium of the game where the firms choose their quantities simultaneously and independently. How do the equilibrium quantities of the two firms depend on c ? Give an intuitive explanation of your findings.
- (c) [*Note: This is the longest question of the exam. So you may want to do other questions first.*]

Let $x = 1$ and $c = 2$. Suppose the game between the two firms is repeated over an infinite time horizon $t = 1, 2, \dots, \infty$. The discount factor of each firm is $\delta \in (0, 1)$. In this infinitely repeated game, specify trigger strategies such that the outcome of each stage is $(q_1, q_2) = (2, 3)$. Find the inequalities that must be satisfied for the trigger strategies to constitute a subgame perfect Nash equilibrium. Find the lowest value of δ such that the inequalities are satisfied.

4. Consider the game given by the game tree below:



- Find all pure strategy Nash equilibria and perfect Bayesian equilibria.
- For each of the perfect Bayesian equilibria you found in question (a), determine whether it satisfies Requirement 5 from section 4.4 in Gibbons. Explain.