KOULUTUSPALVELUT
1.8.2018

UNIVERSITY OF OULU

YLEISEN TENTIN TENTTILOMAKE - GENERAL EXAM FORM

Opiskelija täyttää / Student fills in

Opiskelijan nimi / Student name:	**Opiskelijanumero / Student number:**
Click here to enter text.	Click here to enter text.

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: 15.5.2019 (3rd 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: ☒ Funktiolaskin / Scientific calculator ☐ Ohjelmoitava laskin / Programmable calculator ☐ Muu tentissä sallittu materiaali tai apuvälineet. Tarkenna alla. / Other material or devices, allowed in the exam. Specify below. Click here to enter text. ☐ 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) Peter uses *m* euros per day for chocolate bars (x) and coffee (cups of coffee) (y). Suppose that his utility function is $u(x,y) = a\sqrt{x} + \sqrt{y}$, where a > 0. Price of the goods are p_x and p_y.

   Use this information to calculate:
   - Marshallian demand functions for both goods.
   - What share of the total expenditures per day Peter uses for coffee?
   - How many chocolate bars and coffee (cups of coffee) Peter uses, if a = 1/2, m = 9, $p_x = 2$ and $p_y = 1$?

   (4 points)

2. We can use compensating variation, equivalent variation and consumer surplus to measure how much consumer's welfare will change after the price of the good changes. Explain carefully what these concepts mean. Use figures to describe the difference of these concepts in a case of two normal goods. *You don't have to calculate anything!* (*6 points*)

3. a) Consider a duopoly with identical firms. Define (draw a figure and explain shortly) in a general level what is the Cournot-Nash equilibrium. Draw firms' iso-profit curves, reaction functions and Nash equilibrium to the figure. (*2 points*)

   b) Lets' continue with Duopoly case. The cost function of firm 1 is $C(y_1) = 30y_1$. The cost function of firm 2 is $C(y_2) = (y_2)^2$. y_1 and y_2 are outputs of firms 1 and 2. Inverse demand function of the market is on p = 120 – Q, where Q is total output. Solve Cournot –Nash equilibrium, when firms make decisions over their output quantities simultaneously. What are the firms' outputs and profits in a Nash equilibrium of Cournot's model? (*4 points*)

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) There are two commodities (x,y) and two individuals (1,2) in an exchange economy. These individuals have their utility functions as follows

   $u^1(x,y) = a \ln x + (1-a)\ln y, \quad 0 < a < 1$

   $u^2(x,y) = \frac{1}{2}\ln x + \frac{1}{2}\ln y$

   Consumers' initial endowments are $(\bar{x}_1, \bar{y}_1 = (1, 0.25)$ *ja* $(\bar{x}_2, \bar{y}_2) = (0.25, 1)$. Find the equilibrium price ratio. *(4 points)*

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5. Suppose that the players can choose the probability with which to play each of their pure strategies. Denote the probability that player A chooses *l* by x, so that she chooses *r* with probability (1 - x). Similarly, player B chooses *u* by y, so that she chooses *d* with probability (1- y). *(In brackets first number refers to player A's payoffs, and the second number to player B's payoffs.)*

		Player A: l	Player A: r
Player B	u	(5,10)	(10,2)
	d	(4,8)	(2,4)

a) Is there a Nash Equilibrium in pure strategies? Explain your answer shortly.

(*1 point*)

b) Find the mixed-strategy equilibrium, explain optimal strategies for both players, and draw a figure (in x, y plane) which shows reaction correspondence of both players and the equilibrium. (*5 points*)

(*totally 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.