

YLEISEN TENTIN TENTTILOMAKE - GENERAL EXAM FORM

Opiskelija täyttää / Student fills in

Opiskelijan nimi / Student name: Click here to enter text.	Opiskelijanumero / Student number: Click here to enter text.
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Opettaja täyttää / Lecturer fills in

Opintojakson koodi / The code of the course: 721320S	
Opintojakson (tentin) nimi / The name of the course or exam: ECONOMIC THEORY I	
Opintopistemäärä / Credit units: 6	
Mikäli kyseessä on välikoe, opintopistemääräksi täytetään 0 op. 0 ECTS Credits is used for mid-term exams.	
Tiedekunta / Faculty: Oulu Business School	
Tentin pvm / Date of exam: 3.4.2019 (2nd exam)	Tentin kesto tunteina / Exam in hours: 3 h
Tentaattori(t) / Examiner(s): Professor (acting) Jaakko Simonen	Sisäinen postiosoite / Internal address: jaakko.simonen@oulu.fi
Tentissä sallitut apuvälineet / The devices allowed in the exam:	
<input checked="" type="checkbox"/> Funktiolaskin / Scientific calculator <input type="checkbox"/> Ohjelmoitava laskin / Programmable calculator <input type="checkbox"/> Muu tentissä sallittu materiaali tai apuvälineet. Tarkenna alla. / Other material or devices, allowed in the exam. Specify below. Click here to enter text. <input type="checkbox"/> Tentissä ei ole sallittua käyttää apuvälineitä / The devices are not allowed in the exam	
Muut tenttiä koskevat ohjeet opiskelijalle (esimerkiksi kuinka moneen kysymyksen opiskelijan tulee vastata) / Other instructions for students e.g. how many questions he/she should answer:	
Important ! <u>You can choose to answer question 1 or 2, not both!</u> Questions 3 - 5 are for everyone. In total you can answer to 4 questions. Please remember to explain shortly what you are calculating in different situations.	

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Tentin kysymykset / Exam questions:

1. a) Describe graphically consumer's utility optimisation problem in a general level in x, y -space. (You can assume the Cobb-Douglas utility function).

(2 points)

- b) Suppose that consumer has a utility function $u(x, y) = -1/x - 1/y$ where $x > 0, y > 0$.

Budget constraint is $m = p_x x + p_y y$. Use this information to calculate:

- Marshallian demand functions
- Indirect utility function

(4 points)

2. Explain shortly what following concepts mean (draw figures to clarify and enliven your answer).

a) Risk-averse

b) Constant relative risk aversion

c) Certainty equivalent

d) Risk premium

(6 points)

3. Consider a duopoly with identical firms. Cost function for firm f is $C^f(q^f) = C_0 + cq^f$, $f = 1, 2$. q^f is the output of firm f . Inverse demand function of the market is $p = \beta_0 - \beta q$. Total output of the market is given by $q = q^1 + q^2$. C_0, c, β_0 and β are all positive numbers.

a) Solve Cournot -Nash equilibrium, when firms make decisions over their output quantities simultaneously. What are the firms' outputs (q) and profits (π) in the equilibrium? Draw figure (in q^1, q^2 - and π^1, π^2 -spaces) to clarify and enliven your answer. Explain shortly its content.

b) Let's assume that firms form a cartel. How much each firm produces and what are their profits? Illustrate solution in the figure that you draw in point a.

c) Find so called Stackelberg solution. How much firms produce and what are their profits? Illustrate solution in the figure that you draw in point a. You can define that firm 1 is a leader and firm 2 is a follower. Compare the results that you got in points a - c.

(6 points)

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4. a) Use Edgeworth box to describe the competitive equilibrium of the exchange economy in a case of two individuals (who have convex preferences) and two commodities. Draw a figure and explain its content carefully. Define Walras's law, contract curve and core of economy.

(2 points)

- b) Consider an exchange economy that consists of two commodities (x and y) and two individuals (1 and 2). These individuals have their utility functions as follows

$$u^1(x_1, y_1) = a \ln(x_1) + (1-a) \ln(y_1)$$

$$u^2(x_2, y_2) = b \ln(x_2) + (1-b) \ln(y_2)$$

We assume that $0 < a < 1$, $0 < b < 1$ and $a + b > 1$.

The initial endowments ω of consumers are $(\bar{x}_1, \bar{y}_1) = (1, 0)$ for consumer 1 and $(\bar{x}_2, \bar{y}_2) = (0, 1)$ for consumer 2.

Find the equilibrium price ratio. What is the equilibrium allocation? What happens in the economy if $p_1/p_2 = 1$? In which direction has the price pressures for change and why?

(4 points)

5. A taxpayer has income y that should be reported in full to the tax authority. There is a (proportional) tax rate γ on income. The reporting technology means that taxpayer must report income in full or zero income. The tax authority can choose whether or not to audit the taxpayer. Each audit costs an amount ϕ and if the audit uncovers under-reporting then the taxpayer is required to pay the full amount of tax owed plus a fine F .

a) Set the problem out as a game in strategic form where each agent (taxpayer, tax-authority) has two pure strategies. Explain why there is no simultaneous-move equilibrium in pure strategies.

b) Find the mixed-strategy equilibrium. How will the equilibrium respond to changes in the parameters γ , ϕ and F ?

(6 points)

Opettajalle: Jos tenttikysymykset sisältävät matemaattisia kaavoja, kuvia tms. sisältöä, joka ei saa muuttua, toimita tämä tenttilomake docx-muodossa ja varsinaiset tenttikysymykset erillisenä liitteenä pdf-muodossa. Toimita tentin kysymykset sekä suomeksi että englanniksi, jos tentissä on kansainvälisiä opiskelijoita.

For teacher: If the exam questions have mathematical formulas, pictures or other content that should not change, please send two separate documents: this general exam form in docx-format and the actual exam questions in pdf-format. Submit the exam questions both in Finnish and in English if there are international students in the exam.

