YLIOPISTOTENTTILOMAKEPOHJA / UNIVERSITY EXAM TEMPLATE

Koskee tiedekuntia LuTK, OyKKK, KaTK, TTK, TST ja BMTK (Linnanmaan tentit) /
Concerns Faculties SCI, OBS, OMS, TECH, ITEE and BMM (Linnanmaa campus)

Tentin päivämäärä / Date of exam: 20.01.2016	**Tentin kesto tunteina / Exam in hours: 4h**

Tiedekunta / Faculty: Oulun yliopiston kauppakorkeakoulu / Oulu Business School

Opintojakson koodi, nimi ja tentin numero / The code and the name of the course and number of the exam: 721345S, Intermediate Microeconomics, 2nd Retake Exam

Tentaattori(t) / Examiner(s): Enni Ruokamo, Hannu Huuki	**Sisäinen postios. / Internal address** **60yKKK**

Sallitut apuvälineet / The devices allowed in the exam:

☒ Nelilaskin / Standard calculator   ☒ Funktiolaskin / Scientific calculator   ☐ Ohjelmoitava laskin / Programmable calculator

☐ Muu materiaali, tarkennettu alla / Other material, specified below:

Tenttiin vastaaminen / Please answer the questions:
☒ Suomeksi / in Finnish   ☒ Englanniksi / in English

Kysymyspaperi on palautettava / Paper with exam questions must be returned:
☒ Kyllä / Yes   ☐ Ei / No

Answer to all 5 questions.

1.

Consider the following statements if they are true or false. <u>Verify</u> your answers briefly. In order to get the credit from the correct answer the explanation is needed.

a) Indifference curves can never intersect with each other. 1p

b) For goods x_1 and x_2 the marginal rate of substitution describes the market price ratio p_1/p_2. 1p

c) A Giffen good is a good that decreases in demand as income decreases. 1p

d) A bond paying 1000€ each year forever with an annual discount rate of 6% has a present value of 6000€. 1p

e) If firm has a production function of the form $y = f(x_1, x_2) = x_1^{0.3} x_2^{0.7}$, where x_i is the amount of input i and y is the amount of output, it exhibits constant returns to scale. 1p

f) Adverse selection refers to situation where one side of the market can't observe the actions of the other side. 1p

2.

Intertemporal choice, two period model:

Consumer has preferences: $U(c_1, c_2) = c_1 c_2$,
where c_1 is consumption in period 1 and c_2 is consumption in period 2.
Let m_1 and m_2 be the incomes received in periods 1 and 2.
The interest rate is r.
Ignore the price effects by setting the prices in periods 1 and 2 to one: $p_1 = p_2 = 1$.

a) Write down the intertemporal budget constraint? 2p

b) Consumer maximizes intertemporal utility.
Solve the optimized consumption levels $c_1^*(m_1, m_2, r)$ and $c_2^*(m_1, m_2, r)$. 3p

c) Set $m_1 = 10, m_2 = 21$ and $r = 5\%$.
Is the consumer a saver or a borrower? 1p

3.

Danny has a utility function of the form $u(w) = \sqrt{w}$. He initially has wealth w of 4€. He has a lottery ticket that will be worth 12€ with probability $1/2$ and will be worth 0€ with probability $1/2$.

    a) What are Danny's preferences towards risk. Is he risk loving, risk averse or risk neutral? Explain your answer by studying the shape of the utility function analytically and/or graphically. 3p

    b) What is Danny's expected utility of participating into this lottery? 2p

    c) What is the lowest price p at which he would sell his lottery ticket? 1p

4.

    a) Explain the concept of (own) <u>price elasticity of demand</u>.
Calculate the elasticity of demand for a linear demand $D(p) = a - bp$,
where a and b are parameters, p is price and $D(p)$ is quantity demanded. 2p

    b) What <u>marginal product</u> measures? Calculate the marginal products of capital (K) and labor (L),
when the production function is $y = f(K, L) = \sqrt{K} + (1/3)L$.
Is the marginal product of capital MP_K diminishing, increasing or constant?
Is the marginal product of labor MP_L diminishing, increasing or constant? 2p

    c) What is meant by <u>technical rate of substitution</u> (TRS)?
Suppose the firm's production function is $y = f(K, L) = K^{1/3}L^{2/3}$.
Calculate the TRS at a point, where the firm employs 4 units of capital (K) and 8 units of labor (L). 2p

5.

In a small town there are two bakers, A and B, baking identical breads b_A and b_B.
The cost function for both bakers is $c(b) = 4b$.
The inverse market demand curve for bread is $p(b) = 100 - 2b$.

First, study the market with <u>Cournot duopoly model</u>, where each firm chooses its output to maximize its profits given the output that it expects the other firm to produce.

    a) Calculate the reaction functions $R_A(b_B)$ and $R_B(b_A)$. Draw a graph illustrating these functions, where output b_A is on the horizontal axis and output b_B is on the vertical axis.
Solve the Cournot-Nash equilibrium (b_A^*, b_B^*), and point it on your graph.
How much will baker A produce? How much will baker B produce?
What is baker A's profit? What is baker B's profit.
3p

Now, suppose the producers operate in a <u>Stackelberg-market model</u>. Baker A begins early, and acts as a Stackelber-leader. Baker B is a Stackelberg-follower.

    b) Write down baker A's profit maximization problem.
Solve leader's Stackelberg output b_A^S.
Solve follower's Stackelberg output b_B^S.
2p

Finally, suppose the producers operate in a <u>Bertrand-market model</u>. Both bakers set their prices simultaneously.

    c) What is the Nash equilibrium price p^* in this framework?
Explain the adjustment process of price setting.
1p